



**E**UROPEAN  
**T**ELECOMMUNICATION  
**S**TANDARD

**ETS 300 394-4-9**

June 1999

---

Source: TETRA

Reference: DE/TETRA-02009-4-9

ICS: 33.020

**Key words:** TETRA, protocol, radio, TTCN

**Terrestrial Trunked Radio (TETRA);  
Conformance testing specification;  
Part 4: Protocol testing specification for  
Direct Mode Operation (DMO);  
Sub-part 9: Abstract Test Suite (ATS)  
for Mobile Station (MS) Gateway**

**ETSI**

European Telecommunications Standards Institute

**ETSI Secretariat**

**Postal address:** F-06921 Sophia Antipolis CEDEX - FRANCE

**Office address:** 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE

**Internet:** [secretariat@etsi.fr](mailto:secretariat@etsi.fr) - <http://www.etsi.org>

Tel.: +33 4 92 94 42 00 - Fax: +33 4 93 65 47 16

---

**Copyright Notification:** No part may be reproduced except as authorized by written permission. The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 1999. All rights reserved.



## Contents

Foreword .....	7
1 Scope .....	9
2 References.....	9
3 Definitions and abbreviations.....	10
3.1 TETRA definitions .....	10
3.2 TETRA abbreviations .....	10
3.3 ISO 9646 definitions .....	10
3.4 ISO 9646 abbreviations .....	11
4 Abstract Test Method (ATM).....	11
4.1 ATM for the DM-MAC ATS.....	11
4.1.1 Lower Tester (LT) .....	12
4.1.2 Upper Tester (UT).....	12
4.1.3 Test Co-ordination Procedures (TCP) .....	12
4.1.4 Point of Control and Observation (PCO).....	12
4.2 ATM for the layer 3 ATS .....	13
4.2.1 Single PCO testing.....	13
4.2.1.1 Lower Tester (LT).....	13
4.2.1.2 Upper Tester (UT) .....	13
4.2.1.3 Test Co-ordination Procedures (TCP).....	13
4.2.1.4 Point of Control and Observation (PCO) .....	14
4.2.2 Multiple PCO testing .....	14
4.2.2.1 Lower Testers (LT) .....	14
4.2.2.2 Upper Tester (UT) .....	14
4.2.2.3 Test Co-ordination Procedures (TCP).....	14
4.2.2.4 Point of Control and Observation (PCO) .....	14
4.2.3 Test configurations and use of concurrent TTCN.....	15
5 ATS conventions.....	16
5.1 Naming conventions.....	16
5.1.1 Declarations part.....	16
5.1.1.1 Test suite type and structured type definitions .....	16
5.1.1.2 Test suite operations definitions.....	16
5.1.1.3 Test suite parameter declarations.....	16
5.1.1.4 Test case selection expression definitions.....	16
5.1.1.5 Test suite constant declarations.....	17
5.1.1.6 Test suite variable declarations.....	17
5.1.1.7 Test case variable declarations.....	17
5.1.1.8 PCO declarations .....	17
5.1.1.9 Timer declarations.....	17
5.1.1.10 ASP type definitions .....	17
5.1.1.11 PDU type definitions .....	18
5.1.1.12 Alias definitions .....	18
5.1.2 Constraints part.....	18
5.1.3 Dynamic part.....	19
5.1.3.1 Test case identifier .....	19
5.1.3.2 Test step identifier .....	19
5.1.3.3 Default identifier .....	19
5.2 TC and TP naming .....	19
Annex A (normative): ATS for TETRA DMO MS-GW MAC layer.....	20
A.1 ATS for TETRA DMO MS-GW MAC protocol.....	20
A.1.1 The TTCN Graphical form (TTCN.GR) .....	20

A.1.2	The TTCN Machine Processable form (TTCN.MP).....	20
A.2	ATS for TETRA DMO MS-GW NWK protocol .....	20
A.2.1	The TTCN Graphical form (TTCN.GR).....	20
A.2.2	The TTCN Machine Processable form (TTCN.MP).....	20
Annex B (normative):	Partial PIXIT proforma for TETRA DMO MS-GW protocol .....	21
B.1	Partial PIXIT proforma for TETRA DMO MS-GW MAC layer protocol .....	21
B.1.1	Identification summary .....	21
B.1.2	ATS summary .....	21
B.1.3	Test laboratory .....	21
B.1.4	Client identification .....	21
B.1.5	SUT .....	22
B.1.6	Protocol layer information .....	22
B.1.6.1	Protocol identification .....	22
B.1.6.2	IUT information.....	22
B.1.6.2.1	Implicit send events .....	22
B.1.6.2.2	Parameter values .....	23
B.2	Partial PIXIT proforma for TETRA DMO MS-GW NWK layer protocol.....	23
B.2.1	Identification summary .....	23
B.2.2	ATS summary .....	24
B.2.3	Test laboratory .....	24
B.2.4	Client identification .....	24
B.2.5	SUT .....	24
B.2.6	Protocol layer information .....	25
B.2.6.1	Protocol identification .....	25
B.2.6.2	IUT information.....	25
B.2.6.2.1	Implicit send events .....	25
B.2.6.2.2	Parameter values .....	26
Annex C (normative):	Protocol Conformance Test Report (PCTR) proforma for TETRA DMO MS-GW protocol .....	28
C.1	PCTR proforma for TETRA DMO MS-GW MAC layer protocol.....	28
C.1.1	Identification summary .....	28
C.1.1.1	Protocol conformance test report .....	28
C.1.1.2	IUT identification.....	28
C.1.1.3	Testing environment.....	28
C.1.1.4	Limits and reservation .....	29
C.1.1.5	Comments .....	29
C.1.2	IUT conformance status .....	29
C.1.3	Static conformance summary .....	29
C.1.4	Dynamic conformance summary .....	30
C.1.5	Static conformance review report .....	30
C.1.6	Test campaign report.....	31
C.1.7	Observations.....	31
C.2	PCTR proforma for TETRA DMO MS-GW NWK layer protocol.....	32
C.2.1	Identification summary .....	32
C.2.1.1	Protocol conformance test report .....	32
C.2.1.2	IUT identification.....	32
C.2.1.3	Testing environment.....	32
C.2.1.4	Limits and reservation .....	32
C.2.1.5	Comments .....	33
C.2.2	IUT conformance status .....	33
C.2.3	Static conformance summary .....	33
C.2.4	Dynamic conformance summary .....	33
C.2.5	Static conformance review report .....	34
C.2.6	Test campaign report.....	35
C.2.7	Observations.....	36

