

# ETSI TS 102 598 V1.1.1 (2007-06)

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*Technical Specification*

## **Methods for Testing and Specification (MTS); Internet Protocol Testing (IPT): IPv6 Mobility; Interoperability Test Suite**

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Reference

DTS/MTS-IPT-017-IPV6-MOBITS

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Keywords

IP, IPv6, interoperability, mobility, testing

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## Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Methods for Testing and Specification (MTS).

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## Introduction

IPv6 is the next generation Internet. It gives vastly increased address space and true end-to-end communication. It has improved security and mobility features and allows "plug-and-play" connection to the network. The complexity of implementing IPv6 technology and the relative openness of IETF standards means that wide-ranging and effective testing of IPv6 products will be one of the key factors in ensuring the deployment, interoperability, security and reliability of the IPv6 infrastructure.

The present document specifies interoperability tests for IPv6 Mobility. The test suite results from an analysis of RFC 3775 and RFC 3776, the extraction of the requirements contained in these documents, and a selection of the requirements which could be tested by interoperability means.

The methodology and framework used to analyse the RFCs, to extract the requirements, write the Test Purposes, and the test descriptions is described in TS 102 351 [1]. The reader is strongly encouraged to read TS 102 351 [1] in order to make the best usage of the present document.

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## 1 Scope

The present document specifies the interoperability Test Descriptions (TDs) with integrated Test Purposes (TPs) for the IPv6 Mobility standards. The TDs are presented in the tabular form specified in TS 102 424 (see Bibliography) and the TPs are defined using the TPLan notation also described in ES 202 553 (see Bibliography).

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## 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

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- [1] ETSI TS 102 351: "Methods for Testing and Specification (MTS); Internet Protocol Testing (IPT)".
- [2] IETF RFC 3775: "Mobility Support in IPv6".
- [3] IETF RFC 3776: "Using IPsec to Protect Mobile IPv6 Signalling Between Mobile Nodes and Home Agents".
- [4] ETSI TS 102 559: "Methods for Testing and Specification (MTS); Internet Protocol Testing (IPT): IPv6 Mobility; Requirements Catalogue".

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## 3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

CoA	Care of address
CN	Correspondent Node
EUT	Equipment Under Test
HA	Home Agent
MN	Mobile Node
MTU	Maximum Transmission Unit
QE	Qualified Equipment
TD	Test Description
TP	Test Purpose
TPLan	Test Purpose Language
TSS	Test Suite Structure

## 4 IPv6 Mobility Interoperability Test Specification

### 4.1 Test Descriptions

Test Description presentation and concepts are explained in TS 102 351 [1].

Requirements referred to within the Test Description (example: RQ\_001\_1016) are all contained in TS 102 559 [4], the IPv6 Mobility "Requirements catalogue".

#### 4.1.1 Index of test grouping

In the present document, tests have been grouped according to the original RFC clause numbers from which they were extracted.

In the table below, each close number (example: "5.1") refers to the clause number of the RFC from which the requirements covered by the Tests Descriptions were extracted.

NOTE: Test Descriptions covering requirements coming from more than one clause are repeated in the relevant clause.

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## 4.1.2 TDs extracted from RFC 3775 "Mobility Support in IPv6"

## 5.1 Binding Updates to Home Agents

Test Description			
<b>Identifier:</b>	TD_MOB_1016_01	<b>Test Purpose:</b>	TP_MOB_1016_01
<b>Summary:</b>	'Home Agent supports transport_mode_ESP protection of Binding Update messages'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1016		
<pre> with {     QE1 disconnected     and QE1 configured to protect any Binding_Update packet         using transport_mode_ESP } ensure that {     when {         QE1 is connected to a foreign_network         and QE1 receives a packet from QE4             indicating that a response is required }     then { QE1 sends response directly to QE4 } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is disconnected QE1 is configured to protect Binding Update packets using transport mode ESP		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Connect QE1 to Foreign Network 1		
2	Wait a few seconds		
3	Cause QE4 to send an Echo Request to the Home Address of QE1		
4	Check: does QE4 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1017_01	<b>Test Purpose:</b>	TP_MOB_1017_01
<b>Summary:</b>	'Mobile Node uses transport_mode_ESP to protect Binding Update messages'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1017		
<pre> with {     QE1 configured to accept only a Binding_Update         secured using transport_mode_ESP } ensure that {     when {         EUT moves to a foreign_network         and QE4 is requested to send a packet to EUT             indicating that a response is required }     then { QE4 indicates receipt of the response } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT connected to Home Network 1 QE1 configured to serve as Home Agent for EUT		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Configure QE1 to accept only ESP protected binding update messages		
2	Move EUT to foreign network 1		
3	Wait a few seconds to allow EUT to attempt to register with QE1		
4	Cause QE4 to send an Echo Request to the Home Address of EUT		
5	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			



## 5.2.5 Return Routability Procedure

Test Description			
<b>Identifier:</b>	TD_MOB_1047_01	<b>Test Purpose:</b>	TP_MOB_1047_01
<b>Summary:</b>	'Correspondent Node completes Return Routability Procedure before accepting a Binding Update from a mobile node'		
<b>Roles:</b>	Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1047		
<pre> with {     QE4 away_from_home     and QE4 registered to QE1     and QE4 configured to perform route_optimization     and EUT configured to perform route_optimization     and QE1 unreachable from QE4 -- QE4 cannot complete RRP } ensure that {     when { QE4 is requested to send a packet to the EUT            indicating that a response is required }     then { EUT sends no response directly to QE4 } } </pre>			
<b>Pre-test conditions:</b>	Not testable by interoperability means Not possible for a QE to send a BU without completing the RRP !		
<b>Step</b>	<b>Test Sequence</b>		<b>Verdict</b>
			<b>Pass</b> <b>Fail</b>
<b>Observations:</b>			

## 5.2.6 Authorizing Binding Management Messages

Test Description			
<b>Identifier:</b>	TD_MOB_1068_01	<b>Test Purpose:</b>	TP_MOB_1068_01
<b>Summary:</b>	'Correspondent Node does not establish any binding with a lifetime greater than MAX_RR_BINDING_LIFETIME'		
<b>Roles:</b>	Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1068		
<pre> with {     EUT configured to perform route_optimization     and QE4 configured to perform route_optimization     and QE4 away_from_home     and QE4 registered to QE1 } ensure that {     when {         EUT establishes a binding to QE4     }     then {         EUT and QE4 are able to communicate directly             within the binding_lifetime         and EUT and QE4 are unable to communicate directly             after MAX_RR_BINDING_LIFETIME } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is configured to perform Route Optimization QE4 is configured to perform Route Optimization QE4 is connected to Foreign Network 1 and registered to its Home Agent QE1 QE3 is configured with the same (home) address as QE4 QE3 is disconnected from Home Network 1		

Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause EUT to send an Echo Request to the Home Address of QE4		
2	Check: does EUT receive an Echo Reply from QE4?	Yes	No
3	Wait a few seconds (to let QE4 and EUT perform the Return Routability Procedure and establish Bindings)		
4	Disconnect QE1 from Home Network 1		
5	Cause EUT to send an Echo Request to the home address of QE4		
6	Check: does EUT receive an Echo Reply from QE4? (this ensures that EUT and QE4 have established a Binding)	Yes	No
7	Connect QE3 to Home Network 1		
8	Disconnect QE4 from Foreign Network 1		
9	Cause EUT to send an Echo Request to the home address of QE4		
10	Check: does EUT receive an Echo Reply from QE4?	No	Yes
11	Wait 420 seconds==MAX_RR_BINDING_LIFETIME (Binding between EUT and QE4 Bindings has expired)		
12	Cause EUT to send an Echo Request to the Home Address of QE4		
13	Check: does EUT receive an Echo Reply from QE3 (which is a clone of QE4)?	Yes	No
<b>Observations:</b>	Once the Bindings have expired the Correspondent Node can no longer communicate directly with the Mobile Node and will send the Echo Request to the Home Address of the Mobile Node via the Home Agent. In our case, QE3 respond because it is configured with the same address as QE4.		

Test Description			
<b>Identifier:</b>	TD_MOB_1068_02	<b>Test Purpose:</b>	TP_MOB_1068_02
<b>Summary:</b>	'Mobile Node does not establish any binding with a lifetime greater than MAX_RR_BINDING_LIFETIME'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1068		
<pre>--NOT interop TESTABLE -- ==&gt; there is no Interoperability method to guarantee that a -- Mobile Node (on a foreign network) will use its Home Address -- to send a new packet (instead of using its Care-of-Address).  with {     EUT configured to perform route_optimization     and EUT away_from_home     and EUT registered to QE1     and QE4 configured to perform route_optimization } ensure that {     when {         EUT establishes a binding to QE4     }     then {         EUT and QE4 are able to communicate directly         within the binding_lifetime         and EUT and QE4 are unable to communicate directly         after MAX_RR_BINDING_LIFETIME     } } </pre>			
<b>Pre-test conditions:</b>	NOT TESTABLE BY INTEROPERABILITY MEANS There is no Interoperability method to guarantee that a Mobile Node (on a foreign network) will use its Home address to send a new packet (instead of using its Care-of-Address)		
Step	Test Sequence	Verdict	
		Pass	Fail
<b>Observations:</b>			

## 8.4

## IPv6 Home Agents

Test Description			
<b>Identifier:</b>	TD_MOB_1803_01	<b>Test Purpose:</b>	TP_MOB_1803_01
<b>Summary:</b>	'Home Agent discards packets received from a non registered mobile node'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_05
<b>References:</b>	RQ_001_1803		
<pre> with {     EUT disconnected from home_network 1     and QE2 configured to use the same IP_address as EUT     and QE1 away_from_home     and QE1 registered to QE2     and QE1 configured to perform route_optimization     and QE4 configured to perform route_optimization } ensure that { when {     QE2 is disconnected from home_network     and EUT is connected to home_network     and QE1 is requested to send a packet to QE4         indicating that a response is required }     then {     QE3 indicates no receipt of the response } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is disconnected QE2 serves as Home Agent on Home Network 1 with the same address as EUT QE1 is connected to Foreign Network 1 and registered to its Home Agent QE2 QE1 is configured to perform Route Optimization QE4 is configured to perform Route Optimization		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Disconnect QE2		
2	Connect EUT to Home Network 1		
3	Cause QE1 to send an Echo Request to QE4		
4	Check: does QE1 receive an Echo Reply?	No	Yes
<b>Observations:</b>	Ensure that QE1 use its Home Address when pinging QE4 (Home Address Option present in IPv6 packet).		

## 8.5

## IPv6 Mobile Nodes

Test Description			
<b>Identifier:</b>	TD_MOB_1810_01	<b>Test Purpose:</b>	TP_MOB_1810_01
<b>Summary:</b>	'MN is able to receive tunnelled multicast packets from HA'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1810		
<pre> with {     EUT subscribed to a global_multicast_group     and EUT away_from_home     and EUT registered to QE1 } ensure that { when { QE3 is requested to send a packet         to the global_multicast_group }     then { QE3 indicates no receipt of the response } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Home Network 1 EUT has registered to multicast group FF1E:1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move EUT to Foreign Network 1		
2	Cause QE3 to send an Echo Reply to multicast address FF1E::1		
3	Check: does QE3 receive an Echo Reply?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1013_01	<b>Test Purpose:</b>	TP_MOB_1013_01
<b>Summary:</b>	'Home Agent supports the protection of Binding Update message'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1013		
<pre> with   {     QE1 at_home     and QE1 configured to protect any Binding_Update   } ensure that   { when {     QE1 moves to a foreign_network     and QE4 is requested to send a packet to QE1     indicating that a response is required }     then { QE4 indicates receipt of the response }   } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Home Network 1 QE1 is configured to protect Binding Update messages		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move QE1 to Foreign Network 1		
2	Wait a few seconds (for QE1 to establish a binding with EUT)		
3	Cause QE4 to send an Echo Request to the home address of QE1		
4	Check: does QE4 receive an Echo Reply?	Yes	No
<b>Observations:</b>	If EUT does not support protection of Binding Update, then it is unable to accept the binding.		

Test Description			
<b>Identifier:</b>	TD_MOB_1013_02	<b>Test Purpose:</b>	TP_MOB_1013_02
<b>Summary:</b>	'Mobile Node supports the protection of Binding Update message'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1013		
<pre> with {   EUT at_home   and QE1 configured to accept only a secured Binding_Update } ensure that   { when {     EUT moves to a foreign_network     and QE4 is requested to send a packet to EUT     indicating that a response is required }     then { QE4 indicates receipt of the response }   } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to home network 1 QE1 is configured to accept only protected Binding Update messages		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move EUT to Foreign Network 1		
2	Wait a few seconds (for EUT to establish a binding with QE1)		
3	Cause QE4 to send an Echo Request to the home address of EUT		
4	Check: does QE4 receive an Echo Reply?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1082_01	<b>Test Purpose:</b>	TP_MOB_1082_01
<b>Summary:</b>	'Home Agent uses a Security Association to protect integrity and authenticity of Mobile_Prefix_Solicitations and Advertisements'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1014, RQ_001_1082, RQ_001_1607		
<pre> with {     QE1 at_home     and QE1 configured to protect         Mobile_Prefix_Solicitations     and QE1 configured to accept only secured         Mobile_Prefix_Advertisements     and QE1 configured to have a short prefix_lifetime --(suggest 30s) } ensure that { when {     QE1 moves to a foreign_network     before its prefix_lifetime expires     before QE4 sends a packet to QE1         indicating that a response is required }     then {     QE4 indicates receipt of the response from QE1 } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Foreign Network 1 and registered to its Home Agent EUT QE1 is configured to protect Mobile Prefix Solicitation messages QE1 is configured to only accept protected Mobile Prefix Advertisement messages EUT is configured to advertise a preferred prefix lifetime of 20 sec EUT is configured to advertise a valid prefix lifetime of 30 sec		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Wait 30 sec so that initial lifetime of the home address of QE1 has expired		
2	Cause QE4 to send an Echo Request to the Home Address of QE1		
3	Check: does QE4 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1082_02	<b>Test Purpose:</b>	TP_MOB_1082_02
<b>Summary:</b>	'Mobile Node uses a Security Association to protect integrity and authenticity of Mobile Prefix Solicitations and Advertisements'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1014, RQ_001_1082, RQ_001_1663, RQ_001_1664		
<pre> with {     EUT at_home     and QE1 configured to accept only secured         Mobile_Prefix_Solicitations     and QE1 configured to protect Mobile_Prefix_Advertisements     and EUT configured to have a short prefix_lifetime (--suggest 30s)' } ensure that { when {     EUT moves to a foreign_network     before its prefix_lifetime expires     before QE4 sends a packet to the EUT         indicating that response is required }     then {     QE4 indicates receipt of the response from the EUT } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and is registered to its Home Agent QE1 QE1 is configured to only accept protected Mobile Prefix Solicitation messages QE1 is configured to protect Mobile Prefix Advertisement messages QE1 is configured to advertise a preferred prefix lifetime of 20 sec QE1 is configured to advertise a valid prefix lifetime of 30 sec		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Wait 30 sec so that EUT has send a Mobile Prefix Solicitation message and received a Mobile Prefix Advertisement message		
2	Cause QE4 to send an Echo Request to the Home Address of EUT		
3	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

## 9.3.1

## Receiving Packets with Home Address Option

Test Description			
<b>Identifier:</b>	TD_MOB_1412_01	<b>Test Purpose:</b>	TP_MOB_1412_01
<b>Summary:</b>	'Correspondent Node receives packets directly from the Mobile Node when a binding exists or Mobile Node believes in its existence'		
<b>Roles:</b>	Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1412		
<pre> with {     QE4 away_from_home     and QE4 registered to QE1     and EUT configured to perform route_optimization     and QE4 configured to perform route_optimization     and QE4 having established a binding with EUT } ensure that {     when { EUT is requested to send a packet to QE4            indicating that a response is required }     then { EUT indicates receipt of the response directly from QE4 } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE4 is connected to Foreign Network 1 and is registered to its Home Agent QE1 EUT is configured to support route optimization QE4 is configured to support route optimization QE4 has established a binding with EUT		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Disconnect QE1 from Home Network 1		
2	Cause QE4 to send an Echo Request to EUT		
3	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>	Actually it would be sufficient to check whether EUT actually receives the ECHO request from QE4. However I don't know yet how we should test that.		

Test Description			
<b>Identifier:</b>	TD_MOB_1413_01	<b>Test Purpose:</b>	TP_MOB_1413_01
<b>Summary:</b>	'Correspondent Node drops packets containing Home Address option (but no Binding Update) when there is no corresponding Binding Cache entry'		
<b>Roles:</b>	Correspondent_Node, Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1413, RQ_001_1413, RQ_001_1427		
<pre> with {     EUT configured to perform route_optimization     and QE4 configured to perform route_optimization     and QE4 away_from_home     and QE4 registered to QE1     and EUT having no Binding_Cache_entry for QE4     and QE4 having a Binding_Cache_entry for EUT } ensure that {     when { EUT receives a packet directly from QE4            indicating that a response is required }     then { EUT sends no response to QE4 } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT configured to perform route optimization QE3 configured to perform route optimization QE4 configured to perform route optimization EUT disconnected QE3 is connected to Home Network 2 QE3 is configured to have the same address as EUT QE4 connected to Foreign Network 1 and registered to its Home Agent QE1 QE4 has established a binding with QE3		

Step	Test Sequence	Verdict	
		Pass	Fail
1	Disconnect QE3 from Home Network 2		
2	Connect EUT to Home Network 2		
3	Cause QE4 to send an Echo Request to EUT		
4	Check: does QE4 receive an Echo Reply from EUT	No	Yes
<b>Observations:</b>	Step 3 : QE4 MUST use its Home Address when pinging EUT (Home Address Option present in IPv6 packet).		

Test Description			
<b>Identifier:</b>	TD_MOB_1413_02	<b>Test Purpose:</b>	TP_MOB_1413_02
<b>Summary:</b>	'Correspondent Node drops packets containing Home Address option (but no Binding Update) and send a Binding Error message to the Mobile Node, when there is no corresponding Binding Cache entry'		
<b>Roles:</b>	Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1413		
<pre> with {     EUT configured to perform route_optimization     and QE4 configured to perform route_optimization     and QE4 away_from_home     and QE4 registered to QE1     and EUT having no Binding_Cache_entry for QE4     and QE4 having a Binding_Cache_entry for EUT } ensure that { when { EUT receives a packet directly from QE4         indicating that a response is required }   then {     EUT sends no response to QE4     before EUT and QE4 are able to communicate } } </pre>			
<b>Pre-test conditions:</b>	NOT TESTABLE BY INTEROPERABILITY MEAN Mobile Node may ignore the Binding Error from Correspondent Node		
Step	Test Sequence	Verdict	
		Pass	Fail
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1414_01	<b>Test Purpose:</b>	TP_MOB_1414_01
<b>Summary:</b>	'When using Route Optimization, a Correspondent Node drops any packet in which the Home Address option (but not Binding Update) does not match the Home Address recorded in its Binding Cache'		
<b>Roles:</b>	Correspondent_Node, Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1414, RQ_001_1414, RQ_001_1427		
<pre> with {     EUT configured to perform route_optimization     and QE4 configured to perform route_optimization     and QE4 away_from_home     and QE4 registered to QE1     and QE4 having established a binding with EUT } ensure that { when { EUT receives a packet from QE4         containing a Home_Address_Option         not set to the Home_Address of QE4 }   then { EUT discards the packet } } </pre>			

<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is configured to perform route optimization QE4 is configured to perform route optimization QE3 is configured to perform route optimization QE5 is configured to perform route optimization QE4 is connected to Foreign Network 1 and registered with QE1 QE4 has established a binding with EUT QE5 is disconnected QE5 is configured with the same link-layer Address as QE4 QE5 is configured with a Home Address which is not the same as QE4 QE5 is configured to be a Mobile Node to Home Network 1 QE5 is configured to register with its Home Agent QE1 QE3 is disconnected QE3 is configured with the same addresses as EUT		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Disconnect EUT		
2	Disconnect QE4		
3	Reboot QE1 (mobility support only)		
4	Connect QE3 on Home Network 2		
5	Connect QE5 on Foreign Network 1		
6	Wait a few seconds (for QE5 to register with its Home Agent QE1)		
7	Cause QE3 to send an Echo Request to the Home Address of QE5		
8	Check: does QE3 receive an Echo Reply from QE5	Yes	No
9	Disconnect QE3 from Home Network 2		
10	Reconnect EUT to Home Network 2		
11	Cause QE5 to send an Echo Request to EUT		
12	Check: does QE5 receive an Echo Reply from EUT?	No	Yes
<b>Observations:</b>	Step 7 causes QE5 to establish a binding with QE3. QE3 and QE5 share the same Care-Of Address, but do not have the same Home Address.		

Test Description			
<b>Identifier:</b>	TD_MOB_1414_02	<b>Test Purpose:</b>	TP_MOB_1414_02
<b>Summary:</b>	'When using Route Optimization, a Correspondent Node drops any packet in which the Home Address option (but not Binding Update) does not match the Home Address recorded in its Binding Cache and send a Binding Error mess		
<b>Roles:</b>	Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1414		
	<pre> with {     EUT configured to perform route_optimization     and QE4 configured to perform route_optimization     and QE4 away_from_home     and QE4 registered to QE1     and QE4 having established a binding with EUT } ensure that {   when {     EUT receives a packet from QE4     containing a Home_Address_Option     not set to the Home_Address of QE4 }   then {     EUT discards the packet     before EUT and QE4 are able to communicate } } </pre>		
<b>Pre-test conditions:</b>	NOT TESTABLE BY INTEROPERABILITY MEAN Mobile Node may ignore the Binding Error from Correspondent Node		
Step	Test Sequence	Verdict	
		Pass	Fail
<b>Observations:</b>			



Test Description			
<b>Identifier:</b>	TD_MOB_1415_01	<b>Test Purpose:</b>	TP_MOB_1415_01
<b>Summary:</b>	'A Correspondent Node drops packets in which the Source Address does not match the care-of address recorded in the corresponding Binding Cache Entry'		
<b>Roles:</b>	Correspondent_Node, Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1415, RQ_001_1415, RQ_001_1427		
<pre> with {     EUT configured to perform route_optimization     and QE4 configured to perform route_optimization     and QE4 away_from_home     and QE4 registered to QE1     and QE4 having established a binding with EUT } ensure that {     when {         EUT receives a packet from QE4         containing a Home_Address_Option         set to the Home_Address of QE4         and containing a Source_Address         not set to the Care_Of_Address of QE4     }     then {         EUT discards the packet     } } </pre>			
<b>Pre-test conditions:</b>	<p>The cleaning procedure has been run (see configuration comments)</p> <p>EUT is configured to perform route optimization</p> <p>QE3 is configured to perform route optimization</p> <p>QE4 is configured to perform route optimization</p> <p>QE5 is configured to perform route optimization</p> <p>QE4 is connected to Foreign Network 1 and registered with QE1</p> <p>QE4 has established a binding with EUT</p> <p>QE5 is disconnected</p> <p>QE5 is configured to be a Mobile Node to Home Network 1</p> <p>QE5 is configured to use QE1 as Home Agent</p> <p>QE5 is configured with the same Home Address address as QE4</p> <p>QE5 is configured with a Link-Layer address which is not the same as QE4</p> <p>QE3 is disconnected</p> <p>QE3 is configured with the same addresses as EUT</p>		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Disconnect EUT		
2	Disconnect QE4		
3	Reboot QE1 (restart mobility support)		
4	Connect QE3 on Home Network 2		
5	Connect QE5 on Foreign Network 1		
6	Wait a few seconds (for QE5 to register with its Home Agent QE1)		
7	Cause QE3 to send an Echo Request to the Home Address of QE5		
8	Check: does QE3 receive an Echo Reply from QE5?	Yes	No
9	Disconnect QE3 from Home Network 2		
10	Connect EUT to Home Network 2		
11	Cause QE5 to send an Echo Request to EUT		
12	Check: does QE5 receive an Echo Reply from EUT?	No	Yes
<b>Observations:</b>	<p>Step 7 causes QE5 to establish a binding with QE3.</p> <p>QE3 and QE5 share the Home Care-Of Address, but have different Care-Of addresses.</p>		

Test Description			
<b>Identifier:</b>	TD_MOB_1415_02	<b>Test Purpose:</b>	TP_MOB_1415_02
<b>Summary:</b>	'A Correspondent Node drops packets in which the Source Address does not match the care-of address recorded in the corresponding Binding Cache Entry and sends a Binding Error message to the Mobile Node'		
<b>Roles:</b>	Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1415		
<pre> with {     EUT configured to perform route_optimization     and QE4 configured to perform route_optimization     and QE4 away_from_home     and QE4 registered to QE1     and QE4 having established a binding with EUT } ensure that { when {     EUT receives a packet from QE4     containing a Home_Address_Option     set to the Home_Address of QE4     and containing a Source_Address     not set to the Care_Of_Address of QE4 }     then {     EUT discards the packet     before QE4 and the EUT are able communicate } } ----- --* This TP is phrased as a conformance test *-- ----- --TP id : TP_MOB_1661_01 --summary : 'MN sends Mobil Prefix Solicitation to HA when its home address -- becomes invalid' --RQ ref : RQ_001_1661 --Role : Mobile_Node --config : CF_MOB_03 --TD ref : TD_MOB_1661_01  -- with { --     EUT away_from_home --     and EUT registered to QE1 -- } -- ensure that -- { when { EUT 'has its home address which becomes invalid' } --     then { EUT 'update the prefix lifetime information for its home address' } -- } </pre>			
<b>Pre-test conditions:</b>	NOT TESTABLE BY INTEROPERABILITY MEAN Mobile Node may ignore the Binding Error from Correspondent Node		
<b>Step</b>	<b>Test Sequence</b>	<b>Verdict</b>	
		<b>Pass</b>	<b>Fail</b>
<b>Observations:</b>			

### 9.3.2 Sending Packets to a Mobile Node

Test Description			
<b>Identifier:</b>	TD_MOB_1423_01	<b>Test Purpose:</b>	TP_MOB_1423_01
<b>Summary:</b>	'Correspondent Node sends packets directly to Mobile Node when a binding already exists'		
<b>Roles:</b>	Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1423		
<pre> with {     QE4 away_from_home     and QE4 registered to QE1     and EUT configured to perform route_optimization     and QE4 configured to perform route_optimization     and QE4 having established a binding with EUT     and EUT having established a binding with QE4 } ensure that { when { QE4 sends a packet to the EUT     indicating that a response is required }     then { QE4 indicates receipt of the response directly from EUT } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE4 is connected to Foreign Network 1 and is registered to its Home Agent QE1 EUT is configured to support route optimization QE4 is configured to support route optimization QE4 has established a binding with EUT		

Step	Test Sequence	Verdict	
		Pass	Fail
1	Disconnect QE1 from Home Network 1		
2	Cause QE4 to send an Echo Request to EUT		
3	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

### 9.3.4 Receiving ICMP Error Messages

Test Description			
<b>Identifier:</b>	TD_MOB_1429_01	<b>Test Purpose:</b>	TP_MOB_1429_01
<b>Summary:</b>	'Correspondent Node deletes a binding cache entry if it receives persistent ICMP Destination Unreachable messages'		
<b>Roles:</b>	Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1429		
<pre>-- EUT=CN2 -- QE1=HA1 -- QE4=MN1  with {   QE4 'away from home and registered to QE1'   and EUT 'having established a binding with QE4' } ensure that {   when {     QE4 'returns home'     and QE4 'is unable to update its binding with EUT'     and EUT is requested to 'send packets to QE4' }   then {     EUT 'is temporarily unable to communicate with QE4'     and EUT 'is able to communicate again with QE4 before the end of the binding lifetime' } }</pre>			
<b>Pre-test conditions:</b>	<p>QE4 is connected to Foreign Network 1 and is registered to its Home Agent QE1  EUT and QE4 have established binding  QE4 is configured not to ask Binding Acknowledgements  The tester is aware of the lifetime of these bindings and of the remaining binding lifetime when he starts this test</p>		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Disconnect QE4 from Foreign Network 1		
2	Cause router R1 to disable its interface connected to Foreign Network 1		
3	Connect QE4 to Home Network 1		
4	Wait a few seconds to let QE4 perform the "return home" procedure. (a protocol analyzer can be used to ensure that the "return home" procedure is finished) Note that EUT will not receive Binding Update messages from QE4 (because R1 is disconnected from Foreign Network 1) and still thinks that QE4 is in Foreign Network 1		
5	Cause R1 to enable its interface connected to Foreign Network 1		
6	Cause EUT to send an Echo Request message to the Home Address of QE4 (the IPv6 destination address of the Echo Request sent should still be the former care-of-address of QE4 in Foreign Network 1)		
7	Check: does EUT receive an Echo Reply from QE4? (EUT will receive an ICMP "Destination Unreachable" message from router R3)	No	Yes
8	Cause EUT to continuously send Echo Request messages to the Home Address of QE4 (EUT will receive persistent ICMP "Destination Unreachable" messages from router R3)		
9	Check: after several unsuccessful Echo Request messages, does EUT receive Echo Replies from QE4?	Yes	No
10	Check: when EUT receives the first Echo Reply from QE4, have the previous EUT <--> QE4 Bindings expired?	No	Yes

<b>Observations:</b>	<p>NOTE 1: If EUT received no Binding Update message when EUT returned home, and EUT manages to re-establish communication with QE4 before the expiration of the EUT &lt;--&gt; QE4 bindings, then this implies that the ICMP Destination Unreachable messages caused EUT to delete these bindings and to use the Home Address of QE4 instead its previous care-of-address as IPv6 destination address.</p> <p>NOTE 2: RFC 3775 [2] states in clause 9.3.4 that "persistent ICMP messages lead to the deletion of the Binding", yet there is no detail about the amount of ICMP error messages that will cause the deletion to occur. Hence this TD might lead to inconclusive verdicts.</p> <p>NOTE 3: Step 2: beware of interface buffers, which can keep and then retransmit packets emitted before the interface is disabled! Do not unplug, but use "ifconfig" or equivalent.</p>
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### 9.3 Packet Processing

Test Description			
<b>Identifier:</b>	TD_MOB_1344_01	<b>Test Purpose:</b>	TP_MOB_1344_01
<b>Summary:</b>	'Correspondent Node discard received packets containing Type 2 Routing Headers'		
<b>Roles:</b>	Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1344		
<pre> with {     EUT disconnected     and QE4 configured to have the same link_local_address as EUT     and QE4 connected to Home_Network 2     and QE4 registered to QE1     and QE4 having established a binding with QE3 } ensure that { when {     QE4 is disconnected     and EUT is connected to Home_Network 1     and QE3 is requested to send a packet to the EUT     indicating that a response is required     -- QE3 sends packets containing     -- Routing Headers Type 2     and QE5 is requested to send a packet to the EUT     indicating that a response is required }     -- QE5 sends packets not containing     -- Routing Headers Type 2     then {     QE3 indicates no receipt of the response from the EUT     and QE5 indicates receipt of the response from the EUT } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is disconnected QE4 is configured with the same link-layer address as EUT QE4 is connected to Home Network 2 and registered with its Home Agent QE1 QE4 has established a binding with QE3		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Disconnect QE4		
2	Connect EUT to Home Network 2		
3	Cause QE3 to send an Echo Request to EUT		
4	Check: does QE3 receive an Echo Reply from EUT?	No	Yes
5	Cause QE5 to send an Echo Request to EUT		
6	Check: does QE5 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

## 9.4.1 Receiving Home Test Init Messages

Test Description			
<b>Identifier:</b>	TD_MOB_1348_01	<b>Test Purpose:</b>	TP_MOB_1348_01
<b>Summary:</b>	'Correspondent Node is able to participate in Return Routability Procedure'		
<b>Roles:</b>	Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1050, RQ_001_1051, RQ_001_1348		
<pre> with {     QE4 away_from_home     and QE4 registered to QE1     and QE4 configured to perform route_optimization     and EUT configured to perform route_optimization } ensure that {     when { EUT is requested to send a packet to QE4            indicating that a response is required }     then { EUT indicates receipt of the response directly from QE4 } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE4 is connected to Foreign Network 1 and is registered to its Home Agent QE1 QE4 is configured to perform route optimization EUT is configured to perform route optimization		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE4 so sent an Echo Request to EUT		
2	Check: does QE4 receive a reply from EUT?	Yes	No
3	Wait a few seconds to allow QE4 and EUT to perform Return Routability Procedure and establish Bindings.		
4	Disconnect QE1, the Home Agent of QE4		
5	Cause EUT to send an Echo Request to the Home Address of QE4		
6	Check: does EUT receive an Echo Reply from QE4?	Yes	No
<b>Observations:</b>	Disconnecting the Home Agent QE1 guarantees that traffic will not go through if Route Optimization didn't succeed. Cannot send the Echo Request from QE4 because nothing guarantees that QE4 would use its Home Address.		

## 9.4.2 Receiving Care-of Test Init Messages

Test Description			
<b>Identifier:</b>	TD_MOB_1348_01	<b>Test Purpose:</b>	TP_MOB_1348_01
<b>Summary:</b>	'Correspondent Node is able to participate in Return Routability Procedure'		
<b>Roles:</b>	Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1050, RQ_001_1051, RQ_001_1348		
<pre> with {     QE4 away_from_home     and QE4 registered to QE1     and QE4 configured to perform route_optimization     and EUT configured to perform route_optimization } ensure that {     when { EUT is requested to send a packet to QE4            indicating that a response is required }     then { EUT indicates receipt of the response directly from QE4 } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE4 is connected to Foreign Network 1 and is registered to its Home Agent QE1 QE4 is configured to perform route optimization EUT is configured to perform route optimization		

Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE4 so sent an Echo Request to EUT		
2	Check: does QE4 receive a reply from EUT?	Yes	No
3	Wait a few seconds to allow QE4 and EUT to perform Return Routability Procedure and establish Bindings		
4	Disconnect QE1, the Home Agent of QE4		
5	Cause EUT to send an Echo Request to the Home Address of QE4		
6	Check: does EUT receive an Echo Reply from QE4?	Yes	No
<b>Observations:</b>	Disconnecting the Home Agent QE1 guarantees that traffic will not go through if Route Optimization didn't succeed. Cannot send the Echo Request from QE4 because nothing guarantees that QE4 would use its Home Address.		

