Technical Specification Group Services and System Aspects **TSGS#13(01)0466**

Meeting #13, Beijing, China, 24-27 September 2001

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**Source:** **SA5**

**Title:** **Rel-4 CR32.102 (3G Telecom Management Architecture)**

**Document for:** **Approval**

**Agenda Item:** **7.5.3**

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| Doc-1st-Level | Doc-2nd-Level | Spec | CR | Rev | Phase | Subject | Cat | Version Current | Version-New | Workitem |
|---|---|---|---|---|---|---|---|---|---|---|
| SP-010466 | S5-010526 | 32.102 | 016 | | Rel-4 | Update and alignment of compliance conditions for UMTS Management Physical architectures | F | 4.1.0 | 4.2.0 | OAM-AR |

**3GPP TSG-SA5 (Telecom Management)** **S5-010526**
**Meeting #22, Paris, France, 3-7 september 2001**

CR-Form-v3

# CHANGE REQUEST

⌘ **32.102** **CR** **016** ⌘ rev **-** ⌘ Current version: **4.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

***Proposed change affects:*** ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network **X**

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Update and alignment of compliance conditions for UMTS Management Physical architectures |
| ***Source:*** | ⌘ | SA5 |
| ***Work item code:*** | ⌘ | OAM-AR |
| ***Date:*** | ⌘ | 07/09/2001 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | REL-4 |

*Use one of the following categories:*
***F*** *(essential correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(Addition of feature),*
***C*** *(Functional modification of feature)*
***D*** *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*

| | |
|---|---|
| *2* | *(GSM Phase 2)* |
| *R96* | *(Release 1996)* |
| *R97* | *(Release 1997)* |
| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *REL-4* | *(Release 4)* |
| *REL-5* | *(Release 5)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | Alignments with the new IRP definitions and general update |
| ***Summary of change:*** | ⌘ | Update and alignment of compliance conditions with the new IRP definitions. Clarifications of figures. |
| ***Consequences if not approved:*** | ⌘ | Misunderstandings and unclear requirements |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | 3.2, 8.2, 8.3, 8.4, 8.5, 8.6 |
| ***Other specs affected:*** | ⌘ | ☐ Other core specifications ⌘<br>☐ Test specifications<br>☐ O&M Specifications |
| ***Other comments:*** | ⌘ | |

## 3.2 Abbreviations

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

| | |
|---|---|
| 3G | 3rd Generation |
| ATM | Asynchronous Transfer Mode |
| BG | Border Gateway |
| BSC | Base Station Controller |
| BSS | Base Station Subsystem |
| BTS | Base Transceiver Station |
| CIM | Common Information Model Specification (from DMTF) |
| CMIP | Common Management Information Protocol |
| CMIS | Common Management Information Service |
| CMISE | Common Management Information Service Element |
| CORBA | Common Object Request Broker Architecture |
| DCN | Data Communication Network |
| DECT | Digital Enhanced Cordless Telecommunications |
| DSS1 | Digital Subscriber System 1 |
| E-OS | Element Management Layer-Operations System |
| F/W | Firewall |
| FM | Fault Management |
| FTAM | File Transfer, Access and Management |
| GDMO | Guidelines for the Definition of Managed Objects |
| GGSN | Gateway GPRS Support Node |
| GPRS | General Packet Radio Service |
| HLR | Home Location Register |
| HTTP | HyperText Transfer Protocol |
| HW | Hardware |
| IDL | Interface Definition Language |
| IIOP | Internet Inter-ORB Protocol |
| IM | Information Model |
| INAP | Intelligent Network Application Part |
| IP | Internet Protocol |
| IRP | Integration Reference Point |
| IS | Information Service |
| ISDN | Integrated Services Digital Network |
| IWU | Inter Working Unit |
| MD | Mediation Device |
| MIB | Management Information Base |
| MMI | Man-Machine Interface |
| MML | Man-Machine Language |
| MSC | Mobile service Switching Centre |
| NE | Network Element |
| NR | Network Resource |
| NRM | Network Resource Model |
| NSS | Network Switching Subsystem |
| NW | Network |
| N-OS | Network Management Layer-Operations System |
| OMG | Object Management Group |
| OS | Operations System |
| OSF | Operations System Functions |
| PDH | Plesiochronous Digital Hierarchy |
| PSA | Product Specific Applications |
| PSTN | Public Switched Telephone Network |
| QA | Q-Adapter |
| QoS | Quality of Service |
| RNC | Radio Network Controller |
| RSVP | Resource ReserVation Protocol |
| SDH | Synchronous Digital Hierarchy |
| SGSN | Serving GPRS Support Node |
| SLA | Service Level Agreement |

| | |
|---|---|
| SMI | Structure of Management Information |
| SNM | Sub-Network Manager |
| SNMP | Simple Network Management Protocol |
| SS | Solution Set |
| SS7 | Signalling System No. 7 |
| SW | Software |
| TM | Telecom Management |
| TMN | Telecommunications Management Network as defined in ITU-T Recommendation M.3010 [1]. |
| UML | Unified Modelling Language |
| UMTS | Universal Mobile Telecommunications System |
| UTRA | Universal Terrestrial Radio Access |
| UTRAN | Universal Terrestrial Radio Access Network |
| VHE | Virtual Home Environment |
| VLR | Visitor Location Register |
| WBEM | Web Based Enterprise Management |
| WS | Workstation |

# 8 UMTS Management Physical architectures

A UMTS Telecom Management Network will consist of many different management layers and many different building blocks. The complexity will vary greatly in detail because every organisation has different needs. The following clause will identify the most critical architectural issues and compliance conditions for a given UMTS Management Interface. It should serve as fundamental requirements for any UMTS entity (network element or management system) being a part of a UMTS TMN.

