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Direct Mode Operation (DMO);  
Sub-part 8: Test Suite Structure and Test Purposes (TSS&TP)  
for Direct Mode Gateway (DM-GATE)**

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## Foreword

This European Telecommunication Standard (ETS) has been produced by the Terrestrial Trunked Radio (TETRA) Project of the European Telecommunications Standards Institute (ETSI).

This ETS consists of 4 parts as follows:

Part 1: "Radio";

Part 2: "Protocol testing specification for Voice plus Data (V+D)";

**Part 4: "Protocol testing specification for Direct Mode Operation (DMO)";**

Part 5: "Security".

Transposition dates	
Date of adoption of this ETS:	4 June 1999
Date of latest announcement of this ETS (doa):	30 September 1999
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Date of withdrawal of any conflicting National Standard (dow):	31 March 2000

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## 1 Scope

This ETS contains the Test Specifications: Test Suite Structure and Test Purposes (TSS&TPs) and the Abstract Test Suites (ATSS) to test conformity of products to the TETRA Direct Mode Operation (DMO) protocols. This ETS is divided into several parts, each one dealing with one TSS&TP or one ATS for the test of a layer 2 or layer 3 protocol for DMO.

This present sub-part 8 deals with TSS&TP for a GateWay (GW) connecting the MS-GW to the Switching and Management Infrastructure (SwMI) of a V+D system.

NOTE: Sub-part 7 deals with TSS&TP for the other part of the DMO Gateway, which is a Mobile Station (MS) connected to a Gateway (MS-GW).

Testing of security features is outside the scope of this ETS.

The objective of this test specification is to provide a basis for approval tests for TETRA equipment giving a high probability of air interface inter-operability between different manufacturer's TETRA equipment.

The ISO standard for the methodology of conformance testing, ISO/IEC 9646-1 [6] and ISO/IEC 9646-2 [7], as well as the ETSI methodology for conformance testing, ETS 300 406 [8], are used as the basis for the test methodology.

## 2 References

This ETS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] Void.
- [2] ETS 300 396-5: "Terrestrial Trunked Radio (TETRA); Technical requirements for Direct Mode Operation (DMO); Part 5: Gateways".
- [3] ETS 300 396-8-3: "Terrestrial Trunked Radio (TETRA); Direct Mode Operation (DMO); Part 8: PICS proforma; Sub-part 3: Direct Mode Gateway (DM-GATE)".
- [4] ETS 300 392-2: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI)".
- [5] ETS 300 394-2-1: "Terrestrial Trunked Radio (TETRA); Conformance testing specification; Part 2: Protocol testing specification for Voice plus Data (V+D); Sub-part 1: Test suite structure and test purposes".
- [6] ISO/IEC 9646-1 (1994): "Information technology; Open Systems Interconnection; Conformance Testing Methodology and Framework; Part 1: General Concepts". (See also ITU-T Recommendation X.290).
- [7] ISO/IEC 9646-2 (1994): "Information technology; Open Systems Interconnection; Conformance Testing Methodology and Framework; Part 2: Abstract Test Suite Specification". (See also ITU-T Recommendation X.291).
- [8] ETS 300 406 (1995): "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

### 3 Definitions and abbreviations

#### 3.1 TETRA definitions

For the purposes of this ETS, the definitions given in ETS 300 396-5 [2] apply.

#### 3.2 TETRA abbreviations

For the purposes of this ETS the following TETRA abbreviations apply:

CM	Circuit Mode
DMCC	Direct Mode Call Control
DMO	Direct Mode of Operation
GCC	Gateway Call Control
GMM	Gateway Mobility Management
GW	Gateway
LLC	Logical Link Control
MAC	Medium Access Control
MLE	Mobile Link entity
MNI	Mobile Network Identity
MS	Mobile Station
MSC	Message Sequence Chart
NWK	NetWorK. Layer 3 of the TETRA protocol stack
SDS	Short Data Services
TX	Transmit
RX	Receive

#### 3.3 ISO 9646 definitions

For the purposes of this ETS the following ISO 9646-1 [6] definitions apply:

Implementation Conformance Statement (ICS)  
Implementation Under Test (IUT)  
Implementation eXtra Information for Testing (IXIT)  
Protocol Implementation Conformance Statement (PICS)  
Protocol Implementation eXtra Information for Testing (PIXIT)

#### 3.4 ISO 9646 abbreviations

For the purposes of this ETS the following ISO 9646-1 [6] abbreviations apply:

IUT	Implementation Under Test
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
TP	Test Purpose
TSS	Test Suite Structure

### 4 Test Suite Structure (TSS)

This TSS contains several components, some are specific of the gateway functionality and are new, while others are derived or form a subset of other TETRA specifications. TPs are either included in the present document, or are referenced into another document.



Here is the list of the TSS components:

at layer 3 also named NTW layer:

Gateway Call Control (GCC):

CM: derived from V+D CMCE TPs in ETS 300 394-2-1 [5];

SDS: derived from V+D CMCE TPs in ETS 300 394-2-1 [5].

Gateway Mobility Management (GMM): derived from V+D MM TPs in ETS 300 394-2-1 [5];

Mobile Link Entity (MLE): subset of V+D MLE in ETS 300 394-2-1 [5].

at layer 2:

LLC: subset of V+D LLC in ETS 300 394-2-1 [5];

MAC: subset of V+D MLE in ETS 300 394-2-1 [5].

#### 4.1 NWK layer or Layer 3 test groups

The first level separates the NWK layer (or layer 3) in different protocols (Circuit mode, Short Data Service). Next level splits protocol testing into functional test groups according to the type of testing: Capability test (CA), Valid Behaviour (BV) and Timer tests (TI). Further level classifies the possible operations in each protocol condition or state.

The following list defines the NWK layer test group names and identifiers used for those:

Gateway (DMO\_GATE):

Gateway Call Control (GWCC):

Circuit mode (CM):

Call set-up (SU);

Call disconnection (CD);

Call collision (CC);

Control of Transmission (CT);

Timer Tests (TI);

Short Data Service (SDS).

Gateway Mobility Management (GWMM):

Capability tests (CA);

Valid Behaviour tests (BV).

Mobile link entity (MLE): derived from V+D MS MLE.

#### 4.2 Layer 2 test groups

The first level of the Layer 2 test groups separates the test suite in functional test groups: CA, BV and TI. The second level of the test subgroups is used to form a division of protocol requirements.

In the case of a Gateway, the layer 2 contains the LLC and the MAC, and the TSS as well as the TPs of both protocols are derived from the V+D identical components. See ETS 300 394-2-1 [5].

#### 4.3 Test group description

Capability (CA) tests provide limited testing that the observable capabilities of the IUT are in accordance with the conformance requirements and the additional capabilities claimed in the PICS/PIXIT.

The Valid Behaviour (BV) group tests an IUT in response to valid behaviour of the test system. "Valid" means that a test event is syntactically and contextually correct. All test cases in the valid behaviour group are intended to verify as thoroughly as possible the various functions of the protocol.

Different timers are defined to supervise the various state transitions. The Timer (TI) test group is intended to verify that the IUT is reacting properly to an expiry of one of the timers or to a counter mismatch.

## 5 Introduction to Test Purposes (TPs)

The test purposes for each test suite are defined in clause 6 of the present document for NWK layer and MAC layer.