#### 9.4 Return Routability Procedure

Test Description			
<b>Identifier:</b>	TD_MOB_1348_01	<b>Test Purpose:</b>	TP_MOB_1348_01
<b>Summary:</b>	'Correspondent Node is able to participate in Return Routability Procedure'		
<b>Roles:</b>	Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1050, RQ_001_1051, RQ_001_1348		
	<pre> with {     QE4 away_from_home     and QE4 registered to QE1     and QE4 configured to perform route_optimization     and EUT configured to perform route_optimization } ensure that {     when { EUT is requested to send a packet to QE4            indicating that a response is required }     then { EUT indicates receipt of the response directly from QE4 } } </pre>		
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE4 is connected to Foreign Network 1 and is registered to its Home Agent QE1 QE4 is configured to perform route optimization EUT is configured to perform route optimization		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE4 so sent an Echo Request to EUT		
2	Check: does QE4 receive a reply from EUT?	Yes	No
3	Wait a few seconds to allow QE4 and EUT to perform Return Routability Procedure and establish Bindings		
4	Disconnect QE1, the Home Agent of QE4		
5	Cause EUT to send an Echo Request to the Home Address of QE4		
6	Check: does EUT receive an Echo Reply from QE4?	Yes	No
<b>Observations:</b>	Disconnecting the Home Agent QE1 guarantees that traffic will not go through if Route Optimization didn't succeed. Cannot send the Echo Request from QE4 because nothing guarantees that QE4 would use its Home Address.		

## 9.5.1 Receiving Binding Updates

Test Description			
<b>Identifier:</b>	TD_MOB_1817_01	<b>Test Purpose:</b>	TP_MOB_1817_01
<b>Summary:</b>	'Correspondent Node registers the binding when it receives a BU from Mobile Node'		
<b>Roles:</b>	Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1817		
<pre> with { QE4 away_from_home   and QE4 registered to QE1   and QE4 configured to perform route_optimization   and EUT configured to perform route_optimization } ensure that { when { QE4 is requested to send a packet directly to EUT       indicating that a response is required     }   then { QE4 indicates receipt of the response } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE4 is connected to Foreign Network 1 and registered to its Home Agent QE1 QE4 is configured to perform Route Optimization EUT is configured to perform Route Optimization		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause EUT to send an Echo Request to the Home address of QE4		
2	Check: does EUT receive an Echo Reply from QE4?	Yes	No
3	Disconnect QE1 from Home Network 1		
4	Cause EUT to send an Echo Request to the Home Address of QE4		
5	Check: does EUT receive an Echo Reply from QE4?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1065_01	<b>Test Purpose:</b>	TP_MOB_1065_01
<b>Summary:</b>	'Correspondent Node sends a Binding_Acknowledgement message upon receipt of a Binding Update message containing A-Flag set to 1'		
<b>Roles:</b>	Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1065, RQ_001_1350		
<pre> with {   QE4 away_from_home   and QE4 registered to QE1   and QE4 configured 'to request Binding_Acknowledgements from     correspondent nodes'   and QE4 configured to perform route_optimization   and EUT configured to perform route_optimization } ensure that { when { EUT receives a packet from QE4       indicating that a response is required }   then { EUT sends the response directly to QE4 } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE4 is connected to Foreign Network 1 and has registered to its Home Agent QE1 QE4 configured to perform route optimization EUT is configured to perform route optimization QE4 is configured to ask Correspondent Node for Binding Acknowledgement QE4 and EUT have never communicated yet and don't know each other (no binding established, no cache entries)		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause EUT to send an Echo Request to the Home Address of QE4		
2	Check: does EUT receive an Echo Reply from QE4?	Yes	No
3	Wait a few seconds to allow QE4 and EUT to perform Return Routing Procedure and establish Bindings.		
4	Disconnect QE1 from Home Network 1		
5	Cause EUT to sent an Echo Request to the Home Address of QE4		
6	Check: does EUT receive an Echo Reply from QE4?	Yes	No

<b>Observations:</b>	NOTE 1: Configuring QE4 to ask Binding Acknowledgement from Correspondent Nodes ensures that its Binding Update message will have the A-Flag set to 1. Disconnecting the Home Agent QE1 guarantees that traffic will not go through if Route Optimization didn't succeed. NOTE 2: Cannot send the Echo Request from QE4 (as described in Test Purpose) because nothing guarantees that QE4 would use its Home Address.
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### 9.5.2 Requests to Cache a Binding

Test Description			
<b>Identifier:</b>	TD_MOB_1457_01	<b>Test Purpose:</b>	TP_MOB_1457_01
<b>Summary:</b>	'Correspondent Node creates a new entry in its binding cache when receiving a valid Binding Update'		
<b>Roles:</b>	Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1457		
<pre> with {     QE4 away_from_home     and QE4 registered to QE1     and QE4 configured to perform route_optimization     and EUT configured to perform route_optimization } ensure that {     when { EUT receives a packet from QE4             indicating that a response is required }     then { EUT sends response directly to QE4 } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE4 is connected to Foreign Network 1 and registered to its Home Agent QE1 QE4 is configured to perform route optimization EUT is configured to perform route optimization		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause EUT to send an Echo Request to the Home Address of QE4		
2	Check: does EUT receive a reply from QE4?	Yes	No
3	Wait a few seconds to allow QE4 and EUT to perform Return Routing Procedure and establish Bindings		
4	Disconnect QE1, the Home Agent of QE4		
5	Cause EUT to send an Echo Request to the Home Address of QE4		
6	Check: does EUT receive a reply from QE4?	Yes	No
<b>Observations:</b>	NOTE 1: Disconnecting the Home Agent QE1 guarantees that traffic will not go through if Route Optimization didn't succeed. NOTE 2: Cannot send the Echo Request from QE4 (as described in Test Purpose) because nothing guarantees that QE4 would use its Home Address.		

Test Description			
<b>Identifier:</b>	TD_MOB_1458_01	<b>Test Purpose:</b>	TP_MOB_1458_01
<b>Summary:</b>	'Correspondent Node updates a binding cache entry on receipt of a valid Binding Update'		
<b>Roles:</b>	Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1458		
<pre> with {     QE4 away_from_home     and QE4 registered to QE1     and EUT having established a binding with QE4 } ensure that {     when {         QE4 moves to another foreign_network         and EUT is requested to send a packet to QE4             indicating that a response is required }     then { EUT indicates receipt of the response directly from QE4 } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE4 is connected to Foreign Network 1 and registered to its Home Agent QE1 EUT and QE4 have established bindings		



Step	Test Sequence	Verdict	
		Pass	Fail
1	move QE4 to Foreign Network 2		
2	wait a few seconds (to let QE4 update its bindings with QE1 and with EUT)		
3	Disconnect QE1 from Home Network 1		
4	Cause EUT to send an Echo Request to the Home Address of QE4		
5	Check: does EUT receive an Echo Reply from QE4?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1486_01	<b>Test Purpose:</b>	TP_MOB_1486_01
<b>Summary:</b>	'Correspondent Node deletes any Binding Cache entry after the expiration of the binding lifetime'		
<b>Roles:</b>	Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1461, RQ_001_1486		
<pre> with {     EUT configured to perform route_optimization     and QE4 configured to perform route_optimization     and QE4 away_from_home     and QE4 registered to QE1 } ensure that {     when {         EUT establishes a binding to QE4     }     then {         EUT and QE4 are able to communicate directly         within the binding_lifetime         and EUT and QE4 are unable to communicate directly         after the binding_lifetime     } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is configured to perform Route Optimization QE4 is configured to perform Route Optimization QE4 is connected to Foreign Network 1 and registered to QE1 EUT is configured to have a lifetime at one minute		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause EUT to send an Echo Request to the Home Address of QE4		
2	Check: does EUT receive an Echo Reply from QE4?	Yes	No
3	QE1 is disconnected from Home Network 1		
4	Cause QE4 to send an Echo Request to EUT		
5	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
6	Wait a minute (to let the binding between QE4 and EUT expire)		
7	Cause QE4 to send an Echo Request to EUT		
8	Check: does QE4 receive an Echo Reply from EUT?	No	Yes
<b>Observations:</b>	Ensure that QE4 use its Home Address when pinging EUT (Home Address Option present in IPv6 packet).		

Test Description			
<b>Identifier:</b>	TD_MOB_1465_01	<b>Test Purpose:</b>	TP_MOB_1465_01
<b>Summary:</b>	'Correspondent Node deletes any existing related bindings on receipt of a Binding Update requesting to delete a binding'		
<b>Roles:</b>	Correspondent_Node, Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1465, RQ_001_1465, RQ_001_1466, RQ_001_1470		
<pre> with {     EUT away_from_home     and EUT configured to perform route_optimization     and QE4 configured to perform route_optimization     and QE4 having established a binding with EUT } ensure that {     when {         EUT returns home     }     then {         QE4 and the EUT are able to communicate with EUT     } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and registered to its Home Agent QE1 EUT is configured to perform route optimization QE4 is configured to perform route optimization QE4 has established a binding to EUT		

Step	Test Sequence	Verdict	
		Pass	Fail
1	Move EUT to Home Network 1		
2	Cause QE4 to send an Echo Request to the Home Address of EUT		
3	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

#### 9.5.4 Sending Binding Acknowledgements

Test Description			
<b>Identifier:</b>	TD_MOB_1065_01	<b>Test Purpose:</b>	TP_MOB_1065_01
<b>Summary:</b>	'Correspondent Node sends a Binding_Acknowledgement message upon receipt of a Binding Update message containing A-Flag set to 1'		
<b>Roles:</b>	Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1065, RQ_001_1350		
<pre> with {     QE4_away_from_home     and QE4_registered_to_QE1     and QE4_configured_'to_request_Binding_Acknowledgements_from_correspondent_nodes'     and QE4_configured_to_perform_route_optimization     and EUT_configured_to_perform_route_optimization } ensure that {     when { EUT_receives_a_packet_from_QE4_indicating_that_a_response_is_required }     then { EUT_sends_the_response_directly_to_QE4 } } </pre>			
<b>Pre-test conditions:</b>	<p>The cleaning procedure has been run (see configuration comments)  QE4 is connected to Foreign Network 1 and has registered to its Home Agent QE1  QE4 configured to perform route optimization  EUT is configured to perform route optimization  QE4 is configured to ask Correspondent Node for Binding Acknowledgement  QE4 and EUT have never communicated yet and don't know each other (no binding established, no cache entries)</p>		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause EUT to send an Echo Request to the Home Address of QE4		
2	Check: does EUT receive an Echo Reply from QE4?	Yes	No
3	Wait a few seconds to allow QE4 and EUT to perform Return Routing Procedure and establish Bindings		
4	Disconnect QE1 from Home Network 1		
5	Cause EUT to send an Echo Request to the Home Address of QE4		
6	Check: does EUT receive an Echo Reply from QE4?	Yes	No
<b>Observations:</b>	<p>NOTE 1: Configuring QE4 to ask Binding Acknowledgement from Correspondent Nodes ensures that its Binding Update message will have the A-Flag set to 1. Disconnecting the Home Agent QE1 guarantees that traffic will not go through if Route Optimization didn't succeed.</p> <p>NOTE 2: Cannot send the Echo Request from QE4 (as described in Test Purpose) because nothing guarantees that QE4 would use its Home Address.</p>		

## 9.5.5 Sending Binding Refresh Requests

Test Description			
<b>Identifier:</b>	TD_MOB_1483_01	<b>Test Purpose:</b>	TP_MOB_1483_01
<b>Summary:</b>	'Correspondent Node tries to refresh a binding cache entry before it expires'		
<b>Roles:</b>	Correspondent_Node, Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1483, RQ_001_1483		
<pre> with {     QE4 away_from_home     and QE4 registered to QE1     and EUT having established a binding with QE4     and EUT established 'in continuous unbounded communication with QE4' } ensure that {     when {         QE4 sends a packet to the EUT         after the binding_lifetime         indicating that a response is required     }     then {         QE4 indicates receipt of the response directly from the EUT     } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE4 is connected to Foreign Network 1 and registered to QE1 EUT having established a binding with QE4 EUT is configured to have a binding lifetime at one minute		
Step	Test Sequence	Verdict	
		Pass	Fail
1	wait 45 seconds after the registration between EUT and QE4		
2	Cause QE4 to send an series of Echo Request during 30 seconds to EUT		
3	After one minute and 5 seconds, disconnect QE1 from Home Network 1		
4	Check: are more one Echo Request of the series dropped?	No	Yes
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1485_01	<b>Test Purpose:</b>	TP_MOB_1485_01
<b>Summary:</b>	'Correspondent Node stops retransmitting Binding Refresh Requests messages when it receives a Binding Update'		
<b>Roles:</b>	Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1485		
<pre> --***** --*   However we wrap this up, it is a conformance test, not interop   *-- --***** </pre> <pre> with {     QE4 away_from_home     and QE4 registered to QE1     and EUT having established a binding with QE4 } ensure that {     when {         EUT 'tries to refresh its binding with QE4'         and EUT receives 'a message indicating that         the refresh is successful'     }     then {         EUT 'stops sending refresh requests to QE4'     } } </pre>			
<b>Pre-test conditions:</b>	NOT TESTABLE BY INTEROPERABILITY MEAN depending of the implementation to reduce the handover		
Step	Test Sequence	Verdict	
		Pass	Fail
<b>Observations:</b>			

## Binding Cache Management (was: 9.6 Cache Replacement Policy)

Test Description			
<b>Identifier:</b>	TD_MOB_1390_01	<b>Test Purpose:</b>	TP_MOB_1390_01
<b>Summary:</b>	'Correspondent Node maintains a separate binding cache for each of its unicast routable addresses'		
<b>Roles:</b>	Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1390		
<pre> with {     EUT configured to have 2 global_addresses     and QE4 away_from_home     and QE4 registered to QE1     and EUT having established a binding to QE4         using its first global_address     and QE1 disconnected from the network } ensure that {     when { EUT is requested to send a packet to QE4         containing a source_address         set to its second global_address }     then { QE4 does not indicate receipt of the packet } } --TP id : TP_MOB_1429_01 --summary : 'Correspondent Node deletes a binding cache entry if it receives --          persistent ICMP Destination Unreachable messages' --RQ ref : RQ_001_1429 --Role   : Correspondent_Node --config : CF_MOB_04 --TD ref : TD_MOB_1429_01  ----- --* The imprecision in this requirement and the lack of clear guidance *-- --* on how many ICMP DU messages will cause the deletion of the *-- --* binding cache entry make this almost impossible to test by IOP *-- --* methods. It should be removed from the IOP test suite. *-- -----  -- with { --     QE4 away_from_home --     and QE4 registered to QE1 --     and EUT having established a binding with QE4 -- } -- ensure that -- { --     when { --         QE4 returns home --         and QE4 is unable to update its binding to the EUT --         and EUT is requested to send packets to QE4 } --     then { --         EUT 'is temporarily unable to communicate with QE4' --         and EUT is able to communicate with QE4 --         before the binding_lifetime expires } -- } </pre>			
<b>Pre-test conditions:</b>	NOT TESTABLE BY INTEROPERABILITY MEANS That relates to internal operations		
Step	Test Sequence	Verdict	
		Pass	Fail
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1486_01	<b>Test Purpose:</b>	TP_MOB_1486_01
<b>Summary:</b>	'Correspondent Node deletes any Binding Cache entry after the expiration of the binding lifetime'		
<b>Roles:</b>	Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1461, RQ_001_1486		
<pre> with {     EUT configured to perform route_optimization     and QE4 configured to perform route_optimization     and QE4 away_from_home     and QE4 registered to QE1 } ensure that {     when {         EUT establishes a binding to QE4 }     then {         EUT and QE4 are able to communicate directly             within the binding_lifetime         and EUT and QE4             are unable to communicate directly             after the binding_lifetime } } </pre>			

<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is configured to perform Route Optimization QE4 is configured to perform Route Optimization QE4 is connected to Foreign Network 1 and registered to QE1 EUT is configured to have a lifetime at one minute		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause EUT to send an Echo Request to the Home Address of QE4		
2	Check: does EUT receive an Echo Reply from QE4?	Yes	No
3	QE1 is disconnected from Home Network 1		
4	Cause QE4 to send an Echo Request to EUT		
5	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
6	Wait a minute (to let the binding between QE4 and EUT expire)		
7	Cause QE4 to send an Echo Request to EUT		
8	Check: does QE4 receive an Echo Reply from EUT?	No	Yes
<b>Observations:</b>	Ensure that QE4 use its Home Address when pinging EUT (Home Address Option present in IPv6 packet).		

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## Home Agent Operation

Test Description			
<b>Identifier:</b>	TD_MOB_1807_01	<b>Test Purpose:</b>	TP_MOB_1807_01
<b>Summary:</b>	'If HA support the multicast group membership control protocols, HA must be capable to determine which multicast data packets to forward via the tunnel to MN'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1561, RQ_001_1807		
<pre>-- Config-HA with {     QE1 connected to home_network     and QE1 subscribed to a global_multicast_group     and QE3 subscribed to another global_multicast_group } ensure that { when {     QE1 moves to a foreign_network     and QE1 registers to EUT }   then {     QE1 receives packets from its global_multicast_group } } ----- --* RFC3776 - Security for Mobility -----</pre>			
<b>Pre-test conditions:</b>	NOT TESTABLE BY INTEROPERABILITY MEANS You do not know if the Home Agent do not forward the multicast packets or if the Mobile Node drops this packets		
Step	Test Sequence	Verdict	
		Pass	Fail
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1557_01	<b>Test Purpose:</b>	TP_MOB_1557_01
<b>Summary:</b>	'HA tunnels multicast packets with a global scope to the mobile node'		
<b>Roles:</b>	Home_Agent, Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1372, RQ_001_1557, RQ_001_1557		
<pre>with {     QE1 subscribed to a global_multicast_group     and QE1 away_from_home     and QE1 registered to EUT } ensure that { when { QE3 is requested to send a packet to the global_multicast_group     indicating that a response is required }   then { QE3 indicates receipt of the response } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Home Network 1 QE1 has registered to multicast group FF1E::1		

Step	Test Sequence	Verdict	
		Pass	Fail
1	Move QE1 to Foreign Network 1		
2	Cause QE3 to send an Echo Request to the multicast address FF1E::1		
3	Check: does QE3 receives an Echo Reply	Yes	No
4	Disconnect EUT		
5	Cause QE3 to send an Echo Request to the multicast address FF1E::1		
6	Check: does QE3 receives an Echo Reply	No	Yes
<b>Observations:</b>	FF1E::1 is a global scope, non reserved, multicast group.		

## 10.5 Dynamic Home Agent Address Discovery

Test Description			
<b>Identifier:</b>	TD_MOB_1804_01	<b>Test Purpose:</b>	TP_MOB_1804_01
<b>Summary:</b>	'Home Agent is able to participate in Dynamic Home Agent Address Discovery'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1368, RQ_001_1804		
<pre> with {     QE1 at_home     and QE1 not configured to have its Home_Agent_address available } ensure that {     when {         QE1 moves to a foreign_network         and QE4 is requested to send a packet to QE1             indicating that a response is required }     then {         QE4 indicates receipt of the response } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is disconnected from Home Network 1 QE1 is unaware of the address of its Home Agent		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move QE1 to Foreign Network 1		
2	Wait a few seconds		
3	Cause QE4 to send an Echo Request to the Home Address of QE1		
4	Check: does QE4 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>			

## 10.6 Sending Prefix Information to the Mobile Node

Test Description			
<b>Identifier:</b>	TD_MOB_1592_01	<b>Test Purpose:</b>	TP_MOB_1592_01
<b>Summary:</b>	'HA schedules the delivery of the prefix information when a new prefix is added to its home subnet interface'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1370, RQ_001_1592, RQ_001_1805		
<pre> with {     QE1 away_from_home     and QE1 registered to EUT } ensure that {     when {         EUT generates a new prefix to the home_address of QE1         before (QE4 sends a packet to QE1             using the new home_address             and indicating that a response is required) }     then {         QE4 indicates receipt of a response from QE1 } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 connected to Foreign Network 1 QE1 registered to EUT		

Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause EUT to generate a new prefix added on its home subnet interface		
2	Wait for at least 3.5 seconds		
3	Check: does QE1 indicate a new home address?	Yes	No
<b>Observations:</b>	MIN_DELAY_BETWEEN_RAS (3,0 s) + MAX_RA_DELAY_TIME (0,5 s) = 3,5 s (cf. RFC 2561).		

### 10.6.2 Scheduling Prefix Deliveries

Test Description			
<b>Identifier:</b>	TD_MOB_1812_01	<b>Test Purpose:</b>	TP_MOB_1812_01
<b>Summary:</b>	'HA delivers new prefix information when lifetime information (valid or preferred lifetime) of the prefix changes'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1812		
<pre> with {     QE1 away_from_home     and QE1 registered to EUT     and EUT configured to have a short prefix_lifetime on the         Home_Network of QE1 --(suggest 30s) } ensure that {     when { EUT is requested to configure a new prefix_lifetime         for QE1 }     then { QE1 and QE4 are able to communicate         using the new prefix         after the original prefix_lifetime expires } } --TP id : TP_MOB_1602_01 --summary : 'If the bindings of MN expire before BU then HA stops sending MPAs' --RQ ref : RQ_001_1602 --Role : Home_Agent --config : CF_MOB_02 --TD ref : TD_MOB_1602_01  --XX-- --X Not interoperability X-- --XX--  -- with { --     QE1 away_from_home --     and QE1 registered to EUT -- } -- ensure that -- { --     when { QE1 'is disconnected' from 'the foreign network' --         and EUT 'indicates the binding of QE1 expired' --     } --     then { EUT sends 'no other messages to QE1' before 'new registration' } -- } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 connected to Foreign Network 1 QE1 registered to EUT		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Configure EUT with new, higher, valid lifetime		
2	Wait for expiration of the original prefix lifetime		
3	Cause QE4 to send an Echo Request to QE1		
4	Check: does QE4 receive an Echo Reply	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1592_01	<b>Test Purpose:</b>	TP_MOB_1592_01
<b>Summary:</b>	'HA schedules the delivery of the prefix information when a new prefix is added to its home subnet interface'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	7
<b>References:</b>	RQ_001_1370, RQ_001_1592, RQ_001_1805		
<pre>with {     QE1 away_from_home     and QE1 registered to EUT } ensure that { when {     EUT generates a new prefix to the home_address of QE1     before (QE4 sends a packet to QE1             using the new home_address             and indicating that a response is required) }     then {     QE4 indicates receipt of a response from QE1 } }</pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 connected to Foreign Network 1 QE1 registered to EUT		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause EUT to generate a new prefix added on its home subnet interface		
2	Wait for at least 3.5 seconds		
3	Check: does QE1 indicate a new home address?	Yes	No
<b>Observations:</b>	MIN_DELAY_BETWEEN_RAS (3,0 s) + MAX_RA_DELAY_TIME (0,5 s) = 3,5 s (cf. RFC 2561).		

Test Description			
<b>Identifier:</b>	TD_MOB_1600_01	<b>Test Purpose:</b>	TP_MOB_1600_01
<b>Summary:</b>	'HA retransmits periodically unsolicited Advertisement until the receipt of a Mobile_Prefix_Solicitation from MN'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1600, RQ_001_1813		
<pre>with {     QE1 away_from_home     and QE1 registered to EUT } ensure that { when {     QE1 is disconnected from the foreign_network     before EUT generates a new prefix to the home_address of QE1     before QE1 is connected to the foreign_network after 1 minute     before QE4 sends a packet to QE1             using the new home_address             and indicating that a response is required }     then {     QE4 indicates receipt of a response from QE1 } } --TP id : TP_MOB_1591_01 --summary : 'HA delivers new prefix information when the state of the flags --          changes for the prefix of the MN registered' --RQ ref : RQ_001_1591 --Role : Home_Agent --config : CF_MOB_02 --TD ref : TD_MOB_1591_01  --XX-- --X Not interoperability X-- --XX--  -- with { --     QE1 away_from_home --     and QE1 registered to EUT -- } -- ensure that -- { when { EUT generates 'a new state of the flags on the prefix of its home subnet interface' } --     then { QE1 indicates 'a new state on its home address' } -- }</pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected in Foreign Network 1 QE1 is registered to EUT		



Step	Test Sequence	Verdict	
		Pass	Fail
1	Disconnect EUT		
2	Cause EUT to generate a new prefix added on its home subnet interface		
3	Wait for one minute		
4	Reconnect EUT to home network		
5	Check: does QE1 indicate a new home address?	Yes	No
<b>Observations:</b>	It is not clear to me why a delay of 'one' minute is suggested here.		

Test Description			
<b>Identifier:</b>	TD_MOB_1603_01	<b>Test Purpose:</b>	TP_MOB_1603_01
<b>Summary:</b>	'HA transmits again unsolicited Mobile_Prefix_Advertisement after the prolongation of the binding of the Mobile Node'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1603		
<pre> with {     QE1 away_from_home     and QE1 is registered to the EUT     and QE1 and the EUT configured to have a short binding_lifetime         -- (Suggest 30s) } ensure that { when {     QE1 is disconnected from the foreign_network     before the binding_lifetime expires between QE1 and the EUT     before QE1 is connected to another foreign_network } then { QE1 and QE4 are able to communicate } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 connected to Foreign Network 1 QE1 registered to EUT		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Disconnect QE1		
2	Wait until QE1's binding to EUT expires		
3	Cause EUT to generate a new prefix added on its home subnet interface		
4	connect QE1 to foreign network 2		
5	Check: does QE1 indicate a new home address?	Yes	No
<b>Observations:</b>			

### 10.6.3 Sending Advertisements

Test Description			
<b>Identifier:</b>	TD_MOB_1082_01	<b>Test Purpose:</b>	TP_MOB_1082_01
<b>Summary:</b>	'Home Agent uses a Security Association to protect integrity and authenticity of Mobile_Prefix_Solicitations and Advertisements'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1014, RQ_001_1082, RQ_001_1607		
<pre> with {     QE1 at_home     and QE1 configured to protect         Mobile_Prefix_Solicitations     and QE1 configured to accept only secured         Mobile_Prefix_Advertisements     and QE1 configured to have a short prefix_lifetime --(suggest 30s) } ensure that { when {     QE1 moves to a foreign_network     before its prefix_lifetime expires     before QE4 sends a packet to QE1         indicating that a response is required } then {     QE4 indicates receipt of the response from QE1 } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Foreign Network 1 and registered to its Home Agent EUT QE1 is configured to protect Mobile Prefix Solicitation messages QE1 is configured to only accept protected Mobile Prefix Advertisement messages EUT is configured to advertise a preferred prefix lifetime of 20 sec EUT is configured to advertise a valid prefix lifetime of 30 sec		

Step	Test Sequence	Verdict	
		Pass	Fail
1	Wait 30 sec so that initial lifetime of the home address of QE1 has expired		
2	Cause QE4 to send an Echo Request to the Home Address of QE1		
3	Check: does QE4 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>			

## 10.6

## Sending Prefix Information to the Mobile Node

Test Description			
<b>Identifier:</b>	TD_MOB_1592_01	<b>Test Purpose:</b>	TP_MOB_1592_01
<b>Summary:</b>	'HA schedules the delivery of the prefix information when a new prefix is added to its home subnet interface'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1370, RQ_001_1592, RQ_001_1805		
<pre> with {     QE1 away_from_home     and QE1 registered to EUT } ensure that {     when {         EUT generates a new prefix to the home_address of QE1         before (QE4 sends a packet to QE1                 using the new home_address                 and indicating that a response is required) }     then {         QE4 indicates receipt of a response from QE1 } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 connected to Foreign Network 1 QE1 registered to EUT		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause EUT to generate a new prefix added on its home subnet interface		
2	Wait for at least 3.5 seconds		
3	Check: does QE1 indicate a new home address?	Yes	No
<b>Observations:</b> MIN_DELAY_BETWEEN_RAS (3,0 s) + MAX_RA_DELAY_TIME (0,5 s) = 3,5 s (cf. RFC 2561).			

## 10.3.2

## Primary Care-of Address De-Registration

Test Description			
<b>Identifier:</b>	TD_MOB_1526_01	<b>Test Purpose:</b>	TP_MOB_1526_01
<b>Summary:</b>	'Home Agent rejects De-Registration Binding Update if no entry exists in its Binding Cache for the Mobile Node'		
<b>Roles:</b>	Home_Agent, Home_Agent	<b>Configuration:</b>	CF_MOB_05
<b>References:</b>	RQ_001_1526, RQ_001_1526, RQ_001_1527, RQ_001_1535		
<pre> with {     EUT disconnected from Home_Network     and QE2 configured to have the same IP_address as EUT     and QE1 connected to a foreign_network     and QE1 registered to QE2 } ensure that {     when {         QE2 is disconnected from Home_Network         and EUT is connected to Home_Network         and QE1 returns home }     then {         QE4 and QE1 are unable to communicate } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE2 is configured to serve the Home Network 1 QE2 and EUT are configured with the same IP address EUT is disconnected from Home Network 1 QE1 is connected to Foreign Network 1 and registered to its Home Agent QE2 QE2 is connected to Home Network 1		

Step	Test Sequence	Verdict	
		Pass	Fail
1	QE2 is disconnected from Home Network 1		
2	EUT is connected to Home Network 1		
3	Move QE1 to Home Network 1		
4	Cause QE4 to send an Echo Request to the Home Address of QE1		
5	Check: does QE4 receive an Echo Reply from QE1?	No	Yes
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1528_01	<b>Test Purpose:</b>	TP_MOB_1528_01
<b>Summary:</b>	'When accepting Care of Address de-registration Binding Update, Home Agent deletes any existing entry in its Binding Cache for the Mobile Node'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1528, RQ_001_1529		
<pre> with {     QE1 away_from_home     and QE1 registered to EUT     and QE4 able to communicate with QE1     and QE1 configured not to perform Route_Optimization } ensure that {     when { QE1 returns home }     then { QE4 and QE1 are able to communicate directly } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is configured not to perform route optimization QE1 is connected to Foreign Network 1 and registered to its Home Agent EUT		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move QE1 to Home Network 1		
2	Wait a few seconds (to let QE1 deregister to EUT)		
3	Disconnected EUT from Home Network 1		
4	Cause QE4 to send an Echo Request directly to the Home Address of QE1		
5	Check: does QE4 receive an Echo Reply directly from QE1?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1528_01	<b>Test Purpose:</b>	TP_MOB_1528_01
<b>Summary:</b>	'When accepting Care of Address de-registration Binding Update, Home Agent deletes any existing entry in its Binding Cache for the Mobile Node'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1528, RQ_001_1529		
<pre> with {     QE1 away_from_home     and QE1 registered to EUT     and QE4 able to communicate with QE1     and QE1 configured not to perform Route_Optimization } ensure that {     when { QE1 returns home }     then { QE4 and QE1 are able to communicate directly } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is configured not to perform route optimization QE1 is connected to Foreign Network 1 and registered to its Home Agent EUT		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move QE1 to Home Network 1		
2	Wait a few seconds (to let QE1 deregister to EUT)		
3	Disconnected EUT from Home Network 1		
4	Cause QE4 to send an Echo Request directly to the Home Address of QE1		
5	Check: does QE4 receive an Echo Reply directly from QE1?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1534_01	<b>Test Purpose:</b>	TP_MOB_1534_01
<b>Summary:</b>	'Home Agent stops intercepting packets for the mobile node on acceptance of the Primary Care of Address De-Registration Binding Update'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1534		
<pre> with {     QE1 away_from_home     and QE1 registered to EUT } ensure that {     when {         QE1 returns home         and EUT is disconnected from the home_network     }     then {         QE4 and QE1 are able to communicate     } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Foreign Network 1 and registered to its Home Agent EUT		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move QE1 to Home Network 1		
2	Wait a few seconds (to let QE1 register to EUT)		
3	EUT is disconnected from Home Network 1		
4	Cause QE4 to send an Echo Request to the Home Address of QE1		
5	Check: does QE4 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>			

### 10.3.1 Primary Care-of Address Registration

Test Description			
<b>Identifier:</b>	TD_MOB_1818_01	<b>Test Purpose:</b>	TP_MOB_1818_01
<b>Summary:</b>	'A Binding Update contains a Home Address destination option.'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1818		
<pre> with {     QE1 at_home } ensure that {     when {         QE1 moves to a foreign_network         and QE1 sends a Binding_Update         containing no Home_Address_Destination_Option     }     then {         QE4 and QE1 are unable to communicate     } } </pre>			
<b>Pre-test conditions:</b>	Not testable by interoperability means		
Step	Test Sequence	Verdict	
		Pass	Fail
<b>Observations:</b>	It is not possible to send a Binding Update containing no Home Address!		