Annex D (informative): Bibliography..... 37  
History ..... 38

Blank page

## 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
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	31 March 2000
Date of withdrawal of any conflicting National Standard (dow):	31 March 2000

Blank page



## 1 Scope

This ETS contains the Abstract Test Suites (ATS) to test the TETRA Direct Mode Operation (DMO) MS Gateway protocol at layer 3, called Direct Mode Call Control (DMCC) and the MS-Gateway protocol at layer 2, the Medium Access Control (MAC) protocol. The DMCC and MAC protocols are specified in ETS 300 396-1 [1] and in ETS 300 396-5 [2]. The Test Suite Structure (TSS) and Test Purposes (TPs) for these ATSs are defined in ETS 300 394-4-7 [4].

The objective of these test specifications are 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 [5], ISO/IEC 9646-2 [6], ISO/IEC 9646-3 [7] and ISO/IEC 9646-5 [8], as well as the ETSI rules for conformance testing, ETS 300 406 [9] and ETR 141 [10] are used as a basis for the test methodology.

Annex A provides the Tree and Tabular Combined Notation (TTCN) part of these two ATSs.

Annex B provides the Partial Protocol Implementation eXtra Information for Testing (PIXIT) Proforma of this ATS.

Annex C provides the Protocol Conformance Test Report (PCTR) Proforma of this ATS.

## 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] ETS 300 396-1 (1998): "Terrestrial Trunked Radio (TETRA); Technical requirements for Direct Mode Operation (DMO); Part 1: General network design".
- [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 300 394-4-7: "Terrestrial Trunked Radio (TETRA); Conformance testing specification; Part 4: Protocol testing specification for Direct Mode Operation (DMO); Sub-part 7: Test Suite Structure and Test Purposes (TSS&TP) for Mobile Station Gateway".
- [5] 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 (1991)).
- [6] 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 (1991)).
- [7] ISO/IEC 9646-3 (1992): "Information technology; Open Systems Interconnection; Conformance testing methodology and framework; Part 3: The tree and tabular combined notation". (See also ITU-T Recommendation X.292 (1992)).

- [8] ISO/IEC 9646-5 (1994): "Information technology; Open Systems Interconnection; Conformance testing methodology and framework; Part 5: Requirements on test laboratories and clients for the conformance assessment process". (See also ITU-T Recommendation X.292 (1992)).
- [9] ETS 300 406: "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".
- [10] ETR 141 (1994): "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; The Tree and Tabular Combined Notation (TTCN) style guide".

### 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:

DMCC	Direct Mode Call Control
DMMM	Direct Mode Mobility Management
MAC	Medium Access Control
MS	Mobile Station
MS-GW	Mobile Station Gateway
NWK	Network
SDS	Short Data Service
SDU	Service Data Unit

#### 3.3 ISO 9646 definitions

For the purposes of this ETS the following ISO/IEC 9646-1 [5] definitions apply:

Abstract Test Suite (ATS)  
Abstract Test Method (ATM)  
Implementation Conformance Statement (ICS)  
Implementation Under Test (IUT)  
Implementation eXtra Information for Testing (IXIT)  
Lower Tester (LT)  
PICS proforma  
PIXIT proforma  
Point of Control and Observation (PCO)  
Protocol Implementation Conformance Statement (PICS)  
Protocol Implementation eXtra Information for Testing (PIXIT)  
Service Access Point (SAP)  
Single Party Testing (SPyT)  
System Under Test (SUT)  
Upper Tester (UT)

For the purposes of this ETS the following ISO/IEC 9646-3 [7] definitions apply:

TTCN.GR  
TTCN.MP

For the purposes of this ETS the following ISO/IEC 9646-5 [8] definitions apply:

Protocol Conformance Test Report (PCTR)  
PCTR proforma

### 3.4 ISO 9646 abbreviations

For the purposes of this ETS the following ISO/IEC 9646-1 [5] abbreviations apply:

ASP	Abstract Service Primitive
ATM	Abstract Test Method
ATS	Abstract Test Suite
IUT	Implementation Under Test
LT	Lower Tester
MTC	Main Test Component
PCO	Point of Control and Observation
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statements
PIXIT	Protocol Implementation eXtra Information for Testing
PTC	Parallel Test Component
SAP	Service Access Point
SPyT	Single Party Testing
SUT	System Under Test
TC	Test Case
TP	Test Purpose
TTCN	Tree and Tabular Combined Notation
TSS	Test Suite Structure
UT	Upper Tester

For the purposes of this ETS the following ISO/IEC 9646-5 [8] abbreviations apply:

PCTR	Protocol Conformance Test Report
------	----------------------------------

## 4 Abstract Test Method (ATM)

In the present document the following naming convention is taken: the Network layer covers the Direct Mode Call Control (DMCC) and the Direct Mode Mobility Management (DMMM) protocol.

### 4.1 ATM for the DM-MAC ATS

This subclause describes the ATM used for testing the DM-MAC layer protocol of an MS-GW. It is the embedded variant of the remote test method used in Single Party Testing (SPyT) context, as defined in ISO/IEC 9646-2 [6], clause 11. This test method has been selected, because:

- this test method implies no specific requirements from the Implementation Under Test (IUT);
- the upper Service Access Point (SAP) of the IUT cannot be directly observed;
- the variety of the possible TETRA implementations is a serious technical obstacle for the adoption of a different ATM;
- this test method places minimum limitations in the realization of conformance testing.

The selected test method is illustrated in figure 1.