5.1 Test purpose definition conventions

5.1.1 Text and MSCs

Each TP is described in a table that contains the following information:

**Table 0**

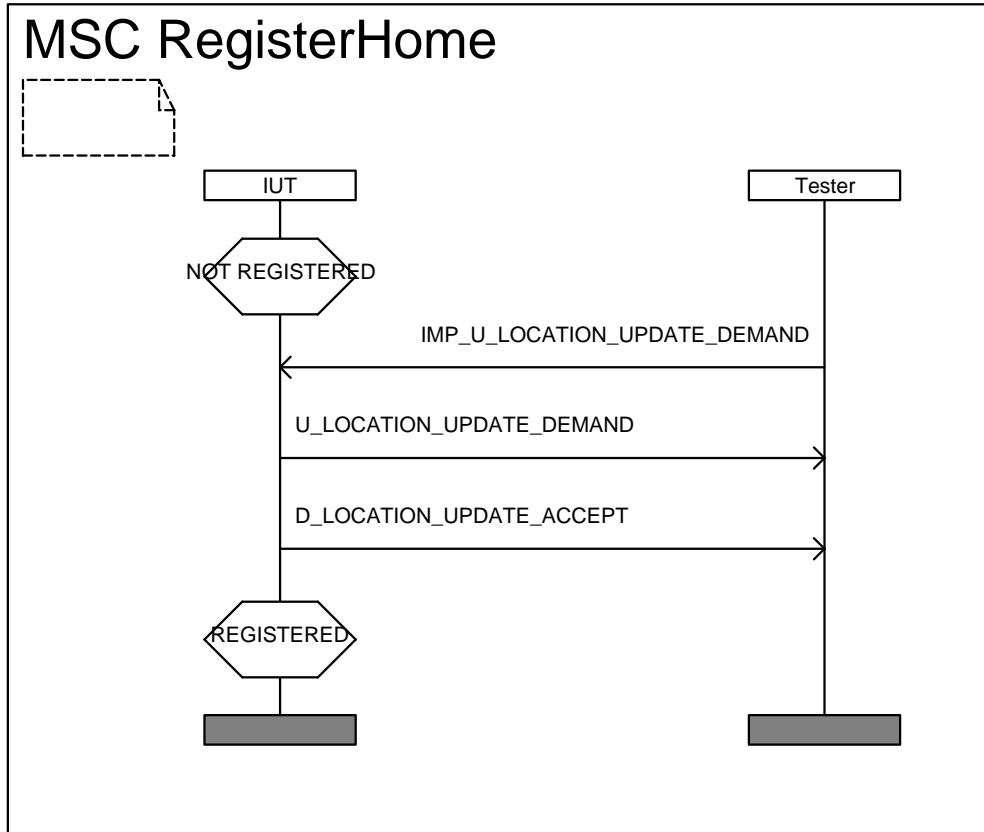
<b>TP-Name</b> The TP name is a unique identifier, specified according to the TP naming conventions defined in the subclause below. (it is also the name of the corresponding test case)	<b>Reference:</b> reference to the paragraph number of specification ETS 300 396-5 [2] stating this conformance requirement. For example: ETS 300 396-5 [2], 6.2.5.1
<b>Purpose</b>	purpose of the test itself, indicating for example the test performed against a requirement of the protocol, described by this test purpose. Example: test of changeover initiated from RX reservation state
<b>Test description</b>	body of the test
<b>Pass criteria</b>	visible action to be observed at PCO to declare that the IUT passes the test and conforms to the specifications
<b>Selection</b>	expression based on ETS 300 396-8-3 [3] PICS statements, used to select or deselect the corresponding test case according to the options of the implementation.
<b>Preamble</b>	"None" or name of the preamble procedure bringing the IUT from idle state to the state required to run the test. For example: idle_to_RX_reservation
<b>Postamble</b>	"None" or name of the postamble to bring the IUT back to idle state, for example: RX_occupation_to_idle.

The preambles and postambles are described using MSCs and are shown in the following paragraphs.

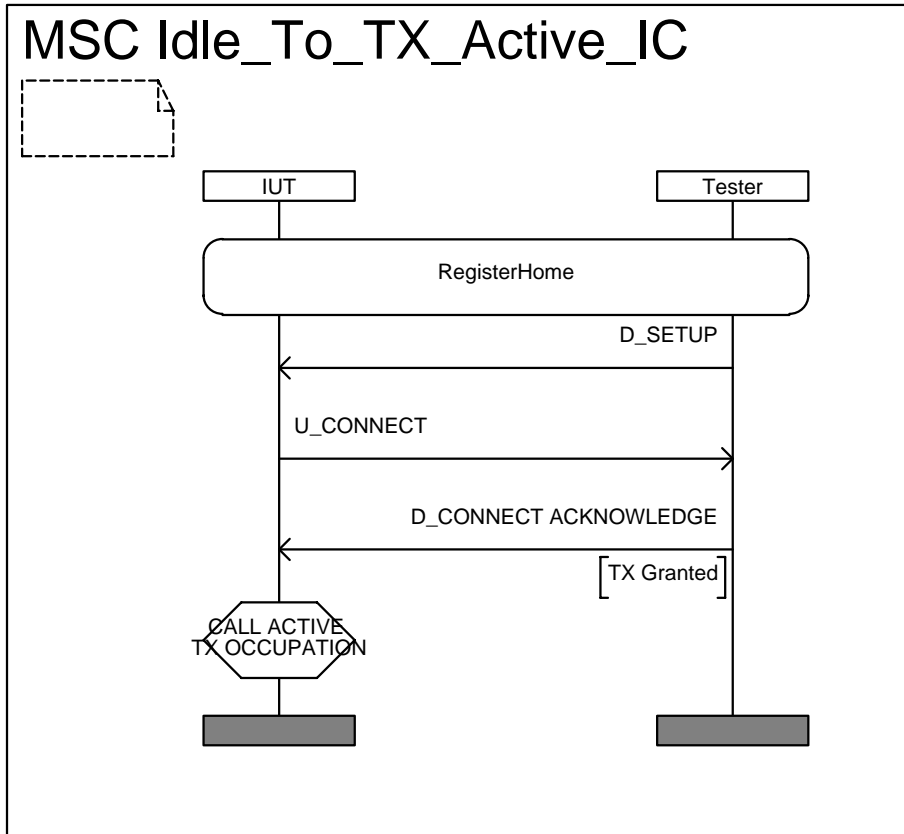
### 5.1.2 Preamble descriptions

Preambles are used to bring the IUT from the idle state to the state where the test takes place. As the protocol has different options, as for instance the use of presence check or the absence of presence check, there are several ways to reach a given state. The preamble has to be chosen according to the IUT capabilities and the implemented options.