Test Description			
<b>Identifier:</b>	TD_MOB_1825_01	<b>Test Purpose:</b>	TP_MOB_1825_01
<b>Summary:</b>	'When Home Agent processes a Binding Update secured by IPsec, the contents of Home Address Option is not checked'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_05
<b>References:</b>	RQ_001_1825		
<pre> with {     QE1 configured not to perform Route_Optimization     and QE1 away_from_home     and QE1 registered to EUT     and EUT configured to accept any secured Binding_Update from QE1     and QE1 configured to send only a secured Binding_Update to EUT } ensure that {     when {         QE1 sends a Binding_Update secured by IPsec         containing a Home_Address_Option         not indicating its Home_Address     }     then {         EUT accepts the packet     } } </pre>			

<b>Pre-test conditions:</b>	Not testable by IOP means		
<b>Step</b>	<b>Test Sequence</b>	<b>Verdict</b>	
		<b>Pass</b>	<b>Fail</b>
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1826_01	<b>Test Purpose:</b>	TP_MOB_1826_01
<b>Summary:</b>	'Home Agent updates the entry in its Binding Cache upon receipt of a Binding Update'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1826		
<pre> with {     QE1 away_from_home     and QE1 registered to EUT     and QE1 configured not to perform Route_Optimization } ensure that {     when { QE1 moves to another foreign_network }     then { QE3 and QE1 are able to communicate } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Foreign Network 1 and registered to its Home Agent EUT QE1 is configured not to perform Route Optimization		
<b>Step</b>	<b>Test Sequence</b>	<b>Verdict</b>	
		<b>Pass</b>	<b>Fail</b>
1	Move QE1 to Foreign Network 2		
2	Cause QE3 to send an Echo request to the Home Address of QE1		
3	Check: does QE3 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1494_01	<b>Test Purpose:</b>	TP_MOB_1494_01
<b>Summary:</b>	'Home Agent returns a type "132" Binding Acknowledgment upon receipt of a Binding Update which Home Address is not on link'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1494		
<pre> with {     QE1 disconnected from the home_network     and QE1 configured not to perform Route_Optimization } ensure that {     when {         QE1 is connected to a foreign_network         and EUT receives a Binding_Update         containing a Home_Address not on_link }     then {         QE4 and QE1 are unable to communicate } } </pre>			
<b>Pre-test conditions:</b>	NOT TESTABLE BY INTEROPERABILITY MEAN no node can answer to an address which is not on link		
<b>Step</b>	<b>Test Sequence</b>	<b>Verdict</b>	
		<b>Pass</b>	<b>Fail</b>
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1496_01	<b>Test Purpose:</b>	TP_MOB_1496_01
<b>Summary:</b>	'Correspondent Node sends a type "131" Binding Acknowledgment when receiving a Home Registration Binding Update'		
<b>Roles:</b>	Correspondent_Node, Correspondent_Node, Mobile_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1496, RQ_001_1496		
<pre> with {     EUT at_home     and QE5 at_home     and QE5 configured 'to use EUT as Home Agent' } ensure that {     when { QE5 moves to a foreign_network }     then { QE3 and QE5 are unable to communicate } } </pre>			

<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Home Network 2 QE5 is connected to Home Network 2 QE5 is configured to use EUT as Home Agent		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move QE5 to Foreign Network 2		
2	Cause QE3 to send an Echo Request to the Home Address of QE5		
3	Check: does QE3 receive an Echo Reply from QE5?	No	Yes
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1497_01	<b>Test Purpose:</b>	TP_MOB_1497_01
<b>Summary:</b>	'Home Agent creates a new entry in its Binding Cache upon receipt of a Binding Update'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1497		
<pre> with {     QE1 at_home     and QE1 configured not to perform Route_Optimization } ensure that {     when { QE1 moves to a foreign_network }     then { QE4 is able to communicate with QE1 } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Home Network 1 QE1 is configured not to perform Route Optimization		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move QE1 to Foreign Network 1		
2	Wait a few seconds (to let QE1 register to EUT)		
3	Cause QE4 to send an Echo Request to the Home Address of QE1		
4	Check: does QE4 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1500_01	<b>Test Purpose:</b>	TP_MOB_1500_01
<b>Summary:</b>	'Home Agent maintains a Binding Cache entry from receipt of a Binding Update until the Binding Lifetime expires'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1497, RQ_001_1500, RQ_001_1522		
<pre> with {     QE1 at_home     and QE1 configured not to perform Route_Optimization } ensure that {     when { QE1 moves to a foreign_network }     then { QE4 and QE1 are able to communicate           within the Binding_Lifetime } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Home Network 1 QE1 is configured not to perform Route Optimization EUT is configured to set the binding lifetime to 2 minutes QE3 is disconnected from Home Network 1 QE3 is configured with the same Ethernet address as QE1		

Step	Test Sequence	Verdict	
		Pass	Fail
1	Move QE1 to Foreign Network 1		
2	Wait a few seconds (to let QE1 register with its Home Agent)		
3	Cause QE4 to send an Echo Request to QE1		
4	Check: does QE4 receive an Echo Reply from QE1	Yes	No
5	Disconnect QE1 from Foreign Network 1		
6	Wait a period a little less long than the Binding Lifetime		
7	Connected QE3 to Home Network 1		
8	Wait for the expiration of the binding lifetime		
9	Cause QE4 to send an Echo Request to QE1		
10	Check: does QE4 receive an Echo Reply from QE1?	No	Yes
<b>Observations:</b>	DAD occurs at step 7		

Test Description			
<b>Identifier:</b>	TD_MOB_1501_01	<b>Test Purpose:</b>	TP_MOB_1501_01
<b>Summary:</b>	'Home Agent performs Duplicate Address Detection on home link before sending a Binding Acknowledgment'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1501, RQ_001_1502, RQ_001_1503		
<pre> with {     QE1 at_home     and QE3 disconnected from home_network     and QE3 having the same home_address as QE1 } ensure that {     when {         QE1 is disconnected from the home_network         and QE3 is connected to the home_network         and QE1 is connected to a foreign_network }     then { QE4 and QE1 are unable to communicate } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Home Network 1 QE3 is manually configured with the same Home Address as QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move QE1 to Foreign Network 1		
2	Wait a few seconds (to let QE1 register to EUT)		
3	Disconnect QE3 from Home Network 1		
4	Cause QE4 to send an Echo Request to the Home Address of QE1		
5	Check: does QE4 receive an Echo Reply from QE1?	No	Yes
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1503_01	<b>Test Purpose:</b>	TP_MOB_1503_01
<b>Summary:</b>	'Home Agent returns a type "134" Binding Acknowledgement when Duplicate Address Detection for the Home Address / Link Local Address fails'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1503		
<pre> with {     QE1 disconnected from home_network     and QE3 connected to home_network     and QE3 configured to have the same link_local_address as QE1 } ensure that {     when { QE1 is connected to a foreign_network }     then { QE4 and QE1 are unable to communicate } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is disconnected from Home Network 1 QE3 is connected on Home Network QE3 is manually configured with the same link-local address as QE1		

Step	Test Sequence	Verdict	
		Pass	Fail
1	QE1 is connected to Foreign Network 1		
2	Cause QE4 to send an Echo Request to QE1		
3	Check: does QE4 receive an Echo Reply from QE1?	No	Yes
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1507_01	<b>Test Purpose:</b>	TP_MOB_1507_01
<b>Summary:</b>	'Home Agent removes binding when the associated prefix valid lifetime expires'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1507		
<pre> with {     QE1 away_from_home     and QE1 registered to the EUT     and QE1 configured not to perform Route_Optimization } ensure that {     when { the prefix_lifetime expires at the EUT }     then { QE4 and QE1 are unable to communicate } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is configured to accept only secured Mobile Prefix Solicitations. QE1 is configured to send unsecured Mobile Prefix Solicitations. QE1 is configured not to perform Route Optimization QE1 is connected to Foreign Network 1 and registered to its Home Agent R1 is configured to advertise a valid prefix lifetime of 1 minute		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Wait a minute (to let the prefix A become invalid)		
2	Cause QE4 to send an Echo Request to QE1		
3	Check: does QE4 receive an Echo Reply from QE1?	No	Yes
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1510_01	<b>Test Purpose:</b>	TP_MOB_1510_01
<b>Summary:</b>	'Home Agent returns a Binding Acknowledgment in response to a Binding Update'		
<b>Roles:</b>	Home_Agent, Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1510, RQ_001_1501, RQ_001_1510, RQ_001_1511, RQ_001_1516, RQ_001_1517, RQ_001_2002, RQ_001_2013, RQ_001_2029		
<pre> with { QE1 at_home } ensure that {     when { QE1 moves to a foreign_network }     then { QE4 and the EUT are able to communicate } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Home Network 1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move QE1 to Foreign Network 1		
2	Wait a few seconds (to let the QE1 register with its Home Agent)		
3	Cause QE4 to send an Echo Request to the Home Address of QE1		
4	Check: does QE4 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>			



Test Description			
<b>Identifier:</b>	TD_MOB_1500_01	<b>Test Purpose:</b>	TP_MOB_1500_01
<b>Summary:</b>	'Home Agent maintains a Binding Cache entry from receipt of a Binding Update until the Binding Lifetime expires'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1497, RQ_001_1500, RQ_001_1522		
<pre> with {     QE1 at_home     and QE1 configured not to perform Route_Optimization } ensure that {     when { QE1 moves to a foreign_network }     then { QE4 and QE1 are able to communicate           within the Binding_Lifetime } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Home Network 1 QE1 is configured not to perform Route Optimization EUT is configured to set the binding lifetime to 2 minutes QE3 is disconnected from Home Network 1 QE3 is configured with the same Ethernet address as QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move QE1 to Foreign Network 1		
2	Wait a few seconds (to let QE1 register with its Home Agent)		
3	Cause QE4 to send an Echo Request to QE1		
4	Check: does QE4 receive an Echo Reply from QE1?	Yes	No
5	Disconnect QE1 from Foreign Network 1		
6	Wait a period a little less long than the Binding Lifetime		
7	Connected QE3 to Home Network 1		
8	Wait for the expiration of the binding lifetime		
9	Cause QE4 to send an Echo Request to QE1		
10	Check: does QE4 receive an Echo Reply from QE1?	No	Yes
<b>Observations:</b>	DAD occurs at step 7.		

## 10.3

## Processing Bindings

Test Description			
<b>Identifier:</b>	TD_MOB_1366_01	<b>Test Purpose:</b>	TP_MOB_1366_01
<b>Summary:</b>	'Home Agent returns a Binding_Acknowledgement message in response to a Binding Update message'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1366		
<pre> with {     QE1 at_home } ensure that {     when {         QE1 moves to a foreign_network         and QE1 receives a packet from QE4             indicating that a response is required }     then {         QE4 indicates receipt of the response } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 connected to Home Network 1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move QE1 to foreign network 1		
2	Wait a few seconds		
3	Cause QE4 to send an Echo Request to the Home Address of QE1		
4	Check: does QE4 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>			

## 10.4.1

## Intercepting Packets for a Mobile Node

Test Description			
<b>Identifier:</b>	TD_MOB_1536_01	<b>Test Purpose:</b>	TP_MOB_1536_01
<b>Summary:</b>	'HA intercepts packets for registered mobile node on the home network and uses reverse tunnel encapsulation'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1364, RQ_001_1536, RQ_001_1551, RQ_001_1568		
	<pre> with {     QE1 away_from_home     and QE1 registered to EUT     and QE1 configured not to perform Route_Optimization } ensure that {     when { QE3 is requested to send a packet to QE1           indicating that a response is required }     then { QE3 indicates receipt of the response } } </pre>		
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Foreign Network 1 and has registered to its Home Agent EUT QE1 is configured NOT to perform route optimization		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE3 to send an Echo Request to the Home Address of QE1		
2	Check: does QE3 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>	Very Similar to TD_MOBILITY_1547_01.		

Test Description			
<b>Identifier:</b>	TD_MOB_1537_01	<b>Test Purpose:</b>	TP_MOB_1537_01
<b>Summary:</b>	'HA multicasts Neighbour Advertisement in Home network in order to intercept packets for mobile node'		
<b>Roles:</b>	Home_Agent, Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1537, RQ_001_1537, RQ_001_1539, RQ_001_1540, RQ_001_1541, RQ_001_1542, RQ_001_1543, RQ_001_1544		
	<pre> with {     QE1 at home     and QE1 having established communication to QE3 } ensure that {     when { QE1 moves to a foreign_network           }     then { QE3 updates its Neighbor_Discovery_cache_entry           for the link_local_address of QE1 } } </pre>		
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Home Network 1 QE3 has already sent packets to the home address of QE1 QE4 is configured with the same link-layer address as QE1 and with the Home Address of QE1 Configure R2 to advertise Prefix A instead of Prefix C		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move QE1 to Foreign Network 1		
2	Wait a few seconds (for QE1 to register with its Home Agent EUT)		
3	Disconnect EUT		
4	Connect Home Network 1 and Home Network 2 together		
5	Cause QE3 to send an Echo Request to the home address of QE1		
6	Check: does EUT receive an Echo Reply?	No	Yes
<b>Observations:</b>	<p>Explanation:</p> <p>If EUT behaves correctly (i.e. sends a NA) then QE3 will send the Echo Request to the link-layer address of EUT and will not receive any Echo Reply.</p> <p>If EUT behaves incorrectly (i.e. sends no NA) then QE3 will send the Echo Request to the link-layer address of QE1, which is equal to QE4's one and will receive any Echo Reply.</p> <p>HN1 and HN2 are connected together to avoid QE4 performing DAD and advertising itself</p> <p>NOTE: Go through steps 1 to 5 quickly enough to avoid neighbour cache expiry on QE3.</p>		

Test Description			
<b>Identifier:</b>	TD_MOB_1538_01	<b>Test Purpose:</b>	TP_MOB_1538_01
<b>Summary:</b>	'HA multicast Neighbour Advertisement to intercept the packets to the link_local_address of a registered mobile node'		
<b>Roles:</b>	Home_Agent, Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1538, RQ_001_1538, RQ_001_1539, RQ_001_1540, RQ_001_1541, RQ_001_1542, RQ_001_1543, RQ_001_1544		
<pre> with {     QE1 at_home     and QE1 using the same Interface_ID for its link_local_address                                 and its home_address     and QE3 having established communication                                 to the link_local_address of QE1 } ensure that {   when { QE1 moves to a foreign_network }   then { QE3 updates the Neighbor_Discovery_cache_entry         for the link_local_address of QE1 } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Home Network 1 QE1 uses the same Interface ID for both its link-local address and its home address QE3 has already sent packets to the link-local address of QE1 QE4 is configured with the same link-layer address as QE1 Configure R2 to advertise Prefix A instead of Prefix C		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move QE1 to Foreign Network 1		
2	Wait a few seconds (for QE1 to register with its Home Agent EUT)		
3	Disconnect EUT		
4	Connect Home Network 1 and Home Network 2 together		
5	Cause QE3 to send an Echo Request to the link-local address of QE1		
6	Check: does EUT receive an Echo Reply?	No	Yes
<b>Observations:</b>	Explanation: QE1 sends Binding Updates with the L flag activated (same interface ID for link-local and home addresses). If EUT behaves correctly (i.e. sends a NA) then QE3 will send the Echo Request to the link-layer address of EUT and will not receive any Echo Reply. If EUT behaves incorrectly (i.e. sends no NA) then QE3 will send the Echo Request to the link-layer address of QE1, which is equal to QE4's one and will receive any Echo Reply. HN1 and HN2 are connected together to avoid QE4 performing DAD and advertising itself.		

Test Description			
<b>Identifier:</b>	TD_MOB_1547_01	<b>Test Purpose:</b>	TP_MOB_1547_01
<b>Summary:</b>	'HA act as proxy for a registered mobile node and reply to any received Neighbour Solicitations for it'		
<b>Roles:</b>	Home_Agent, Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1547, RQ_001_1547, RQ_001_1548, RQ_001_1549		
<pre> with {     QE3 'is disconnected'     and QE1 away_from_home     and QE1 registered to EUT } ensure that {   when {     QE3 is connected to its home_network     and QE3 is requested to send a packet to QE1             indicating that a response is required }   then { QE3 indicates receipt of the response } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE3 is disconnected QE1 is connected to Foreign Network 1 and registered to its Home Agent QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Connect QE3 to Home Network 1		
2	Cause QE3 to send an Echo Request to the Home Address of QE1		
3	Check: does QE3 receive an Echo Reply?	Yes	No
<b>Observations:</b>	Very Similar to TD_MOBILITY_1536_01.		

## 10.4.2

## Processing Intercepted Packets

Test Description			
<b>Identifier:</b>	TD_MOB_1536_01	<b>Test Purpose:</b>	TP_MOB_1536_01
<b>Summary:</b>	'HA intercepts packets for registered mobile node on the home network and uses reverse tunnel encapsulation'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1364, RQ_001_1536, RQ_001_1551, RQ_001_1568		
	<pre> with {     QE1 away_from_home     and QE1 registered to EUT     and QE1 configured not to perform Route_Optimization } ensure that {     when { QE3 is requested to send a packet to QE1         indicating that a response is required }     then { QE3 indicates receipt of the response } } </pre>		
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Foreign Network 1 and has registered to its Home Agent EUT QE1 is configured NOT to perform route optimization		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE3 to send an Echo Request to the Home Address of QE1		
2	Check: does QE3 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>	Very Similar to TD_MOBILITY_1547_01.		

Test Description			
<b>Identifier:</b>	TD_MOB_1552_01	<b>Test Purpose:</b>	TP_MOB_1552_01
<b>Summary:</b>	'HA does not tunnel packets to the link_local_address of mobile node'		
<b>Roles:</b>	Home_Agent, Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1552, RQ_001_1552, RQ_001_1553		
	<pre> with {     QE1 away_from_home     and QE1 registered to EUT } ensure that {     when { QE3 is requested to send a packet         to the link_local_address of QE1         indicating that a response is required }     then { QE3 indicates no receipt of the response } } </pre>		
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Foreign Network 1 and registered to its Home Agent QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE3 to send an Echo Reply to the link-layer address of QE1		
2	Check: does QE3 receive an Echo Reply?	No	Yes
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1555_01	<b>Test Purpose:</b>	TP_MOB_1555_01
<b>Summary:</b>	'HA does not tunnel multicast packets with a scope smaller than global to the mobile node'		
<b>Roles:</b>	Home_Agent, Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1555, RQ_001_1556, RQ_001_1555, RQ_001_1556		
<pre> with {     QE1 subscribed to a link_local_multicast_group     and QE1 subscribed to a organization_local_multicast_group     and QE1 away_from_home     and QE1 registered to EUT } ensure that { when {     QE3 is requested to send a packet         to the link_local_multicast_group         indicating that a response is required     and QE3 is requested to send a packet         to the organization_local_multicast_group         indicating that a response is required }     then { QE3 indicates no receipt of any response } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Foreign Network 1 QE1 has registered to multicast group FF12::1 QE1 has registered to multicast group FF18::1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE3 to send an Echo Request to the multicast address FF12::1		
2	Check: does QE3 receive an Echo Reply	No	Yes
3	Cause QE3 to send an Echo Request to the multicast address FF18::1		
4	Check: does QE3 receive an Echo Reply?	No	Yes
<b>Observations:</b>	FF12::1 is a link-local scope, non reserved, multicast address FF18::1 is an organization-local scope, non reserved, multicast address		

Test Description			
<b>Identifier:</b>	TD_MOB_1555_01	<b>Test Purpose:</b>	TP_MOB_1555_01
<b>Summary:</b>	'HA does not tunnel multicast packets with a scope smaller than global to the mobile node'		
<b>Roles:</b>	Home_Agent, Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1555, RQ_001_1556, RQ_001_1555, RQ_001_1556		
<pre> with {     QE1 subscribed to a link_local_multicast_group     and QE1 subscribed to a organization_local_multicast_group     and QE1 away_from_home     and QE1 registered to EUT } ensure that { when {     QE3 is requested to send a packet         to the link_local_multicast_group         indicating that a response is required     and QE3 is requested to send a packet         to the organization_local_multicast_group         indicating that a response is required }     then { QE3 indicates no receipt of any response } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Foreign Network 1 QE1 has registered to multicast group FF12::1 QE1 has registered to multicast group FF18::1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE3 to send an Echo Request to the multicast address FF12::1		
2	Check: does QE3 receive an Echo Reply?	No	Yes
3	Cause QE3 to send an Echo Request to the multicast address FF18::1		
4	Check: does QE3 receive an Echo Reply?	No	Yes
<b>Observations:</b>	FF12::1 is a link-local scope, non reserved, multicast address. FF18::1 is an organization-local scope, non reserved, multicast address.		

Test Description			
<b>Identifier:</b>	TD_MOB_1557_01	<b>Test Purpose:</b>	TP_MOB_1557_01
<b>Summary:</b>	'HA tunnels multicast packets with a global scope to the mobile node'		
<b>Roles:</b>	Home_Agent, Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1372, RQ_001_1557, RQ_001_1557		
<pre> with {     QE1 subscribed to a global_multicast_group     and QE1 away_from_home     and QE1 registered to EUT } ensure that {     when { QE3 is requested to send a packet to the global_multicast_group         indicating that a response is required }     then { QE3 indicates receipt of the response } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Home Network 1 QE1 has registered to multicast group FF1E::1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move QE1 to Foreign Network 1		
2	Cause QE3 to send an Echo Request to the multicast address FF1E::1		
3	Check: does QE3 receives an Echo Reply?	Yes	No
4	Disconnect EUT		
5	Cause QE3 to send an Echo Request to the multicast address FF1E::1		
6	Check: does QE3 receives an Echo Reply?	No	Yes
<b>Observations:</b>	FF1E::1 is a global scope, non reserved, multicast group.		

## 10.4.3

## Multicast Membership Control

Test Description			
<b>Identifier:</b>	TD_MOB_1560_01	<b>Test Purpose:</b>	TP_MOB_1560_01
<b>Summary:</b>	'if multicast forwarding is not supported, HA ignores multicast group membership control messages'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1560		
<pre> with {     QE1 subscribed to a global_multicast_group     and EUT unable to support multicast_data_packet_forwarding     and QE1 away_from_home     and QE1 registered to EUT } ensure that {     when { QE3 is requested to send a packet         to the global_multicast_group }     then { QE3 indicates no receipt of the response } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Foreign Network 1 QE1 has registered with its Home Agent EUT EUT does not support multicast data packet forwarding		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE1 to register to multicast group FF1E::1		
2	Cause QE3 to send an Echo Reply to multicast address FF1E::1		
3	Check: does QE3 receive an Echo Reply?	No	Yes
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1807_01	<b>Test Purpose:</b>	TP_MOB_1807_01
<b>Summary:</b>	'If HA support the multicast group membership control protocols, HA must be capable to determine which multicast data packets to forward via the tunnel to MN'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1561, RQ_001_1807		
<pre>-- Config-HA with {     QE1 connected to home_network     and QE1 subscribed to a global_multicast_group     and QE3 subscribed to another global_multicast_group } ensure that { when {     QE1 moves to a foreign_network     and QE1 registers to EUT }   then {     QE1 receives packets from its global_multicast_group } }</pre>			
<b>Pre-test conditions:</b>	NOT TESTABLE BY INTEROPERABILITY MEANS You do not know if the Home Agent do not forward the multicast packets or if the Mobile Node drops this packets		
Step	Test Sequence	Verdict	
		Pass	Fail
<b>Observations:</b>			

## 10.4.5

## Handling ReverseTunnelled Packets

Test Description			
<b>Identifier:</b>	TD_MOB_1536_01	<b>Test Purpose:</b>	TP_MOB_1536_01
<b>Summary:</b>	'HA intercepts packets for registered mobile node on the home network and uses reverse tunnel encapsulation'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1364, RQ_001_1536, RQ_001_1551, RQ_001_1568		
<pre>with {     QE1 away_from_home     and QE1 registered to EUT     and QE1 configured not to perform Route_Optimization } ensure that { when { QE3 is requested to send a packet to QE1     indicating that a response is required }   then { QE3 indicates receipt of the response } }</pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Foreign Network 1 and has registered to its Home Agent EUT QE1 is configured NOT to perform route optimization		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE3 to send an Echo Request to the Home Address of QE1		
2	Check: does QE3 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>	Very Similar to TD_MOBILITY_1547_01.		

Test Description			
<b>Identifier:</b>	TD_MOB_1536_01	<b>Test Purpose:</b>	TP_MOB_1536_01
<b>Summary:</b>	'HA intercepts packets for registered mobile node on the home network and uses reverse tunnel encapsulation'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1364, RQ_001_1536, RQ_001_1551, RQ_001_1568		
<pre>with {     QE1 away_from_home     and QE1 registered to EUT     and QE1 configured not to perform Route_Optimization } ensure that { when { QE3 is requested to send a packet to QE1     indicating that a response is required }   then { QE3 indicates receipt of the response } }</pre>			

<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Foreign Network 1 and has registered to its Home Agent EUT QE1 is configured NOT to perform route optimization		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE3 to send an Echo Request to the Home Address of QE1		
2	Check: does QE3 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>	Very Similar to TD_MOBILITY_1547_01.		

#### 10.4.6 Protecting Return Routability packets

Test Description			
<b>Identifier:</b>	TD_MOB_1371_01	<b>Test Purpose:</b>	TP_MOB_1371_01
<b>Summary:</b>	'Home Agent supports ESP protection of Home Test and Home Test Init messages'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1371		
<pre> with {     QE4 configured to perform route_optimization     and QE1 configured to perform route_optimization     and QE1 configured to protect return_routability_packets         using ESP } ensure that {     when {         QE1 moves to a Foreign_Network         before QE4 sends a packet to QE1             indicating that a response is required }     then {         QE4 indicates receipt of the response directly from QE1 } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE4 is configured to perform route optimization QE1 is configured to perform route optimization QE1 is configured to protect return routability packets using ESP QE1 connected to Home Network 1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move QE1 to Foreign Network 1		
2	Wait a few seconds		
3	Cause QE4 to send an Echo Request to QE1		
4	Check: does QE4 receive Echo Reply?	Yes	No
5	Disconnect EUT		
6	Cause QE4 to send an Echo Request to QE1		
7	Check: does QE4 receive Echo Reply?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2014_01	<b>Test Purpose:</b>	TP_MOB_2014_01
<b>Summary:</b>	'Home Agent supports Home Test Init secured using tunnel_mode_ESP'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1571, RQ_001_2034, RQ_001_2035		
<pre> with {     QE1 configured to protect any Home_Test_Init to EUT         using tunnel_mode_ESP     and EUT configured to accept only Home_Test_Init secured         using tunnel_mode_ESP from QE1     and QE1 configured to perform route_optimization     and QE4 configured to perform route_optimization     and QE1 is away_from_home     and QE1 registered to EUT } ensure that {     when {         a Security_Association is established between EUT and QE1         and QE1 moves to a foreign_network }     then { QE4 and QE1 are able to communicate directly } } </pre>			



<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is configured to protect Home Test Init sent to EUT using tunnel mode ESP EUT is configured to accept only Home Test Init protected using tunnel mode ESP from QE1 QE1 configured to perform Route Optimization QE4 configured to perform Route Optimization QE1 is away from Home and registered to its Home Agent EUT		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE4 to send an Echo Request to the Home Address of QE1		
2	Wait a few second (to let QE1 register to QE4)		
3	Disconnect EUT from Home Network 1		
4	Cause QE4 to send an Echo Request to the Home Address of QE1		
5	Check: does QE4 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1574_01	<b>Test Purpose:</b>	TP_MOB_1574_01
<b>Summary:</b>	'Home Agent supports the protection of Home Test and Home Test Init messages'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1574		
<pre> with {     QE4 configured to perform route_optimization     and QE1 configured to perform route_optimization     and QE1 away_from_home     and QE1 registered to EUT     and QE1 configured to protect return_routability_packets } ensure that {   when { QE1 receives a packet from QE4         indicating that a response is required }     then { QE1 sends the response directly to QE4 } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE4 is configured to perform route optimization QE1 is configured to perform route optimization QE1 is away from home and registered to EUT QE1 is configured to protect return routability packets with QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE4 to send an Echo Request to the Home Address of QE1		
2	Check: does QE4 receive an Echo Reply from QE1?	Yes	No
3	Wait a few seconds (to let QE4 and QE1 process the return routability procedure)		
4	Disconnect EUT from Home Network 1		o
5	Cause QE4 to send an Echo Request to the Home Address of QE1		
6	Check: does QE4 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>	RRP is performed during first echo exchange.		

11

## Mobile Node Operation

Test Description			
<b>Identifier:</b>	TD_MOB_1003_01	<b>Test Purpose:</b>	TP_MOB_1003_01
<b>Summary:</b>	'MN continues to communicate after moving to a new link'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1002, RQ_001_1003, RQ_001_1004		
<pre> with {     EUT connected in home_network     and EUT registered to QE1     and EUT and QE4 established in communication } ensure that {   when {     EUT moves to a foreign_network     and QE4 is requested to send a packet to EUT         indicating that a response is required }     then { QE4 indicates receipt of the response from the EUT } } </pre>			

<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Home Network 1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause EUT to send an Echo Request to QE4		
2	Check: does EUT receive an Echo Reply from QE4?	Yes	No
3	Move EUT to Foreign Network 1		
4	wait a few seconds (to let the EUT register with its Home Agent).		
5	Cause QE4 to send an Echo Request to the Home Address of EUT		
6	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

### 11.3 Packet Processing

Test Description			
<b>Identifier:</b>	TD_MOB_1003_01	<b>Test Purpose:</b>	TP_MOB_1003_01
<b>Summary:</b>	'MN continues to communicate after moving to a new link'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1002, RQ_001_1003, RQ_001_1004		
<pre> with {     EUT connected in home_network     and EUT registered to QE1     and EUT and QE4 established in communication } ensure that {   when {     EUT moves to a foreign_network     and QE4 is requested to send a packet to EUT         indicating that a response is required   }   then { QE4 indicates receipt of the response from the EUT } } </pre> <p>-----</p>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Home Network 1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause EUT to send an Echo Request to QE4		
2	Check: does EUT receive an Echo Reply from QE4?	Yes	No
3	Move EUT to Foreign Network 1		
4	wait a few seconds (to let the EUT register with its Home Agent)		
5	Cause QE4 to send an Echo Request to the Home Address of EUT		
6	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

#### 11.3.1 Sending Packets While Away From Home

Test Description			
<b>Identifier:</b>	TD_MOB_1820_01	<b>Test Purpose:</b>	TP_MOB_1820_01
<b>Summary:</b>	'When Home Agent receives a packet from Mobile Node using reverse tunnelling, it forwards the encapsulated packet to Correspondent Node'		
<b>Roles:</b>	Home_Agent, Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1820, RQ_001_1820		
<pre> with {     QE1 away_from_home     and QE1 registered to EUT     and QE1 configured not to perform Route_Optimization } ensure that {   when { EUT is disconnected }   then { QE1 and QE4 are unable to communicate with QE4 } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Foreign Network 1 and registered to EUT QE1 is configured NOT to perform Route Optimization		

Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE4 to send an Echo Request to the Home Address to QE1		
2	Check: does QE4 receive an Echo Reply from QE1?	Yes	No
3	Disconnect EUT from Home Network 1		
4	Cause QE4 to send an Echo Request to the Home Address to QE1		
5	Check: does QE4 receive an Echo Reply from QE1?	No	Yes
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1003_01	<b>Test Purpose:</b>	TP_MOB_1003_01
<b>Summary:</b>	'MN continues to communicate after moving to a new link'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1002, RQ_001_1003, RQ_001_1004		
<pre> with {     EUT connected in home_network     and EUT registered to QE1     and EUT and QE4 established in communication } ensure that { when {     EUT moves to a foreign_network     and QE4 is requested to send a packet to EUT     indicating that a response is required } then { QE4 indicates receipt of the response from the EUT } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Home Network 1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause EUT to send an Echo Request to QE4		
2	Check: does EUT receive an Echo Reply from QE4?	Yes	No
3	Move EUT to Foreign Network 1		
4	wait a few seconds (to let the EUT register with its Home Agent).		
5	Cause QE4 to send an Echo Request to the Home Address of EUT		
6	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1612_01	<b>Test Purpose:</b>	TP_MOB_1612_01
<b>Summary:</b>	'When MN starts a transport-level connections at Home, it conserves that connection away_from_home'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1612		
<pre> with {     EUT connected in home_network     and EUT having established a transport_connection to QE3 } ensure that { when { EUT moves to a foreign_network } then { EUT and QE3 are able to communicate using the transport_connection } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT connected to Home Network 1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause EUT to establish a transport-level connection (telnet, ftp, ssh, etc.) with QE3		
2	Move EUT to foreign network 1		
3	Check: Is the transport-level connection established in step 1 still alive?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1613_01	<b>Test Purpose:</b>	TP_MOB_1613_01
<b>Summary:</b>	'When MN starts a transport-level connections in Foreign network, it conserves this connection into another Foreign network'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1613		
<pre> with {     EUT away_from_home     and EUT registered to QE1     and EUT having established a transport_connection to QE3 } ensure that {     when { EUT moves to another foreign_network }     then { EUT and QE3 are able to communicate           using the transport_connection } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT connected to Foreign Network 1 and registered to its Home Agent QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause EUT to establish a transport-level (telnet, ftp, ssh or similar) connection with QE1		
2	Move EUT to foreign network 2		
3	Check: Is the transport level connection established in step 1 still alive?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1614_01	<b>Test Purpose:</b>	TP_MOB_1614_01
<b>Summary:</b>	'MN sends packets directly to the correspondent node when a binding exists'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1614		
<pre> with {     EUT away_from_home     and EUT registered to QE1     and EUT configured to perform route_optimization     and QE4 configured to perform route_optimization     and EUT having established a binding to QE4 } ensure that {     when { EUT receives a packet from QE4           indicating that a response is required }     then { EUT sends the response directly to QE4 } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT connected in Foreign Network 1 and registered to its Home Agent QE1 EUT configured to perform route optimization QE4 configured to perform route optimization EUT has established a binding to QE4		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Disconnect QE1		
2	Cause QE4 to send an Echo Request to the Home Address of EUT		
3	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1615_01	<b>Test Purpose:</b>	TP_MOB_1615_01
<b>Summary:</b>	'MN uses reverse tunnelling to the correspondent node when no binding exists'		
<b>Roles:</b>	Mobile_Node, Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1615, RQ_001_1615, RQ_001_1819		
<pre> with {     EUT_away_from_home     and EUT_registered_to_QE1     and EUT_configured_to_perform_route_optimization     and QE4_configured_not_to_perform_Route_Optimization } ensure that {     when {         EUT_receives_a_packet_from_QE4         indicating_that_a_response_is_required     }     then {         QE4_indicates_receipt_of_the_response_from_the_EUT     } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT connected in Foreign Network 1 and registered to its Home Agent QE1 EUT configured to perform route optimization QE4 configure NOT to perform route optimization		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE4 to send an Echo Request to the Home Address of EUT		
2	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
3	Disconnect QE1		
4	Cause QE4 to send an Echo Request to the Home Address of EUT		
5	Check: does QE4 receive an Echo Reply from EUT?	No	Yes
<b>Observations:</b>			