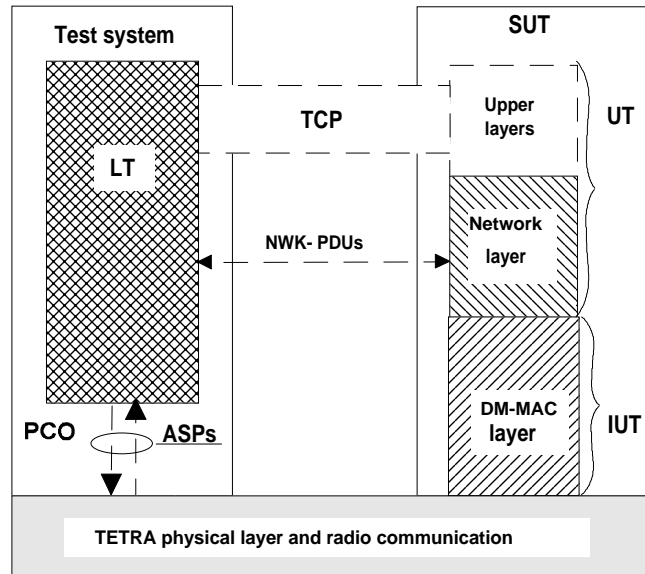


Figure 1: Remote SPyT test method for TETRA DMO MAC layer

#### 4.1.1 Lower Tester (LT)

A LT is located in a remote TETRA test system. It controls and observes the behaviour of the IUT.

#### 4.1.2 Upper Tester (UT)

There is no explicit UT in the remote test method, but the layers above inside the System Under Test (SUT) are used implicitly for testing the DM-MAC layer.

#### 4.1.3 Test Co-ordination Procedures (TCP)

The implicit send events defined by the provider of an implementation in annex B serve the purpose of the TCP. They are used as an input to the IUT communicating with the UT to initiate test events at the DMO MAC layer.

#### 4.1.4 Point of Control and Observation (PCO)

All test events at the PCO carrying service user data are specified in terms of MAC layer PDUs. Only few Abstract Service Primitives (ASPs) are defined for control or observation purposes. The mapping of the MAC PDUs into the physical layer frame structure is left to the test implementation.

## 4.2 ATM for the layer 3 ATS

This subclause describes the different ATMs used for testing the Network Layer protocol. The selected method is the remote method, as defined in ISO/IEC 9646-2 [6], clause 11.

The remote test method has been selected, because:

- this test method implies no specific requirements from the Implementation Under Test (IUT);
- the upper Service Access Point (SAP) of the IUT cannot be directly observed;
- the variety of the possible TETRA implementations is a serious technical obstacle for the adoption of a different ATM;
- this test method places minimum limitations in the realization of conformance testing.

Since the protocol defines the operation of a MS-GW via gateway, only one interface is used. The protocol also defines cases where the MS-GW is pre-empting an other DM-MS which is master of a call via Gateway; in these cases two interfaces need to be tested simultaneously. This implies that two testing methods shall be used: the remote single-party test method (with one PCO) and the remote multi-party test method with two PCOs.

### 4.2.1 Single PCO testing

The selected test method is illustrated in figure 2.

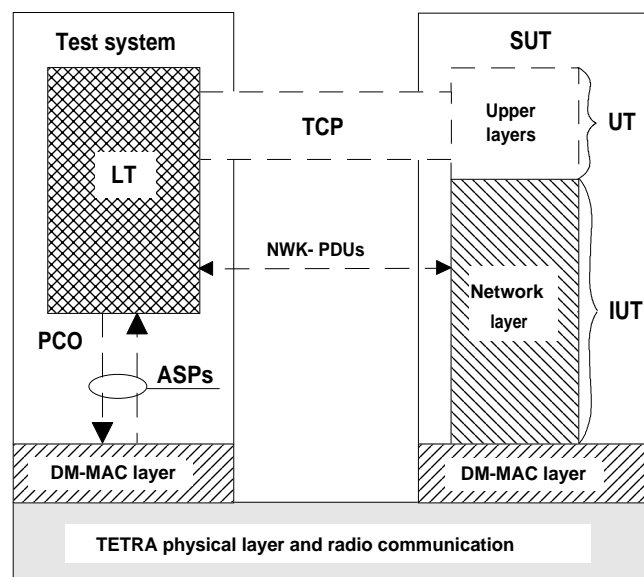


Figure 2: Remote single party test method for TETRA MS-GW NWK protocol

#### 4.2.1.1 Lower Tester (LT)

A LT is located in a remote TETRA test system. It controls and observes the behaviour of the IUT.

#### 4.2.1.2 Upper Tester (UT)

There is no explicit UT in the remote test method, but the TETRA MS-GW NWK layer and the layers above inside the System Under Test (SUT) are used implicitly for testing the DMCC layer.

#### 4.2.1.3 Test Co-ordination Procedures (TCP)

The implicit send events defined by the provider of an implementation in annex B serve the purpose of the TCP. They are used as an input to the IUT communicating with the UT to initiate test events at the NWK protocol layer.

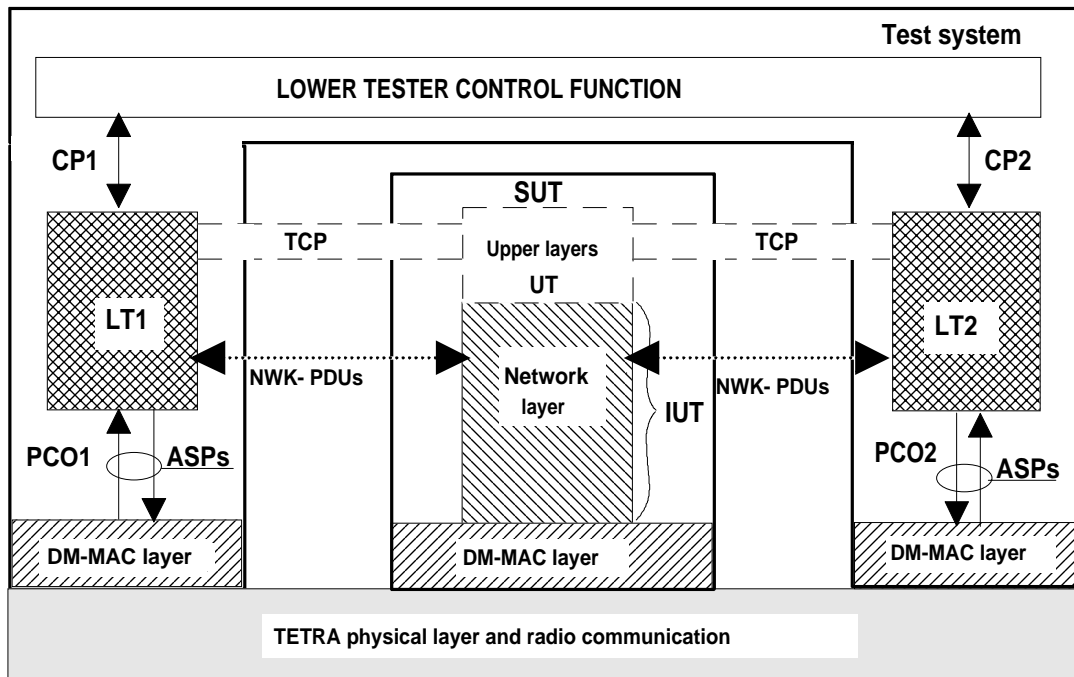
**4.2.1.4 Point of Control and Observation (PCO)**