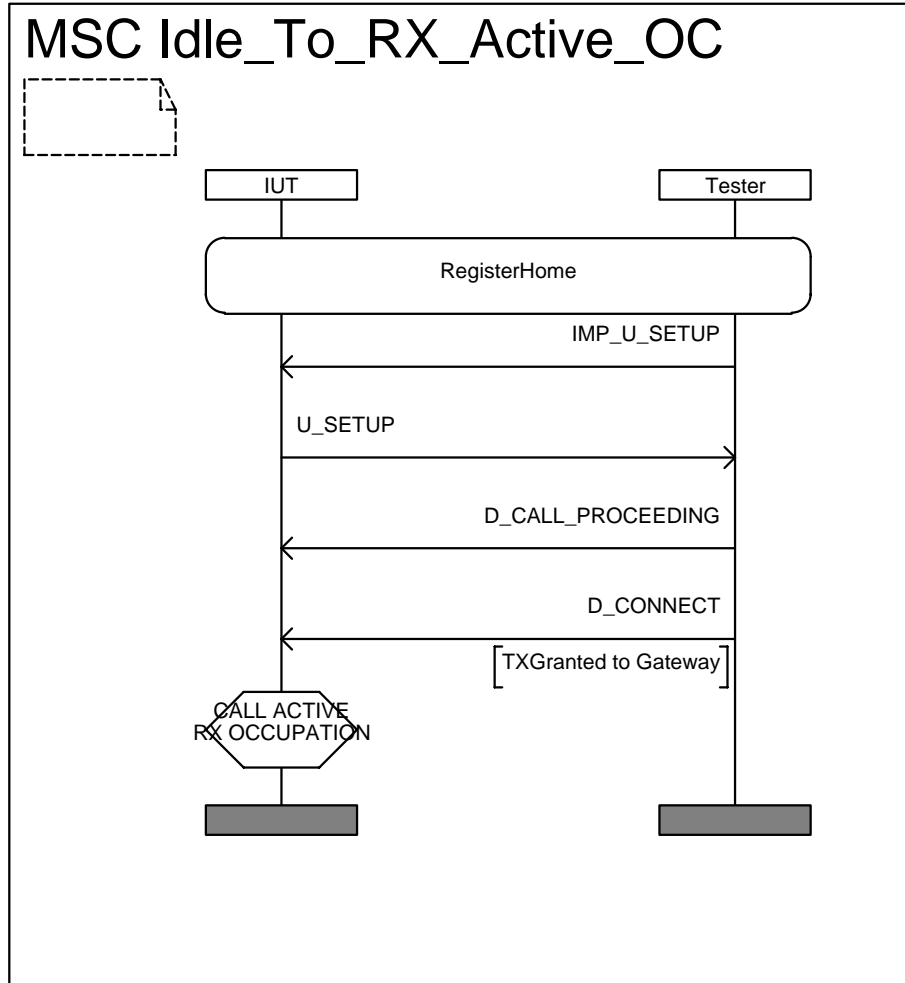
#### 5.1.2.1 Preamble RegisterHome



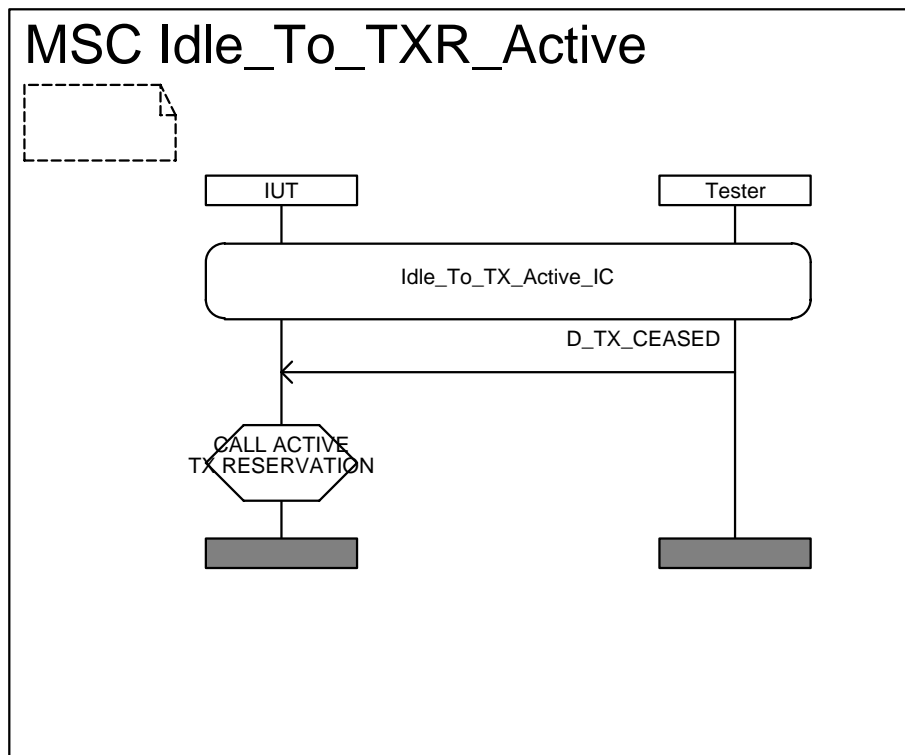
5.1.2.2 Preamble Idle\_To\_TX\_Active\_IC: From Idle state to Call Active TX Occupation



5.1.2.3 Preamble Idle\_To\_RX\_Active: From Idle state to Call Active RX Occupation



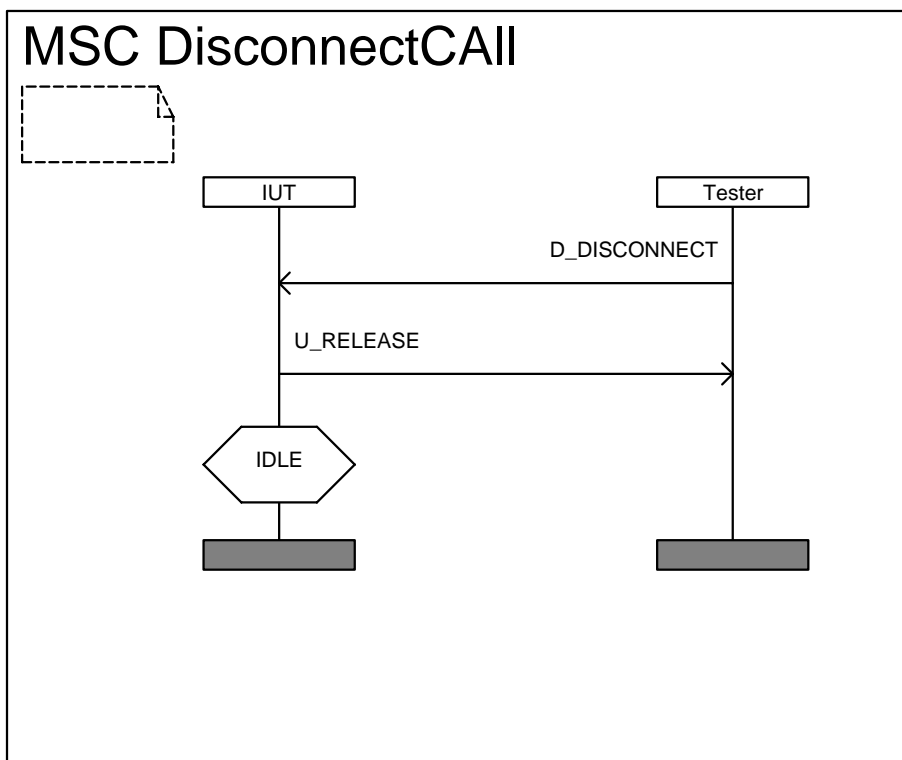
5.1.2.4 Preamble Idle\_to\_TXR\_Active



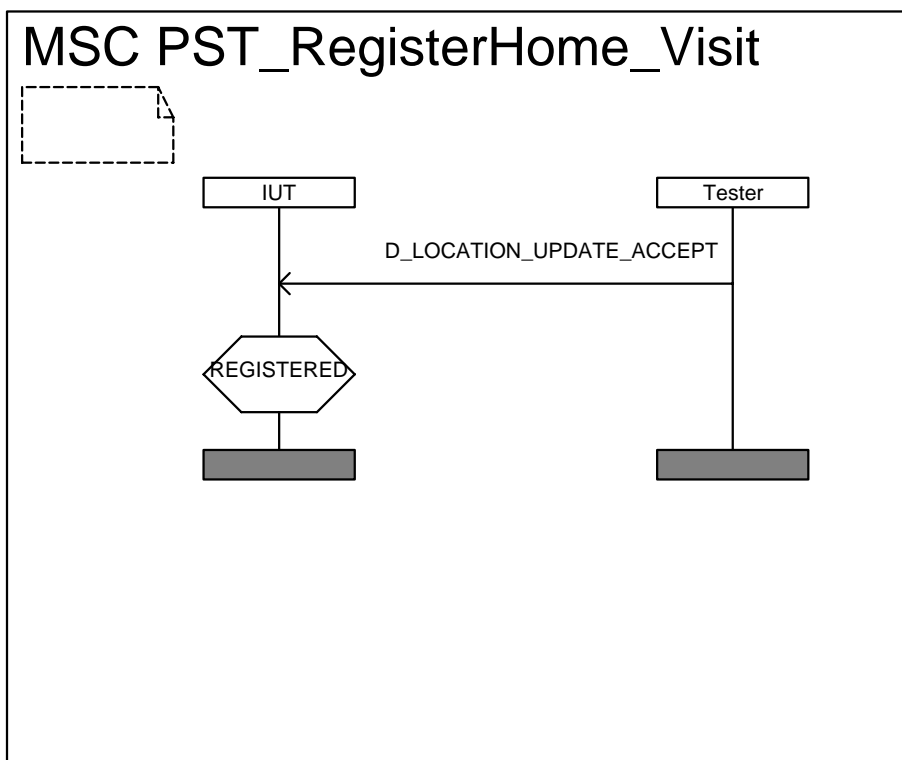
### 5.1.3 Postamble descriptions

Postambles are used to bring the IUT from the state ending the test, to the idle state.