## 11.4

## Home Agent and Prefix Management

Test Description			
<b>Identifier:</b>	TD_MOB_1082_01	<b>Test Purpose:</b>	TP_MOB_1082_01
<b>Summary:</b>	'Home Agent uses a Security Association to protect integrity and authenticity of Mobile_Prefix_Solicitations and Advertisements'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1014, RQ_001_1082, RQ_001_1607		
<pre> with {     QE1_at_home     and QE1_configured_to_protect         Mobile_Prefix_Solicitations     and QE1_configured_to_accept_only_secured         Mobile_Prefix_Advertisements     and QE1_configured_to_have_a_short_prefix_lifetime --(suggest 30s) } ensure that {     when {         QE1_moves_to_a_foreign_network         before_its_prefix_lifetime_expires         before_QE4_sends_a_packet_to_QE1         indicating_that_a_response_is_required     }     then {         QE4_indicates_receipt_of_the_response_from_QE1     } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is connected to Foreign Network 1 and registered to its Home Agent EUT QE1 is configured to protect Mobile Prefix Solicitation messages QE1 is configured to only accept protected Mobile Prefix Advertisement messages EUT is configured to advertise a preferred prefix lifetime of 20 sec EUT is configured to advertise a valid prefix lifetime of 30 sec		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Wait 30 sec so that initial lifetime of the home address of QE1 has expired		
2	Cause QE4 to send an Echo Request to the Home Address of QE1		
3	Check: does QE4 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1082_02	<b>Test Purpose:</b>	TP_MOB_1082_02
<b>Summary:</b>	'Mobile Node uses a Security Association to protect integrity and authenticity of Mobile Prefix Solicitations and Advertisements'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1014, RQ_001_1082, RQ_001_1663, RQ_001_1664		
<pre> with {     EUT at_home     and QE1 configured to accept only secured         Mobile_Prefix_Solicitations     and QE1 configured to protect Mobile_Prefix_Advertisements     and EUT configured to have a short prefix_lifetime (--suggest 30s)' } ensure that {     when {         EUT moves to a foreign_network         before its prefix_lifetime expires         before QE4 sends a packet to the EUT             indicating that response is required }     then {         QE4 indicates receipt of the response from the EUT } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and is registered to its Home Agent QE1 QE1 is configured to only accept protected Mobile Prefix Solicitation messages QE1 is configured to protect Mobile Prefix Advertisement messages QE1 is configured to advertise a preferred prefix lifetime of 20 sec QE1 is configured to advertise a valid prefix lifetime of 30 sec		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Wait 30 sec so that EUT has send a Mobile Prefix Solicitation message and received a Mobile Prefix Advertisement message		
2	Cause QE4 to send an Echo Request to the Home Address of EUT		
3	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

#### 11.4.1 Dynamic Home Agent Address Discovery

Test Description			
<b>Identifier:</b>	TD_MOB_1655_01	<b>Test Purpose:</b>	TP_MOB_1655_01
<b>Summary:</b>	'Mobile Node already registered to a Home Agent uses that Home Agent for any new registrations'		
<b>Roles:</b>	Mobile_Node, Mobile_Node	<b>Configuration:</b>	CF_MOB_06
<b>References:</b>	RQ_001_1655, RQ_001_1655		
<pre> with {     EUT configured 'to use DHAAD'     and EUT away_from_home     and EUT registered to QE1     and QE2 disconnected from Home_Network 1 } ensure that {     when {         QE1 is disconnected from Home_Network 1         and QE2 is connected to Home_Network 1         and EUT moves to another foreign_network }     then {         QE4 and EUT are unable to communicate         within MAX_BINDACK_TIMEOUT         -- EUT tries to register with QE1         and QE4 is able to communicate after MAX_BINDACK_TIMEOUT } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is configured to use DHAAD QE2 is configured to serve as home agent for home network 1 QE2 is disconnected EUT connected to foreign network 1 and registered to QE1		

Step	Test Sequence	Verdict	
		Pass	Fail
1	Disconnect QE1		
2	Connect QE2 to Home Network 1		
3	Move EUT to foreign network 2		
4	Cause QE4 to continuously send ICMP ECHO requests to EUT		
5	Check: does QE4 receive ICMP ECHO replies from EUT?	No	Yes
6	Wait for MAX_BINDACK_TIMEOUT seconds or more (EUT should still be trying to register to QE1 until this delay expires)		
7	Check: does QE4 receive ICMP ECHO replies from EUT? (EUT should now have successfully registered to QE2)	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1657_01	<b>Test Purpose:</b>	TP_MOB_1657_01
<b>Summary:</b>	'Mobile Node attempts Dynamic Home Agent Address Discovery if it cannot contact its current Home Agent'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_06
<b>References:</b>	RQ_001_1657		
<pre> with {     EUT_away_from_home     and EUT_registered_to_QE1 } ensure that {     when {         QE1_is_disconnected_from_the_Home_Network         and EUT_moves_to_another_foreign_network     }     then {         QE4_and_EUT_are_able_to_communicate     } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE2 is configured to be Home Agent on Home Network 1 EUT is connected to Foreign Network 1 and is registered to its Home Agent QE1 QE1 is configured to have a Binding Lifetime at one minute		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Disconnect QE1 from Home Network 1		
2	Move EUT to Foreign Network 2		
3	Wait a few seconds (for EUT to try to bind to Home Agent)		
4	Cause QE3 to send an Echo Request to the Home Address of EUT		
5	Check: does QE3 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1385_01	<b>Test Purpose:</b>	TP_MOB_1385_01
<b>Summary:</b>	'Mobile Node supports Dynamic Home Agent Address Discovery'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1385		
<pre> with {     EUT_registered_to_QE1     and EUT_disconnected     and EUT_configured_not_to_perform_Route_Optimization     and QE4_configured_not_to_perform_Route_Optimization } ensure that {     when {         QE1_is_requested_to_modify_its_IP_address         before_the_EUT_is_connected_to_a_foreign_network     }     then {         QE4_and_the_EUT_are_able_to_communicate     } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Home Network 1		

Step	Test Sequence	Verdict	
		Pass	Fail
1	Disconnect EUT from Home Network 1		
2	Configure QE1 with a new IP address on prefix_B		
3	Connect EUT to Foreign Network 1		
4	Cause QE4 to send an Echo Request to the Home Address of EUT		
5	Check: does QE4 receives an Echo Reply?	Yes	No
<b>Observations:</b>			

#### 11.4.2 Sending Mobile Prefix Solicitations

Test Description			
<b>Identifier:</b>	TD_MOB_1661_01	<b>Test Purpose:</b>	TP_MOB_1661_01
<b>Summary:</b>	'MN sends Mobil Prefix Solicitation to HA when its home address becomes invalid'		
<b>Roles:</b>	Mobile_Node, Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1661, RQ_001_1661, RQ_001_1662, RQ_001_1665		
<pre> with {     EUT away_from_home     and EUT registered to QE1 } ensure that {     when { EUT 'has its home address which becomes invalid' }     then { EUT 'update the prefix lifetime information for its home address' } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Home Network 1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move EUT to Foreign network 1		
2	Wait for original Home address lifetime to expire		
3	Cause QE4 to send an Echo Request to EUT		
4	Check: does QE4 receive an Echo Reply?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1082_02	<b>Test Purpose:</b>	TP_MOB_1082_02
<b>Summary:</b>	'Mobile Node uses a Security Association to protect integrity and authenticity of Mobile Prefix Solicitations and Advertisements'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1014, RQ_001_1082, RQ_001_1663, RQ_001_1664		
<pre> with {     EUT at_home     and QE1 configured to accept only secured         Mobile_Prefix_Solicitations     and QE1 configured to protect Mobile_Prefix_Advertisements     and EUT configured to have a short prefix_lifetime (--suggest 30s)' } ensure that {     when {         EUT moves to a foreign_network         before its prefix_lifetime expires         before QE4 sends a packet to the EUT             indicating that response is required }     then {         QE4 indicates receipt of the response from the EUT } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and is registered to its Home Agent QE1 QE1 is configured to only accept protected Mobile Prefix Solicitation messages QE1 is configured to protect Mobile Prefix Advertisement messages QE1 is configured to advertise a preferred prefix lifetime of 20 sec QE1 is configured to advertise a valid prefix lifetime of 30 sec		



Step	Test Sequence	Verdict	
		Pass	Fail
1	Wait 30 sec so that EUT has send a Mobile Prefix Solicitation message and received a Mobile Prefix Advertisement message		
2	Cause QE4 to send an Echo Request to the Home Address of EUT		
3	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1082_02	<b>Test Purpose:</b>	TP_MOB_1082_02
<b>Summary:</b>	'Mobile Node uses a Security Association to protect integrity and authenticity of Mobile Prefix Solicitations and Advertisements'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1014, RQ_001_1082, RQ_001_1663, RQ_001_1664		
<pre> with {     EUT at_home     and QE1 configured to accept only secured         Mobile_Prefix_Solicitations     and QE1 configured to protect Mobile_Prefix_Advertisements     and EUT configured to have a short prefix_lifetime (--suggest 30s)' } ensure that {     when {         EUT moves to a foreign_network         before its prefix_lifetime expires         before QE4 sends a packet to the EUT             indicating that response is required }     then {         QE4 indicates receipt of the response from the EUT } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and is registered to its Home Agent QE1 QE1 is configured to only accept protected Mobile Prefix Solicitation messages QE1 is configured to protect Mobile Prefix Advertisement messages QE1 is configured to advertise a preferred prefix lifetime of 20 sec QE1 is configured to advertise a valid prefix lifetime of 30 sec		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Wait 30 sec so that EUT has send a Mobile Prefix Solicitation message and received a Mobile Prefix Advertisement message		
2	Cause QE4 to send an Echo Request to the Home Address of EUT		
3	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

### 11.4.3 Receiving Mobile Prefix Advertisements

Test Description			
<b>Identifier:</b>	TD_MOB_1384_01	<b>Test Purpose:</b>	TP_MOB_1384_01
<b>Summary:</b>	'MN reconfigures its home address according to the prefix information in a Mobile_Prefix_Advertisement'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1384		
<pre> with {     EUT away_from_home     and EUT registered to QE1 } ensure that {     when {         QE1 is requested to modify its home_network prefix }     then {         QE4 and the EUT are able to communicate         using the new home_address } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT connected to foreign network 1 EUT registered to QE1		

Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE1 to change the prefix on its home subnet interface		
2	Wait for some seconds to allow EUT to retrieve new home address		
3	Check: does EUT indicate a new home address?	Yes	No
<b>Observations:</b>			

## 11.5 Movement

Test Description			
<b>Identifier:</b>	TD_MOB_1809_01	<b>Test Purpose:</b>	TP_MOB_1809_01
<b>Summary:</b>	'Mobile Nodes support returning home'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1808, RQ_001_1809		
<pre> with {     EUT_away_from_home     and QE4_able_to_communicate_with_EUT } ensure that {     when { EUT_returns_home }     then { QE4_and_the_EUT_are_able_to_communicate } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and registered to its Home Agent QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move EUT to Home Network 1		
2	Cause QE4 to send an Echo Request to the Home Address of EUT		
3	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1809_01	<b>Test Purpose:</b>	TP_MOB_1809_01
<b>Summary:</b>	'Mobile Nodes support returning home'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1808, RQ_001_1809		
<pre> with {     EUT_away_from_home     and QE4_able_to_communicate_with_EUT } ensure that {     when { EUT_returns_home }     then { QE4_and_the_EUT_are_able_to_communicate } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and registered to its Home Agent QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move EUT to Home Network 1		
2	Cause QE4 to send an Echo Request to the Home Address of EUT		
3	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1380_01	<b>Test Purpose:</b>	TP_MOB_1380_01
<b>Summary:</b>	'Mobile Node supports care-of address formation'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1380		
<pre> with {     EUT connected to home_network     and QE4 able to communicate with EUT } ensure that {     when { EUT moves to a foreign_network }     then { QE4 and the EUT are able to communicate } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Home Network 1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move EUT to Foreign Network 1		
2	Wait a few seconds (to let the EUT register with its Home Agent)		
3	Cause QE4 to send an Echo Request to the Home Address of EUT		
4	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1683_01	<b>Test Purpose:</b>	TP_MOB_1683_01
<b>Summary:</b>	'Mobile Node generates a new primary Care of Address after having moved'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1380, RQ_001_1683, RQ_001_1690		
<pre> with {     EUT away_from_home     and QE4 able to communicate with EUT } ensure that {     when { EUT moves to another foreign_network }     then { QE4 and the EUT are able to communicate } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and registered to its Home Agent QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move EUT to Foreign Network 2		
2	Wait a few seconds (to let the EUT register with its Home Agent)		
3	Cause QE4 to send an Echo Request to the Home Address of EUT		
4	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

## 11.5.1

## Movement Detection

Test Description			
<b>Identifier:</b>	TD_MOB_1678_01	<b>Test Purpose:</b>	TP_MOB_1678_01
<b>Summary:</b>	'MN discover a new default router when it detects the default router is no longer bi-directionally reachable'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1678		
<pre> with {     EUT connected in home_network     and QE1 disconnected } ensure that {     when {         EUT moves to a foreign_network         and EUT receives a packet from QE3             indicating that a response is required             and containing a destination_address             set to the Care_of_Address of the EUT }     then { QE3 indicates receipt of the response from the EUT } } </pre>			

<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is disconnected EUT is connected to Home Network 1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move EUT to Foreign Network 1		
2	Cause QE3 to send an Echo Request to the new Care-of Address of EUT		
3	Check: does QE3 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1824_01	<b>Test Purpose:</b>	TP_MOB_1824_01
<b>Summary:</b>	'When Mobile Node detects a L3 handover, it constructs a new Care-of Address, it select a new default router and register the new address to its Home Agent and the Correspondent Nodes which it is performing route optimization		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1682, RQ_001_1824		
<pre> with {     EUT away_from_home     and EUT registered to QE1     and EUT configured to perform route_optimization     and QE4 configured to perform route_optimization     and EUT having established a binding to QE4 } ensure that {     when { EUT moves to another foreign_network }     then { QE4 and EUT are able to communicate directly } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and registered to its Home Agent QE1 EUT is configured to perform Route Optimization QE4 is configured to perform Route Optimization EUT has established a binding with the Correspondent Node QE4		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Moves EUT to Foreign Network 2		
2	Wait a few seconds (to let EUT update its bindings to QE1 and QE4)		
3	Disconnect QE1 from Home Network 1		
4	Cause QE4 to send an Echo Request to the Home Address to EUT		
5	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1824_01	<b>Test Purpose:</b>	TP_MOB_1824_01
<b>Summary:</b>	'When Mobile Node detects a L3 handover, it constructs a new Care-of Address, it select a new default router and register the new address to its Home Agent and the Correspondent Nodes which it is performing route optimization		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1682, RQ_001_1824		
<pre> with {     EUT away_from_home     and EUT registered to QE1     and EUT configured to perform route_optimization     and QE4 configured to perform route_optimization     and EUT having established a binding to QE4 } ensure that {     when { EUT moves to another foreign_network }     then { QE4 and EUT are able to communicate directly } } </pre>			

<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and registered to its Home Agent QE1 EUT is configured to perform Route Optimization QE4 is configured to perform Route Optimization EUT has established a binding with the Correspondent Node QE4		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Moves EUT to Foreign Network 2		
2	Wait a few seconds (to let EUT update its bindings to QE1 and QE4)		
3	Disconnect QE1 from Home Network 1		
4	Cause QE4 to send an Echo Request to the Home Address to EUT		
5	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

### 11.5.2 Forming New Care-of Addresses

Test Description			
<b>Identifier:</b>	TD_MOB_1683_01	<b>Test Purpose:</b>	TP_MOB_1683_01
<b>Summary:</b>	'Mobile Node generates a new primary Care of Address after having moved'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1380, RQ_001_1683, RQ_001_1690		
<pre> with {     EUT away_from_home     and QE4 able to communicate with EUT } ensure that {     when {         EUT moves to another foreign_network     }     then {         QE4 and the EUT are able to communicate     } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and registered to its Home Agent QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move EUT to Foreign Network 2		
2	Wait a few seconds (to let the EUT register with its Home Agent)		
3	Cause QE4 to send an Echo Request to the Home Address of EUT		
4	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1684_01	<b>Test Purpose:</b>	TP_MOB_1684_01
<b>Summary:</b>	'Mobile Node generates a new primary Care of Address when the current one is deprecated'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_07
<b>References:</b>	RQ_001_1684		
<pre> with {     EUT away_from_home     and QE3 configured as default_router for EUT     and QE2 able to communicate with EUT } ensure that {     when {         QE3 stops advertizing the old prefix         before (QE3 starts advertizing a new prefix         before QE2 is requested to send a packet to the EUT         indicating that a response is required)     }     then {         QE2 indicates receipt of the response from the EUT     } } </pre>			
<b>Pre-test conditions:</b>	NOT TESTABLE BY INTEROPERABILITY MEAN Impossible to know when the Care-of address registration will take place Depending of the implementation to reduce the handover		
Step	Test Sequence	Verdict	
		Pass	Fail
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1005_01	<b>Test Purpose:</b>	TP_MOB_1005_01
<b>Summary:</b>	'When away, Mobile Node is addressable at one or more Care of Addresses'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1005		
<pre> with {     EUT at_home     and QE6 'advertising a second prefix on Foreign Network 1' } ensure that { when { EUT moves to Foreign_Network 1 }   then { QE4 and EUT are able to communicate         using first and second Care_of_address } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Home Network 1 Both R1 and R3 have two global addresses, one on Prefix B and one on Prefix E R3 advertises prefix B and prefix E on Foreign Network 1 QE1, QE4 and R2 have a static route for prefix E and are able to reach a node with a prefix E on Foreign Network 1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move EUT to Foreign Network 1		
2	Cause QE4 to send an Echo Request to EUT on its care-of address generated using prefix E		
3	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
4	Cause QE4 to send an Echo Request to EUT on its care-of address generated using prefix B		
5	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

## 11.5.3

## Using Multiple Care-of Addresses

Test Description			
<b>Identifier:</b>	TD_MOB_1683_01	<b>Test Purpose:</b>	TP_MOB_1683_01
<b>Summary:</b>	'Mobile Node generates a new primary Care of Address after having moved'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1380, RQ_001_1683, RQ_001_1690		
<pre> with {     EUT away_from_home     and QE4 able to communicate with EUT } ensure that { when { EUT moves to another foreign_network }   then { QE4 and the EUT are able to communicate } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and registered to its Home Agent QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move EUT to Foreign Network 2		
2	Wait a few seconds (to let the EUT register with its Home Agent)		
3	Cause QE4 to send an Echo Request to the Home Address of EUT		
4	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1693_01	<b>Test Purpose:</b>	TP_MOB_1693_01
<b>Summary:</b>	'MN accepts packets at its previous CoA after registering its new primary CoA'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1693		
<pre> with {     EUT away_from_home     and EUT registered to QE1     and QE8 advertizing a new prefix -- thus causing a new care-of                                      -- address to be generated } ensure that { when {     QE8 stops advertizing the old prefix     before (QE8 starts advertizing a new prefix     before EUT receives a packet from QE3             indicating that a response is required             and containing a destination_address             set to the old Care_Of_Address of the EUT) }     then { QE3 indicates receipt of the response from the EUT } } </pre>			
<b>Pre-test conditions:</b>	NOT TESTABLE BY INTEROPERABILITY MEAN Impossible to know when the Care-of address registration will take place Depending of the implementation to reduce the handover		
<b>Step</b>	<b>Test Sequence</b>	<b>Verdict</b>	
		<b>Pass</b>	<b>Fail</b>
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1694_01	<b>Test Purpose:</b>	TP_MOB_1694_01
<b>Summary:</b>	'Mobile Node invalidates all associated Care of Addresses when the corresponding router is unreachable'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1694		
<pre> with {     EUT away_from_home     and EUT registered to QE1 } ensure that { when { EUT moves to another foreign_network }     then { QE1 and the EUT are unable to communicate           using the old Care_of_Address } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and registered to its Home Agent QE1		
<b>Step</b>	<b>Test Sequence</b>	<b>Verdict</b>	
		<b>Pass</b>	<b>Fail</b>
1	Move EUT to Foreign Network 2		
2	Cause QE4 to send an Echo Request to EUT on its old care-of address of the Foreign Network 1		
3	Check: does QE4 receive an Echo Reply from EUT?	No	Yes
<b>Observations:</b>			

## 11.5.4

## Returning Home

Test Description			
<b>Identifier:</b>	TD_MOB_1702_01	<b>Test Purpose:</b>	TP_MOB_1702_01
<b>Summary:</b>	'Mobile Node replies to Neighbour Solicitations for its Home Address after returning home and having sent a Binding Update'		
<b>Roles:</b>	Mobile_Node, Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1695, RQ_001_1702, RQ_001_1702, RQ_001_1703		
<pre> with {     EUT away_from_home     and EUT registered to QE1 } ensure that {     when {         EUT returns home         and QE1 is disconnected from the home_network     }     then { QE4 and the EUT are unable to communicate } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and registered to its Home Agent QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	QE1 is disconnected from Home Network 1		
2	Move EUT to Home Network 1		
3	Cause QE4 send an Echo Request to the Home Address of EUT		
4	Check: does QE4 receive an Echo Reply from EUT?	No	Yes
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1700_01	<b>Test Purpose:</b>	TP_MOB_1700_01
<b>Summary:</b>	'Mobile Node does not perform Duplicate Address Detection when returning home before the expiry of its bindings'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1700		
<pre> with {     EUT away_from_home     and EUT registered to QE1     and QE1 is disconnected     and QE3 having the same Home_Address as EUT     and QE3 having the same ethernet_address as QE1 } ensure that {     when {         EUT returns home before the binding_lifetime expires         and QE3 is disconnected         and QE1 is connected to the Home_Network     }     then { EUT and QE4 are able to communicate } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and registered to its Home Agent QE1 QE3 is disconnected from Home Network 1 QE3 is configured with the same address as EUT and the same Ethernet address as QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Disconnected QE1 from Home Network 1		
2	Connected QE3 to Home Network 1		
3	Move EUT to Home Network 1		
4	Wait a very few seconds (two seconds, to let Mobile Node send Binding Update to its Home Agent)		
5	Disconnect QE3 to Home Network 1		
6	Connect QE1 to Home network 1		
7	Wait a few seconds (to let EUT de-register with its Home Agent QE1)		
8	Cause QE4 to send an Echo Request to EUT		
9	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			



Test Description			
<b>Identifier:</b>	TD_MOB_1701_01	<b>Test Purpose:</b>	TP_MOB_1701_01
<b>Summary:</b>	'Mobile Node performs Duplicate Address Detection when returning home after its bindings have expired'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1701		
<pre> with {     EUT away_from_home     and EUT registered to QE1     and EUT binding_lifetime expired at QE1     and QE4 connected to home_network         using the same Home_Address as EUT } ensure that {     when { EUT returns home }     then { EUT is unable to communicate } -- DAD fails } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is configured to have a Binding Lifetime at one minute EUT is connected to Foreign Network 1 and registered to its Home Agent QE1 QE4 is manually configured with the same address as EUT QE4 is disconnected		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Disconnect QE1		
2	Wait one minute (to let the Binding of EUT expire)		
3	Connect QE4 to Home Network 1		
4	Move EUT to Home Network 1		
5	QE4 is disconnected from Home Network 1		
6	Cause QE1 to send an Echo Request to the Home Address of EUT		
7	Check: does QE1 receive an Echo Reply from EUT?	No	Yes
<b>Observations:</b>			

## 11.6.3

## Protecting Return Routability Packets

Test Description			
<b>Identifier:</b>	TD_MOB_1725_01	<b>Test Purpose:</b>	TP_MOB_1725_01
<b>Summary:</b>	'Mobile Node support the protection of Home Test and Home Test Init messages'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1725		
<pre> with {     EUT away_from_home     and EUT registered to QE1     and EUT configured to perform route_optimization     and QE4 configured to perform route_optimization     and QE1 configured to protect return_routability_packets } ensure that {     when { EUT receives a packet from QE4         indicating that a response is required }     then { EUT sends a response directly to QE4 } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and registered to its Home Agent QE1 EUT is configured to perform route optimization QE4 is configured to perform route optimization QE1 is configured to protect return routability packets by IPSec with EUT		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE4 to send an Echo Request to the Home Address of EUT		
2	Check: does QE4 receive an Echo Reply from EUT	Yes	No
<b>Observations:</b>			

## 11.6 Return Routability Procedure

Test Description			
<b>Identifier:</b>	TD_MOB_1063_01	<b>Test Purpose:</b>	TP_MOB_1063_01
<b>Summary:</b>	'Mobile Node is able to participate in Return Routability Procedure'		
<b>Roles:</b>	Mobile_Node, Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1048, RQ_001_1063, RQ_001_1709, RQ_001_1063, RQ_001_1064, RQ_001_1744, RQ_001_1745, RQ_001_1750, RQ_001_1751, RQ_001_1754, RQ_001_1759		
<pre> with {     EUT away_from_home     and EUT registered to QE1     and EUT configured to perform route_optimization     and QE4 configured to perform route_optimization } ensure that {     when { EUT receives a packet from QE4             indicating that a response is required }     then { QE4 indicates receipt of the response directly from the EUT } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and is registered to its Home Agent QE1 EUT is configured to perform route optimization QE4 is configured to perform route optimization		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE4 to send an Echo Request message to the Home Address of EUT		
2	Check: does QE4 receive Echo Replies from EUT?	Yes	No
3	Wait a few seconds to ensure that EUT and QE4 have had time to complete the Return Routability Procedure		
4	Disconnect QE1 from the network		
5	Cause QE4 to send an Echo Request to the Home Address of EUT		
6	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>	If the Mobile Node still manages to communicate with the Corresponding Node once the Home Agent is disconnected from the network, this shows that it is using Route Optimization and hence that it managed to perform the Return Routability Procedure.		

## 11.6.1 Sending Test Init Messages

Test Description			
<b>Identifier:</b>	TD_MOB_1063_01	<b>Test Purpose:</b>	TP_MOB_1063_01
<b>Summary:</b>	'Mobile Node is able to participate in Return Routability Procedure'		
<b>Roles:</b>	Mobile_Node, Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1048, RQ_001_1063, RQ_001_1709, RQ_001_1063, RQ_001_1064, RQ_001_1744, RQ_001_1745, RQ_001_1750, RQ_001_1751, RQ_001_1754, RQ_001_1759		
<pre> with {     EUT away_from_home     and EUT registered to QE1     and EUT configured to perform route_optimization     and QE4 configured to perform route_optimization } ensure that {     when { EUT receives a packet from QE4             indicating that a response is required }     then { QE4 indicates receipt of the response directly from the EUT } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and is registered to its Home Agent QE1 EUT is configured to perform route optimization QE4 is configured to perform route optimization		

Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE4 to send an Echo Request message to the Home Address of EUT		
2	Check: does QE4 receive Echo Replies from EUT?	Yes	No
3	Wait a few seconds to ensure that EUT and QE4 have had time to complete the Return Routability Procedure		
4	Disconnect QE1 from the network		
5	Cause QE4 to send an Echo Request to the Home Address of EUT		
6	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>	If the Mobile Node still manages to communicate with the Corresponding Node once the Home Agent is disconnected from the network, this shows that is using Route Optimization and hence that it managed to perform the Return Routability Procedure.		

### 11.6.2 Receiving Test Messages

Test Description			
<b>Identifier:</b>	TD_MOB_1724_01	<b>Test Purpose:</b>	TP_MOB_1724_01
<b>Summary:</b>	'Mobile Node falls back to tunnelling if correspondent refuses Route Optimization'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1724		
<pre> with {     EUT away_from_home     and EUT registered to QE1     and EUT configured to perform route_optimization     and QE4 configured not to perform Route_Optimization } ensure that {     when {         EUT receives a packet from QE4         indicating that a response is required     }     then {         QE4 indicates receipt of the response from the EUT     } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and has registered to its Home Agent QE1 EUT is configured to perform route optimization QE4 is configured NOT to perform route optimization		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE4 to send an Echo Request to the Home Address of EUT		
2	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>	As QE4 is configured to refuse Route Optimization, EUT can only fall back to tunnelling.		

### 11.7.1 Sending Binding Updates To The Home Agent

Test Description			
<b>Identifier:</b>	TD_MOB_1727_01	<b>Test Purpose:</b>	TP_MOB_1727_01
<b>Summary:</b>	'Mobile Node registers its new primary Care-Of Address after changing it'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1727		
<pre> with {     EUT away_from_home     and EUT registered to QE1 } ensure that {     when {         EUT moves to another foreign_network         and EUT receives a packet from QE4         indicating that a response is required     }     then {         QE4 indicates receipt of the response from the EUT     } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and is registered to its Home Agent QE1		

Step	Test Sequence	Verdict	
		Pass	Fail
1	Move EUT to Foreign Network 2		
2	Cause QE4 to send an Echo Request to the Home Address of EUT		
3	Check: does QE4 receives an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1768_01	<b>Test Purpose:</b>	TP_MOB_1768_01
<b>Summary:</b>	'Mobile Node sends Binding Update before expiry of the binding lifetime'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1728, RQ_001_1768		
<pre> with {     EUT away_from_home     and EUT registered to QE1     and EUT able to communicate with QE4 } ensure that {     when { QE4 (is requested to send a packet to the EUT               indicating that a response is required)           after the binding_lifetime }     then { QE4 indicates receipt of the response from the EUT } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and registered to its Home Agent QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Wait a period equal to the Binding Lifetime		
2	Cause QE4 to send an Echo Request to the Home Address of EUT		
3	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1733_01	<b>Test Purpose:</b>	TP_MOB_1733_01
<b>Summary:</b>	'Mobile Node sends Binding Update messages to its Home Agent until it receives a matching Binding_Acknowledgement message, before MAX_BINDACK_TIMEOUT seconds'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1733		
<pre> with {     EUT at_home     and EUT configured to have its Home_Agent_address available     and QE1 disconnected } ensure that {     when {         EUT moves to a foreign_network         and QE1 is connected after 15 seconds         -- ~ MAX_BINDACK_TIMEOUT / 2     }     then { QE4 and EUT are able to communicate } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Home Network 1 EUT is aware of the address of its Home Agent QE1 is disconnected from Home Network 1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move EUT to Foreign Network 1		
2	Wait 20 seconds (EUT will try to bind to QE1)		
3	Connect QE1 to Home Network 1		
4	Wait a few seconds (to let EUT de-register to QE1)		
5	Cause QE4 to send an Echo Request to the Home Address of EUT		
6	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1734_01	<b>Test Purpose:</b>	TP_MOB_1734_01
<b>Summary:</b>	'When Mobile Node knows several Home Agent (returned during DHAAD), Mobile Node tries to register with other Home Agents when registration fails with the first one'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_06
<b>References:</b>	RQ_001_1734		
<pre> with {     EUT not configured to have its Home_Agent_address available     and QE1 configured to have a Home_Agent_Preference greater than QE2 } ensure that {     when {         QE1 is disconnected         and EUT moves to a foreign_network     }     then {         QE4 and EUT are able to communicate         after MAX_BINDACK_TIMEOUT     } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is unaware the address of its Home Agent QE2 is configured to serve as Home Agent in the Home Network 1 QE1 is configured with a Home Agent Preference higher than QE2		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move EUT to Foreign Network 1		
2	Wait a few seconds		
3	Cause QE4 to send an Echo Request to the Home Address of EUT		
4	Check: does QE4 receive an Echo Reply from EUT?	No	Yes
5	Wait two minutes		
6	Cause QE4 to send an Echo Request to the Home Address of EUT		
7	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1740_01	<b>Test Purpose:</b>	TP_MOB_1740_01
<b>Summary:</b>	'Mobile Node attempts to register all of its home addresses'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1740		
<pre> with {     EUT disconnected     and EUT configured to have 2 home_addresses } ensure that {     when {         EUT is connected to a foreign_network         and QE4 is requested to send a packet             indicating that a response is required             to the first home_address of EUT         and QE4 is requested to send a packet             indicating that a response is required             to the second home_address of EUT     }     then {         QE4 indicates receipt of the first response         and QE4 indicates receipt of the second response     } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Home Network 1 EUT is configured to have two different home addresses		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move EUT to Foreign Network 1		
2	Wait a few seconds (to let EUT register to QE1)		
3	Cause QE4 to send an Echo Request to the first home address of EUT		
4	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
5	Cause QE4 to send an Echo Request to EUT to the second home address of EUT		
6	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1742_01	<b>Test Purpose:</b>	TP_MOB_1742_01
<b>Summary:</b>	'Mobile Node does not attempt to use its home address if registration with Home Agent fails due to DAD'		
<b>Roles:</b>	Mobile_Node, Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1742, RQ_001_1742, RQ_001_1770		
<pre>with { QE3 configured to have the home_address of EUT }   ensure that     { when { EUT moves to a foreign_network }       -- the registering of EUT has failed       then { EUT does not use its Home_Address to communicate }     }   }</pre>			
<b>Pre-test conditions:</b>	NOT TESTABLE BY INTEROPERABILITY MEAN It is not possible to control that Mobile Node doesn't use its Home Address		
<b>Step</b>	<b>Test Sequence</b>		<b>Verdict</b>
			<b>Pass</b>   <b>Fail</b>
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1743_01	<b>Test Purpose:</b>	TP_MOB_1743_01
<b>Summary:</b>	'Mobile Node goes on registering home addresses when the registration of one of them fails'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1743		
<pre>with {   EUT disconnected   and EUT configured to have 2 home_addresses   and QE3 configured to use the first home_address of EUT }   ensure that     { when {       EUT is connected to a foreign_network       and EUT receives a packet from QE4       containing a destination_address       set to EUT home_address 2       and indicating that a response is required }       then { QE4 indicates receipt of the response from the EUT }     }   }</pre>			
<b>Pre-test conditions:</b>	NOT TESTABLE BY INTEROPERABILITY MEAN You do not know how the Home Addresses are listed, so you can't guarantee that the address which failed is not the first or the last		
<b>Step</b>	<b>Test Sequence</b>		<b>Verdict</b>
			<b>Pass</b>   <b>Fail</b>
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1814_01	<b>Test Purpose:</b>	TP_MOB_1814_01
<b>Summary:</b>	'Mobile Node sends Binding Update messages to its Home Agent until it receives a matching Binding_Acknowledgement message, without time limit if it knows only one Home Agent'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1814		
<pre>with {   EUT at_home   and EUT configured to have its Home_Agent_address available   and QE1 disconnected }   ensure that     { when {       EUT moves to a foreign_network       and QE1 is connected after MAX_BINDACK_TIMEOUT       and QE4 is requested to send a packet to QE1       indicating that a response is required }       then { QE4 indicates receipt of the response }     }   }</pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Home Network 1 EUT is aware of the address of its Home Agent QE1 QE1 is disconnected		

Step	Test Sequence	Verdict	
		Pass	Fail
1	Move EUT to Foreign Network 1		
2	Wait 2 minutes (more than MAX_BINDACK_TIMEOUT seconds)		
3	Connect QE1 to Home Network 1		
4	Wait a few seconds (to let EUT establish a binding with QE1)		
5	Cause QE4 to send an Echo Request to the home address of EUT		
6	Check: does QE4 receives an Echo reply from EUT?	Yes	No
<b>Observations:</b>			