The PCO is located inside the protocol.

All test events at the PCO carrying service user data is specified in terms of PDUs. The mapping of the PDUs to possible Medium Access Control (MAC) layer service primitives is left to the test implementation.

**4.2.2 Multiple PCO testing**

The selected test method is illustrated in figure 3.



**Figure 3: Remote multi party test method for TETRA MS-GW NWK protocol**

**4.2.2.1 Lower Testers (LT)**

Two LT: LT1 and LT2 are located in a remote TETRA test system. They observe the behaviour of the IUT. They are controlled and synchronized by the lower tester control function.

**4.2.2.2 Upper Tester (UT)**

There is no explicit UT in the remote test method, but the layers above inside the System Under Test (SUT) are used implicitly for testing the DMCC layer.

**4.2.2.3 Test Co-ordination Procedures (TCP)**

The implicit send events defined by the provider of an implementation in annex B serve the purpose of the TCP. They are used as an input to the IUT communicating with the UT to initiate test events at the NWK protocol layer.

**4.2.2.4 Point of Control and Observation (PCO)**

The PCOs are located inside the protocol.

All test events at the PCOs carrying service user data are specified in terms of PDUs. The mapping of the PDUs to possible Medium Access Control (MAC) layer service primitives is left to the test implementation.

### 4.2.3 Test configurations and use of concurrent TTCN

As this ATS covers both single-party testing using non-concurrent TTCN, and multi-party testing using concurrent TTCN, the notation chosen for the complete ATS is concurrent TTCN syntax. Therefore, tests components are defined to describe the two configurations: the "single\_party" configuration and the "multi\_party" configuration, as shown in figures 4 and 5.

The single\_party configuration is used in case of single-party testing, i.e. for the protocol between the MS-GW and the gateway. Only one test component, which is the Main Test Component (MTC) MTC\_SINGLE, connected to the IUT via the PCO LNWK, is needed in this case.

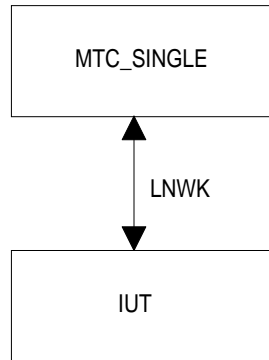


Figure 4: Single\_party configuration

The Multi\_party configuration is used when an other DM-MS is needed to check the protocol, i.e. to test pre-emption when an other DM-MS is master. In this case, three components are needed, these are the MTC MTC\_GATE\_MS, and two parallel Test Components (PTCs) PTC\_GATE and PTC\_MS, which are connected to the MTC via the two co-ordination points CP\_GATE and CP\_MS. PTC\_GATE and PTC\_MS are further connected to the IUT via the two PCOs LNWK and LNWK\_MS.

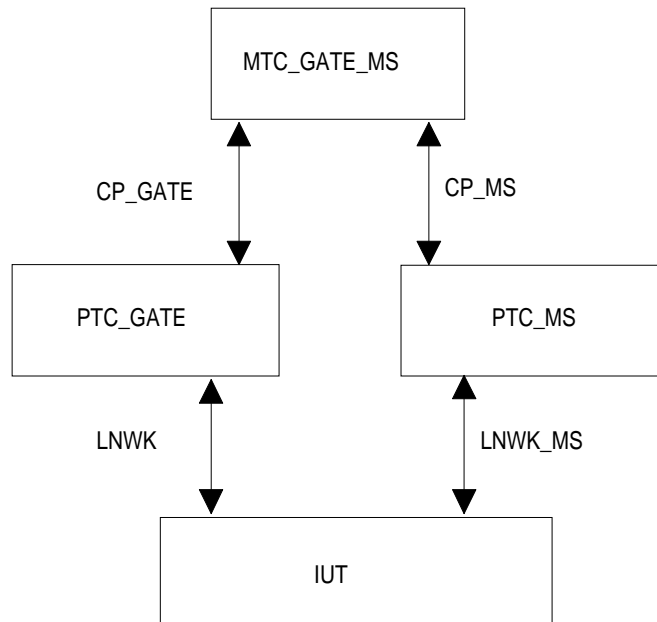


Figure 5: Multi\_party configuration

## 5 ATS conventions

This clause describes the conventions applied to define the two ATSS and gives the naming conventions chosen for the different elements of the ATSS.

The ATS conventions are intended to give a better understanding of the ATS but they describe also the conventions made for the development of the ATS, thus for any later maintenance purposes or further development of the ATS, the conventions described in this clause shall be considered.

### 5.1 Naming conventions

#### 5.1.1 Declarations part

This subclause describes the naming conventions chosen for the elements of the ATS declarations part.

##### 5.1.1.1 Test suite type and structured type definitions

The test suite type and test suite structured type identifiers describe the information elements, and each whole word included in the name is written in lowercase starting by an uppercase letter:

EXAMPLE:	Priority_Level_Type	simple type;
	SSI_Type	simple type;
	ITSI_Type	structured type.