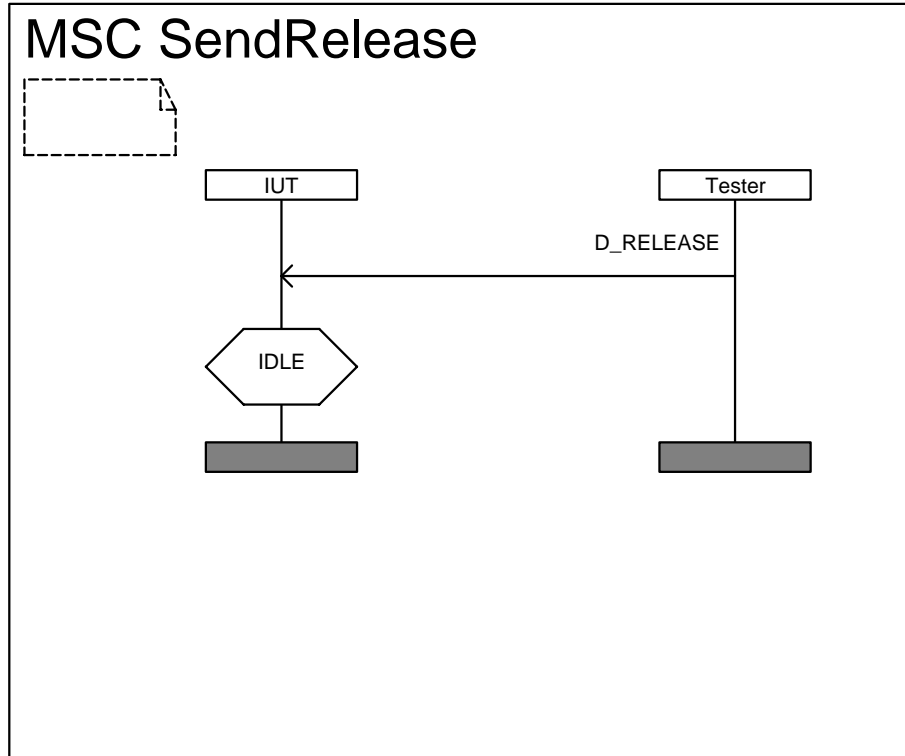
#### 5.1.3.1 Postamble DisconnectCall: From Call Active to Idle



#### 5.1.3.2 Postamble PST\_RegisterHome\_Visit: end registration procedure



5.1.3.3 Postamble SendRelease



5.2 Test purpose naming conventions

The identifier of the test purpose is built according to table 1.

Table 1: Test purpose naming convention

DMO/<ts>/<fm>/<ss>/<tt>/<uu>/<nn>		
<ts> = test suite type	MSMS MSGW GATE REPx	MS to MS (see ETS 300 394-4-1 []) MS connected to a gateway Gateway Repeater type x (see ETS 300 394-4-4 [])
<fm> = functional entity in a layer	DMCC MAC	Direct Mode Call Control (layer 3) Upper MAC (layer 2)
<ss> = test group	letters such as: CM SDS	abbreviation of the group name (optional) Circuit Mode (layer 3) Short Data Service (layer 3)
tt = Type of testing	CA BV BI TI	Capability Tests Valid Behaviour Tests Invalid Behaviour Tests Timer expiry and counter mismatch tests
<uu> = test subgroup	letters	abbreviation of the subgroup name
<nn> = sequential number	01-99	(optional) Test Purpose Number

## 6 Test Purposes for the Call Control protocol of a DMO GATEWAY: GWCC

In this section, the IUT is a gateway. The tester is a SwMI of a V+D network. The interface between the gateway and the SwMI is being tested.

### 6.1 Circuit Mode (CM) Call Control test purposes

#### 6.1.1 Call set up

<b>DMO_GATE_GWCC_CM_BV_SU_01</b>	<b>Reference:</b> ETS 300 396-5 [2], 9.3.2.1, case iii)
<b>Purpose</b>	Individual outgoing call set-up, TX granted to Gateway
<b>Test description</b>	The tester issues an implicit send to cause the IUT to initiate a call set-up. The IUT sends U-SETUP PDU to the tester, which accepts it by sending the D-CALL PROCEEDING then D-CONNECT PDU with TX granted to Gateway.
<b>Pass criteria</b>	Check that the IUT reaches the CALL ACTIVE state. To do it, the tester sends D-DISCONNECT PDU to the IUT, which answers with U-RELEASE PDU).
<b>Selection</b> ETS 300 396-8-3 [3]	A.39/4 Accept Call from DM without presence check
<b>Preamble</b>	RegisterHome
<b>Postamble</b>	DisconnectCall

<b>DMO_GATE_GWCC_CM_BV_SU_02</b>	<b>Reference:</b> ETS 300 396-5 [2], 9.3.2.1, case i)
<b>Purpose</b>	Individual outgoing call set-up, TX granted to called
<b>Test description</b>	The tester issues an implicit send to cause the IUT to initiate a call set-up. The IUT sends U-SETUP PDU to the tester, which accepts it by sending the D-CALL PROCEEDING then D-CONNECT PDU with TX granted to called.
<b>Pass criteria</b>	Check that the IUT reaches the CALL ACTIVE state. To do it, the tester sends D-DISCONNECT PDU to the IUT, which answers with U-RELEASE PDU)
<b>Selection</b> ETS 300 396-8-3 [3]	A.39/4 Accept Call from DM without presence check
<b>Preamble</b>	RegisterHome
<b>Postamble</b>	DisconnectCall

<b>DMO_GATE_GWCC_CM_BV_SU_03</b>	<b>Reference:</b> ETS 300 396-5 [2], 9.3.2.1, case ii)
<b>Purpose</b>	Individual outgoing call set-up, TX granted to no party
<b>Test description</b>	The tester issues an implicit send to cause the IUT to initiate a call set-up. The IUT sends U-SETUP PDU to the tester, which accepts it by sending the D-CALL PROCEEDING then D-CONNECT PDU with TX granted to no party.
<b>Pass criteria</b>	Check that the IUT reaches the CALL ACTIVE state. To do it, the tester sends D-DISCONNECT PDU to the IUT, which answers with U-RELEASE PDU)
<b>Selection</b> ETS 300 396-8-3 [3]	A.39/4 Accept Call from DM without presence check
<b>Preamble</b>	RegisterHome
<b>Postamble</b>	DisconnectCall