### 11.7.2 Correspondent registration

Test Description			
<b>Identifier:</b>	TD_MOB_1744_01	<b>Test Purpose:</b>	TP_MOB_1744_01
<b>Summary:</b>	'Mobile Node updates its bindings with correspondent nodes after changing its primary care-of address'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1744		
<pre> with {     EUT away_from_home     and EUT registered to QE1     and EUT having established a binding to QE4 } ensure that {     when {         EUT moves to another foreign_network         and QE4 is requested to send a packet to EUT         indicating that a response is required }     then {         QE4 indicates receipt of the response from the EUT } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and registered to its Home Agent QE1 EUT having established a binding with QE4		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move EUT to Foreign Network 2		
2	Cause QE4 to send directly an Echo Request to the Home Address of EUT		
3	Check: does QE4 receive directly an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_1753_01	<b>Test Purpose:</b>	TP_MOB_1753_01
<b>Summary:</b>	'Mobile Node is able to delete a binding with a correspondent node'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1753		
<pre> with {     EUT away_from_home     and EUT registered to QE1     and EUT having established a binding with QE4 } ensure that {     when {         EUT returns home         and QE4 is requested to send a packet to EUT         indicating that a response is required }     then {         QE4 indicates receipt of the response from the EUT} } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and registered to its Home Agent QE1 EUT having established a binding with QE4		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move EUT to Home Network 1		
2	Cause QE4 to send an Echo Request to the Home Address of EUT		
3	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

## 11.7.3 Receiving Binding Acknowledgements

Test Description			
<b>Identifier:</b>	TD_MOB_1768_01	<b>Test Purpose:</b>	TP_MOB_1768_01
<b>Summary:</b>	'Mobile Node sends Binding Update before expiry of the binding lifetime'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_1728, RQ_001_1768		
<pre> with {     EUT_away_from_home     and EUT_registered_to_QE1     and EUT_able_to_communicate_with_QE4 } ensure that {     when { QE4 (is requested to send a packet to the EUT             indicating that a response is required)           after the binding_lifetime }     then { QE4 indicates receipt of the response from the EUT } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is connected to Foreign Network 1 and registered to its Home Agent QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Wait a period equal to the Binding Lifetime		
2	Cause QE4 to send an Echo Request to the Home Address of EUT		
3	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

## 11.7.4 Receiving Binding Refresh Requests

Test Description			
<b>Identifier:</b>	TD_MOB_1776_01	<b>Test Purpose:</b>	TP_MOB_1776_01
<b>Summary:</b>	'Mobile Node updates binding with correspondent node upon receipt of a Binding Refresh Request'		
<b>Roles:</b>	Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1383, RQ_001_1776		
<pre> with {     EUT_away_from_home     and EUT_registered_to_QE1     and EUT_having_established_a_binding_with_QE4 } ensure that {     when { QE4_sends_a_Binding_Refresh_Request }     then { QE4_and_the_EUT_are_able_to_communicate_directly           after_the_original_binding_lifetime } } </pre>			
<b>Pre-test conditions:</b>	NOT TESTABLE BY INTEROPERABILITY MEAN depending of the implementation to reduce the handover		
Step	Test Sequence	Verdict	
		Pass	Fail
<b>Observations:</b>			



Test Description			
<b>Identifier:</b>	TD_MOB_1776_01	<b>Test Purpose:</b>	TP_MOB_1776_01
<b>Summary:</b>	'Mobile Node updates binding with correspondent node upon receipt of a Binding Refresh Request'		
<b>Roles:</b>	Correspondent_Node	<b>Configuration:</b>	CF_MOB_04
<b>References:</b>	RQ_001_1383, RQ_001_1776		
<pre> with {     EUT away_from_home     and EUT registered to QE1     and EUT having established a binding with QE4 } ensure that {     when { QE4 sends a Binding_Refresh_Request }     then { QE4 and the EUT are able to communicate directly           after the original binding_lifetime } } </pre>			
<b>Pre-test conditions:</b>	NOT TESTABLE BY INTEROPERABILITY MEAN depending of the implementation to reduce the handover		
Step	Test Sequence	Verdict	
		Pass	Fail
<b>Observations:</b>			

### 4.1.3 TDs extracted from RFC 3776 "Using IPsec to Protect Mobile IPv6 Signalling Between Mobile Nodes and Home Agents"

#### 4.1 Mandatory Support

Test Description			
<b>Identifier:</b>	TD_MOB_2013_01	<b>Test Purpose:</b>	TP_MOB_2013_01
<b>Summary:</b>	'Mobile Node sends Binding Update secured using transport_mode_ESP to its Home Agent'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_2013, RQ_001_2031		
<pre> with {     EUT configured to protect any Binding_Update to QE1         using transport_mode_ESP     and QE1 configured to accept only Binding_Update secured         using transport_mode_ESP from EUT } ensure that {     when { a Security_Association is established between EUT and QE1           and EUT moves to a foreign_network }     then { QE4 and EUT are able to communicate } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is configured to protect Binding Update sent to QE1 using transport mode ESP QE1 is configured to accept only Binding Update protected using transport mode ESP from EUT EUT is connected to Home Network 1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move EUT to Foreign Network 1		
2	Wait a few seconds (to let EUT register to QE1)		
3	Cause QE4 to send an Echo Request to EUT		
4	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2013_02	<b>Test Purpose:</b>	TP_MOB_2013_02
<b>Summary:</b>	'Home Agent sends Binding_Acknowledgement secured using transport_mode_ESP to a Mobile Node'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_2013, RQ_001_2031		
<pre> with {     EUT configured to protect any Binding_Acknowledgement to QE1         using transport_mode_ESP     and QE1 configured to accept only a Binding_Acknowledgement secured         using transport_mode_ESP from EUT } ensure that {     when {         a Security_Association is established between EUT and QE1         and QE1 moves to a foreign_network     }     then { QE4 is able to communicate with QE1 } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is configured to protect Binding Acknowledgement sent to QE1 using transport mode ESP QE1 is configured to accept only Binding Acknowledgement protected using transport mode ESP from EUT QE1 is connected to Home Network 1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move QE1 to Foreign Network 1		
2	Wait a few second (to let QE1 register to EUT)		
3	Cause QE4 to send an Echo Request to QE1		
4	Check: does QE4 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2016_01	<b>Test Purpose:</b>	TP_MOB_2016_01
<b>Summary:</b>	'Home Agent supports Mobile_Prefix_Solicitation secured using transport_mode_ESP'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_2016, RQ_001_2031		
<pre> with {     QE1 configured to protect any Mobile_Prefix_Solicitation to EUT         using transport_mode_ESP     and EUT configured to accept only a Mobile_Prefix_Solicitation secured         using transport_mode_ESP from QE1     and QE6 configured to have a prefix_lifetime of 1 minute     and QE1 away_from_home     and QE1 registered to EUT } ensure that {     when { a Security_Association is established between EUT and QE1 }     then { QE4 is able to communicate with QE1 after the prefix_lifetime } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is configured to protect Mobile Prefix Solicitation sent to EUT using transport mode ESP EUT is configured to accept only Mobile Prefix Solicitation protected using transport mode ESP from QE1 R1 is configured to have a valid prefix lifetime at 1 minute QE1 is away from Home and registered to its Home Agent EUT		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Wait a few minutes (to let the exchange of MPA / MPS be carried out)		
2	Cause QE4 send an Echo Request to the Home Address of QE1		
3	Check: does QE4 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2016_02	<b>Test Purpose:</b>	TP_MOB_2016_02
<b>Summary:</b>	'Mobile Node supports Mobile_Prefix_Advertisement secured using transport_mode_ESP'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_2016, RQ_001_2031		
<pre> with {     QE1 configured to protect any Mobile_Prefix_Advertisement to EUT         using transport_mode_ESP     and EUT configured to accept only Mobile_Prefix_Advertisement         secured using transport_mode_ESP from QE1     and EUT away_from_home     and EUT registered to QE1     and QE6 configured to have a prefix_lifetime of 1 minute } ensure that {     when { a Security_Association is established between EUT and QE1 }     then { QE4 and EUT are able to communicate after prefix_lifetime } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is configured to protect Mobile Prefix Advertisement sent to EUT using transport mode ESP EUT is configured to accept only Mobile Prefix Advertisement protected using transport mode ESP from QE1 R1 is configured to have a valid prefix lifetime at 1 minute EUT is away from Home and registered to its Home Agent QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Wait a few minutes (to let the exchange of MPA / MPS be carried out)		
2	Cause QE4 send an Echo Request to the Home Address of EUT		
3	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2017_01	<b>Test Purpose:</b>	TP_MOB_2017_01
<b>Summary:</b>	'Mobile Node sends Mobile_Prefix_Solicitation secured using transport_mode_ESP to its Home Agent'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_2017, RQ_001_2030		
<pre> with {     EUT configured to protect any Mobile_Prefix_Solicitation to QE1         using transport_mode_ESP     and QE1 configured to accept only a Mobile_Prefix_Solicitation         secured using transport_mode_ESP from EUT     and QE6 configured to have a prefix_lifetime of 1 minute     and EUT away_from_home     and EUT registered to QE1 } ensure that {     when { a Security_Association is established between EUT and QE1 }     then { QE4 and EUT are able to communicate after prefix_lifetime } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is configured to protect Mobile Prefix Solicitation sent to QE1 using transport mode ESP QE1 is configured to accept only Mobile Prefix Solicitation protected using transport mode ESP from EUT R1 is configured to have a valid prefix lifetime at 1 minute EUT is away from Home and registered to its Home Agent QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Wait a few more one minute (to let the exchange of MPA / MPS be carried out)		
2	Cause QE4 to send an Echo Request to the Home Address of EUT		
3	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2017_02	<b>Test Purpose:</b>	TP_MOB_2017_02
<b>Summary:</b>	'Home Agent sends Mobile_Prefix_Advertisement secured using transport_mode_ESP'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_2017, RQ_001_2030		
<pre> with {     EUT configured to protect any Mobile_Prefix_Advertisement to QE1         using transport_mode_ESP     and QE1 configured to accept only a Mobile_Prefix_Advertisement         secured using transport_mode_ESP from EUT     and QE1 away_from_home     and QE1 registered to EUT     and QE6 configured to have a prefix_lifetime of 1 minute } ensure that {     when { a Security_Association is established between EUT and QE1 }     then { QE4 is able to communicate with QE1 after prefix_lifetime } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is configured to protect Mobile Prefix Advertisement sent to QE1 using transport mode ESP QE1 is configured to accept only Mobile Prefix Advertisement protected using transport mode ESP from EUT R1 is configured to have a valid prefix lifetime at 1 minute QE1 is away from Home and registered to its Home Agent EUT		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Wait a few more one minute (to let the exchange of MPA / MPS be carried out)		
2	Cause QE4 to send an Echo Request to the Home Address of QE1		
3	Check: does QE4 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2018_01	<b>Test Purpose:</b>	TP_MOB_2018_01
<b>Summary:</b>	'Mobile Node sends payload_packet tunnelled to its Home Agent secured using tunnel_mode_ESP'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_2018		
<pre> with {     EUT configured to protect any payload_packet to QE1         using tunnel_mode_ESP     and QE1 configured to accept only a payload_packet secured         using tunnel_mode_ESP from EUT     and EUT configured not to perform Route_Optimization     and EUT away_from_home     and EUT registered to QE1 } ensure that {     when {         a Security_Association is established between EUT and QE1         and EUT moves to a foreign_network     }     then { QE4 and EUT are able to communicate } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is configured to protect payload packets sent to QE1 using tunnel mode ESP QE1 is configured to accept only payload packets protected using tunnel mode ESP from EUT EUT configured not to perform Route Optimization EUT is away from home and registered to its Home Agent QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE4 to send an Echo Request to the Home Address of EUT		
2	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2018_02	<b>Test Purpose:</b>	TP_MOB_2018_02
<b>Summary:</b>	'Home Agent sends payload_packet tunnelled to Mobile Node secured using tunnel_mode_ESP'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_2018		
<pre> with {     EUT configured to protect any payload_packet to QE1         using tunnel_mode_ESP     and QE1 configured to accept only a payload_packet secured         using tunnel_mode_ESP from EUT     and QE1 configured not to perform Route_Optimization     and QE1 away_from_home     and QE1 registered to EUT } ensure that {     when {         a Security_Association is established between EUT and QE1         and QE1 moves to a foreign_network     }     then {         QE4 and QE1 are able to communicate     } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is configured to protect payload packets sent to QE1 using tunnel mode ESP QE1 is configured to accept only payload packets protected using tunnel mode ESP from EUT QE1 configured not to perform Route Optimization QE1 is away from home and registered to its Home Agent EUT		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE4 to send an Echo Request to the Home Address of the QE1		
2	Check: does QE4 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2018_03	<b>Test Purpose:</b>	TP_MOB_2018_03
<b>Summary:</b>	'Mobile Node supports payload_packet secured using tunnel_mode_ESP'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_2018		
<pre> with {     QE1 configured to protect any payload_packet to EUT         using tunnel_mode_ESP     and EUT configured to accept only a payload_packet secured         using tunnel_mode_ESP from QE1     and EUT configured not to perform Route_Optimization     and EUT away_from_home     and EUT registered to QE1 } ensure that {     when {         a Security_Association is established between EUT and QE1         and EUT moves to a foreign_network     }     then {         QE4 and EUT are able to communicate     } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is configured to protect payload packets sent to EUT using tunnel mode ESP EUT is configured to accept only payload packets protected using tunnel mode ESP from QE1 EUT configured not to perform Route Optimization EUT is away from home and registered to its Home Agent QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE4 to send an Echo Request to the Home Address of EUT		
2	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2018_04	<b>Test Purpose:</b>	TP_MOB_2018_04
<b>Summary:</b>	'Home Agent supports payload_packet tunnelled from Mobile Node and secured using tunnel_mode_ESP'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_2018		
<pre> with {     QE1 configured to protect any payload_packet to EUT         using tunnel_mode_ESP     and EUT configured to accept only a payload_packet secured         using tunnel_mode_ESP from QE1     and QE1 configured not to perform Route_Optimization     and QE1 away_from_home     and QE1 registered to EUT } ensure that {     when {         a Security_Association is established between EUT and QE1         and QE1 moves to a foreign_network     }     then {         QE4 is able to communicate with QE1     } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is configured to protect payload packets sent to EUT using tunnel mode ESP EUT is configured to accept only payload packets protected using tunnel mode ESP from QE1 QE1 configured not to perform Route Optimization QE1 is away from home and registered to its Home Agent EUT		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE4 to send an Echo Request to the Home Address of QE1		
2	Check: does QE4 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2019_01	<b>Test Purpose:</b>	TP_MOB_2019_01
<b>Summary:</b>	'Mobile Node supports multicast group membership control packets tunnelled from its Home Agent protected by ESP with the tunnel mode'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_2019		
<pre> with {     QE1 configured to protect any         multicast_group_membership_control_packet to EUT         using tunnel_mode_ESP     and EUT configured to accept only a         multicast_group_membership_control_packet from QE1         secured using tunnel_mode_ESP     and EUT configured to subscribed to a global_multicast_group     and EUT away_from_home     and EUT registered to QE1 } ensure that {     when {         QE3 sends a packet to the global_multicast_group         indicating that a response is required     }     then {         QE3 indicates receipt of the response     } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is configured to secured multicast group membership control packets tunnelled to EUT by ESP with tunnel mode EUT is configured to accept only protected multicast group membership control packets tunnelled from QE1 by ESP with tunnel mode EUT is configured to subscribed to a multicast group MG1 with a global scope EUT away from home and registered to its Home Agent QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE3 to send an Echo Request to the Address of multicast group MG1		
2	Check: does QE3 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2019_02	<b>Test Purpose:</b>	TP_MOB_2019_02
<b>Summary:</b>	'Home Agent supports multicast group membership control packets tunnelled from Mobile Node protected by ESP with the tunnel mode'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_2019		
<pre> with {     QE1 configured to protect any         multicast_group_membership_control_packet to EUT         using tunnel_mode_ESP     and EUT configured to accept only         a multicast_group_membership_control_packet from QE1         secured using tunnel_mode_ESP     and QE1 configured to subscribed to a global_multicast_group     and QE1 away_from_home     and QE1 registered to EUT } ensure that {     when { EUT sends a packet to the global_multicast_group             indicating that a response is requested }     then { QE3 indicates receipt of the response } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is configured to secured multicast group membership control packets tunnelled to EUT by ESP with tunnel mode EUT is configured to accept only protected multicast group membership control packets tunnelled from QE1 by ESP with tunnel mode QE1 is configured to subscribed to a multicast group MG1 with a global scope QE1 away from home and registered to its Home Agent EUT		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE3 to send an Echo Request to the Address of multicast group MG1		
2	Check: does QE3 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>			

#### 4.2 Policy Requirements

Test Description			
<b>Identifier:</b>	TD_MOB_2026_01	<b>Test Purpose:</b>	TP_MOB_2026_01
<b>Summary:</b>	'When Mobile Node returns home and is configured with manually established Security Associations, it makes inactive security policies concerning tunnelled traffic with Home Agent without deleting Security Associations'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_2026		
<pre> with {     EUT configured 'with manually established Security Associations         and Policies'     and EUT configured to protect packets to QE1         using tunnel_mode_ESP     and QE1 configured to accept only a packets secured         using tunnel_mode_ESP     and EUT configured not to perform Route_Optimization     and EUT away_from_home     and EUT registered to QE1 } ensure that {     when {         EUT moves to another foreign_network         after EUT returns home }     then {         QE4 and EUT are able to communicate } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments). EUT is configured with manually established Security Associations and Policies. EUT is configured to secure packets tunnelled to QE1 using tunnel mode ESP. QE1 is configured to accept only packets protected using tunnel mode ESP. EUT is configured not to perform Route Optimization. EUT is away from home and has registered to its Home Agent QE1.		

Step	Test Sequence	Verdict	
		Pass	Fail
1	Move EUT to Home Network 1		
2	Wait a few seconds		
3	Move EUT to Foreign Network 1		
4	Cause QE4 to send an Echo Request to EUT		
5	Check: does QE4 receive an Echo Reply?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2026_02	<b>Test Purpose:</b>	TP_MOB_2026_02
<b>Summary:</b>	'When Mobile Node returns home and is configured with manually established Security Associations, Home Agent makes inactive security policies concerning tunnelled traffic with Mobile Node without deleting Security Associations		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_2026		
<pre> with {     EUT configured 'with manually established Security Associations         and Policies'     and EUT configured to protect packets to QE1         using tunnel_mode_ESP     and QE1 configured to accept only a packets secured         using tunnel_mode_ESP     and QE1 configured not to perform Route_Optimization     and QE1 away_from_home     and QE1 registered to EUT } ensure that {     when {         QE1 moves to another foreign_network         after QE1 returns home     }     then {         QE4 is able to communicate with QE1     } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is configured with manually established Security Associations and Policies EUT is configured to secure packets tunnelled to QE1 using tunnel mode ESP QE1 is configured to accept only packets protected using tunnel mode ESP QE1 is configured not to perform Route Optimization QE1 is away from home and has registered to its Home Agent EUT		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move QE1 to Home Network 1		
2	Wait a few seconds		
3	Move QE1 to Foreign Network 1		
4	Cause QE4 to send an Echo Request to QE1		
5	Check: does QE4 receive an Echo Reply?	Yes	No
<b>Observations:</b>			



## 4.3

## IPsec Protocol Processing

Test Description			
<b>Identifier:</b>	TD_MOB_2017_01	<b>Test Purpose:</b>	TP_MOB_2017_01
<b>Summary:</b>	'Mobile Node sends Mobile_Prefix_Solicitation secured using transport_mode_ESP to its Home Agent'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_2017, RQ_001_2030		
<pre> with {     EUT configured to protect any Mobile_Prefix_Solicitation to QE1         using transport_mode_ESP     and QE1 configured to accept only a Mobile_Prefix_Solicitation         secured using transport_mode_ESP from EUT     and QE6 configured to have a prefix_lifetime of 1 minute     and EUT away_from_home     and EUT registered to QE1 } ensure that {     when { a Security_Association is established between EUT and QE1 }     then { QE4 and EUT are able to communicate after prefix_lifetime } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is configured to protect Mobile Prefix Solicitation sent to QE1 using transport mode ESP QE1 is configured to accept only Mobile Prefix Solicitation protected using transport mode ESP from EUT R1 is configured to have a valid prefix lifetime at 1 minute EUT is away from Home and registered to its Home Agent QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Wait a few more one minute (to let the exchange of MPA / MPS be carried out)		
2	Cause QE4 to send an Echo Request to the Home Address of EUT		
3	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2017_02	<b>Test Purpose:</b>	TP_MOB_2017_02
<b>Summary:</b>	'Home Agent sends Mobile_Prefix_Advertisement secured using transport_mode_ESP'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_2017, RQ_001_2030		
<pre> with {     EUT configured to protect any Mobile_Prefix_Advertisement to QE1         using transport_mode_ESP     and QE1 configured to accept only a Mobile_Prefix_Advertisement         secured using transport_mode_ESP from EUT     and QE1 away_from_home     and QE1 registered to EUT     and QE6 configured to have a prefix_lifetime of 1 minute } ensure that {     when { a Security_Association is established between EUT and QE1 }     then { QE4 is able to communicate with QE1 after prefix_lifetime } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is configured to protect Mobile Prefix Advertisement sent to QE1 using transport mode ESP QE1 is configured to accept only Mobile Prefix Advertisement protected using transport mode ESP from EUT R1 is configured to have a valid prefix lifetime at 1 minute QE1 is away from Home and registered to its Home Agent EUT		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Wait a few more one minute (to let the exchange of MPA / MPS be carried out)		
2	Cause QE4 to send an Echo Request to the Home Address of QE1		
3	Check: does QE4 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2013_01	<b>Test Purpose:</b>	TP_MOB_2013_01
<b>Summary:</b>	'Mobile Node sends Binding Update secured using transport_mode_ESP to its Home Agent'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_2013, RQ_001_2031		
<pre> with {     EUT configured to protect any Binding_Update to QE1         using transport_mode_ESP     and QE1 configured to accept only Binding_Update secured         using transport_mode_ESP from EUT } ensure that {     when {         a Security_Association is established between EUT and QE1         and EUT moves to a foreign_network     }     then {         QE4 and EUT are able to communicate     } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is configured to protect Binding Update sent to QE1 using transport mode ESP QE1 is configured to accept only Binding Update protected using transport mode ESP from EUT EUT is connected to Home Network 1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move EUT to Foreign Network 1		
2	Wait a few seconds (to let EUT register to QE1)		
3	Cause QE4 to send an Echo Request to EUT		
4	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2013_02	<b>Test Purpose:</b>	TP_MOB_2013_02
<b>Summary:</b>	'Home Agent sends Binding_Acknowledgement secured using transport_mode_ESP to a Mobile Node'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_2013, RQ_001_2031		
<pre> with {     EUT configured to protect any Binding_Acknowledgement to QE1         using transport_mode_ESP     and QE1 configured to accept only a Binding_Acknowledgement secured         using transport_mode_ESP from EUT } ensure that {     when {         a Security_Association is established between EUT and QE1         and QE1 moves to a foreign_network     }     then {         QE4 is able to communicate with QE1     } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is configured to protect Binding Acknowledgement sent to QE1 using transport mode ESP QE1 is configured to accept only Binding Acknowledgement protected using transport mode ESP from EUT QE1 is connected to Home Network 1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move QE1 to Foreign Network 1		
2	Wait a few second (to let QE1 register to EUT)		
3	Cause QE4 to send an Echo Request to QE1		
4	Check: does QE4 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2016_01	<b>Test Purpose:</b>	TP_MOB_2016_01
<b>Summary:</b>	'Home Agent supports Mobile_Prefix_Solicitation secured using transport_mode_ESP'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_2016, RQ_001_2031		
<pre> with {     QE1 configured to protect any Mobile_Prefix_Solicitation to EUT         using transport_mode_ESP     and EUT configured to accept only a Mobile_Prefix_Solicitation secured         using transport_mode_ESP from QE1     and QE6 configured to have a prefix_lifetime of 1 minute     and QE1 away_from_home     and QE1 registered to EUT } ensure that {     when { a Security_Association is established between EUT and QE1 }     then { QE4 is able to communicate with QE1 after the prefix_lifetime } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is configured to protect Mobile Prefix Solicitation sent to EUT using transport mode ESP EUT is configured to accept only Mobile Prefix Solicitation protected using transport mode ESP from QE1 R1 is configured to have a valid prefix lifetime at 1 minute QE1 is away from Home and registered to its Home Agent EUT		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Wait a few minutes (to let the exchange of MPA / MPS be carried out)		
2	Cause QE4 send an Echo Request to the Home Address of QE1		
3	Check: does QE4 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2016_02	<b>Test Purpose:</b>	TP_MOB_2016_02
<b>Summary:</b>	'Mobile Node supports Mobile_Prefix_Advertisement secured using transport_mode_ESP'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_2016, RQ_001_2031		
<pre> with {     QE1 configured to protect any Mobile_Prefix_Advertisement to EUT         using transport_mode_ESP     and EUT configured to accept only Mobile_Prefix_Advertisement         secured using transport_mode_ESP from QE1     and EUT away_from_home     and EUT registered to QE1     and QE6 configured to have a prefix_lifetime of 1 minute } ensure that {     when { a Security_Association is established between EUT and QE1 }     then { QE4 and EUT are able to communicate after prefix_lifetime } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is configured to protect Mobile Prefix Advertisement sent to EUT using transport mode ESP EUT is configured to accept only Mobile Prefix Advertisement protected using transport mode ESP from QE1 R1 is configured to have a valid prefix lifetime at 1 minute EUT is away from Home and registered to its Home Agent QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Wait a few minutes (to let the exchange of MPA / MPS be carried out)		
2	Cause QE4 send an Echo Request to the Home Address of EUT		
3	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2014_01	<b>Test Purpose:</b>	TP_MOB_2014_01
<b>Summary:</b>	'Home Agent supports Home Test Init secured using tunnel_mode_ESP'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_1571, RQ_001_2034, RQ_001_2035		
<pre> with {     QE1 configured to protect any Home_Test_Init to EUT         using tunnel_mode_ESP     and EUT configured to accept only Home_Test_Init secured         using tunnel_mode_ESP from QE1     and QE1 configured to perform route_optimization     and QE4 configured to perform route_optimization     and QE1 is away_from_home     and QE1 registered to EUT } ensure that {     when {         a Security_Association is established between EUT and QE1         and QE1 moves to a foreign_network     }     then {         QE4 and QE1 are able to communicate directly     } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is configured to protect Home Test Init sent to EUT using tunnel mode ESP EUT is configured to accept only Home Test Init protected using tunnel mode ESP from QE1 QE1 configured to perform Route Optimization QE4 configured to perform Route Optimization QE1 is away from Home and registered to its Home Agent EUT		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE4 to send an Echo Request to the Home Address of QE1		
2	Wait a few second (to let QE1 register to QE4)		
3	Disconnect EUT from Home Network 1		
4	Cause QE4 to send an Echo Request to the Home Address of QE1		
5	Check: does QE4 receive an Echo Reply from QE1?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2014_02	<b>Test Purpose:</b>	TP_MOB_2014_02
<b>Summary:</b>	'Mobile Node supports Home Test secured using tunnel_mode_ESP'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_2034, RQ_001_2035		
<pre> with {     QE1 configured to protect any Home_Test to EUT         using tunnel_mode_ESP     and EUT configured to accept only a Home_Test secured         using tunnel_mode_ESP from QE1     and EUT configured to perform Route_Optimization     and QE4 configured to perform route_optimization     and EUT is away_from_home     and EUT registered to QE1 } ensure that {     when {         a Security_Association is established between EUT and QE1         and EUT moves to a foreign_network     }     then {         QE4 and EUT are able to communicate directly     } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) QE1 is configured to protect Home Test sent to EUT using tunnel mode ESP EUT is configured to accept only Home Test protected using tunnel mode ESP from QE1 EUT configured to perform Route Optimization QE4 configured to perform Route Optimization EUT is away from Home and has registered to its Home Agent QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE4 to send an Echo Request to the Home Address of EUT		
2	Wait a few second (to let EUT register to QE4)		
3	Disconnect QE1 from Home Network		
4	Cause QE4 to send an Echo Request to the Home Address of EUT		
5	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2015_01	<b>Test Purpose:</b>	TP_MOB_2015_01
<b>Summary:</b>	'Mobile Node sends Home Test Init secured using tunnel_mode_ESP to its Home Agent'		
<b>Roles:</b>	Mobile_Node	<b>Configuration:</b>	CF_MOB_03
<b>References:</b>	RQ_001_2034		
<pre> with {     EUT configured to protect any Home_Test_Init to QE1         using tunnel_mode_ESP     and QE1 configured to accept only Home_Test_Init secured         using tunnel_mode_ESP from EUT     and EUT configured to perform route_optimization     and QE4 configured to perform route_optimization } ensure that {     when {         a Security_Association is established between EUT and QE1         and EUT moves to a foreign_network     }     then { QE4 and EUT are able to communicate directly } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is configured to protect Home Test Init sent to QE1 using tunnel mode ESP QE1 is configured to accept only Home Test Init protected using tunnel mode ESP from EUT EUT configured to perform Route Optimization QE4 configured to perform Route Optimization EUT is away from Home and registered to its Home Agent QE1		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE4 to send an Echo Request to the Home Address to EUT		
2	Wait a few second (to let QE4 register to EUT)		
3	Disconnect QE1 from Home Network 1		
4	Cause QE4 to send an Echo Request to the Home Address to EUT		
5	Check: does QE4 receive an Echo Reply from EUT?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2015_02	<b>Test Purpose:</b>	TP_MOB_2015_02
<b>Summary:</b>	'Home Agent sends Home Test secured using tunnel_mode_ESP'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_2034		
<pre> with {     EUT configured to protect any Home_Test to QE1         using tunnel_mode_ESP     and QE1 configured to accept only Home_Test secured         using tunnel_mode_ESP from EUT     and QE1 configured to perform Route_Optimization     and QE4 configured to perform Route_Optimization } ensure that {     when {         a Security_Association is established between EUT and QE1         and QE1 moves to a foreign_network     }     then { QE4 and QE1 are able to communicate directly } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is configured to protect Home Test sent to QE1 using tunnel mode ESP QE1 is configured to accept only Home Test protected using tunnel mode ESP from EUT QE1 configured to perform Route Optimization QE4 configured to perform Route Optimization QE1 is away from Home and registered to its Home Agent EUT		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Cause QE4 to send an Echo Request to the Home Address of QE1		
2	Wait a few second (to let QE4 register to QE1)		
3	Disconnect EUT from Home Network 1		
4	Cause QE4 to send an Echo Request to the Home Address of QE1		
5	Check: does QE4 receive an Echo Reply from QE4?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2039_01	<b>Test Purpose:</b>	TP_MOB_2039_01
<b>Summary:</b>	'Home Agent update its security association entries when the Mobile Node change of foreign network'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_2039		
<pre> with {     EUT configured to protect any Binding_Acknowledgement to QE1         using tunnel_mode_ESP     and QE1 configured to accept only a Binding_Acknowledgement         secured using tunnel_mode_ESP from EUT     and QE1 away_from_home     and QE1 registered to EUT } ensure that {     when { QE1 moves to another foreign_network }     then { QE4 and QE1 are able to communicate } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is configured to secure Binding Acknowledgement using ESP transport mode QE1 is configured to accept only Binding Acknowledgement protected by ESP transport mode QE1 is connected to Foreign Network 1 and has registered to its Home Agent EUT		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move QE1 to Foreign Network 2		
2	Cause QE4 to send an Echo Request to QE1		
3	Check: does QE4 receive an Echo Reply?	Yes	No
<b>Observations:</b>			

Test Description			
<b>Identifier:</b>	TD_MOB_2040_01	<b>Test Purpose:</b>	TP_MOB_2040_01
<b>Summary:</b>	'Home Agent does not take into account a Binding Update not secured'		
<b>Roles:</b>	Home_Agent	<b>Configuration:</b>	CF_MOB_02
<b>References:</b>	RQ_001_2040		
<pre> with {     and EUT configured to accept only a Binding_Update         secured using tunnel_mode_ESP     and QE1 configured to send any Binding_Update not secured } ensure that {     when { QE1 moves to a foreign_network }     then { QE4 and QE1 are unable to communicate } } </pre>			
<b>Pre-test conditions:</b>	The cleaning procedure has been run (see configuration comments) EUT is configured to accept only Binding Update protected by ESP with transport mode QE1 is configured to send unprotected Binding Update		
Step	Test Sequence	Verdict	
		Pass	Fail
1	Move QE1 to Foreign Network 1		
2	Cause QE4 to send an Echo Request to QE1		
3	Check: does QE4 receive an Echo Reply?	No	Yes
<b>Observations:</b>			

---

## Annex A (informative): Interoperability Testing Configurations

The following architectural configurations are referenced in the IPv6 *Mobility* Interoperability Test Descriptions specified in the present document. They are intended to give a general rather than specific view of the possible roles of the EUT and its associated QE(s) and the relationships between them.

The CF\_Mob-Basic\_01 configuration is not referenced in any of the Test Description, however all other configurations are subset of the architecture described in CF\_Mob-Basic\_01. Hence, replicating CF\_Mob-Basic\_01 in a test bed will save a lot of time to a tester willing to test all the Test Descriptions of the present document.