In the case an abbreviation is included in the declaration name, there is an underscore ("\_") before and/or after it, separating it from the rest of the identifier. This rule with abbreviations apply to all the naming conventions in the whole test suite.

##### 5.1.1.2 Test suite operations definitions

The test suite operation identifiers are composed of strings in uppercase letters starting by the uppercase string "TSO\_". The different strings in the definition are separated with underscores.

EXAMPLE: TSO\_ACTIVE\_IND\_CALL\_OCCUPATION\_GATE\_MS.

##### 5.1.1.3 Test suite parameter declarations

The test suite parameter identifiers are composed of strings in uppercase letters starting by the uppercase string "PIC\_" or "PIX\_" and separated by underscores.

If the test suite parameter references a PICS item, the prefix "PIC\_" is used.

EXAMPLE 1: PIC\_CIRCUIT\_MODE\_CALL.

If the test suite parameter references a PIXIT item, the prefix "PIX\_" is used.

EXAMPLE 2: PIX\_MS\_ITSI.

Complete names as defined in the specifications are used.

##### 5.1.1.4 Test case selection expression definitions

The naming conventions for the test case selection expression definitions use free text starting with an uppercase letter. The name of the expression shall explain clearly the selection rule. The test case selection expressions are generally logical combinations of the PICS element definitions.



#### 5.1.1.5 Test suite constant declarations

The test suite constant identifiers are composed of strings in uppercase letters starting by the uppercase string "TSC\_".

EXAMPLE: TSC\_RESERVED2.

Complete names as defined in the specifications are used. However, in the parameters including a dot character, the dot is replaced by an underscore.

#### 5.1.1.6 Test suite variable declarations

The test suite variable identifiers are composed of string in lowercase letters starting by the lowercase string "tsv\_".

If the test suite variable represents a system parameter or value, the name defined in the specifications is used. However, in the variables including a dot character, the dot is replaced by an underscore.

#### 5.1.1.7 Test case variable declarations

The test case variable identifiers are composed of strings in lowercase letters starting by the lowercase string "tcv\_".

EXAMPLE: tcv\_counter.

#### 5.1.1.8 PCO declarations

The point of control and observation identifiers are composed of three to six capital letters, beginning with an "L", as there are only LTs.

EXAMPLE: LDNWK Represents a PCO on NWK layer for PDUs.

#### 5.1.1.9 Timer declarations

Two kinds of timers can be distinguished:

1) standardized:

Those defined in the standard, e.g. DT303, use the same name as in the standard, beginning with capital "DT".

As there is a tolerance margin accepted for these timers, two values are needed:

- the minimum value allowed, which will use the suffix "\_Min";
- the maximum value allowed, which will use the suffix "\_Max".

EXAMPLE 1: DT303\_Min, DT303\_Max.

2) non-standardized:

Those not defined in the standard, i.e. for execution use, e.g. a timer waiting for a response. These timers begin with the prefix "T\_", followed by a string in lowercase letters with each word in the following string starting with an uppercase letter.

EXAMPLE 2: T\_IUT\_Response;  
T\_NoResponse.

#### 5.1.1.10 ASP type definitions

ASP definitions follow the specification in the ETS 300 396-5 [2] when a corresponding definition exists. If not, a free name is used.

### 5.1.1.11 PDU type definitions

The identifier of a PDU is given in a string in uppercase letters, which represents the layer message.

EXAMPLE:                   DM\_U\_SETUP\_Type           for the SETUP layer 3 PDU;  
                          DM\_DISCONNECT\_Type       for the DISCONNECT layer 3 PDU.

### 5.1.1.12 Alias definitions

No alias definitions are used in the test suite.

### 5.1.2 Constraints part

This subclause describes the naming conventions chosen for the elements of the ATS constraints part.

Constraint identifiers commence with uppercase. The remaining part of the name is separated from the beginning with an underscore and is written in lowercase with each word starting with an uppercase letter.

Identifier names of elements concerning the same subject have equivalent names in the declaration and the constraint part. The postfix \_R or \_S are added at the end of the name to indicate whether the constraint is sent (\_S) or received (\_R) by the tester:

- Declaration part:       DM\_CONNECT\_Type;
- Constraint part:       DM\_CONNECT\_R.

The name of the modified constraint describes the particularity of the modified constraint:

EXAMPLE 1:           - Declaration part:       DM\_PRE\_ACCEPT\_Type;  
                          - Constraint part:       DM\_PRE\_ACCEPT\_OngoingCall\_S.

If formal parameter lists are used, the variable names are written in lowercase. The variable name is the same as the name of the element it is representing starting with prefix "cpa\_".

EXAMPLE 2:           -       cpa\_New\_Call\_Preemption.

### 5.1.3 Dynamic part

This subclause describes the naming conventions chosen for the elements of the ATS dynamic part.

#### 5.1.3.1 Test case identifier

The identifier of a TC is built according to the test purpose name, as in table 1:

**Table 1: TC naming convention**

DMO/<ts>/<fm>/<ss>/<tt>/<uu>/<nn>		
<ts> = test suite type	MSMS MSGW GATE REPx	MS to MS (see 300 394-4-1) MS connected to a gateway Gateway Repeater type x (see 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

#### 5.1.3.2 Test step identifier

The test step identifier is built with a string of lowercase letters led by a string of capital letter and joined by an underscore character. The first string indicates the main function of the test step; e.g. PRE for preamble, PST for postamble, CS for check state steps, LTS for local tree name and STP for general step. The second string indicates the meaning of the step.

EXAMPLES:               PRE\_Idle\_To\_TX\_Occupation;  
                          PST\_TX\_Occupation\_Reservation\_To\_Idle;  
                          CS\_RX\_Resrvation;  
                          LTS\_Send\_SDS\_Data.

#### 5.1.3.3 Default identifier

Two default identifiers are used, namely DMCC\_OtherwiseFail and PRE\_PST\_OtherwiseFail.

### 5.2 TC and TP naming

There is a single name for both the TC identifiers and the TP identifiers.