<b>DMO_GATE_GWCC_CM_BV_SU_04</b>		<b>Reference:</b> ETS 300 396-5 [2], 9.3.1.1
<b>Purpose</b>	Individual incoming call set-up, TX granted to V+D (calling)	
<b>Test description</b>	The tester issues D-SETUP PDU.	
<b>Pass criteria 1</b>	Check that the IUT accepts it by sending the U-CONNECT PDU.	
<b>Test description</b>	The tester issues D-CONNECT ACKNOWLEDGE PDU with TX granted to V+D.	
<b>Pass criteria 2</b>	Check that the IUT reaches the CALL ACTIVE state. To do it, the tester sends D-DISCONNECT PDU to the IUT, which answers with U-RELEASE PDU)	
<b>Selection</b> ETS 300 396-8-3 [3]	A.41/1 Individual call from V+D with presence check	
<b>Preamble</b>	RegisterHome	
<b>Postamble</b>	DisconnectCall	

<b>DMO_GATE_GWCC_CM_BV_SU_05</b>		<b>Reference:</b> ETS 300 396-5 [2], 9.3.1.1
<b>Purpose</b>	Individual incoming call set-up, TX granted to called DM MS	
<b>Test description</b>	The tester issues D-SETUP PDU. Check that the IUT accepts it by sending the U-CONNECT PDU. The tester issues D-CONNECT ACKNOWLEDGE PDU with TX granted to called DM-MS.	
<b>Pass criteria</b>	Check that the IUT sends back U-TX-CEASED. Check that the IUT reaches the CALL ACTIVE state. To do it, the tester sends D-DISCONNECT PDU to the IUT, which answers with U-RELEASE PDU	
<b>Selection</b> ETS 300 396-8-3 [3]	A.41/1 Individual call from V+D with presence check	
<b>Preamble</b>	RegisterHome	
<b>Postamble</b>	DisconnectCall	

<b>DMO_GATE_GWCC_CM_BV_SU_06</b>		<b>Reference:</b> ETS 300 396-5 [2], 9.3.1.1
<b>Purpose</b>	Individual incoming call set-up, TX granted to no party	
<b>Test description</b>	The tester issues D-SETUP PDU. Check that the IUT accepts it by sending the U-CONNECT PDU. The tester issues D-CONNECT ACKNOWLEDGE PDU with TX granted to no party.	
<b>Pass criteria</b>	Check that the IUT reaches the CALL ACTIVE state. To do it, the tester sends D-DISCONNECT PDU to the IUT, which answers with U-RELEASE PDU	
<b>Selection</b> ETS 300 396-8-3 [3]	A.41/1 Individual call from V+D with presence check	
<b>Preamble</b>	RegisterHome	
<b>Postamble</b>	DisconnectCall	

<b>DMO_GATE_GWCC_CM_BV_SU_07</b>		<b>Reference:</b> ETS 300 396-5 [2], 9.3.1.1
<b>Purpose</b>	Individual incoming call set-up, on/off hook signalling	
<b>Test description</b>	The tester issues D-SETUP PDU, containing on/off hook signalling request	
<b>Pass criteria</b>	Check that the IUT sends back to the tester a U-CONNECT PDU with hook method selection element value set to 'no hook signalling'	
<b>Selection</b> ETS 300 396-8-3 [3]	A.41/1 Individual call from V+D with presence check	
<b>Preamble</b>	RegisterHome	
<b>Postamble</b>	DisconnectCall	

<b>DMO_GATE_GWCC_CM_BV_SU_08</b>		<b>Reference:</b> ETS 300 396-5 [2], 9.3.1.1
<b>Purpose</b>	Individual incoming call set-up, duplex call	
<b>Test description</b>	The tester issues D-SETUP PDU, containing duplex call support request	
<b>Pass criteria</b>	Check that the IUT sends back to the tester a U-CONNECT PDU with simplex/duplex selection element value set to 'simplex requested'	
<b>Selection</b> ETS 300 396-8-3 [3]	A.41/1 Individual call from V+D with presence check	
<b>Preamble</b>	RegisterHome	
<b>Postamble</b>	DisconnectCall	

<b>DMO_GATE_GWCC_CM_BV_SU_09</b>		<b>Reference:</b> ETS 300 396-5 [2], 9.3.1.1
<b>Purpose</b>	Individual incoming call set-up, slot service	
<b>Test description</b>	The tester issues D-SETUP PDU, containing multi-slot support request	
<b>Pass criteria</b>	Check that the IUT sends back to the tester a U-CONNECT PDU with slots per frame element value set to 'one slot'	
<b>Selection</b> ETS 300 396-8-3 [3]	A.41/1 Individual call from V+D with presence check	
<b>Preamble</b>	RegisterHome	
<b>Postamble</b>	DisconnectCall	

<b>DMO_GATE_GWCC_CM_BV_SU_10</b>		<b>Reference:</b> ETS 300 396-5 [2], 9.3.2.1, case ii)
<b>Purpose</b>	Outgoing call set-up (without D-CALL PROCEEDING PDU), TX granted to no party	
<b>Test description</b>	The tester issues an implicit send to cause the IUT to initiate a call set-up. The IUT sends U-SETUP PDU to the tester, which accepts it by sending the D-CONNECT PDU with TX granted to no party sent back by the tester. (the tester does not send the D-CALL PPROCEEDING PDU).	
<b>Pass criteria</b>	Check that the IUT reaches CALL ACTIVE state. To do it, the tester sends D-DISCONNECT PDU to the IUT, which answers with U-RELEASE PDU)	
<b>Selection</b> ETS 300 396-8-3 [3]	A.39/4 Accept Call from DM without presence check	
<b>Preamble</b>	RegisterHome	
<b>Postamble</b>	DisconnectCall	

<b>DMO_GATE_GWCC_CM_BV_SU_11</b>		<b>Reference:</b> ETS 300 396-5 [2], 9.3.1.2
<b>Purpose</b>	Incoming group call set-up, TX granted to V+D (calling)	
<b>Test description</b>	The tester issues D-SETUP PDU to the IUT	
<b>Pass criteria</b>	Check that the IUT reaches CALL ACTIVE state. To do it, the tester sends D-DISCONNECT PDU to the IUT, which answers with U-RELEASE PDU)	
<b>Selection</b> ETS 300 396-8-3 [3]	A.40/1 Group call from V+D without presence check	
<b>Preamble</b>	RegisterHome	
<b>Postamble</b>	DisconnectCall	

### 6.1.2 Call disconnection

<b>DMO_GATE_GWCC_CM_BV_CD_01</b>	<b>Reference:</b> ETS 300 396-5 [2], 9.3.3.9.1
<b>Purpose</b>	Check disconnection initiated by DM-MS
<b>Test description</b>	The tester issues an implicit send to cause the IUT to disconnect. The IUT sends U-DISCONNECT PDU to the tester, which sends back the D-RELEASE.
<b>Pass criteria</b>	Check that the IUT reaches Idle state. To do it, check that the IUT accepts a call with the same call identifier
<b>Selection</b> ETS 300 396-8-3 [3]	A.39/4 Accept Call from DM without presence check
<b>Preamble</b>	Idle_To_RX_Active_OC
<b>Postamble</b>	none

<b>DMO_GATE_GWCC_CM_BV_CD_02</b>	<b>Reference:</b> ETS 300 396-5 [2], 9.3.3.9.2
<b>Purpose</b>	Check disconnection initiated by the SwMI
<b>Test description</b>	The tester issues D-DISCONNECT PDU to the IUT.
<b>Pass criteria</b>	Check that the IUT accepts it (U-RELEASE PDU sent back to the tester) then enters IDLE state
<b>Selection</b> ETS 300 396-8-3 [3]	A.38/1 Accept circuit mode call
<b>Preamble</b>	Idle_To_Active
<b>Postamble</b>	none

<b>DMO_GATE_GWCC_CM_BV_CD_03</b>	<b>Reference:</b> ETS 300 396-5 [2], 9.3.3.9.2
<b>Purpose</b>	Check release initiated by Network
<b>Test description</b>	The tester issues D-RELEASE PDU to the IUT.
<b>Pass criteria</b>	Check that the IUT reaches Idle state. To do it, check that the IUT accepts a call with the same call identifier
<b>Selection</b> ETS 300 396-8-3 [3]	A.38/1 Accept circuit mode call
<b>Preamble</b>	Idle_To_Active
<b>Postamble</b>	none