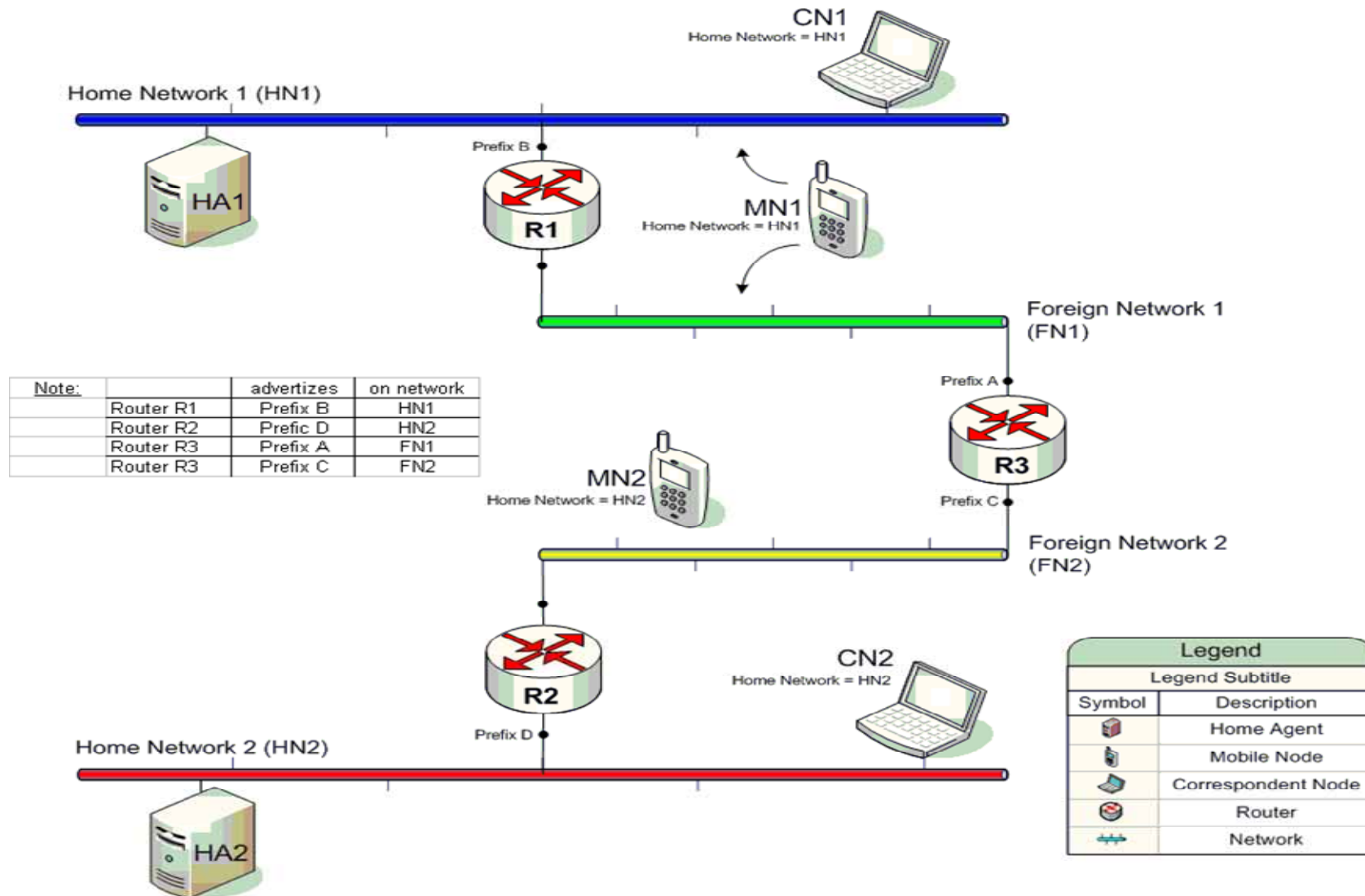


Figure A.1: CF\_Mob-Basic\_01



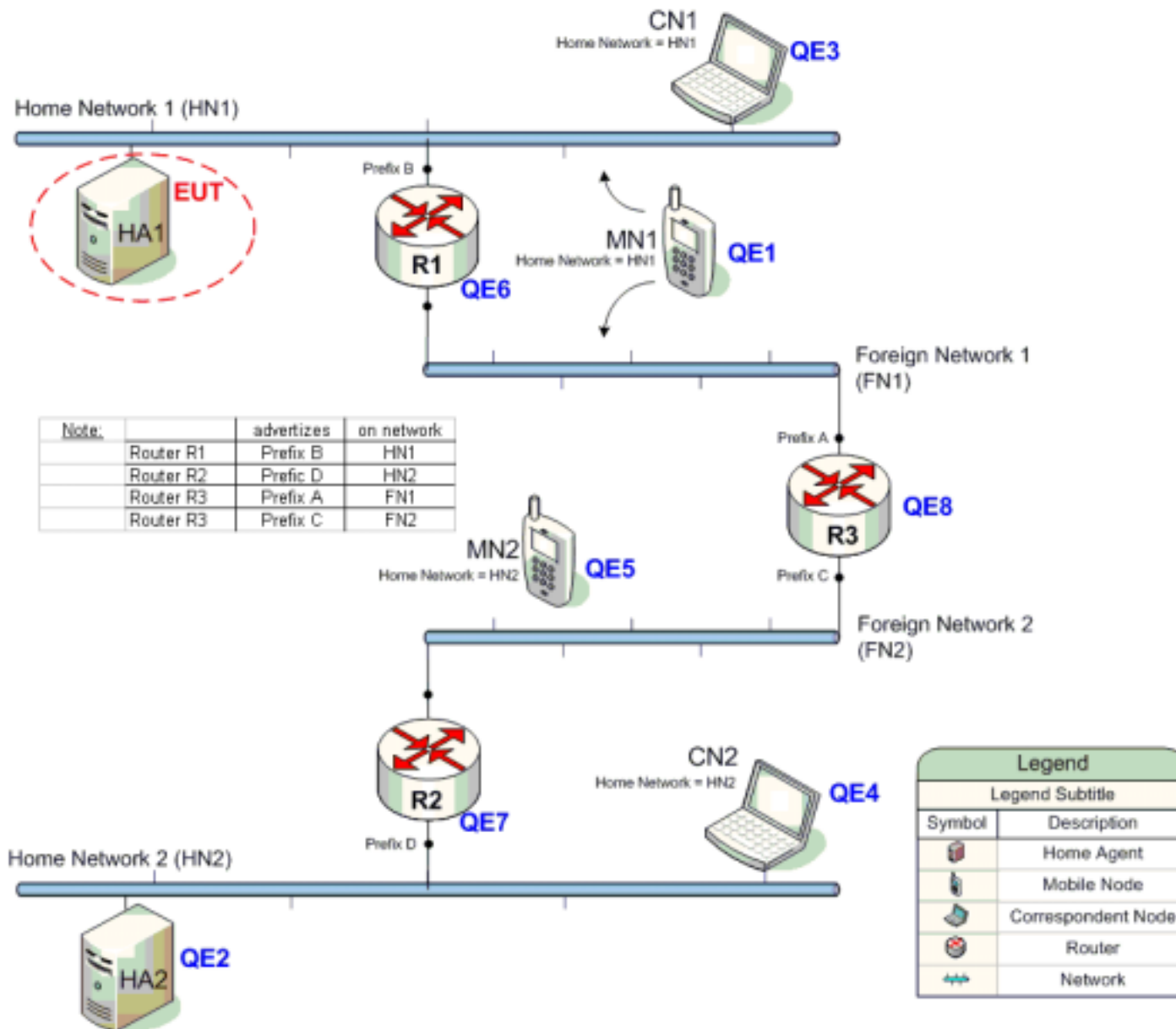


Figure A.2: CF\_MOB\_02

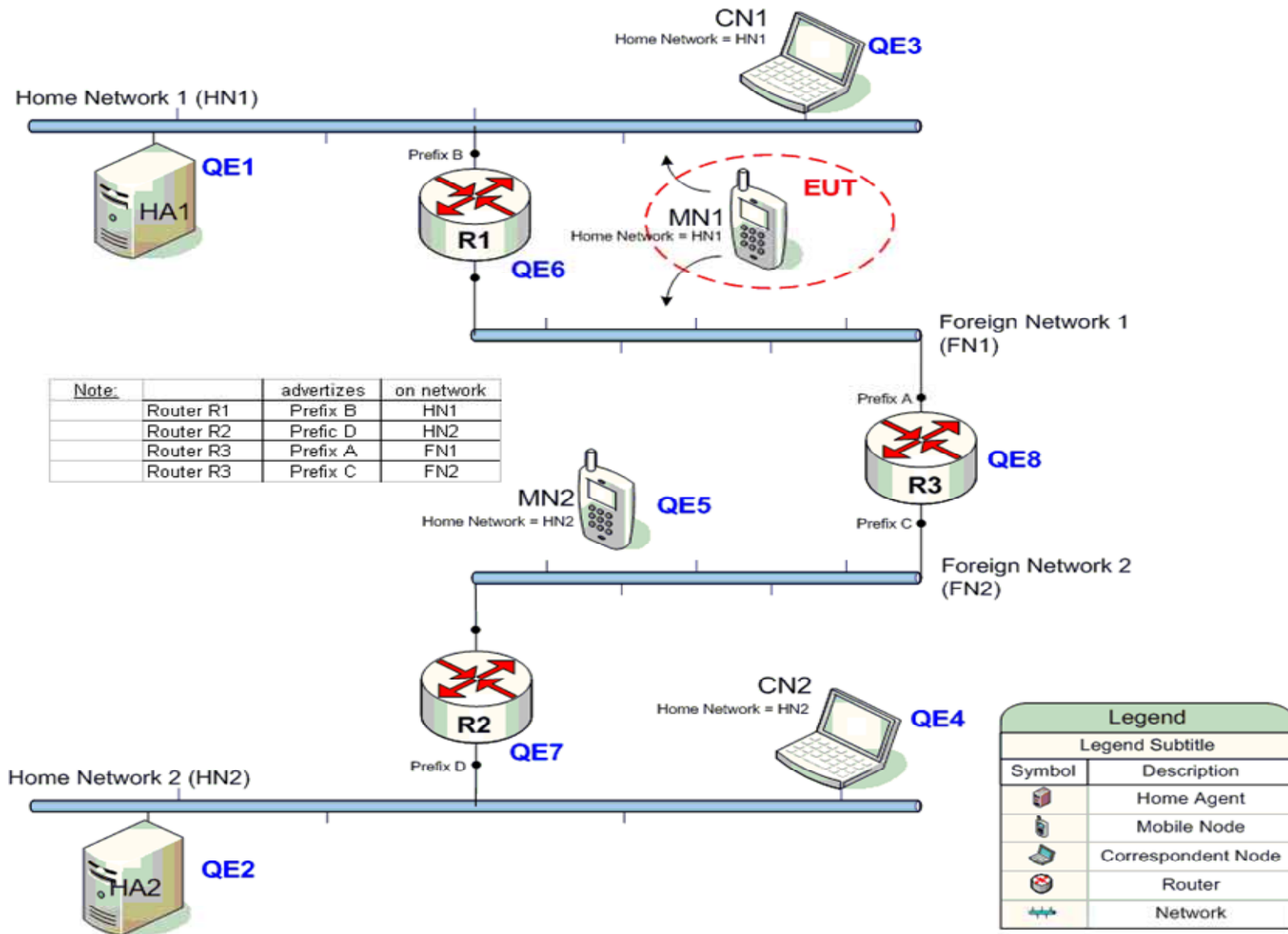


Figure A.3: CF\_MOB\_03

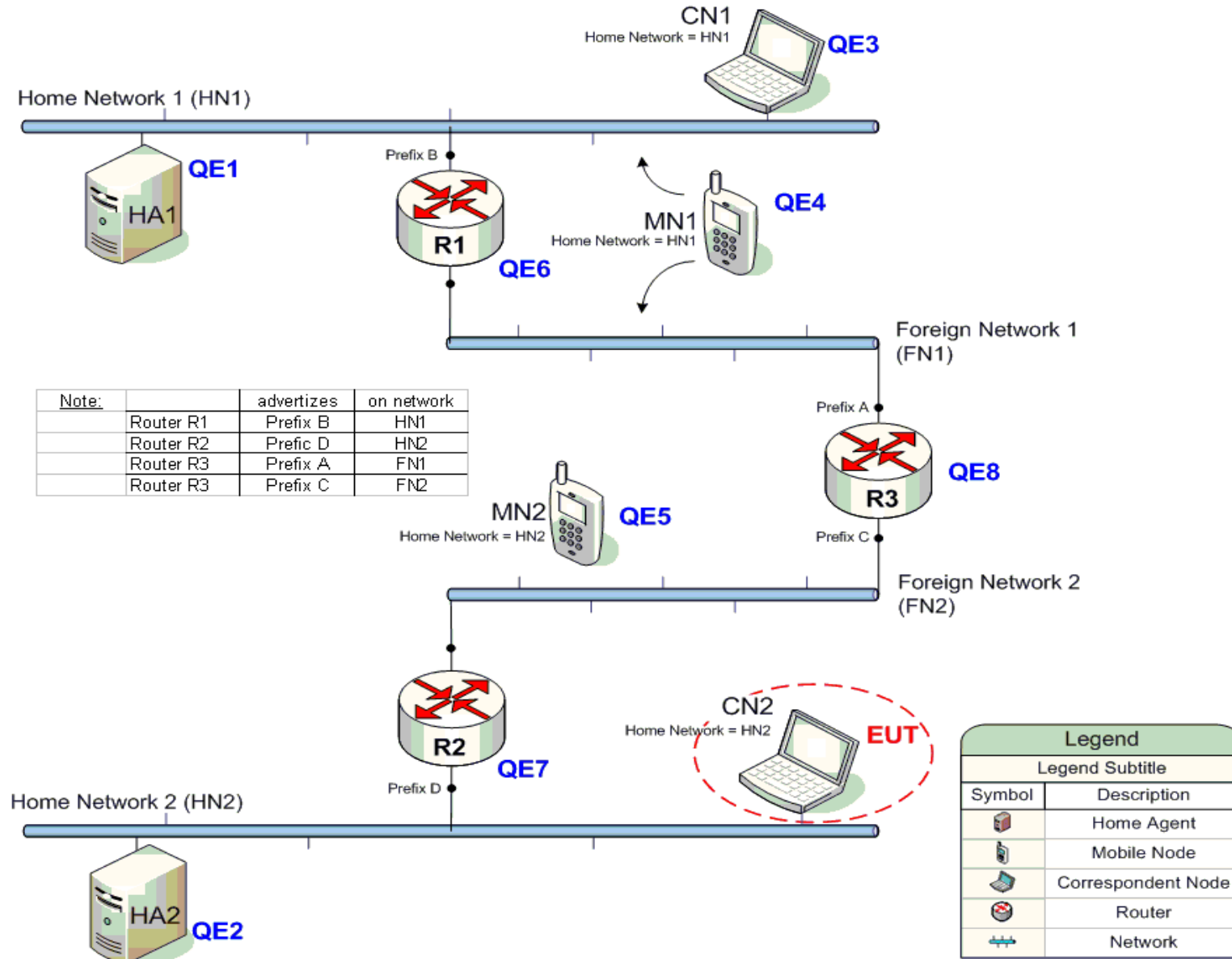


Figure A.4: CF\_MOB\_04

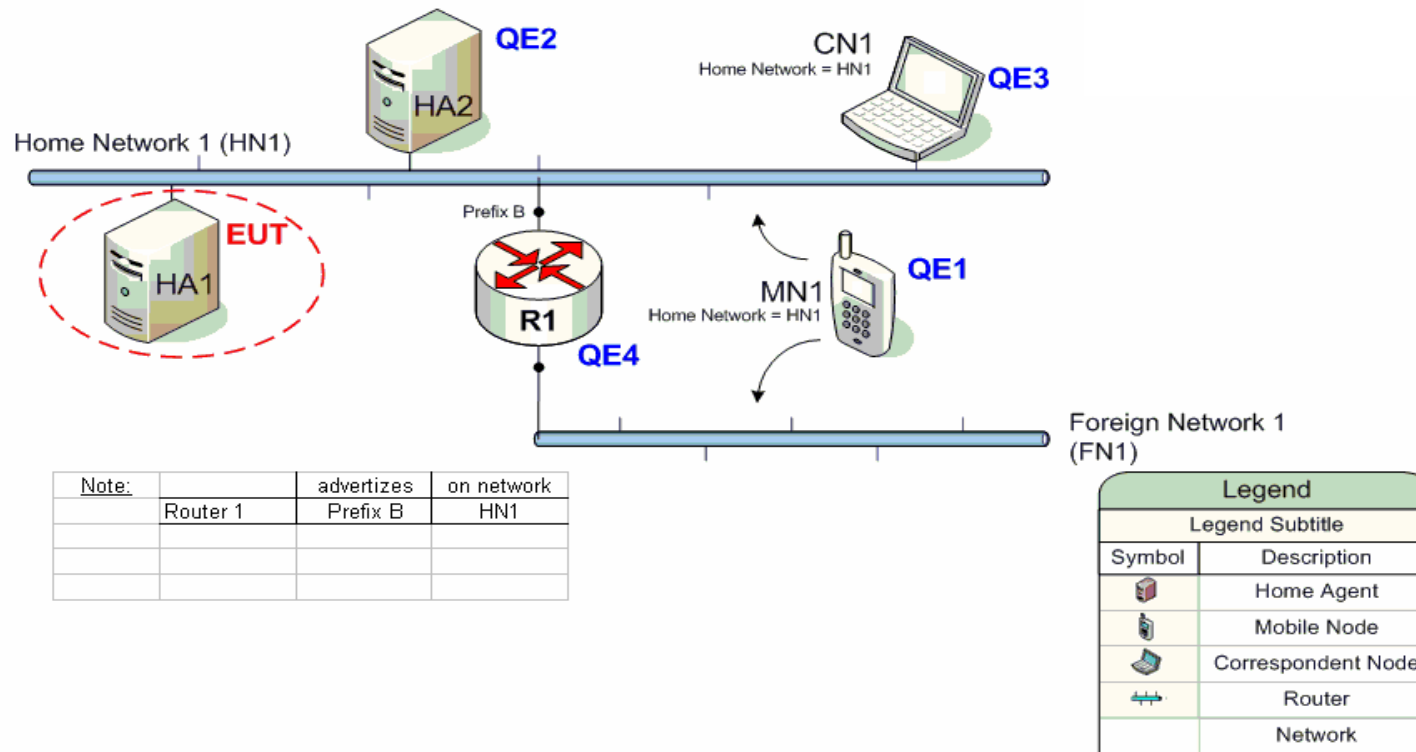


Figure A.5: CF\_MOB\_05

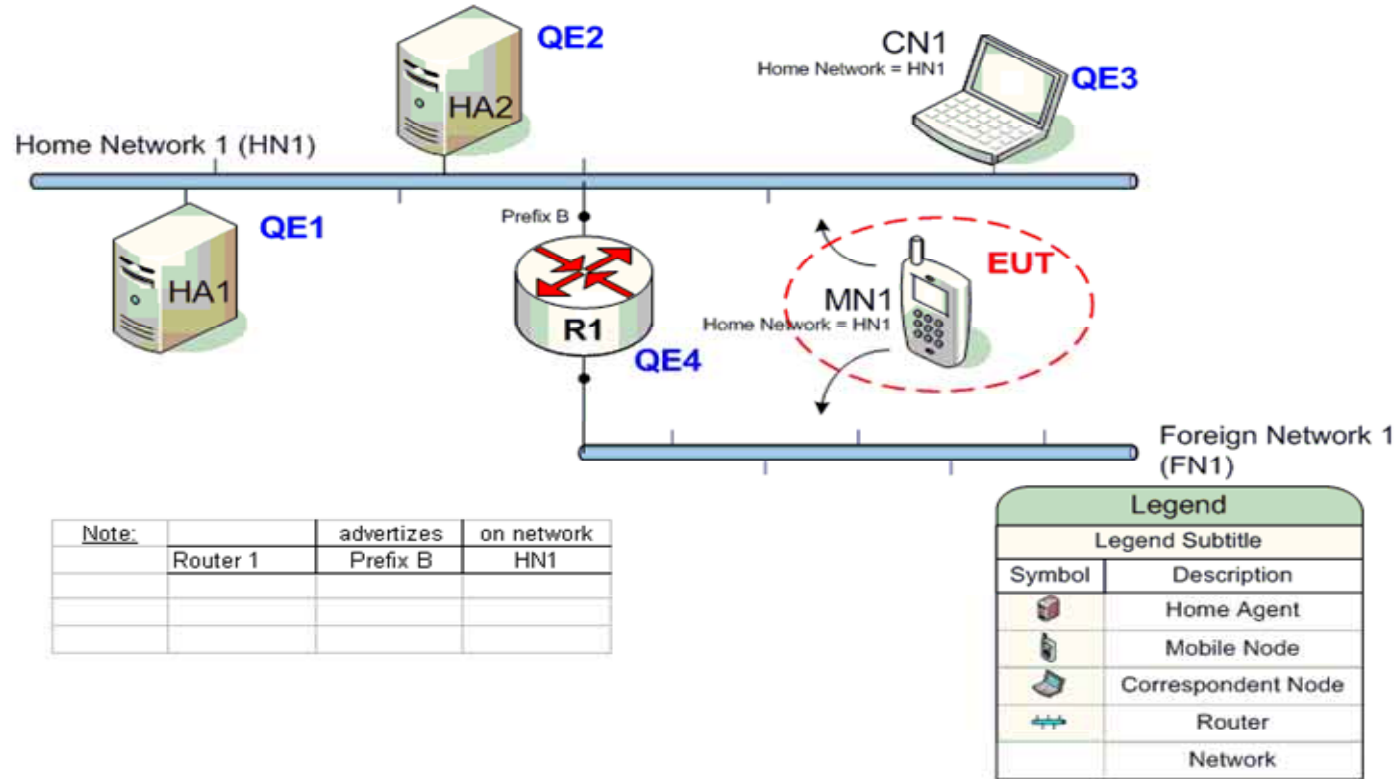


Figure A.6: CF\_MOB\_06

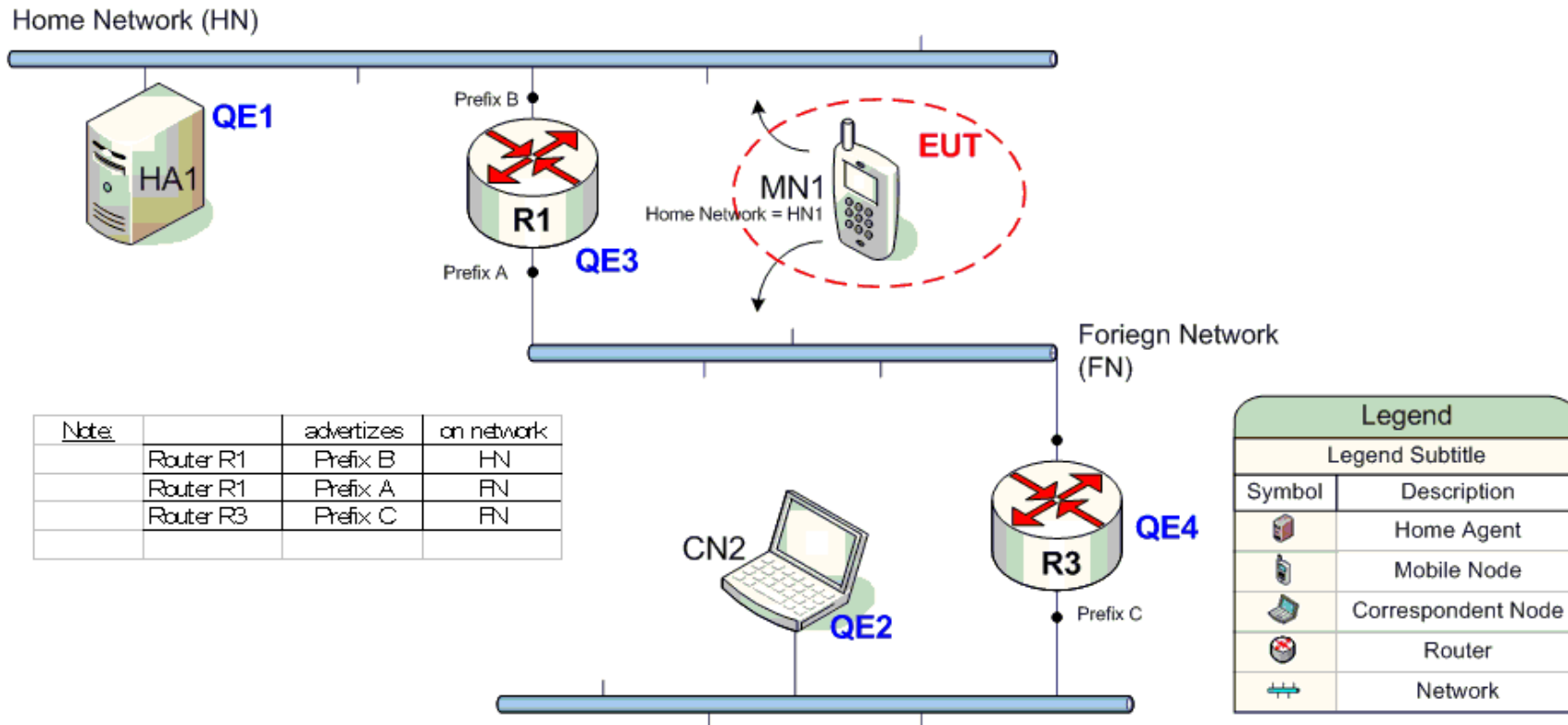


Figure A.7: CF\_MOB\_07

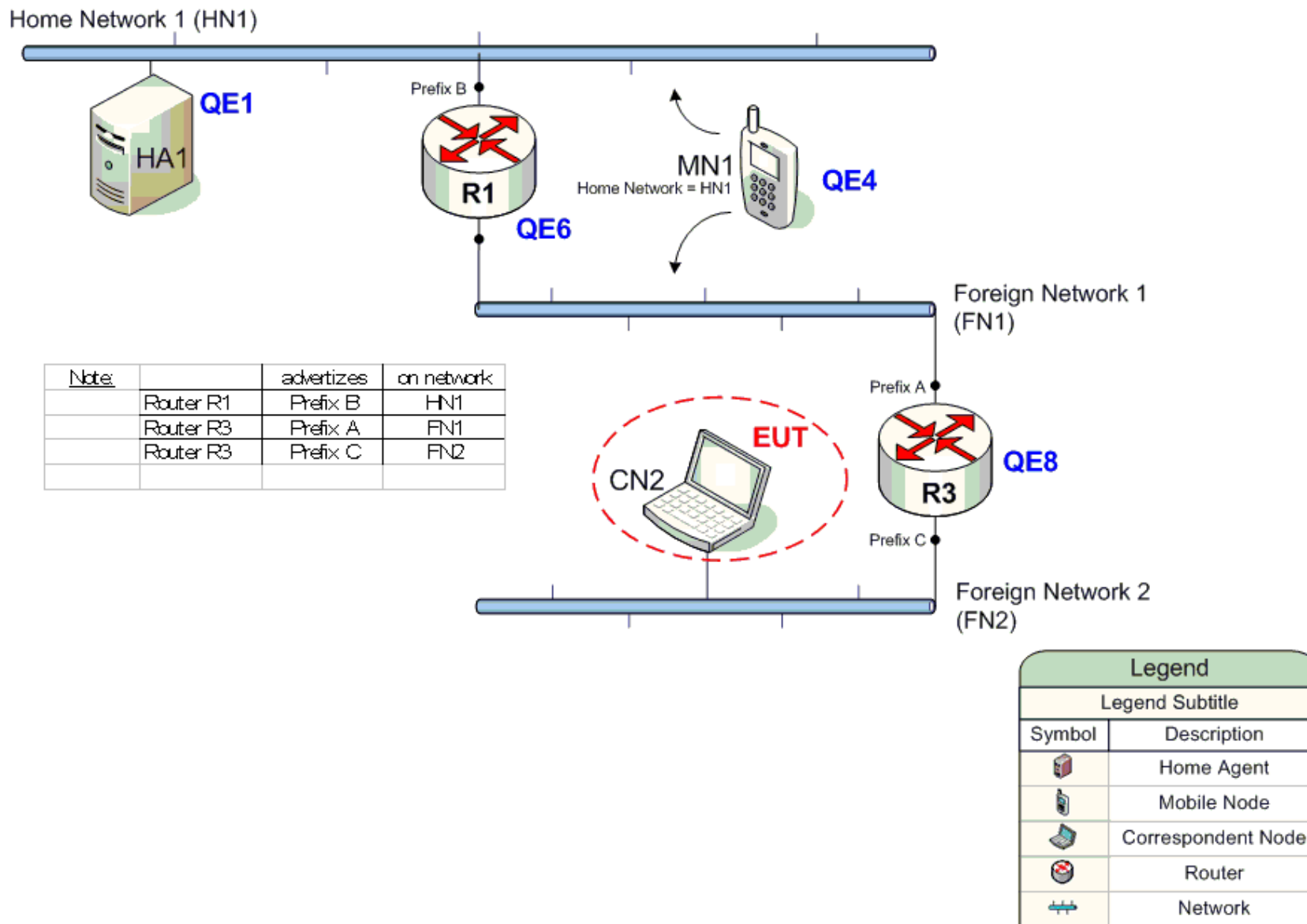


Figure A.8: CF\_MOB\_08

## Annex B (informative): IPv6 Interoperability Test Purposes

The Test Suite Structure is based on the IPv6 Mobility RFCs and the IPv6 Requirements Catalogue nodes. It is defined by the groups within the following TPLan specification of test purposes. The numbering is not contiguous so that new TPs can be added at a later date without the need to completely renumber the TSS groups.

```

TSS      : MOB
Title    : 'IOP - Mobility'
Version  : 1.0.0
Date     : 29.11.2006
Author   : 'STF276 - Task 4'

-- Last $Rev: 430 $
-- Last $Author: vreck $
-- $Date: 2007-03-15 16:25:18 +0100 (Thu, 15 Mar 2007) $

---**Cross references**
xref RQ_001 {RFC3775,
            RFC3776}

xref CF_MOB_02 {Configs_IOP_SEC.pdf}
xref CF_MOB_03 {Configs_IOP_SEC.pdf}
xref CF_MOB_04 {Configs_IOP_SEC.pdf}
xref CF_MOB_05 {Configs_IOP_SEC.pdf}
xref CF_MOB_06 {Configs_IOP_SEC.pdf}
xref CF_MOB_07 {Configs_IOP_SEC.pdf}

---**Definitions**

-- Entities
---- Primary Configuration entities
def entity EUT
def entity QE1
def entity QE2
def entity QE3
def entity QE4
def entity QE5
def entity QE6
def entity QE7
def entity QE8

---- Supplementary entities
def entity binding
def entity Binding_Cache_entry
def entity default_router
def entity foreign_network
def entity global_multicast_group
def entity home
def entity home_network
def entity link_local_multicast_group
def entity Neighbor_Discovery_cache_entry
def entity network
def entity organization_local_multicast_group
def entity Security_Association
def entity Security_Policy
def entity transport_connection

-- Messages
def event Binding_Acknowledgement
def event Binding_Refresh_Request
def event Binding_Update
    { Home_Address,
      Home_Address_Destination_Option }
def event Home_Test
def event Home_Test_Init
def event Mobile_Prefix_Advertisements {Mobile_Prefix_Advertisement}
def event Mobile_Prefix_Solicitations {Mobile_Prefix_Solicitation}
def event multicast_group_membership_control_packet
def event packets {packet}

```



```

def event payload_packet
def event return_routability_packets

-- Procedures
def event IKEv2
def event multicast_data_packet_forwarding
def event route_optimization

-- Values
def value accept
def value binding_lifetime
def value care_of_address
def value ESP
def value ethernet_address
def value global_address
def value global_addresses
def value home_address
def value home_addresses
def value Home_Agent_address
def value Home_Agent_Preference
def value Interface_ID
def value IP_address
def value IPsec
def value lifetime
def value link_local_address
def value MAX_BINDACK_TIMEOUT
def value MAX_RR_BINDING_LIFETIME
def value on_link
def value packet {Authentication_Header,
                  destination_address,
                  ESP_Header,
                  Home_Address_Option,
                  sequence_number,
                  source_address}

def value prefix
def value prefix_lifetime
def value transport_mode_ESP
def value tunnel_mode_ESP

-- Units
def unit minute
def unit seconds

-- Conditions
def condition at_home
def condition available
def condition away_from_home
def condition connected
def context {~connected [to]}
def condition configured
def condition disconnected
def context {~disconnected [from]}
def condition registered
def context {~registered to}
def condition required
def condition subscribed
def context {~subscribed to}
def condition unreachable
def context {~unreachable from}

-- Keywords - Preconditions
def word communication
def word established
def word implement
def word perform
def word protect
def word use

-- Keywords - Stimuli
def word advertizing
def word communicate
def word configure
def word detects
def word expired
def word generates
def word modify
def word moves
def word reboot

```

```

def word registers
def word requested
def context {is ~requested to}
def context {is ~requested to ~configure}
def context {is ~requested to ~modify}
def word returns
def context {~returns ~home}
def word send
def context {is requested to ~send}
def word set
def context {~set to}
def word starts
def context {~starts advertizing}
def word stops
def context {~stops advertizing}
def word support

```

```
-- Keywords - Responses
```

```

def word accepts
def word deletes
def word discards
def word establishes
def word expires
def word implemented
def word indicate
def word indicates
def word only
def word receipt
def context {~indicates ~receipt of}
def word response
def context {sends no ~response}
def word secured
def word updates
def word using

```

```
-- Keywords - Glue
```

```

def word able
def word another
def word any
def word are
def word at
def word between
def word by
def word directly
def word does
def word even
def word first
def word for
def word greater
def word have
def word having
def word its
def word least
def word more
def word new
def word offered
def word old
def word on
def word original
def word own
def context {~its ~own}
def word previously
def word same
def word second
def word short
def word than
def word unable
def word used

```

```

--*****--
--* RFC3775 Mobility Support in IPv6 *--
--*****--

```

```

Group 1 'RFC 3775'
Group 1.1 'Group A'

```

```
TP id : TP_MOB_1724_01
```



```

    }
}
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id   : TP_MOB_1486_01
summary : 'Correspondent Node deletes any Binding Cache entry
          after the expiration of the binding lifetime'
RQ ref  : RQ_001_1486 ,RQ_001_1461
Role    : Correspondent_Node
config  : CF_MOB_04
TD ref  : TD_MOB_1486_01

with {
    EUT configured to perform route_optimization
    and QE4 configured to perform route_optimization
    and QE4 away_from_home
    and QE4 registered to QE1
}
ensure that
{ when {
    EUT establishes a binding to QE4}
  then {
    EUT and QE4 are able to communicate directly
    within the binding_lifetime
    and EUT and QE4 are unable to communicate directly
    after the binding_lifetime }
}
}
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id   : TP_MOB_1068_01
summary : 'Correspondent Node does not establish any binding with
          a lifetime greater than MAX_RR_BINDING_LIFETIME'
RQ ref  : RQ_001_1068
Role    : Correspondent_Node
config  : CF_MOB_04
TD ref  : TD_MOB_1068_01

with {
    EUT configured to perform route_optimization
    and QE4 configured to perform route_optimization
    and QE4 away_from_home
    and QE4 registered to QE1
}
ensure that
{ when {
    EUT establishes a binding to QE4}
  then {
    EUT and QE4 are able to communicate directly
    within the binding_lifetime
    and EUT and QE4 are unable to communicate directly
    after MAX_RR_BINDING_LIFETIME }
}
}
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id   : TP_MOB_1068_02
summary : 'Mobile Node does not establish any binding with
          a lifetime greater than MAX_RR_BINDING_LIFETIME'
RQ ref  : RQ_001_1068
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_1068_02
--NOT interop TESTABLE
-- ==> there is no Interoperability method to guarantee that a
-- Mobile Node (on a foreign network) will use its Home Address
-- to send a new packet (instead of using its Care-of-Address).

with {
    EUT configured to perform route_optimization
    and EUT away_from_home
    and EUT registered to QE1
    and QE4 configured to perform route_optimization
}
ensure that
{ when {
    EUT establishes a binding to QE4 }
  then {
    EUT and QE4 are able to communicate directly
    within the binding_lifetime
    and EUT and QE4 are unable to communicate directly
    after MAX_RR_BINDING_LIFETIME }
}
}
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id   : TP_MOB_1483_01