## **Annex A (normative):      ATS for TETRA DMO MS-GW MAC layer**

The ATS is written in TTCN according to ISO/IEC 9646-3 [7].

The ATS itself contains a test suite overview part which provides additional information and references.

### **A.1   ATS for TETRA DMO MS-GW MAC protocol**

#### **A.1.1   The TTCN Graphical form (TTCN.GR)**

The TTCN.GR representation of this ATS is contained in an Adobe Portable Document Format™ file (msgw\_mac.PDF contained in archive 39449e1.ZIP) which accompanies the present document.

#### **A.1.2   The TTCN Machine Processable form (TTCN.MP)**

The TTCN.MP representation corresponding to this ATS is contained in an ASCII file (msgw\_mac.MP contained in archive 39449e1.ZIP) which accompanies the present document.

NOTE:      According to ISO/IEC 9646-3 [7], in case of a conflict in interpretation of the operational semantics of TTCN.GR and TTCN.MP, the operational semantics of the TTCN.GR representation takes precedence.

### **A.2   ATS for TETRA DMO MS-GW NWK protocol**

#### **A.2.1   The TTCN Graphical form (TTCN.GR)**

The TTCN.GR representation of this ATS is contained in an Adobe Portable Document Format™ file (msgw\_nwk.PDF contained in archive 39449e1.ZIP) which accompanies the present document.

#### **A.2.2   The TTCN Machine Processable form (TTCN.MP)**

The TTCN.MP representation corresponding to this ATS is contained in an ASCII file (msgw\_nwk.MP contained in archive 39449e1.ZIP) which accompanies the present document.

NOTE:      According to ISO/IEC 9646-3 [7], in case of a conflict in interpretation of the operational semantics of TTCN.GR and TTCN.MP, the operational semantics of the TTCN.GR representation takes precedence.

**Annex B (normative): Partial PIXIT proforma for TETRA DMO MS-GW protocol**

Notwithstanding the provisions of the copyright clause related to the text of this ETS, ETSI grants that users of this ETS may freely reproduce the PIXIT proforma in this annex so that it can be used for its intended purposes and may further publish the completed PIXIT.

The PIXIT proforma is based on ISO/IEC 9646-5 [8]. Any additional information needed can be found in this international standard document.

**B.1 Partial PIXIT proforma for TETRA DMO MS-GW MAC layer protocol**

**B.1.1 Identification summary**

**Table B.1**

PIXIT number:	
Test laboratory name:	
Date of issue:	
Issued to:	

**B.1.2 ATS summary**

**Table B.2**

Protocol specification:	ETS 300 396-5
Protocol to be tested:	
ATS specification:	ETS 300 394-4-9
Abstract test method:	Remote test method, embedded variant

**B.1.3 Test laboratory**

**Table B.3**

Test laboratory identification:	
Test laboratory manager:	
Means of testing:	
SAP address:	

**B.1.4 Client identification**

**Table B.4**

Client identification:	
Client test manager:	
Test facilities required:	

**B.1.5 SUT**

**Table B.5**

Name:	
Version:	
SCS number:	
Machine configuration:	
Operating system identification:	
IUT identification:	
PICS reference for IUT:	
Limitations of the SUT:	
Environmental conditions:	

**B.1.6 Protocol layer information**

**B.1.6.1 Protocol identification**

**Table B.6**

Name:	TETRA - DMO - Gateway Air Interface ETS 300 396-5
Version:	
PICS references:	ETS 300 396-8-3

**B.1.6.2 IUT information**

**B.1.6.2.1 Implicit send events**

**Table B.7: Implicit send events**

Item	PIXIT (See note)	Related implicit send message (PDU)	Invocation description
1	IMP_SYNC_GPREEMPT_ON GOING	True if it is possible to cause the IUT to send a DM-GPREEMPT SDU for ongoing call	
2	IMP_SYNC_GSETUP	True if it is possible to cause the IUT to send a DMAC-SYNC PDU containing a DM-SETUP SDU.	
3	IMP_SYNC_PREEMPT_ONG OING	True if it is possible to cause the IUT to send a DM-PREEMPT SDU for ongoing call	
4	IMP_SYNC_SDS_DATA	True if it is possible to cause the IUT to send a DMAC-SYNC PDU containing a DM-SDS DATA SDU.	
5	IMP_SYNC_SDS_UDATA	True if it is possible to cause the IUT to send a DMAC-SYNC PDU containing a DM-SDS UDATA SDU.	

NOTE: The PIXIT names for the implicit send events in this table are the same as those of the test steps in which the implicit send events are used.

**B.1.6.2.2 Parameter values**

**Table B.8: Parameter values**

Item	Parameter	Parameter type	Explanation	Value or reference
1	PIX_CIRCUIT_MODE_TYPE	Circuit_Mode_Type_Type	Traffic channel type and interleaving depth supported by the IUT.	
2	PIX_POWER_CLASS	Power_Class_Type	The power class of the IUT.	
3	PIX_POWER_CONTROL_FLAG	Power_Control_Flag_Type	Power control flag, which indicate whether or not power control by slave is permitted.	
4	PIX_GATEWAY_ADDRESS	Gateway_Address_Type	Value of the gateway (tester) address.	
5	PIX_MS_SSI	SSI_Type	SSI of the IUT	
6	PIX_MS_MNI	MNI_Type	MNI of the IUT	
7	PIX_OTHER_MS_SSI	SSI_Type	SSI of the other DM-MS	
8	PIX_OTHER_MS_MNI	MNI_Type	MNI of the other DM-MS	
9	PIX_TESTER_MNI	MNI_Type	MNI of the tester	
10	PIX_TESTER_SSI	SSI_Type	SSI of the tester	
11	PIX_REGISTRATION_LABEL	BITSTRING	Value of the registration label	

**Table B.9: SDS parameter values**

Item	Parameter	Parameter type	Explanation	Value or reference
1	PIX_SDS_CURRENTLY_TESTING	INTEGER	The type (1 to 4) of SDS data currently testing.	
2	PIX_SDS_TIME_REMAINING	SDS_Time_Remaining_Type	Value of the SDS time remaining element used to indicate the current estimate of the SDS channel occupation time.	
3	PIX_SDS_DATA_2	Oto4294967295_Type	Value of SDS data type 2.	
4	PIX_SDS_DATA_3	INTEGER	Value of SDS data type 3.	
5	PIX_SDS_DATA_4	User_Defined_Data_4_Type	Value of SDS data type 4.	
6	PIX_SDS_DATA_4_LENGTH	INTEGER	Length of the value of the SDS data type 4.	