### 6.1.3 Call collision

<b>DMO_GATE_GWCC_CM_BV_CC_01</b>	<b>Reference:</b> ETS 300 396-5 [2], 9.3.2.2
<b>Purpose</b>	Individual call collision
<b>Test description</b>	The tester issues an implicit send to cause the IUT to initiate a call set-up. The IUT sends U-SETUP PDU to the tester, while the tester sends a D-SETUP (new call identifier)
<b>Pass criteria</b>	Check that the IUT gives priority to one of the calls, i.e. it will release one of the two calls and keep the other by sending a U-DISCONNECT with the relevant call identifier.
<b>Selection</b> ETS 300 396-8-3 [3]	A.41/1 Individual call from V+D with presence check AND A.41/2 Individual call from DM without presence check
<b>Preamble</b>	RegisterHome
<b>Postamble</b>	none

<b>DMO_GATE_GWCC_CM_BV_CC_02</b>   <b>Reference:</b> ETS 300 396-5 [2], 9.3.2.2	
<b>Purpose</b>	Group call collision
<b>Test description</b>	The tester issues an implicit send to cause the IUT to initiate a call set-up. The IUT sends U-SETUP PDU to the tester, while the tester sends a D-SETUP (new call identifier)
<b>Pass criteria</b>	Check that the IUT gives priority to one of the calls, i.e. it will release one of the two calls and keep the other by sending a U-DISCONNECT with the relevant call identifier.
<b>Selection</b> ETS 300 396-8-3 [3]	A.40/1      Group call from V+D without presence check AND A.40/2      Group call from DM without presence check
<b>Preamble</b>	RegisterHome
<b>Postamble</b>	none

#### 6.1.4 Control of transmission

<b>DMO_GATE_GWCC_CM_BV_CT_01</b>   <b>Reference:</b> ETS 300 396-5 [2], 9.3.3.1.1	
<b>Purpose</b>	end of transmission from DM-MS, or pre-emption from Gate for ongoing call
<b>Test description</b>	The tester issues an implicit send to cause the IUT to initiate end of transmission. The IUT sends U-TX-CEASED PDU to the tester
<b>Pass criteria</b>	Check that the IUT accepts in response D-TX-CEASED PDU and stops transmitting
<b>Selection</b> ETS 300 396-8-3 [3]	A.39/4      Accept Call from DM without presence check
<b>Preamble</b>	Idle_To_RX_Active_OC
<b>Postamble</b>	DiconnectCall

<b>DMO_GATE_GWCC_CM_BV_CT_02</b>   <b>Reference:</b> ETS 300 396-5 [2], 9.3.3.1.2	
<b>Purpose</b>	end of transmission from V+D
<b>Test description</b>	The tester issues D-TX-CEASED PDU to the IUT
<b>Pass criteria</b>	Check that the IUT accepts it and stops transmitting
<b>Selection</b> ETS 300 396-8-3 [3]	A.39/4      Accept Call from DM without presence check
<b>Preamble</b>	Idle_To_RX_Active_OC
<b>Postamble</b>	DiconnectCall

<b>DMO_GATE_GWCC_CM_BV_CT_03</b>   <b>Reference:</b> ETS 300 396-5 [2], 9.3.3.3	
<b>Purpose</b>	TX granted to another party
<b>Test description</b>	The tester sends D-TX-GRANTED PDU to the IUT
<b>Pass criteria</b>	Check that the IUT accepts it and restarts transmission
<b>Selection</b> ETS 300 396-8-3 [3]	A.41/1      Individual call from V+D with presence check
<b>Preamble</b>	Idle_To_TXR_Active
<b>Postamble</b>	DiconnectCall

<b>DMO_GATE_GWCC_CM_BV_CT_04</b>   <b>Reference:</b> ETS 300 396-5 [2], 9.3.3.2	
<b>Purpose</b>	Transmission interruption during channel occupation (gateway master)
<b>Test description</b>	The tester sends the D-TX-INTERRUPT PDU to the IUT
<b>Pass criteria</b>	Check that the IUT accepts it and stops transmitting if TX assigned to "no party"
<b>Selection</b> ETS 300 396-8-3 [3]	A.41/1      Individual call from V+D with presence check
<b>Preamble</b>	Idle_To_TX_Active_IC
<b>Postamble</b>	DiconnectCall

<b>DMO_GATE_GWCC_CM_BV_CT_05</b>	<b>Reference:</b> ETS 300 396-5 [2], 9.3.3.4.1
<b>Purpose</b>	demand for transmission from DM-MS
<b>Test description</b>	The tester issues an implicit send to cause the IUT to initiate a demand for transmission. The IUT sends U-TX-DEMAND PDU to the tester
<b>Pass criteria</b>	Check that the IUT accepts in response D-TX-GRANTED PDU and restarts transmitting
<b>Selection</b> ETS 300 396-8-3 [3]	A.41/1 Individual call from V+D with presence check
<b>Preamble</b>	Idle_To_TXR_Active
<b>Postamble</b>	DisconnectCall

<b>DMO_GATE_GWCC_CM_BV_CT_06</b>	<b>Reference:</b> ETS 300 396-5 [2], 9.3.3.5
<b>Purpose</b>	V+D permission to transmit withdrawn
<b>Test description</b>	The tester sends a D-TX WAIT PDU
<b>Pass criteria</b>	Check that the IUT stops transmitting
<b>Selection</b> ETS 300 396-8-3 [3]	A.41/1 Individual call from V+D with presence check
<b>Preamble</b>	Idle_To_TX_Active_IC
<b>Postamble</b>	DisconnectCall

<b>DMO_GATE_GWCC_CM_BV_CT_07</b>	<b>Reference:</b> ETS 300 396-5 [2], 9.3.3.6
<b>Purpose</b>	V+D permission to continue with withdrawn call
<b>Test description</b>	The tester issues a D-TX WAIT PDU, the IUT stops transmitting. The tester sends D-TX CONTINUE PDU indicating same transmission permission
<b>Pass criteria</b>	Check that the IUT starts transmitting again
<b>Selection</b> ETS 300 396-8-3 [3]	A.41/1 Individual call from V+D with presence check
<b>Preamble</b>	Idle_To_TX_Active_IC
<b>Postamble</b>	DisconnectCall

<b>DMO_GATE_GWCC_CM_BV_CT_08</b>	<b>Reference:</b> ETS 300 396-5 [2], 9.3.4.1.3
<b>Purpose</b>	DM-MS initiates pre-emption for ongoing call during channel occupation
<b>Test description</b>	The tester issues an implicit send to cause the IUT to initiate a pre-emption. The IUT sends U-TX-DEMAND PDU to the tester
<b>Pass criteria</b>	Check that the IUT accepts in response D-TX-GRANTED PDU and starts to transmit
<b>Selection</b> ETS 300 396-8-3 [3]	A.41/1 Individual call from V+D with presence check
<b>Preamble</b>	Idle_To_TX_Active_IC
<b>Postamble</b>	DisconnectCall

<b>DMO_GATE_GWCC_CM_BV_CT_09</b>	<b>Reference:</b> ETS 300 396-5 [2], 9.3.4.2.1
<b>Purpose</b>	V+D initiates pre-emption during channel occupation (gateway slave)
<b>Test description</b>	The tester sends a D-TX-INTERRUPT with granted permission assigned to another user to the IUT
<b>Pass criteria</b>	Check that the IUT accepts it and starts to transmit if TX granted to another user
<b>Selection</b> ETS 300 396-8-3 [3]	A.39/4 Accept Call from DM without presence check
<b>Preamble</b>	Idle_To_RX_Active_OC
<b>Postamble</b>	DisconnectCall