```

```

summary : 'Correspondent Node tries to refresh a binding cache entry
          before it expires'
RQ ref  : RQ_001_1483
Role    : Correspondent_Node
config  : CF_MOB_04
TD ref  : TD_MOB_1483_01

with {
    QE4 away_from_home
    and QE4 registered to QE1
    and EUT having established a binding with QE4
    and EUT established 'in continuous unbounded communication with QE4'
}
ensure that
{ when { QE4 sends a packet to the EUT
        after the binding_lifetime
        indicating that a response is required }
  then { QE4 indicates receipt of the response directly from the EUT }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_1390_01
summary : 'Correspondent Node maintains a separate binding cache for each
          of its unicast routable addresses'
RQ ref  : RQ_001_1390
Role    : Correspondent_Node
config  : CF_MOB_04
TD ref  : TD_MOB_1390_01

```

```

with {
    EUT configured to have 2 global_addresses
    and QE4 away_from_home
    and QE4 registered to QE1
    and EUT having established a binding to QE4
        using its first global_address
    and QE1 disconnected from the network
}
ensure that
{ when { EUT is requested to send a packet to QE4
        containing a source_address
        set to its second global_address }
  then { QE4 does not indicate receipt of the packet }
}

```

```

TP id   : TP_MOB_1458_01
summary : 'Correspondent Node updates a binding cache entry on receipt
          of a valid Binding Update'
RQ ref  : RQ_001_1458
Role    : Correspondent_Node
config  : CF_MOB_04
TD ref  : TD_MOB_1458_01

```

```

with {
    QE4 away_from_home
    and QE4 registered to QE1
    and EUT having established a binding with QE4
}
ensure that
{ when { QE4 moves to another foreign_network
        and EUT is requested to send a packet to QE4
        indicating that a response is required }
  then { EUT indicates receipt of the response directly from QE4 }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_1776_01
summary : 'Mobile Node updates binding with correspondent node upon receipt
          of a Binding Refresh Request'
RQ ref  : RQ_001_1776 , RQ_001_1383
Role    : Correspondent_Node
config  : CF_MOB_04
TD ref  : TD_MOB_1776_01

```

```

with {
    EUT away_from_home
    and EUT registered to QE1
    and EUT having established a binding with QE4
}
ensure that

```

```

    { when { QE4 sends a Binding_Refresh_Request }
      then { QE4 and the EUT are able to communicate directly
            after the original binding_lifetime }
    }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_1348_01
summary : 'Correspondent Node is able to participate in Return
          Routability Procedure'
RQ ref  : RQ_001_1348 , RQ_001_1050, RQ_001_1051
Role    : Correspondent_Node
config  : CF_MOB_04
TD ref  : TD_MOB_1348_01

with {
    QE4 away_from_home
    and QE4 registered to QE1
    and QE4 configured to perform route_optimization
    and EUT configured to perform route_optimization
}
ensure that
{ when { EUT is requested to send a packet to QE4
        indicating that a response is required }
  then { EUT indicates receipt of the response directly from QE4 }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_1063_01
summary : 'Mobile Node is able to participate in Return Routability
          Procedure'
RQ ref  : RQ_001_1063 , RQ_001_1048 , RQ_001_1709,
          RQ_001_1007, RQ_001_1723, RQ_001_1750
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_1063_01

with {
    EUT away_from_home
    and EUT registered to QE1
    and EUT configured to perform route_optimization
    and QE4 configured to perform route_optimization
}
ensure that
{ when { EUT receives a packet from QE4
        indicating that a response is required }
  then { QE4 indicates receipt of the response directly from the EUT }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_1047_01
summary : 'Correspondent Node completes Return Routability Procedure
          before accepting a Binding Update from a mobile node'
RQ ref  : RQ_001_1047
Role    : Correspondent_Node
config  : CF_MOB_04
TD ref  : TD_MOB_1047_01

with {
    QE4 away_from_home
    and QE4 registered to QE1
    and QE4 configured to perform route_optimization
    and EUT configured to perform route_optimization
    and QE1 unreachable from QE4 -- QE4 cannot complete RRP
}
ensure that
{ when { QE4 is requested to send a packet to the EUT
        indicating that a response is required }
  then { EUT sends no response directly to QE4 }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_1485_01
summary : 'Correspondent Node stops retransmitting Binding Refresh Requests
          messages when it receives a Binding Update'
RQ ref  : RQ_001_1485
Role    : Correspondent_Node
config  : CF_MOB_04

```

TD ref : TD\_MOB\_1485\_01

```

--*****
--*   However we wrap this up, it is a conformance test, not interop   *--
--*****

```

```

with {
    QE4 away_from_home
    and QE4 registered to QE1
    and EUT having established a binding with QE4
}
ensure that
{ when {
    EUT 'tries to refresh its binding with QE4'
    and EUT receives 'a message indicating that
        the refresh is successful' }
    then { EUT 'stops sending refresh requests to QE4' }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

TP id : TP\_MOB\_1725\_01  
summary : 'Mobile Node support the protection of Home Test and  
Home Test Init messages'  
RQ ref : RQ\_001\_1725  
Role : Mobile\_Node  
config : CF\_MOB\_03  
TD ref : TD\_MOB\_1725\_01

```

with {
    EUT away_from_home
    and EUT registered to QE1
    and EUT configured to perform route_optimization
    and QE4 configured to perform route_optimization
    and QE1 configured to protect return_routability_packets
}
ensure that
{ when { EUT receives a packet from QE4
    indicating that a response is required }
    then { EUT sends a response directly to QE4 }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

TP id : TP\_MOB\_1065\_01  
summary : 'Correspondent Node sends a Binding\_Acknowledgement message upon  
receipt of a Binding Update message containing A-Flag set to 1'  
RQ ref : RQ\_001\_1065, RQ\_001\_1350  
Role : Correspondent\_Node  
config : CF\_MOB\_04  
TD ref : TD\_MOB\_1065\_01

```

with {
    QE4 away_from_home
    and QE4 registered to QE1
    and QE4 configured 'to request Binding_Acknowledgements from
        correspondent nodes'
    and QE4 configured to perform route_optimization
    and EUT configured to perform route_optimization
}
ensure that
{ when { EUT receives a packet from QE4
    indicating that a response is required }
    then { EUT sends the response directly to QE4 }
}

```

End Group -- Group A

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

Group 1.2 'Group B'

TP id : TP\_MOB\_1382\_01  
summary : 'Mobile Node is able to receive and process Binding Acknowledgements'  
RQ ref : RQ\_001\_1382  
Role : Mobile\_Node  
config : CF\_MOB\_03  
TD ref : TD\_MOB\_1382\_01

```

with {
    EUT away_from_home
    and EUT registered to QE1
    and QE1 disconnected
}

```

```

    and QE3 having the same Home_Address as EUT
    and QE3 having the same ethernet_address as QE1
  }
  ensure that
  { when {
      EUT returns home before the binding_lifetime expires
      and QE3 is disconnected
      and QE1 is connected to the Home_Network }
    then {
      EUT and QE4 are able to communicate }
  }

```

```
--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--
```

```

TP id   : TP_MOB_1700_01
summary : 'Mobile Node does not perform Duplicate Address Detection
          when returning home before the expiry of its bindings'
RQ ref  : RQ_001_1700
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_1700_01

```

```

with {
  EUT away_from_home
  and EUT registered to QE1
  and QE1 is disconnected
  and QE3 having the same Home_Address as EUT
  and QE3 having the same ethernet_address as QE1
}
ensure that
{ when {
    EUT returns home before the binding_lifetime expires
    and QE3 is disconnected
    and QE1 is connected to the Home_Network }
  then {
    EUT and QE4 are able to communicate }
}

```

```
--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--
```

```

TP id   : TP_MOB_1693_01
summary : ' MN accepts packets at its previous CoA after registering
          its new primary CoA '
RQ ref  : RQ_001_1693
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_1693_01

```

```

with {
  EUT away_from_home
  and EUT registered to QE1
  and QE8 advertizing a new prefix -- thus causing a new care-of
                                   -- address to be generated
}
ensure that
{ when {
    QE8 stops advertizing the old prefix
    before (QE8 starts advertizing a new prefix
    before EUT receives a packet from QE3
           indicating that a response is required
           and containing a destination_address
           set to the old Care_Of_Address of the EUT) }
  then { QE3 indicates receipt of the response from the EUT }
}

```

```
--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--
```

```

TP id   : TP_MOB_1678_01
summary : ' MN discover a new default router when it detects the default
          router is no longer bi-directionally reachable '
RQ ref  : RQ_001_1678
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_1678_01

```

```

with {
  EUT connected in home_network
  and QE1 disconnected
}
ensure that
{ when {
    EUT moves to a foreign_network
    and EUT receives a packet from QE3
           indicating that a response is required
           and containing a destination_address
           set to the Care_of_Address of the EUT }
  then { QE3 indicates receipt of the response from the EUT }
}

```



}

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

**TP id** : TP\_MOB\_1507\_01  
**summary** : 'Home Agent removes binding when the associated prefix valid lifetime expires'  
**RQ ref** : RQ\_001\_1507  
**Role** : Home\_Agent  
**config** : CF\_MOB\_02  
**TD ref** : TD\_MOB\_1507\_01

```

with {
    QE1 away_from_home
    and QE1 registered to the EUT
    and QE1 configured not to perform Route_Optimization
}
ensure that
{
  when { the prefix_lifetime expires at the EUT }
  then { QE4 and QE1 are unable to communicate }
}
  
```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

**TP id** : TP\_MOB\_1501\_01  
**summary** : 'Home Agent performs Duplicate Address Detection on home link before sending a Binding Acknowledgment'  
**RQ ref** : RQ\_001\_1501 , RQ\_001\_1502 , RQ\_001\_1503  
**Role** : Home\_Agent  
**config** : CF\_MOB\_02  
**TD ref** : TD\_MOB\_1501\_01

```

with {
    QE1 at_home
    and QE3 disconnected from home_network
    and QE3 having the same home_address as QE1
}
ensure that
{
  when {
    QE1 is disconnected from the home_network
    and QE3 is connected to the home_network
    and QE1 is connected to a foreign_network
  }
  then { QE4 and QE1 are unable to communicate }
}
  
```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

**TP id** : TP\_MOB\_1500\_01  
**summary** : 'Home Agent maintains a Binding Cache entry from receipt of a Binding Update until the Binding Lifetime expires'  
**RQ ref** : RQ\_001\_1497, RQ\_001\_1500 , RQ\_001\_1522  
**Role** : Home\_Agent  
**config** : CF\_MOB\_02  
**TD ref** : TD\_MOB\_1500\_01

```

with {
    QE1 at_home
    and QE1 configured not to perform Route_Optimization
}
ensure that
{
  when { QE1 moves to a foreign_network }
  then { QE4 and QE1 are able to communicate
        within the Binding_Lifetime }
}
  
```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

**TP id** : TP\_MOB\_1497\_01  
**summary** : 'Home Agent creates a new entry in its Binding Cache upon receipt of a Binding Update'  
**RQ ref** : RQ\_001\_1497  
**Role** : Home\_Agent  
**config** : CF\_MOB\_02  
**TD ref** : TD\_MOB\_1497\_01

```

with
{
    QE1 at_home
    and QE1 configured not to perform Route_Optimization
}
ensure that
{
  when { QE1 moves to a foreign_network }
}
  
```

```

    then { QE4 is able to communicate with QE1 }
  }

```

```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

```

```

TP id   : TP_MOB_1826_01
summary : 'Home Agent updates the entry in its Binding Cache
          upon receipt of a Binding Update'
RQ ref  : RQ_001_1826
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_1826_01

```

```

  with {
    QE1 away_from_home
    and QE1 registered to EUT
    and QE1 configured not to perform Route_Optimization
  }
  ensure that
  { when { QE1 moves to another foreign_network }
    then { QE3 and QE1 are able to communicate }
  }

```

```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

```

```

TP id   : TP_MOB_1494_01
summary : 'Home Agent returns a type "132" Binding Acknowledgment
          upon receipt of a Binding Update which Home Address
          is not on link'
RQ ref  : RQ_001_1494
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_1494_01

```

```

  with {
    QE1 disconnected from the home_network
    and QE1 configured not to perform Route_Optimization
  }
  ensure that
  { when {
    QE1 is connected to a foreign_network
    and EUT receives a Binding_Update
    containing a Home_Address not on_link }
    then { QE4 and QE1 are unable to communicate }
  }

```

```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

```

```

TP id   : TP_MOB_1503_01
summary : 'Home Agent returns a type "134" Binding Acknowledgement when
          Duplicate Address Detection for the Home Address / Link
          Local Address fails'
RQ ref  : RQ_001_1503
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_1503_01

```

```

  with {
    QE1 disconnected from home_network
    and QE3 connected to home_network
    and QE3 configured to have the same link_local_address as QE1
  }
  ensure that
  { when { QE1 is connected to a foreign_network }
    then { QE4 and QE1 are unable to communicate }
  }

```

```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

```

```

TP id   : TP_MOB_1684_01
summary : 'Mobile Node generates a new primary Care of Address
          when the current one is deprecated'
RQ ref  : RQ_001_1684
Role    : Mobile_Node
config  : CF_MOB_07
TD ref  : TD_MOB_1684_01

```

```

  with {
    EUT away_from_home
    and QE3 configured as default_router for EUT
    and QE2 able to communicate with EUT
  }
  ensure that

```

```

    { when {
      before { QE3 stops advertizing the old prefix
              before (QE3 starts advertizing a new prefix
                      before QE2 is requested to send a packet to the EUT
                          indicating that a response is required) }
      then {
        QE2 indicates receipt of the response from the EUT }
    }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_1683_01
summary : 'Mobile Node generates a new primary Care of Address after
          having moved'
RQ ref  : RQ_001_1683 , RQ_001_1380 , RQ_001_1690
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_1683_01

```

```

with {
  EUT away_from_home
  and QE4 able to communicate with EUT
}
ensure that
{ when { EUT moves to another foreign_network }
  then { QE4 and the EUT are able to communicate }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_1465_01
summary : 'Correspondent Node deletes any existing related bindings
          on receipt of a Binding Update requesting
          to delete a binding'
RQ ref  : RQ_001_1465
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_1465_01

```

```

with {
  EUT away_from_home
  and EUT configured to perform route_optimization
  and QE4 configured to perform route_optimization
  and QE4 having established a binding with EUT
}
ensure that
{ when { EUT returns home }
  then { QE4 and the EUT are able to communicate with EUT }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_1496_01
summary : 'Correspondent Node sends a type "131" Binding Acknowledgment
          when receiving a Home Registration Binding Update'
RQ ref  : RQ_001_1496
Role    : Correspondent_Node
config  : CF_MOB_04
TD ref  : TD_MOB_1496_01

```

```

with {
  EUT at_home
  and QE5 at_home
  and QE5 configured 'to use EUT as Home Agent'
}
ensure that
{ when { QE5 moves to a foreign_network }
  then { QE3 and QE5 are unable to communicate }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_1528_01
summary : 'When accepting Care of Address de-registration Binding
          Update, Home Agent deletes any existing entry in its
          Binding Cache for the Mobile Node'
RQ ref  : RQ_001_1528 , RQ_001_1529
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_1528_01

```

```

with {
  QE1 away_from_home
  and QE1 registered to EUT
}

```

```

        and QE4 able to communicate with QE1
        and QE1 configured not to perform Route_Optimization
    }
    ensure that
    { when { QE1 returns home }
      then { QE4 and QE1 are able to communicate directly }
    }
}

--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--

TP id   : TP_MOB_1526_01
summary : 'Home Agent rejects De-Registration Binding Update if no
          entry exists in its Binding Cache for the Mobile Node'
RQ ref  : RQ_001_1526
Role    : Home_Agent
config  : CF_MOB_05
TD ref  : TD_MOB_1526_01

with {
    EUT disconnected from Home_Network
    and QE2 configured to have the same IP_address as EUT
    and QE1 connected to a foreign_network
    and QE1 registered to QE2
}
ensure that
{ when {
    QE2 is disconnected from Home_Network
    and EUT is connected to Home_Network
    and QE1 returns home }
  then {
    QE4 and QE1 are unable to communicate }
}

--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--

TP id   : TP_MOB_1380_01
summary : 'Mobile Node supports care-of address formation'
RQ ref  : RQ_001_1380
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_1380_01

with {
    EUT connected to home_network
    and QE4 able to communicate with EUT
}
ensure that
{ when { EUT moves to a foreign_network }
  then { QE4 and the EUT are able to communicate }
}

--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--

TP id   : TP_MOB_1809_01
summary : 'Mobile Nodes support returning home'
RQ ref  : RQ_001_1809 , RQ_001_1808
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_1809_01

with {
    EUT away_from_home
    and QE4 able to communicate with EUT
}
ensure that
{ when { EUT returns home }
  then { QE4 and the EUT are able to communicate }
}

--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--

TP id   : TP_MOB_1005_01
summary : 'When away, Mobile Node is addressable at one or
          more Care of Addresses'
RQ ref  : RQ_001_1005
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_1005_01

with
{
    EUT at_home
    and QE6 'advertising a second prefix on Foreign Network 1'
}

```

```

    }
    ensure that
    { when { EUT moves to Foreign_Network 1 }
      then { QE4 and EUT are able to communicate
            using first and second Care_of_address }
    }
}

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id   : TP_MOB_1702_01
summary : 'Mobile Node replies to Neighbour Solicitations for
          its Home Address after returning home
          and having sent a Binding Update'
RQ ref  : RQ_001_1702 , RQ_001_1695
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_1702_01

with {
  EUT away_from_home
  and EUT registered to QE1
}
ensure that
{ when {
  EUT returns home
  and QE1 is disconnected from the home_network }
  then { QE4 and the EUT are unable to communicate }
}

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id   : TP_MOB_1701_01
summary : 'Mobile Node performs Duplicate Address Detection
          when returning home after its bindings have expired'
RQ ref  : RQ_001_1701
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_1701_01

with {
  EUT away_from_home
  and EUT registered to QE1
  and EUT binding_lifetime expired at QE1
  and QE4 connected to home_network
  using the same Home_Address as EUT
}
ensure that
{ when { EUT returns home }
  then { EUT is unable to communicate } -- DAD fails
}

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id   : TP_MOB_1768_01
summary : 'Mobile Node sends Binding Update before expiry of the
          binding lifetime'
RQ ref  : RQ_001_1768 , RQ_001_1728
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_1768_01

with {
  EUT away_from_home
  and EUT registered to QE1
  and EUT able to communicate with QE4
}
ensure that
{ when { QE4 (is requested to send a packet to the EUT
            indicating that a response is required)
          after the binding_lifetime }
  then { QE4 indicates receipt of the response from the EUT }
}

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id   : TP_MOB_1694_01
summary : 'Mobile Node invalidates all associated Care of Addresses
          when the corresponding router is unreachable'
RQ ref  : RQ_001_1694
Role    : Mobile_Node

```

config : CF\_MOB\_03  
 TD ref : TD\_MOB\_1694\_01

```
with {
    EUT away_from_home
    and EUT registered to QE1
}
ensure that
{ when { EUT moves to another foreign_network }
  then { QE1 and the EUT are unable to communicate
        using the old Care_of_Address }
}
```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id : TP\_MOB\_1510\_01  
 summary : 'Home Agent returns a Binding Acknowledgment in response to  
 a Binding Update'  
 RQ ref : RQ\_001\_1510  
 Role : Home\_Agent  
 config : CF\_MOB\_02  
 TD ref : TD\_MOB\_1510\_01

```
with { QE1 at_home }
ensure that
{ when { QE1 moves to a foreign_network }
  then { QE4 and the EUT are able to communicate }
}
```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id : TP\_MOB\_1534\_01  
 summary : 'Home Agent stops intercepting packets for the mobile  
 node on acceptance of the Primary Care of Address  
 De-Registration Binding Update'  
 RQ ref : RQ\_001\_1534  
 Role : Home\_Agent  
 config : CF\_MOB\_02  
 TD ref : TD\_MOB\_1534\_01

```
with {
    QE1 away_from_home
    and QE1 registered to EUT
}
ensure that
{ when {
    QE1 returns home
    and EUT is disconnected from the home_network }
  then { QE4 and QE1 are able to communicate }
}
```

End Group -- Group B

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

Group 1.3 'Group C'

TP id : TP\_MOB\_1344\_01  
 summary : 'Correspondent Node discard received packets containing  
 Type 2 Routing Headers'  
 RQ ref : RQ\_001\_1344  
 Role : Correspondent\_Node  
 config : CF\_MOB\_04  
 TD ref : TD\_MOB\_1344\_01

```
with {
    EUT disconnected
    and QE4 configured to have the same link_local_address as EUT
    and QE4 connected to Home_Network 2
    and QE4 registered to QE1
    and QE4 having established a binding with QE3
}
ensure that
{ when {
    QE4 is disconnected
    and EUT is connected to Home_Network 1
    and QE3 is requested to send a packet to the EUT
    indicating that a response is required
    -- QE3 sends packets containing
    -- Routing Headers Type 2
    and QE5 is requested to send a packet to the EUT
    indicating that a response is required }
  -- QE5 sends packets not containing
}
```



```

config : CF_MOB_04
TD ref : TD_MOB_1423_01

  with {
    QE4 away_from_home
    and QE4 registered to QE1
    and EUT configured to perform route_optimization
    and QE4 configured to perform route_optimization
    and QE4 having established a binding with EUT
    and EUT having established a binding with QE4
  }
  ensure that
  { when { QE4 sends a packet to the EUT
        indicating that a response is required }
    then { QE4 indicates receipt of the response directly from EUT }
  }

```

```
--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--
```

```

TP id : TP_MOB_1615_01
summary : 'MN uses reverse tunnelling to the correspondent node when
            no binding exists'
RQ ref : RQ_001_1615
Role : Mobile_Node
config : CF_MOB_03
TD ref : TD_MOB_1615_01

```

```

  with {
    EUT away_from_home
    and EUT registered to QE1
    and EUT configured to perform route_optimization
    and QE4 configured not to perform Route_Optimization
  }
  ensure that
  { when { EUT receives a packet from QE4
        indicating that a response is required }
    then { QE4 indicates receipt of the response from the EUT }
  }

```

```
--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--
```

```

TP id : TP_MOB_1592_01
summary : 'HA schedules the delivery of the prefix information when a new
            prefix is added to its home subnet interface'
RQ ref : RQ_001_1592 , RQ_001_1370 , RQ_001_1805
Role : Home_Agent
config : CF_MOB_02
TD ref : TD_MOB_1592_01

```

```

  with {
    QE1 away_from_home
    and QE1 registered to EUT
  }
  ensure that
  { when {
        EUT generates a new prefix to the home_address of QE1
        before (QE4 sends a packet to QE1
                using the new home_address
                and indicating that a response is required) }
    then { QE4 indicates receipt of a response from QE1 }
  }

```

```
--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--
```

```

TP id : TP_MOB_1600_01
summary : 'HA retransmits heroically unsolicited Advertisement until
            the receipt of a Mobile_Prefix_Solicitation from MN'
RQ ref : RQ_001_1600 , RQ_001_1813
Role : Home_Agent
config : CF_MOB_02
TD ref : TD_MOB_1600_01

```

```

  with {
    QE1 away_from_home
    and QE1 registered to EUT }
  ensure that
  { when {
        QE1 is disconnected from the foreign_network
        before EUT generates a new prefix to the home_address of QE1
        before QE1 is connected to the foreign_network after 1 minute
        before QE4 sends a packet to QE1
                using the new home_address
                and indicating that a response is required }
    then { QE4 indicates receipt of a response from QE1 }
  }

```



```

    }
}
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
TP id   : TP_MOB_1812_01
summary : 'HA delivers new prefix information when lifetime information
          (valid or preferred lifetime) of the prefix changes'
RQ ref  : RQ_001_1812
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_1812_01

with {
    QE1 away_from_home
    and QE1 registered to EUT
    and EUT configured to have a short prefix_lifetime on the
        Home_Network of QE1 --(suggest 30s)
}
ensure that
{ when { EUT is requested to configure a new prefix_lifetime
        for QE1 }
  then { QE1 and QE4 are able to communicate
        using the new prefix
        after the original prefix_lifetime expires }
}
}
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
TP id   : TP_MOB_1603_01
summary : 'HA transmits again unsolicited Mobile_Prefix_Advertisement after the
          prolongation of the binding of the Mobile Node'
RQ ref  : RQ_001_1603
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_1603_01

with {
    QE1 away_from_home
    and QE1 is registered to the EUT
    and QE1 and the EUT configured to have a short binding_lifetime
        -- (Suggest 30s)
}
ensure that
{ when {
    QE1 is disconnected from the foreign_network
    before the binding_lifetime expires between QE1 and the EUT
    before QE1 is connected to another foreign_network }
  then { QE1 and QE4 are able to communicate }
}
}
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
TP id   : TP_MOB_1612_01
summary : 'When MN starts a transport-level connections at Home, it conserves
          that connection away_from_home'
RQ ref  : RQ_001_1612
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_1612_01

with {
    EUT connected in home_network
    and EUT having established a transport_connection to QE3
}
ensure that
{ when { EUT moves to a foreign_network }
  then { EUT and QE3 are able to communicate
        using the transport_connection }
}
}
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
TP id   : TP_MOB_1613_01
summary : 'When MN starts a transport-level connections in Foreign network,
          it conserves this connection into another Foreign network'
RQ ref  : RQ_001_1613
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_1613_01

with {
    EUT away_from_home
    and EUT registered to QE1
}
}

```

```

        and EUT having established a transport_connection to QE3
    }
    ensure that
    { when { EUT moves to another foreign_network }
      then { EUT and QE3 are able to communicate
            using the transport_connection }
    }
}
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id   : TP_MOB_1413_01
summary : 'Correspondent Node drops packets containing Home Address
          option (but no Binding Update) when there is no corresponding
          Binding Cache entry'
RQ ref  : RQ_001_1413
Role    : Correspondent_Node
config  : CF_MOB_04
TD ref  : TD_MOB_1413_01

```

```

    with {
        EUT configured to perform route_optimization
        and QE4 configured to perform route_optimization
        and QE4 away_from_home
        and QE4 registered to QE1
        and EUT having no Binding_Cache_entry for QE4
        and QE4 having a Binding_Cache_entry for EUT
    }
    ensure that
    { when { EUT receives a packet directly from QE4
          indicating that a response is required }
      then { EUT sends no response to QE4 }
    }
}

```

```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id   : TP_MOB_1413_02
summary : 'Correspondent Node drops packets containing Home Address
          option (but no Binding Update) and send a Binding Error
          message to the Mobile Node, when there is no corresponding
          Binding Cache entry'
RQ ref  : RQ_001_1413
Role    : Correspondent_Node
config  : CF_MOB_04
TD ref  : TD_MOB_1413_02

```

```

    with {
        EUT configured to perform route_optimization
        and QE4 configured to perform route_optimization
        and QE4 away_from_home
        and QE4 registered to QE1
        and EUT having no Binding_Cache_entry for QE4
        and QE4 having a Binding_Cache_entry for EUT
    }
    ensure that
    { when { EUT receives a packet directly from QE4
          indicating that a response is required }
      then { EUT sends no response to QE4
            before EUT and QE4 are able to communicate }
    }
}

```

```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id   : TP_MOB_1414_01
summary : 'When using Route Optimization, a Correspondent Node drops any
          packet in which the Home Address option (but not Binding Update)
          does not match the Home Address recorded in its Binding Cache'
RQ ref  : RQ_001_1414
Role    : Correspondent_Node
config  : CF_MOB_04
TD ref  : TD_MOB_1414_01

```

```

    with {
        EUT configured to perform route_optimization
        and QE4 configured to perform route_optimization
        and QE4 away_from_home
        and QE4 registered to QE1
        and QE4 having established a binding with EUT
    }
    ensure that
    { when { EUT receives a packet from QE4
          containing a Home_Address_Option

```

```

        not set to the Home_Address of QE4 }
    then { EUT discards the packet }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_1414_02
summary : 'When using Route Optimization, a Correspondent Node drops any
          packet in which the Home Address option (but not Binding Update)
          does not match the Home Address recorded in its Binding Cache and
          send a Binding Error message to the Mobile Node'
RQ ref  : RQ_001_1414
Role    : Correspondent_Node
config  : CF_MOB_04
TD ref  : TD_MOB_1414_02

```

```

with {
    EUT configured to perform route_optimization
    and QE4 configured to perform route_optimization
    and QE4 away_from_home
    and QE4 registered to QE1
    and QE4 having established a binding with EUT
}
ensure that
{ when {
    EUT receives a packet from QE4
    containing a Home_Address_Option
    not set to the Home_Address of QE4 }
  then {
    EUT discards the packet
    before EUT and QE4 are able to communicate }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_1415_01
summary : 'A Correspondent Node drops packets in which the Source Address does
          not match the care-of address recorded in the corresponding
          Binding Cache Entry'
RQ ref  : RQ_001_1415
Role    : Correspondent_Node
config  : CF_MOB_04
TD ref  : TD_MOB_1415_01

```

```

with {
    EUT configured to perform route_optimization
    and QE4 configured to perform route_optimization
    and QE4 away_from_home
    and QE4 registered to QE1
    and QE4 having established a binding with EUT
}
ensure that
{ when { EUT receives a packet from QE4
    containing a Home_Address_Option
    set to the Home_Address of QE4
    and containing a Source_Address
    not set to the Care_OF_Address of QE4 }
  then { EUT discards the packet }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_1415_02
summary : 'A Correspondent Node drops packets in which the Source Address does
          not match the care-of address recorded in the corresponding
          Binding Cache Entry and sends a Binding Error message to the
          Mobile Node'
RQ ref  : RQ_001_1415
Role    : Correspondent_Node
config  : CF_MOB_04
TD ref  : TD_MOB_1415_02

```

```

with {
    EUT configured to perform route_optimization
    and QE4 configured to perform route_optimization
    and QE4 away_from_home
    and QE4 registered to QE1
    and QE4 having established a binding with EUT
}
ensure that
{ when {
    EUT receives a packet from QE4

```

```

        containing a Home_Address_Option
        set to the Home_Address of QE4
        and containing a Source_Address
        not set to the Care_Of_Address of QE4 }
    then {
        EUT discards the packet
        before QE4 and the EUT are able communicate }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_1384_01
summary : 'MN reconfigures its home address according to the prefix information
          in a Mobile_Prefix_Advertisement'
RQ ref  : RQ_001_1384
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_1384_01

```

```

with {
    EUT away_from_home
    and EUT registered to QE1
}
ensure that
{
    when {
        QE1 is requested to modify its home_network prefix }
    then {
        QE4 and the EUT are able to communicate
        using the new home_address }
}

```

```
End Group -- Group C
```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```
Group 1.4 'Group D'
```

```
Group 1.4.2
```

```

TP id   : TP_MOB_1574_01
summary : 'Home Agent supports the protection of Home Test and
          Home Test Init messages'
RQ ref  : RQ_001_1574
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_1574_01

```

```

with {
    QE4 configured to perform route_optimization
    and QE1 configured to perform route_optimization
    and QE1 away_from_home
    and QE1 registered to EUT
    and QE1 configured to protect return_routability_packets
}
ensure that
{
    when {
        QE1 receives a packet from QE4
        indicating that a response is required }
    then {
        QE1 sends the response directly to QE4 }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_1371_01
summary : 'Home Agent supports ESP protection of Home Test and
          Home Test Init messages'
RQ ref  : RQ_001_1371
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_1371_01

```

```

with {
    QE4 configured to perform route_optimization
    and QE1 configured to perform route_optimization
    and QE1 configured to protect return_routability_packets
    using ESP
}
ensure that
{
    when {
        QE1 moves to a Foreign_Network
        before QE4 sends a packet to QE1
        indicating that a response is required }
}

```

```

    then {          QE4 indicates receipt of the response directly from QE1 }
  }

```

```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

```

```

TP id   : TP_MOB_1082_01
summary : 'Home Agent uses a Security Association to protect integrity and
          authenticity of Mobile_Prefix_Solicitations and Advertisements'
RQ ref  : RQ_001_1082 , RQ_001_1014 , RQ_001_1607
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_1082_01

```

```

  with {
    and QE1 at_home
    and QE1 configured to protect
      Mobile_Prefix_Solicitations
    and QE1 configured to accept only secured
      Mobile_Prefix_Advertisements
    and QE1 configured to have a short prefix_lifetime (--suggest 30s)
  }
  ensure that
  { when {
      QE1 moves to a foreign_network
      before its prefix_lifetime expires
      before QE4 sends a packet to QE1
        indicating that a response is required }
    then {
      QE4 indicates receipt of the response from QE1 }
  }

```

```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

```

```

TP id   : TP_MOB_1082_02
summary : 'Mobile Node uses a Security Association to protect integrity and
          authenticity of Mobile Prefix Solicitations and Advertisements'
RQ ref  : RQ_001_1082 , RQ_001_1014 , RQ_001_1663 , RQ_001_1664
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_1082_02

```

```

  with {
    and EUT at_home
    and QE1 configured to accept only secured
      Mobile_Prefix_Solicitations
    and QE1 configured to protect Mobile_Prefix_Advertisements
    and EUT configured to have a short prefix_lifetime (--suggest 30s)'
  }
  ensure that
  { when {
      EUT moves to a foreign_network
      before its prefix_lifetime expires
      before QE4 sends a packet to the EUT
        indicating that response is required }
    then {
      QE4 indicates receipt of the response from the EUT }
  }

```