**B.2 Partial PIXIT proforma for TETRA DMO MS-GW NWK layer protocol**

**B.2.1 Identification summary**

**Table B.10**

PIXIT number:	
Test laboratory name:	
Date of issue:	
Issued to:	

**B.2.2    ATS summary**

**Table B.11**

Protocol specification:	ETS 300 396-5
Protocol to be tested:	
ATS specification:	ETS 300 394-4-9
Abstract test method:	Remote test method, embedded variant

**B.2.3    Test laboratory**

**Table B.12**

Test laboratory identification:	
Test laboratory manager:	
Means of testing:	
SAP address:	

**B.2.4    Client identification**

**Table B.13**

Client identification:	
Client test manager:	
Test facilities required:	

**B.2.5    SUT**

**Table B.14**

Name:	
Version:	
SCS number:	
Machine configuration:	
Operating system identification:	
IUT identification:	
PICS reference for IUT:	
Limitations of the SUT:	
Environmental conditions:	



**B.2.6 Protocol layer information**

**B.2.6.1 Protocol identification**

**Table B.15**

Name:	TETRA - DMO - Gateway Air Interface ETS 300 396-5
Version:	
PICS references:	ETS 300 396-8-3

**B.2.6.2 IUT information**

**B.2.6.2.1 Implicit send events**

**Table B.16: Implicit send events**

Item	PIXIT (See note)	Related implicit send message (PDU)	Invocation description
1	IMP_GPREEMPT	True if it is possible to cause the IUT to send a DM-GPREEMPT PDU.	
2	IMP_GSETUP	True if it is possible to cause the IUT to send a DM-GSETUP PDU	
3	IMP_GTX_REQUEST	True if it is possible to cause the IUT to send a DM-GTX REQUEST PDU	
4	IMP_PREEMPT	True if it is possible to cause the IUT to send a DM-PREEMPT PDU	
5	IMP_RELEASE	True if it is possible to cause the IUT to send a DM-RELEASE PDU	
6	IMP_SDS_DATA	True if it is possible to cause the IUT to send a DM-SDS DATA PDU	
7	IMP_SDS_UDATA	/* True if it is possible to cause the IUT to send a DM-SDS UDATA PDU	
8	IMP_TX_CEASED	True if it is possible to cause the IUT to send a DM-TX CEASED PDU	

NOTE: The PIXIT names for the implicit send events in this table are the same as those of the test steps in which the implicit send events are used.

B.2.6.2.2 Parameter values

Table B.17: Parameter values

Item	Parameter	Parameter type	Explanation	Value or reference
1	PIX_CIRCUIT_MODE_TYPE	Circuit_Mode_Type	Traffic channel type and interleaving depth supported by the IUT.	
2	PIX_POWER_CLASS	Power_Class_Type	The power class of the IUT.	
3	PIX_POWER_CONTROL_FLAG	Power_Control_Flag_Type	Power control flag, which indicate whether or not power control by slave is permitted.	
4	PIX_OTHER_TSI	TSI_Type	The gateway TSI not recognized by the IUT and the tester.	
5	PIX_DMMS_WAITING_TIMER	DMMS_Waiting_Timer_Type	/* Value of the DM-MS waiting timer (that the DM-MS should use for timer DT302, DT308 or DT309)	
6	PIX_REGISTRATION_LABEL	Registration_Label_Type	Value of the registration label	
7	PIX_REGISTRATION_TIME_REMAINING	Registration_Transaction_Time_Remaining_Type	Registration transaction time remaining	
8	PIX_RESERVATION_TIME	Reservation_Time_Remaining_Type	Value of the reservation time remaining used by the master MS.	
9	PIX_UNACCEPTABLE_CIRCUIT_MODE_TYPE	Circuit_Mode_Type	Traffic channel type and interleaving depth not acceptable for the IUT.	
10	PIX_EXTERNAL_DIGITS	BITSTRING	External subscriber digits	
11	PIX_EXTERNAL_NUMBER_DIGITS	Oto31_Type	External subscriber number digits	

Table B.18: SDS parameter values

Item	Parameter	Parameter type	Explanation	Value or reference
1	PIX_SDS_TIME_REMAINING	SDS_Time_Remaining_Type	Value of the SDS time remaining element used to indicate the current estimate of the SDS channel occupation time.	
2	PIX_SDS_DATA_1	User_Defined_Data_1_Type	Value of SDS data type 1.	
3	PIX_SDS_DATA_1_FCS	FCS_Type	Value of the Frame Check Sequence for the SDS DATA 1 data.	
4	PIX_SDS_DATA_2	User_Defined_Data_2_Type	Value of SDS data type 2.	
5	PIX_SDS_DATA_2_FCS	FCS_Type	Value of the Frame Check Sequence for the SDS DATA 2 data.	
6	PIX_SDS_DATA_3	User_Defined_Data_3_Type	Value of SDS data type 3.	
7	PIX_SDS_DATA_3_FCS	FCS_Type	Value of the Frame Check Sequence for the SDS DATA 3 data.	
8	PIX_SDS_DATA_4	User_Defined_Data_4_Type	Value of SDS data type 4.	
9	PIX_SDS_DATA_4_FCS	FCS_Type	Value of the Frame Check Sequence for the SDS DATA 4 data.	
10	PIX_SDS_DATA_4_LENGTH	Length_Indicator_Type	Length of the value of the SDS data type 4.	
11	PIX_SDS_CURRENTLY_TESTING	INTEGER	The type (1 to 4) of SDS data currently testing.	

**Annex C (normative): Protocol Conformance Test Report (PCTR) proforma for TETRA DMO MS-GW protocol**

Notwithstanding the provisions of the copyright clause related to the text of this ETS, ETSI grants that users of this ETS may freely reproduce the PCTR proforma in this annex so that it can be used for its intended purposes and may further publish the completed PCTR.