6.1.5 Timer tests

<b>DMO_GATE_GWCC_CM_BV_TI_01</b> <b>Reference:</b> ETS 300 396-5 [2], 9.3.1.1	
<b>Purpose</b>	Check T301 time out.
<b>Test description</b>	The tester sends D-SETUP PDU to the IUT. The IUT accepts it by sending the U-CONNECT PDU. T301 is started. The tester does not send the D-CONNECT ACKNOWLEDGE PDU.
<b>Pass criteria</b>	When T301 expires, check that the IUT sends U-DISCONNECT PDU to the tester with value "expiry of timer".
<b>Selection</b> ETS 300 396-8-3 [3]	A.41/1      Individual call from V+D with presence check
<b>Preamble</b>	RegisterHome
<b>Postamble</b>	none

<b>DMO_GATE_GWCC_CM_BV_TI_02</b> <b>Reference:</b> ETS 300 396-5 [2], 9.3.1.1	
<b>Purpose</b>	Check T310 time out
<b>Test description</b>	The tester sends D-SETUP PDU to the IUT. The IUT accepts it (U-CONNECT PDU sent back to the tester). The tester issues D-CONNECT ACKNOWLEDGE PDU. T310 is started
<b>Pass criteria</b>	When T310 expires, check that the IUT sends U-DISCONNECT PDU to the tester with value "expiry of timer"
<b>Selection</b> ETS 300 396-8-3 [3]	A.41/1      Individual call from V+D with presence check
<b>Preamble</b>	RegisterHome
<b>Postamble</b>	none

<b>DMO_GATE_GWCC_CM_BV_TI_03</b> <b>Reference:</b> ETS 300 396-5 [2], 9.3.1.1	
<b>Purpose</b>	Check DT361 time out
<b>Test description</b>	The tester sends D-SETUP PDU to the IUT. DT361 is started. The DM-MS or its simulation does not answer to the DM-SETUP-PRES PDU
<b>Pass criteria</b>	When DT361 expires and after DN361 times, check that the IUT sends U-DISCONNECT PDU to the tester with value "expiry of timer"
<b>Selection</b> ETS 300 396-8-3 [3]	A.41/1      Individual call from V+D with presence check
<b>Preamble</b>	RegisterHome
<b>Postamble</b>	none

<b>DMO_GATE_GWCC_CM_BV_TI_04</b> <b>Reference:</b> ETS 300 396-5 [2], 9.3.2.1	
<b>Purpose</b>	Check T303 time out
<b>Test description</b>	The tester issues an implicit send to cause the IUT to initiate a call set-up. The IUT sends U-SETUP PDU to the tester. T303 is started. But tester does not send D-CALL PROCEEDING nor D-CONNECT PDU
<b>Pass criteria</b>	When T303 expires, check that the IUT sends U-DISCONNECT PDU to the tester with value "expiry of timer"
<b>Selection</b> ETS 300 396-8-3 [3]	A.40/2      Group call from DM without presence check or A.41/2      Individual call from DM without presence check
<b>Preamble</b>	RegisterHome
<b>Postamble</b>	none

<b>DMO_GATE_GWCC_CM_BV_TI_05</b>		<b>Reference:</b> ETS 300 396-5 [2], 9.3.2.1
<b>Purpose</b>	Check T302 time out	
<b>Test description</b>	The tester issues an implicit send to cause the IUT to initiate a call set-up. The IUT sends U-SETUP PDU to the tester, which accepts it (D-CALL PROCEEDING PDU sent back by the tester). T302 is started. But tester does not send D-CONNECT PDU	
<b>Pass criteria</b>	When T302 expires, check that the IUT sends U-DISCONNECT PDU to the tester with value "expiry of timer"	
<b>Selection</b> ETS 300 396-8-3 [3]	A.40/2          Group call from DM without presence check or A.41/2          Individual call from DM without presence check	
<b>Preamble</b>	RegisterHome	
<b>Postamble</b>	none	

<b>DMO_GATE_GWCC_CM_BV_TI_06</b>		<b>Reference:</b> ETS 300 396-5 [2], 9.3.2.1
<b>Purpose</b>	Check DT363 time out	
<b>Test description</b>	The tester issues an implicit send to cause the IUT to initiate a call set-up. The IUT sends U-SETUP PDU to the tester, which accepts it (D-CALL PROCEEDING PDU sent back by the tester). Then tester sends D-CONNECT PDU. DT363 is started	
<b>Pass criteria</b>	When DT363 expires, check that the IUT sends U-DISCONNECT PDU to the tester with value "expiry of timer"	
<b>Selection</b> ETS 300 396-8-3 [3]	A.40/2          Group call from DM without presence check or A.41/2          Individual call from DM without presence check	
<b>Preamble</b>	RegisterHome	
<b>Postamble</b>	none	

## 6.2 Short Data Service (SDS) test purposes

### Incoming messages

<b>DMO_GATE_GWCC_SDS_BV_01</b>		<b>Reference:</b> ETS 300 396-5 [2], 9.4.1.1, 9.4.1.2
<b>Purpose</b>	Incoming SDS from V+D, leading to unacknowledged or acknowledged SDS, pre-defined short data message	
<b>Test description</b>	The tester issues a D-STATUS PDU (group or individual address)	
<b>Pass criteria</b>	Check that the IUT accepts it	
<b>Selection</b> ETS 300 396-8-3 [3]	A.43/1          Accept incoming SDS from V+D	
<b>Preamble</b>	RegisterHome	
<b>Postamble</b>	none	

<b>DMO_GATE_GWCC_SDS_BV_02</b>		<b>Reference:</b> ETS 300 396-5 [2], 9.4.1.1, 9.4.1.2
<b>Purpose</b>	Incoming SDS from V+D, leading to unacknowledged or acknowledged SDS, user defined short data message	
<b>Test description</b>	The tester issues a D-SDS-DATA PDU (group or individual address)	
<b>Pass criteria</b>	Check that the IUT accepts it	
<b>Selection</b> ETS 300 396-8-3 [3]	A.43/1          Accept incoming SDS from V+D	
<b>Preamble</b>	RegisterHome	
<b>Postamble</b>	none	

<b>DMO_GATE_GWCC_SDS_BV_03</b>	<b>Reference:</b> ETS 300 396-5 [2], 9.4.2.1
<b>Purpose</b>	Outgoing SDS to V+D, pre-defined short data message
<b>Test description</b>	The tester issues an implicit send to cause the IUT to initiate a pre-defined short data message
<b>Pass criteria</b>	Check that the IUT sends a U-STATUS PDU (group or individual address)
<b>Selection</b> ETS 300 396-8-3 [3]	A.43/2      Accept outgoing SDS from DM
<b>Preamble</b>	RegisterHome
<b>Postamble</b>	none

<b>DMO_GATE_GWCC_SDS_BV_04</b>	<b>Reference:</b> ETS 300 396-5 [2], 9.4.2.1
<b>Purpose</b>	Outgoing SDS to V+D, user defined short data message
<b>Test description</b>	The tester issues an implicit send to cause the IUT to initiate a user defined short data message
<b>Pass criteria</b>	Check that the IUT sends a U-SDS-DATA PDU (group or individual address)
<b>Selection</b> ETS 300 396-8-3 [3]	A.43/2      Accept outgoing SDS from DM
<b>Preamble</b>	RegisterHome
<b>Postamble</b>	none

## 7 Test Purposes for the MM protocol of a DMO GATEWAY

In this section, the IUT is a gateway. The tester is a SwMI of a V+D network. The interface between the gateway and the SwMI is being tested.