```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

```

```

TP id   : TP_MOB_1385_01
summary : 'Mobile Node supports Dynamic Home Agent Address Discovery'
RQ ref  : RQ_001_1385
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_1385_01

```

```

  with {
    and EUT registered to QE1
    and EUT disconnected
    and EUT configured not to perform Route_Optimization
    and QE4 configured not to perform Route_Optimization
  }
  ensure that
  { when {
      QE1 is requested to modify its IP_address
      before the EUT is connected to a foreign_network }
    then {
      QE4 and the EUT are able to communicate }
  }

```

```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

```

```

TP id   : TP_MOB_1657_01
summary : 'Mobile Node attempts Dynamic Home Agent Address Discovery
          if it cannot contact its current Home Agent'
RQ ref  : RQ_001_1657
Role    : Mobile_Node

```

config : CF\_MOB\_06  
 TD ref : TD\_MOB\_1657\_01

```

with {
    EUT away_from_home
    and EUT registered to QE1
}
ensure that
{ when {
    QE1 is disconnected from the Home_Network
    and EUT moves to another foreign_network }
  then {
    QE4 and EUT are able to communicate }
}

```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id : TP\_MOB\_1743\_01  
 summary : 'Mobile Node goes on registering home addresses when  
 the registration of one of them fails'  
 RQ ref : RQ\_001\_1743  
 Role : Mobile\_Node  
 config : CF\_MOB\_03  
 TD ref : TD\_MOB\_1743\_01

```

with {
    EUT disconnected
    and EUT configured to have 2 home_addresses
    and QE3 configured to use the first home_address of EUT
}
ensure that
{ when {
    EUT is connected to a foreign_network
    and EUT receives a packet from QE4
    containing a destination_address
    set to EUT home_address 2
    and indicating that a response is required }
  then {
    QE4 indicates receipt of the response from the EUT }
}

```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id : TP\_MOB\_1727\_01  
 summary : 'Mobile Node registers its new primary Care-Of Address  
 after changing it'  
 RQ ref : RQ\_001\_1727  
 Role : Mobile\_Node  
 config : CF\_MOB\_03  
 TD ref : TD\_MOB\_1727\_01

```

with {
    EUT away_from_home
    and EUT registered to QE1
}
ensure that
{ when {
    EUT moves to another foreign_network
    and EUT receives a packet from QE4
    indicating that a response is required }
  then {
    QE4 indicates receipt of the response from the EUT }
}

```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id : TP\_MOB\_1742\_01  
 summary : 'Mobile Node does not attempt to use its home address  
 if registration with Home Agent fails due to DAD'  
 RQ ref : RQ\_001\_1742  
 Role : Mobile\_Node  
 config : CF\_MOB\_03  
 TD ref : TD\_MOB\_1742\_01

```

with {
    QE3 configured to have the home_address of EUT }
ensure that
{ when {
    EUT moves to a foreign_network }
  -- the registering of EUT has failed
  then {
    EUT does not use its Home_Address to communicate }
}

```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id : TP\_MOB\_1740\_01  
 summary : 'Mobile Node attempts to register all of its home addresses'  
 RQ ref : RQ\_001\_1740  
 Role : Mobile\_Node

config : CF\_MOB\_03  
TD ref : TD\_MOB\_1740\_01

```
with {
    EUT disconnected
    and EUT configured to have 2 home_addresses
}
ensure that
{ when {
    EUT is connected to a foreign_network
    and QE4 is requested to send a packet
        indicating that a response is required
        to the first home_address of EUT
    and QE4 is requested to send a packet
        indicating that a response is required
        to the second home_address of EUT }
    then {
        QE4 indicates receipt of the first response
        and QE4 indicates receipt of the second response }
}
```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id : TP\_MOB\_1016\_01  
summary : 'Home Agent supports transport\_mode\_ESP protection of Binding Update messages'  
RQ ref : RQ\_001\_1016  
Role : Home\_Agent  
config : CF\_MOB\_02  
TD ref : TD\_MOB\_1016\_01

```
with {
    QE1 disconnected
    and QE1 configured to protect any Binding_Update packet
        using transport_mode_ESP
}
ensure that
{ when {
    QE1 is connected to a foreign_network
    and QE1 receives a packet from QE4
        indicating that a response is required }
    then { QE1 sends response directly to QE4 }
}
```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id : TP\_MOB\_1017\_01  
summary : 'Mobile Node uses transport\_mode\_ESP to protect Binding Update messages'  
RQ ref : RQ\_001\_1017  
Role : Mobile\_Node  
config : CF\_MOB\_03  
TD ref : TD\_MOB\_1017\_01

```
with {
    QE1 configured to accept only a Binding_Update
        secured using transport_mode_ESP
}
ensure that
{ when {
    EUT moves to a foreign_network
    and QE4 is requested to send a packet to EUT
        indicating that a response is required }
    then { QE4 indicates receipt of the response }
}
```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id : TP\_MOB\_1655\_01  
summary : 'Mobile Node already registered to a Home Agent uses that Home Agent for any new registrations'  
RQ ref : RQ\_001\_1655  
Role : Mobile\_Node  
config : CF\_MOB\_06  
TD ref : TD\_MOB\_1655\_01

```
with
{
    EUT configured 'to use DHAAD'
    and EUT away_from_home
    and EUT registered to QE1
    and QE2 disconnected from Home_Network 1
}
ensure that
{ when {
    QE1 is disconnected from Home_Network 1
    and QE2 is connected to Home_Network 1
}
```

```

        and EUT moves to another foreign_network }
    then {
        QE4 and EUT are unable to communicate
            within MAX_BINDACK_TIMEOUT
        -- EUT tries to register with QE1
        and QE4 is able to communicate after MAX_BINDACK_TIMEOUT }
        -- EUT registered to QE2
    }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_1366_01
summary : 'Home Agent returns a Binding_Acknowledgement message in response
          to a Binding Update message'
RQ ref  : RQ_001_1366
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_1366_01

```

```

with {
    QE1 at_home
}
ensure that
{
    when {
        QE1 moves to a foreign_network
        and QE1 receives a packet from QE4
            indicating that a response is required }
    then {
        QE4 indicates receipt of the response }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_1804_01
summary : 'Home Agent is able to participate in
          Dynamic Home Agent Address Discovery'
RQ ref  : RQ_001_1804 , RQ_001_1368
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_1804_01

```

```

with {
    QE1 at_home
    and QE1 not configured to have its Home_Agent_address available
}
ensure that
{
    when {
        QE1 moves to a foreign_network
        and QE4 is requested to send a packet to QE1
            indicating that a response is required }
    then {
        QE4 indicates receipt of the response }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_1733_01
summary : 'Mobile Node sends Binding Update messages to its Home Agent
          until it receives a matching Binding_Acknowledgement message,
          before MAX_BINDACK_TIMEOUT seconds'
RQ ref  : RQ_001_1733
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_1733_01

```

```

with {
    EUT at_home
    and EUT configured to have its Home_Agent_address available
    and QE1 disconnected
}
ensure that
{
    when {
        EUT moves to a foreign_network
        and QE1 is connected after 15 seconds
            -- ~ MAX_BINDACK_TIMEOUT / 2
    }
    then {
        QE4 and EUT are able to communicate }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_1733_02
summary : 'If the Mobile Node knows just one Home Agent (no DHAAD),
          it continues to send Binding Update messages to its
          Home Agent after MAX_BINDACK_TIMEOUT seconds'
RQ ref  : RQ_001_1733
Role    : Mobile_Node

```



config : CF\_MOB\_03  
 TD ref : TD\_MOB\_1733\_02

```

with {
    EUT at_home
    and EUT configured to have its Home_Agent_address available
    and QE1 disconnected
}
ensure that
{ when {
    EUT moves to a foreign_network
    and QE1 is connected after MAX_BINDACK_TIMEOUT
}
  then {
    QE4 and EUT are able to communicate }
}

```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id : TP\_MOB\_1734\_01  
 summary : 'When Mobile Node knows several Home Agent (returned during DHAAD),  
 Mobile Node tries to register with other Home Agents when  
 registration fails with the first one'  
 RQ ref : RQ\_001\_1734  
 Role : Mobile\_Node  
 config : CF\_MOB\_06  
 TD ref : TD\_MOB\_1734\_01

```

with {
    EUT not configured to have its Home_Agent_address available
    and QE1 configured to have a Home_Agent_Preference greater than QE2
}
ensure that
{ when {
    QE1 is disconnected
    and EUT moves to a foreign_network }
  then {
    QE4 and EUT are able to communicate
    after MAX_BINDACK_TIMEOUT
}
}

```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id : TP\_MOB\_1814\_01  
 summary : 'Mobile Node sends Binding Update messages to its Home Agent  
 until it receives a matching Binding\_Acknowledgement message,  
 without time limit if it knows only one Home Agent'  
 RQ ref : RQ\_001\_1814  
 Role : Mobile\_Node  
 config : CF\_MOB\_03  
 TD ref : TD\_MOB\_1814\_01

```

with {
    EUT at_home
    and EUT configured to have its Home_Agent_address available
    and QE1 disconnected
}
ensure that
{ when {
    EUT moves to a foreign_network
    and QE1 is connected after MAX_BINDACK_TIMEOUT
    and QE4 is requested to send a packet to QE1
    indicating that a response is required }
  then {
    QE4 indicates receipt of the response }
}

```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id : TP\_MOB\_1013\_01  
 summary : 'Home Agent supports the protection of Binding Update message'  
 RQ ref : RQ\_001\_1013  
 Role : Home\_Agent  
 config : CF\_MOB\_02  
 TD ref : TD\_MOB\_1013\_01

```

with
{
    QE1 at_home
    and QE1 configured to protect any Binding_Update
}
ensure that
{ when {
    QE1 moves to a foreign_network
    and QE4 is requested to send a packet to QE1
    indicating that a response is required }
}

```

```

    then { QE4 indicates receipt of the response }
  }

```

```

--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--

```

```

TP id   : TP_MOB_1013_02
summary : 'Mobile Node supports the protection of Binding Update message'
RQ ref  : RQ_001_1013
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_1013_02

```

```

with {
  EUT at_home
  and QE1 configured to accept only a secured Binding_Update
}
ensure that
{ when {
  EUT moves to a foreign_network
  and QE4 is requested to send a packet to EUT
  indicating that a response is required }
  then { QE4 indicates receipt of the response }
}

```

End Group

End Group

Group 1.5 'Group E'

```

TP id   : TP_MOB_1376_01
summary : 'Mobile Node is able to perform IPv6 encapsulation' -- miss decapsulation
RQ ref  : RQ_001_1376
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_1376_01

```

```

with {
  EUT away_from_home
  and EUT registered to QE1
  and EUT configured not to perform Route_Optimization
}
ensure that
{ when { QE4 is requested to send a packet to EUT
  indicating that a response is required }
  then { QE4 indicates receipt of the response }
}

```

```

--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--

```

```

TP id   : TP_MOB_1536_01
summary : 'HA intercepts packets for registered mobile node on the home
  network and uses reverse tunnel encapsulation'
RQ ref  : RQ_001_1536 , RQ_001_1551 , RQ_001_1568 , RQ_001_1364
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_1536_01

```

```

with {
  QE1 away_from_home
  and QE1 registered to EUT
  and QE1 configured not to perform Route_Optimization
}
ensure that
{ when { QE3 is requested to send a packet to QE1
  indicating that a response is required }
  then { QE3 indicates receipt of the response }
}

```

```

--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--

```

```

TP id   : TP_MOB_1537_01
summary : 'HA multicasts Neighbour Advertisement in Home network in order
  to intercept packets for mobile node'
RQ ref  : RQ_001_1537
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_1537_01

```

```

with {
  QE1 at home
  and QE1 having established communication to QE3
}

```

```

ensure that
  { when {      QE1 moves to a foreign_network
    }
    then { QE3 updates its Neighbor_Discovery_cache_entry
          for the link_local_address of QE1 }
  }

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_1547_01
summary : 'HA act as proxy for a registered mobile node and reply to any
          received Neighbour Solicitations for it'
RQ ref  : RQ_001_1547
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_1547_01

```

```

with {      QE3 'is disconnected'
      and QE1 away_from_home
      and QE1 registered to EUT
    }
ensure that
  { when {      QE3 is connected to its home_network
    and QE3 is requested to send a packet to QE1
          indicating that a response is required }
    then { QE3 indicates receipt of the response }
  }

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_1557_01
summary : 'HA tunnels multicast packets with a global scope to the mobile node'
RQ ref  : RQ_001_1557 , RQ_001_1372
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_1557_01

```

```

with {      QE1 subscribed to a global_multicast_group
      and QE1 away_from_home
      and QE1 registered to EUT
    }
ensure that
  { when { QE3 is requested to send a packet to the global_multicast_group
          indicating that a response is required }
    then { QE3 indicates receipt of the response }
  }

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_1552_01
summary : 'HA does not tunnel packets to the link_local_address of
          mobile node'
RQ ref  : RQ_001_1552
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_1552_01

```

```

with {      QE1 away_from_home
      and QE1 registered to EUT
    }
ensure that
  { when { QE3 is requested to send a packet
          to the link_local_address of QE1
          indicating that a response is required }
    then { QE3 indicates no receipt of the response }
  }

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_1803_01
summary : 'Home Agent discards packets received from
          a non registered mobile node'
RQ ref  : RQ_001_1803
Role    : Home_Agent
config  : CF_MOB_05
TD ref  : TD_MOB_1803_01

```

```
with
```

```

{
    EUT disconnected from home_network 1
    and QE2 configured to use the same IP_address as EUT
    and QE1 away_from_home
    and QE1 registered to QE2
    and QE1 configured to perform route_optimization
    and QE4 configured to perform route_optimization
}
ensure that
{ when {
    QE2 is disconnected from home_network
    and EUT is connected to home_network
    and QE1 is requested to send a packet to QE4
        indicating that a response is required }
    then {
    QE3 indicates no receipt of the response }
}

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id   : TP_MOB_1538_01
summary : 'HA multicast Neighbour Advertisement to intercept the packets
          to the link_local_address of a registered mobile node'
RQ ref  : RQ_001_1538
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_1538_01

with {
    QE1 at_home
    and QE1 using the same Interface_ID for its link_local_address
        and its home_address
    and QE3 having established communication
        to the link_local_address of QE1
}
ensure that
{ when { QE1 moves to a foreign_network }
    then { QE3 updates the Neighbor_Discovery_cache_entry
        for the link_local_address of QE1 }
}

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id   : TP_MOB_1555_01
summary : 'HA does not tunnel multicast packets with a scope smaller than
          global to the mobile node '
RQ ref  : RQ_001_1555 , RQ_001_1556
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_1555_01

with {
    QE1 subscribed to a link_local_multicast_group
    and QE1 subscribed to a organization_local_multicast_group
    and QE1 away_from_home
    and QE1 registered to EUT
}
ensure that
{ when {
    QE3 is requested to send a packet
        to the link_local_multicast_group
        indicating that a response is required
    and QE3 is requested to send a packet
        to the organization_local_multicast_group
        indicating that a response is required }
    then { QE3 indicates no receipt of any response }
}

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id   : TP_MOB_1560_01
summary : 'if multicast forwarding is not supported, HA ignores multicast
          group membership control messages'
RQ ref  : RQ_001_1560
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_1560_01

with {
    QE1 subscribed to a global_multicast_group
    and EUT unable to support multicast_data_packet_forwarding
    and QE1 away_from_home
    and QE1 registered to EUT
}

```

```

ensure that
  { when { QE3 is requested to send a packet
          to the global_multicast_group }
    then { QE3 indicates no receipt of the response }
  }

```

```
--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--
```

```

TP id   : TP_MOB_1810_01
summary : 'MN is able to receive tunnelled multicast packets from HA'
RQ ref  : RQ_001_1810
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_1810_01

```

```

with {      EUT subscribed to a global_multicast_group
      and EUT away_from_home
      and EUT registered to QE1
    }
ensure that
  { when { QE3 is requested to send a packet
          to the global_multicast_group }
    then { QE3 indicates no receipt of the response }
  }

```

```
--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--
```

```

TP id   : TP_MOB_1817_01
summary : 'Correspondent Node registers the binding when it receives a BU
          from Mobile Node'
RQ ref  : RQ_001_1817
Role    : Correspondent_Node
config  : CF_MOB_04
TD ref  : TD_MOB_1817_01

```

```

with { QE4 away_from_home
      and QE4 registered to QE1
      and QE4 configured to perform route_optimization
      and EUT configured to perform route_optimization
    }
ensure that
  { when { QE4 is requested to send a packet directly to EUT
          indicating that a response is required
        }
    then { QE4 indicates receipt of the response }
  }

```

```
--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--
```

```

TP id   : TP_MOB_1818_01
summary : 'A Binding Update contains a Home Address destination option.'
RQ ref  : RQ_001_1818
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_1818_01

```

```

with
  { QE1 at_home
  }
ensure that
  { when {      QE1 moves to a foreign_network
          and QE1 sends a Binding_Update
          containing no Home_Address_Destination_Option }
    then { QE4 and QE1 are unable to communicate }
  }

```

```
--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--
```

```

TP id   : TP_MOB_1820_01
summary : 'When Home Agent receives a packet from Mobile Node using reverse
          tunnelling, it forwards the encapsulated packet to Correspondent Node'
RQ ref  : RQ_001_1820
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_1820_01

```

```

with {      QE1 away_from_home
      and QE1 registered to EUT
    }

```

```

        and QE1 configured not to perform Route_Optimization
    }
    ensure that
    { when { EUT is disconnected }
      then { QE1 and QE4 are unable to communicate with QE4 }
    }
}

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id   : TP_MOB_1824_01
summary : 'When Mobile Node detects a L3 handover, it constructs a new
          Care-of Address, it select a new default router and register
          the new address to its Home Agent and the Correspondent Nodes
          which it is performing route optimization'
RQ ref  : RQ_001_1824, RQ_001_1682
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_1824_01

with {   EUT away_from_home
        and EUT registered to QE1
        and EUT configured to perform route_optimization
        and QE4 configured to perform route_optimization
        and EUT having established a binding to QE4
      }
ensure that
{ when { EUT moves to another foreign_network }
  then { QE4 and EUT are able to communicate directly }
}

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id   : TP_MOB_1825_01
summary : 'When Home Agent processes a Binding Update secured by IPsec,
          the contents of Home Address Option is not checked'
RQ ref  : RQ_001_1825
Role    : Home_Agent
config  : CF_MOB_05
TD ref  : TD_MOB_1825_01

with {   QE1 configured not to perform Route_Optimization
        and QE1 away_from_home
        and QE1 registered to EUT
        and EUT configured to accept any secured Binding_Update from QE1
        and QE1 configured to send only a secured Binding_Update to EUT
      }
ensure that
{ when { QE1 sends a Binding_Update secured by IPsec
        containing a Home_Address_Option
        not indicating its Home_Address
      }
  then { EUT accepts the packet }
}

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

TP id   : TP_MOB_1807_01
summary : 'If HA support the multicast group membership control protocols,
          HA must be capable to determine which multicast data packets to
          forward via the tunnel to MN'
RQ ref  : RQ_001_1807 , RQ_001_1561
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_1807_01

-- Config-HA
with {   QE1 connected to home_network
        and QE1 subscribed to a global_multicast_group
        and QE3 subscribed to another global_multicast_group
      }
ensure that
{ when {   QE1 moves to a foreign_network
        and QE1 registers to EUT }
  then {   QE1 receives packets from its global_multicast_group }
}

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

```

End Group -- Group E

End Group -- Group 1

```

--*****--
--* RFC3776 - Security for Mobility
--*****--

```

Group 5

TP id : TP\_MOB\_2013\_01  
summary : 'Mobile Node sends Binding Update secured using transport\_mode\_ESP  
to its Home Agent'  
RQ ref : RQ\_001\_2013 , RQ\_001\_2031  
Role : Mobile\_Node  
config : CF\_MOB\_03  
TD ref : TD\_MOB\_2013\_01

```

with {
    EUT configured to protect any Binding_Update to QE1
        using transport_mode_ESP
    and QE1 configured to accept only Binding_Update secured
        using transport_mode_ESP from EUT
}
ensure that
{
    when {
        a Security_Association is established between EUT and QE1
        and EUT moves to a foreign_network
    }
    then { QE4 and EUT are able to communicate }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

TP id : TP\_MOB\_2013\_02  
summary : 'Home Agent sends Binding\_Acknowledgement secured  
using transport\_mode\_ESP to a Mobile Node'  
RQ ref : RQ\_001\_2013 , RQ\_001\_2031  
Role : Home\_Agent  
config : CF\_MOB\_02  
TD ref : TD\_MOB\_2013\_02

```

with {
    EUT configured to protect any Binding_Acknowledgement to QE1
        using transport_mode_ESP
    and QE1 configured to accept only a Binding_Acknowledgement secured
        using transport_mode_ESP from EUT
}
ensure that
{
    when {
        a Security_Association is established between EUT and QE1
        and QE1 moves to a foreign_network
    }
    then { QE4 is able to communicate with QE1 }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

TP id : TP\_MOB\_2014\_01  
summary : 'Home Agent supports Home Test Init secured using tunnel\_mode\_ESP'  
RQ ref : RQ\_001\_2034, RQ\_001\_2035, RQ\_001\_1571  
Role : Home\_Agent  
config : CF\_MOB\_02  
TD ref : TD\_MOB\_2014\_01

```

with {
    QE1 configured to protect any Home_Test_Init to EUT
        using tunnel_mode_ESP
    and EUT configured to accept only Home_Test_Init secured
        using tunnel_mode_ESP from QE1
    and QE1 configured to perform route_optimization
    and QE4 configured to perform route_optimization
    and QE1 is away_from_home
    and QE1 registered to EUT
}
ensure that
{
    when {
        a Security_Association is established between EUT and QE1
        and QE1 moves to a foreign_network
    }
    then { QE4 and QE1 are able to communicate directly }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

**TP id** : TP\_MOB\_2014\_02  
**summary** : 'Mobile Node supports Home Test secured using tunnel\_mode\_ESP'  
**RQ ref** : RQ\_001\_2034 , RQ\_001\_2035  
**Role** : Mobile\_Node  
**config** : CF\_MOB\_03  
**TD ref** : TD\_MOB\_2014\_02

```

with {
    QE1 configured to protect any Home_Test to EUT
        using tunnel_mode_ESP
    and EUT configured to accept only a Home_Test secured
        using tunnel_mode_ESP from QE1
    and EUT configured to perform Route_Optimization
    and QE4 configured to perform route_optimization
    and EUT is away_from_home
    and EUT registered to QE1
}
ensure that
{
  when {
    a Security_Association is established between EUT and QE1
    and EUT moves to a foreign_network }
  then {
    QE4 and EUT are able to communicate directly }
}

```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

**TP id** : TP\_MOB\_2015\_01  
**summary** : 'Mobile Node sends Home Test Init secured  
 using tunnel\_mode\_ESP to its Home Agent'  
**RQ ref** : RQ\_001\_2034  
**Role** : Mobile\_Node  
**config** : CF\_MOB\_03  
**TD ref** : TD\_MOB\_2015\_01

```

with {
    EUT configured to protect any Home_Test_Init to QE1
        using tunnel_mode_ESP
    and QE1 configured to accept only Home_Test_Init secured
        using tunnel_mode_ESP from EUT
    and EUT configured to perform route_optimization
    and QE4 configured to perform route_optimization
}
ensure that
{
  when {
    a Security_Association is established between EUT and QE1
    and EUT moves to a foreign_network }
  then {
    QE4 and EUT are able to communicate directly }
}

```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

**TP id** : TP\_MOB\_2015\_02  
**summary** : 'Home Agent sends Home Test secured using tunnel\_mode\_ESP'  
**RQ ref** : RQ\_001\_2034  
**Role** : Home\_Agent  
**config** : CF\_MOB\_02  
**TD ref** : TD\_MOB\_2015\_02

```

with {
    EUT configured to protect any Home_Test to QE1
        using tunnel_mode_ESP
    and QE1 configured to accept only Home_Test secured
        using tunnel_mode_ESP from EUT
    and QE1 configured to perform Route_Optimization
    and QE4 configured to perform Route_Optimization
}
ensure that
{
  when {
    a Security_Association is established between EUT and QE1
    and QE1 moves to a foreign_network }
  then {
    QE4 and QE1 are able to communicate directly }
}

```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

**TP id** : TP\_MOB\_2016\_01  
**summary** : 'Home Agent supports Mobile\_Prefix\_Solicitation secured  
 using transport\_mode\_ESP'  
**RQ ref** : RQ\_001\_2016 , RQ\_001\_2031  
**Role** : Home\_Agent  
**config** : CF\_MOB\_02  
**TD ref** : TD\_MOB\_2016\_01

```

with {
    QE1 configured to protect any Mobile_Prefix_Solicitation to EUT

```



```

        using transport_mode_ESP
    and EUT configured to accept only a Mobile_Prefix_Solicitation secured
        using transport_mode_ESP from QE1
    and QE6 configured to have a prefix_lifetime of 1 minute
    and QE1 away_from_home
    and QE1 registered to EUT
}
ensure that
{
    when { a Security_Association is established between EUT and QE1 }
    then { QE4 is able to communicate with QE1 after the prefix_lifetime }
}

```

```
--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--
```

```

TP id   : TP_MOB_2016_02
summary : 'Mobile Node supports Mobile_Prefix_Advertisement secured
          using transport_mode_ESP'
RQ ref  : RQ_001_2016 , RQ_001_2031
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_2016_02

```

```

with {
    QE1 configured to protect any Mobile_Prefix_Advertisement to EUT
        using transport_mode_ESP
    and EUT configured to accept only Mobile_Prefix_Advertisement
        secured using transport_mode_ESP from QE1
    and EUT away_from_home
    and EUT registered to QE1
    and QE6 configured to have a prefix_lifetime of 1 minute
}
ensure that
{
    when { a Security_Association is established between EUT and QE1 }
    then { QE4 and EUT are able to communicate after prefix_lifetime }
}

```

```
--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--
```

```

TP id   : TP_MOB_2017_01
summary : 'Mobile Node sends Mobile_Prefix_Solicitation secured
          using transport_mode_ESP to its Home Agent'
RQ ref  : RQ_001_2017 , RQ_001_2030
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_2017_01

```

```

with {
    EUT configured to protect any Mobile_Prefix_Solicitation to QE1
        using transport_mode_ESP
    and QE1 configured to accept only a Mobile_Prefix_Solicitation
        secured using transport_mode_ESP from EUT
    and QE6 configured to have a prefix_lifetime of 1 minute
    and EUT away_from_home
    and EUT registered to QE1
}
ensure that
{
    when { a Security_Association is established between EUT and QE1 }
    then { QE4 and EUT are able to communicate after prefix_lifetime }
}

```

```
--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--
```

```

TP id   : TP_MOB_2017_02
summary : 'Home Agent sends Mobile_Prefix_Advertisement secured
          using transport_mode_ESP'
RQ ref  : RQ_001_2017 , RQ_001_2030
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_2017_02

```

```

with {
    EUT configured to protect any Mobile_Prefix_Advertisement to QE1
        using transport_mode_ESP
    and QE1 configured to accept only a Mobile_Prefix_Advertisement
        secured using transport_mode_ESP from EUT
    and QE1 away_from_home
    and QE1 registered to EUT
    and QE6 configured to have a prefix_lifetime of 1 minute
}
ensure that
{
    when { a Security_Association is established between EUT and QE1 }
}

```

```

    then { QE4 is able to communicate with QE1 after prefix_lifetime }
  }

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_2018_01
summary : 'Mobile Node sends payload_packet tunnelled to its Home Agent
          secured using tunnel_mode_ESP'
RQ ref  : RQ_001_2018
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_2018_01

```

```

with {
  EUT configured to protect any payload_packet to QE1
        using tunnel_mode_ESP
  and QE1 configured to accept only a payload_packet secured
        using tunnel_mode_ESP from EUT
  and EUT configured not to perform Route_Optimization
  and EUT away_from_home
  and EUT registered to QE1
}
ensure that
{
  when {
    a Security_Association is established between EUT and QE1
    and EUT moves to a foreign_network
  }
  then { QE4 and EUT are able to communicate }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_2018_02
summary : 'Home Agent sends payload_packet tunnelled to Mobile Node secured
          using tunnel_mode_ESP'
RQ ref  : RQ_001_2018
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_2018_02

```

```

with {
  EUT configured to protect any payload_packet to QE1
        using tunnel_mode_ESP
  and QE1 configured to accept only a payload_packet secured
        using tunnel_mode_ESP from EUT
  and QE1 configured not to perform Route_Optimization
  and QE1 away_from_home
  and QE1 registered to EUT
}
ensure that
{
  when {
    a Security_Association is established between EUT and QE1
    and QE1 moves to a foreign_network
  }
  then { QE4 and QE1 are able to communicate }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```

```

TP id   : TP_MOB_2018_03
summary : 'Mobile Node supports payload_packet secured
          using tunnel_mode_ESP'
RQ ref  : RQ_001_2018
Role    : Mobile_Node
config  : CF_MOB_03
TD ref  : TD_MOB_2018_03

```

```

with {
  QE1 configured to protect any payload_packet to EUT
        using tunnel_mode_ESP
  and EUT configured to accept only a payload_packet secured
        using tunnel_mode_ESP from QE1
  and EUT configured not to perform Route_Optimization
  and EUT away_from_home
  and EUT registered to QE1
}
ensure that
{
  when {
    a Security_Association is established between EUT and QE1
    and EUT moves to a foreign_network
  }
  then { QE4 and EUT are able to communicate }
}

```

```
--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--
```



**summary** : 'When Mobile Node returns home and is configured with manually established Security Associations, it makes inactive security policies concerning tunnelled traffic with Home Agent without deleting Security Associations'

**RQ ref** : RQ\_001\_2026

**Role** : Mobile\_Node

**config** : CF\_MOB\_03

**TD ref** : TD\_MOB\_2026\_01

```

with {
    EUT configured 'with manually established Security Associations
                    and Policies'
    and EUT configured to protect packets to QE1
                    using tunnel_mode_ESP
    and QE1 configured to accept only a packets secured
                    using tunnel_mode_ESP
    and EUT configured not to perform Route_Optimization
    and EUT away_from_home
    and EUT registered to QE1
}
ensure that
{
    when {
        EUT moves to another foreign_network
        after EUT returns home
    }
    then {
        QE4 and EUT are able to communicate
    }
}

```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

**TP id** : TP\_MOB\_2026\_02

**summary** : 'When Mobile Node returns home and is configured with manually established Security Associations, Home Agent makes inactive security policies concerning tunnelled traffic with Mobile Node without deleting Security Associations'

**RQ ref** : RQ\_001\_2026

**Role** : Home\_Agent

**config** : CF\_MOB\_02

**TD ref** : TD\_MOB\_2026\_02

```

with {
    EUT configured 'with manually established Security Associations
                    and Policies'
    and EUT configured to protect packets to QE1
                    using tunnel_mode_ESP
    and QE1 configured to accept only a packets secured
                    using tunnel_mode_ESP
    and QE1 configured not to perform Route_Optimization
    and QE1 away_from_home
    and QE1 registered to EUT
}
ensure that
{
    when {
        QE1 moves to another foreign_network
        after QE1 returns home
    }
    then {
        QE4 is able to communicate with QE1
    }
}

```

--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--

**TP id** : TP\_MOB\_2019\_01

**summary** : 'Mobile Node supports multicast group membership control packets tunnelled from its Home Agent protected by ESP with the tunnel mode'

**RQ ref** : RQ\_001\_2019

**Role** : Mobile\_Node

**config** : CF\_MOB\_03

**TD ref** : TD\_MOB\_2019\_01

```

with {
    QE1 configured to protect any
                    multicast_group_membership_control_packet to EUT
                    using tunnel_mode_ESP
    and EUT configured to accept only a
                    multicast_group_membership_control_packet from QE1
                    secured using tunnel_mode_ESP
    and EUT configured to subscribed to a global_multicast_group
    and EUT away_from_home
    and EUT registered to QE1
}
ensure that
{
    when {
        QE3 sends a packet to the global_multicast_group
        indicating that a response is required
    }
}

```

```

    then { QE3 indicates receipt of the response }
  }

```

```
--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--
```

```

TP id   : TP_MOB_2019_02
summary : 'Home Agent supports multicast group membership control packets
          tunnelled from Mobile Node protected by ESP with the tunnel mode'
RQ ref  : RQ_001_2019
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_2019_02

```

```

with {
  QE1 configured to protect any
        multicast_group_membership_control_packet to EUT
        using tunnel_mode_ESP
  and EUT configured to accept only
        a multicast_group_membership_control_packet from QE1
        secured using tunnel_mode_ESP
  and QE1 configured to subscribed to a global_multicast_group
  and QE1 away_from_home
  and QE1 registered to EUT
}
ensure that
{
  when { EUT sends a packet to the global_multicast_group
        indicating that a response is requested }
  then { QE3 indicates receipt of the response }
}

```

```
--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--
```

```

TP id   : TP_MOB_2039_01
summary : 'Home Agent update its security association entries when the
          Mobile Node change of foreign network'
RQ ref  : RQ_001_2039
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_2039_01

```

```

with {
  EUT configured to protect any Binding_Acknowledgement to QE1
        using tunnel_mode_ESP
  and QE1 configured to accept only a Binding_Acknowledgement
        secured using tunnel_mode_ESP from EUT
  and QE1 away_from_home
  and QE1 registered to EUT
}
ensure that
{
  when { QE1 moves to another foreign_network }
  then { QE4 and QE1 are able to communicate }
}

```

```
--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--
```

```

TP id   : TP_MOB_2040_01
summary : 'Home Agent does not take into account a Binding Update not
          secured'
RQ ref  : RQ_001_2040
Role    : Home_Agent
config  : CF_MOB_02
TD ref  : TD_MOB_2040_01

```

```

with {
  and EUT configured to accept only a Binding_Update
        secured using tunnel_mode_ESP
  and QE1 configured to send any Binding_Update not secured
}
ensure that
{
  when { QE1 moves to a foreign_network }
  then { QE4 and QE1 are unable to communicate }
}

```

End Group 5

---

## Annex C (informative): Bibliography

- ETSI TS 102 424: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Requirements of the NGN network to support Emergency Communication from Citizen to Authority".
- ETSI ES 202 553: "Methods for testing and Specification (MTS); TPLan: A notation for expressing test Purposes".

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## History

<b>Document history</b>		
V1.1.1	June 2007	Publication