The PCTR Proforma is based on ISO/IEC 9646-5 [8]. Any additional information needed can be found in this referenced document.

**C.1 PCTR proforma for TETRA DMO MS-GW MAC layer protocol**

**C.1.1 Identification summary**

**C.1.1.1 Protocol conformance test report**

**Table C.1**

PCTR number:	
PCTR date:	
Test laboratory identification:	
Accreditation status	
Accreditation reference	
Technical authority	
Signature:	
Test laboratory manager:	
Signature:	

**C.1.1.2 IUT identification**

**Table C.2**

Name:	
Version:	
Protocol specification:	
PICS:	
Previous PCTR if any:	

**C.1.1.3 Testing environment**

**Table C.3**

PIXIT number:	
ATS specification:	
Abstract test method:	Remote test method, embedded variant
Means of testing identification:	
Period of testing:	
Conformance log reference(s):	
Retention date for log reference(s):	

**C.1.1.4 Limits and reservation**

Additional information relevant to the technical contents or further use of the test report, or the rights and obligations of the test laboratory and the client, may be given here. Such information may include restriction on the publication of the report.

.....  
.....  
.....  
.....  
.....

**C.1.1.5 Comments**

Additional comments may be given by either the client or the test laboratory on any of the contents of the PCTR, for example, to note disagreement between the two parties.

.....  
.....  
.....  
.....  
.....

**C.1.2 IUT conformance status**

This IUT has or has not been shown by conformance assessment to be non-conforming to the specified protocol specification.

Strike the appropriate words in this sentence. If the PICS for this IUT is consistent with the static conformance requirements as specified in clause C.3 in this report and there are no "FAIL" verdicts to be recorded in clause C.6 strike the words "has or". otherwise strike the words "or has not".

**C.1.3 Static conformance summary**

The PICS for this IUT is or is not consistent with the static conformance requirements in the specified protocol.

Strike the appropriate words in this sentence.





**C.2 PCTR proforma for TETRA DMO MS-GW MAC layer protocol**

**C.2.1 Identification summary**

**C.2.1.1 Protocol conformance test report**

**Table C.5**

PCTR number:	
PCTR date:	
Test laboratory identification:	
Accreditation status	
Accreditation reference	
Technical authority	
Signature:	
Test laboratory manager:	
Signature:	

**C.2.1.2 IUT identification**

**Table C.6**

Name:	
Version:	
Protocol specification:	
PICS:	
Previous PCTR if any:	

**C.2.1.3 Testing environment**

**Table C.7**

PIXIT number:	
ATS specification:	
Abstract test method:	Remote test method, embedded variant
Means of testing identification:	
Period of testing:	
Conformance log reference(s):	
Retention date for log reference(s):	

**C.2.1.4 Limits and reservation**

Additional information relevant to the technical contents or further use of the test report, or the rights and obligations of the test laboratory and the client, may be given here. Such information may include restriction on the publication of the report.

.....

.....

.....

.....

.....



**C.2.1.5 Comments**

Additional comments may be given by either the client or the test laboratory on any of the contents of the PCTR, for example, to note disagreement between the two parties.

.....  
.....  
.....  
.....  
.....

**C.2.2 IUT conformance status**

This IUT has or has not been shown by conformance assessment to be non-conforming to the specified protocol specification.

Strike the appropriate words in this sentence. If the PICS for this IUT is consistent with the static conformance requirements as specified in clause C.3 in this report and there are no "FAIL" verdicts to be recorded in clause C.6 strike the words "has or". otherwise strike the words "or has not".

**C.2.3 Static conformance summary**

The PICS for this IUT is or is not consistent with the static conformance requirements in the specified protocol.

Strike the appropriate words in this sentence.

**C.2.4 Dynamic conformance summary**

The test campaign did or did not reveal errors in the IUT.

Strike the appropriate words in this sentence. If there are no "FAIL" verdicts to be recorded in clause C.6 of this report strike the words "did or" otherwise strike the words "or did not".

Summary of the results of groups of test:

.....  
.....  
.....  
.....  
.....



C.2.6 Test campaign report

Table C.8

ATS reference	Selected	Run	Verdict	Observations (see note)
DMO_MSGW_NWK_DMCC_CM_CA_01	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_CA_02	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_ID_01	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_ID_02	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_ID_03	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_ID_04	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_ID_05	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_ID_06	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_ID_07	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_IB_01	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_TXO_01	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_TXO_02	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_TXO_03	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_TXO_04	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_TXO_05	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_TXO_06	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_TXO_07	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_RO_01	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_RO_02	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_RO_03	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_RO_04	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_RO_05	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_RO_06	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_RO_07	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_RR_01	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_RR_02	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_RR_03	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_RR_04	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_TI_01	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_TI_02	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_TI_03	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_TI_04	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_CM_BV_TI_05	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_SDS_CA_01	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_SDS_BV_ID_01	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_SDS_BV_ID_02	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_SDS_BV_ID_03	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_SDS_BV_ID_04	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_SDS_BV_ID_05	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_SDS_BV_IB_01	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_SDS_BV_IB_02	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_SDS_BV_IB_03	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_SDS_BV_IB_04	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_SDS_BV_RO_01	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_SDS_BV_RO_02	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_SDS_BV_RO_03	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_SDS_BV_RO_04	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_SDS_BV_RO_05	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_SDS_BV_RO_06	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_SDS_BV_RO_07	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_SDS_BV_RO_08	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_SDS_BV_RR_01	Yes/No	Yes/No		
DMO_MSGW_NWK_DMCC_SDS_BV_RR_02	Yes/No	Yes/No		



## Annex D (informative): Bibliography

- 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".
- ITU-T Recommendation X.292: "OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications - The Tree and Tabular Combined Notation (TTCN)".

## History

Document history			
November 1998	Public Enquiry	PE 9911:	1998-11-13 to 1999-03-12
March 1999	Vote	V 9922:	1999-03-30 to 1999-05-28
June 1999	First Edition		