These test purposes are a subset and are derived from the V+D MM test purposes, ETS 300 394-2-1 [5]

### 7.1 Capability test purposes

<b>DMO_GATE_GWMM_CA_01</b>	<b>Reference:</b> ETS 300 396-5 [2], 10.3.1 ETS 300 392-2 [4], 16.3.1.1
<b>Purpose</b>	Incoming call set-up when no registration required
<b>Test description</b>	The IUT is powered on and no registration is required. The tester issues D-SETUP PDU to the IUT
<b>Pass criteria</b>	Check that the IUT accepts it (U-CONNECT PDU sent back to the tester).
<b>Selection</b> ETS 300 396-8-3 [3]	A.41/1      Individual call from V+D with presence check
<b>Preamble</b>	none
<b>Postamble</b>	SendRelease

<b>DMO_GATE_GWMM_CA_02</b>	<b>Reference:</b> ETS 300 396-5 [2], 10.3.1 ETS 300 392-2 [4], 16.4.1, 16.4.1.1
<b>Purpose</b>	MM initiates registration
<b>Test description</b>	The IUT is powered on and registration is required.
<b>Pass criteria</b>	Check that the IUT initiates registration by sending U-LOCATION UPDATE DEMAND PDU
<b>Selection</b> ETS 300 396-8-3 [3]	A.37/2      Gateway MM
<b>Preamble</b>	none
<b>Postamble</b>	PST_RegisterHome_Visit



<b>DMO_GATE_GWMM_CA_03</b>		<b>Reference:</b> ETS 300 396-5 [2], 10.3.1 ETS 300 392-2 [4], 16.4.2
<b>Purpose</b>	Incoming call set-up after required registration	
<b>Test description</b>	The IUT is powered on and registration is required. The IUT initiates registration by sending U-LOCATION UPDATE DEMAND PDU. The tester respond with U-LOCATION UPDATE ACCEPT PDU. The tester issues D-SETUP PDU to the IUT	
<b>Pass criteria</b>	Check that the IUT accepts it (U-CONNECT PDU sent back to the tester).	
<b>Selection</b> ETS 300 396-8-3 [3]	A.41/1 Individual call from V+D with presence check	
<b>Preamble</b>	none	
<b>Postamble</b>	SendRelease	

## 7.2 Valid behaviour test purposes

### 7.2.1 MSGW initiated registration procedures

<b>DMO_GATE_GWMM_BV_01</b>		<b>Reference:</b> ETS 300 396-5 [2], 10.3.1 ETS 300 392-2 [4], 16.4.2 b)
<b>Purpose</b>	Check U-LOCATION UPDATE DEMAND PDU parameters	
<b>Test description</b>	MLE initiates registration procedure. The IUT initiates registration by sending U-LOCATION UPDATE DEMAND PDU	
<b>Pass criteria</b>	Check that the U-LOCATION UPDATE DEMAND PDU has 'location update type' set to 'ITSI attach' 'class of MS' set to 'gateway operation'	
<b>Selection</b> ETS 300 396-8-3 [3]	A.37/2 Gateway MM	
<b>Preamble</b>	none	
<b>Postamble</b>	PST_RegisterHome_Visit	

<b>DMO_GATE_GWMM_BV_02</b>		<b>Reference:</b> ETS 300 396-5 [2], 10.3.1 ETS 300 392-2 [4], 16.4.1.1 b)
<b>Purpose</b>	Check U-LOCATION UPDATE DEMAND PDU parameters, when MNI is different from currently active registration area and not equal to IUT home network MNI.	
<b>Test description</b>	MLE initiates registration procedure, with MNI different from currently active registration area. The IUT initiates registration by sending U-LOCATION UPDATE DEMAND PDU	
<b>Pass criteria</b>	Check that the IUT sends U-LOCATION UPDATE DEMAND PDU in which the "location update type" element is set to "migrating location updating".	
<b>Selection</b> ETS 300 396-8-3 [3]	A.37/2 Gateway MM	
<b>Preamble</b>	RegisterHome	
<b>Postamble</b>	PST_RegisterHome_Visit	

<b>DMO_GATE_GWMM_BV_03</b>		<b>Reference:</b> ETS 300 396-5 [2], 10.3.1 ETS 300 392-2 [4], 16.4.2 c)
<b>Purpose</b>	Check U-LOCATION UPDATE DEMAND PDU parameters, during registration procedures with new un-exchanged ITSI.	
<b>Test description</b>	IUT initiates registration procedure with un-exchanged ITSI. The IUT sends a U-LOCATION UPDATE DEMAND PDU in which "location update type" element is set to "ITSI attach". The tester sends the D-LOCATION UPDATE PROCEEDING PDU.	
<b>Pass criteria</b>	Check that IUT responds with a U-LOCATION UPDATE DEMAND PDU in which "location update type" element is set to "demand location updating".	
<b>Selection</b> ETS 300 396-8-3 [3]	A.37/2 Gateway MM	
<b>Preamble</b>	RegisterHome	
<b>Postamble</b>	PST_RegisterHome_Visit	

### 7.2.2 V+D initiated registration procedures

<b>DMO_GATE_GWMM_BV_04</b>		<b>Reference:</b> ETS 300 396-5 [2], 10.3.1 ETS 300 392-2 [4], 16.4.3
<b>Purpose</b>	Check U-LOCATION UPDATE DEMAND PDU when having received the D-LOCATION UPDATE COMMAND PDU.	
<b>Test description</b>	The tester sends the D-LOCATION UPDATE COMMAND PDU.	
<b>Pass criteria</b>	Check that the IUT sends back U-LOCATION UPDATE DEMAND PDU in which the "location update type" element is set to "demand location updating".	
<b>Selection</b> ETS 300 396-8-3 [3]	A.37/2 Gateway MM	
<b>Preamble</b>	RegisterHome	
<b>Postamble</b>	PST_RegisterHome_Visit	

### 7.2.3 Forwarding DM-MS registration procedures to SwMI

<b>DMO_GATE_GWMM_BV_05</b>		<b>Reference:</b> ETS 300 396-5 [2], 10.3.4
<b>Purpose</b>	Forwarding DM-MS registration or de-registration.	
<b>Test description</b>	The tester issues an implicit send to make the IUT forward DM-MS identities to SwMI.	
<b>Pass criteria</b>	Verify that, to forward the identities of DM-MS whose registration has been accepted to the SwMI, the IUT send a U-ATTACH/DETACH DM-MS IDENTITY PDU.	
<b>Selection</b> ETS 300 396-8-3 [3]	A.37/2 Gateway MM	
<b>Preamble</b>	RegisterHome	
<b>Postamble</b>	none	

## **8 Test Purposes for the MLE protocol of a DMO GATEWAY**

In this section, the IUT is a gateway. The tester is a SwMI of a V+D network. The interface between the gateway and the SwMI is being tested.

The test purposes presented in ETS 300 394-2-1 [5], clause 6 shall apply.

## **9 Test Purposes for the LLC protocol of a DMO GATEWAY**

In this section, the IUT is a gateway. The tester is a SwMI of a V+D network. The interface between the gateway and the SWMI is being tested.

The test purposes presented in ETS 300 394-2-1 [5], clause 7 shall apply.

## **10 Test Purposes for the MAC protocol of a DMO GATEWAY**

In this section, the IUT is a gateway. The tester is a SWMI of a V+D network. The interface between the gateway and the SWMI is being tested.

The test purposes presented in ETS 300 394-2-1 [5], clause 8 shall apply.

**Annex A (informative): Bibliography**

- ETS 300 396-1: "Terrestrial Trunked Radio (TETRA); Technical requirements for Direct Mode Operation (DMO); Part 1: General network design".
- ITU-T Recommendation X.290: "OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications - General concepts".
- ITU-T Recommendation X.291: "OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications - Abstract test suite specification".

## History

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