## 8.1 Compliance Conditions

For a UMTS entity (Management System or NE) to be compliant to a given UMTS Management Interface, all the following conditions shall be satisfied:

1) It implements the management functionality following the Information Model and flows specified by the relevant 3GPP UMTS Management Interface Specifications applicable to that interface.

2) It provides at least one of the IRP Solution Sets (were available) related to the valid Application Protocols specified by 3GPP UMTS Application Protocols for that interface, [2] Annex C.

3) It provides at least one standard networking protocol.

4) In case the entity does not offer the management interface on its own, a Q-Adapter shall be provided. This Q-Adapter shall be provided independently of any other UMTS NE and/or UMTS Management System.

5) Support for Bulk Transfer Application Protocols specified by the relevant 3GPP UMTS Management Interface Specifications applicable to that interface.

## 8.2 Network elements management architecture

Figure 8.1 shows two possible options for management interface from the OS upper layers to NE. Option 1, provides access to the NE via element manager, and Option 2, provides a direct access. It is sufficient to provide one or the other.

Figure 8.1 does not imply and limit the realisation of any OS physical block (e.g. E-OS, N-OS) to just one logical layer. OS physical blocks may span more than one logical layer [1]. Different types of network elements, different functional areas, operator and vendor preferences etc will put different constraints on the physical realisation of the OSFs. See further clause 9.

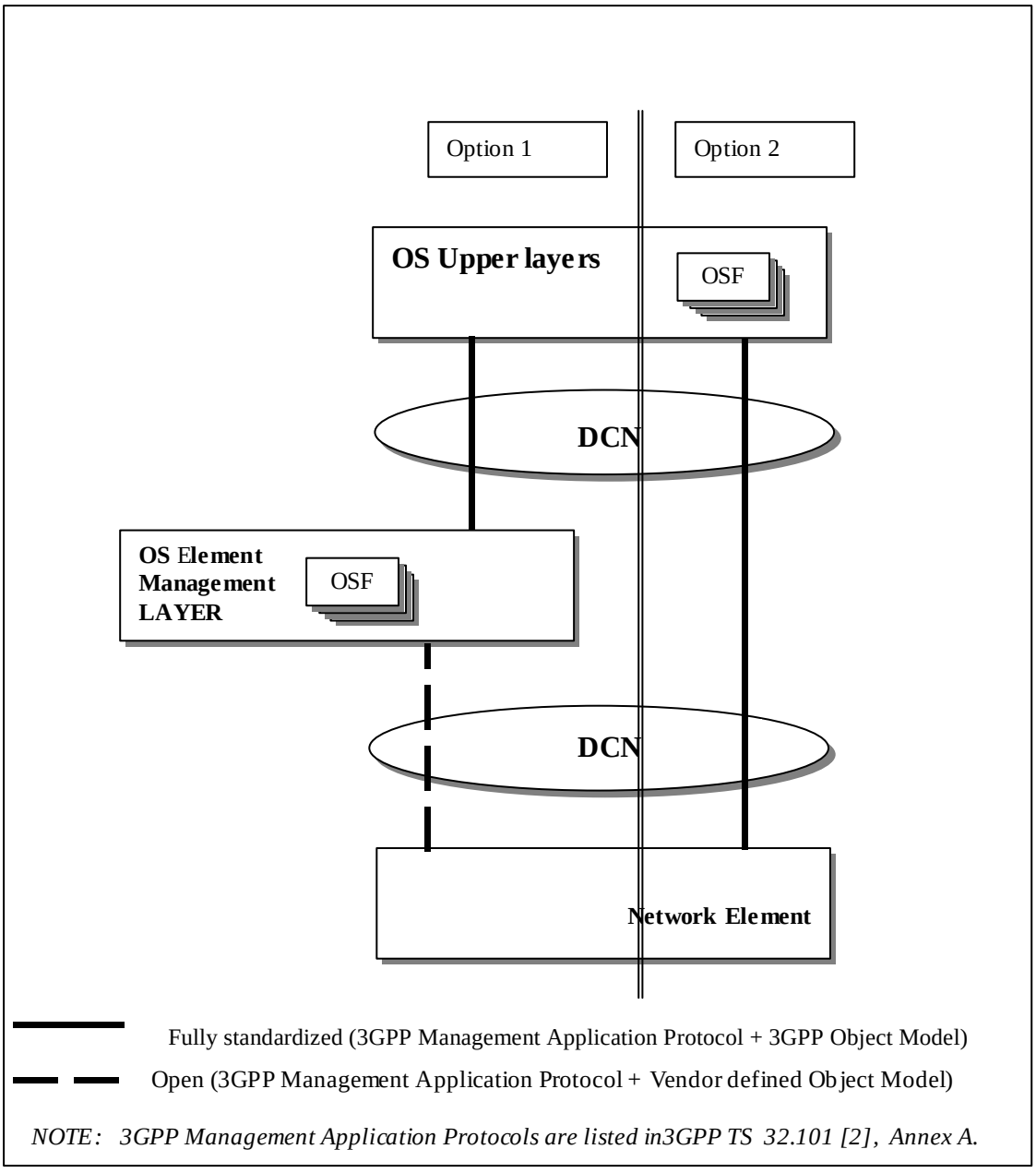



**Figure 8.1: Network Element Management Architecture**

For a UMTS entity (Network Element or management system) to be compliant to a given UMTS Management Interface the following conditions shall all be satisfied:

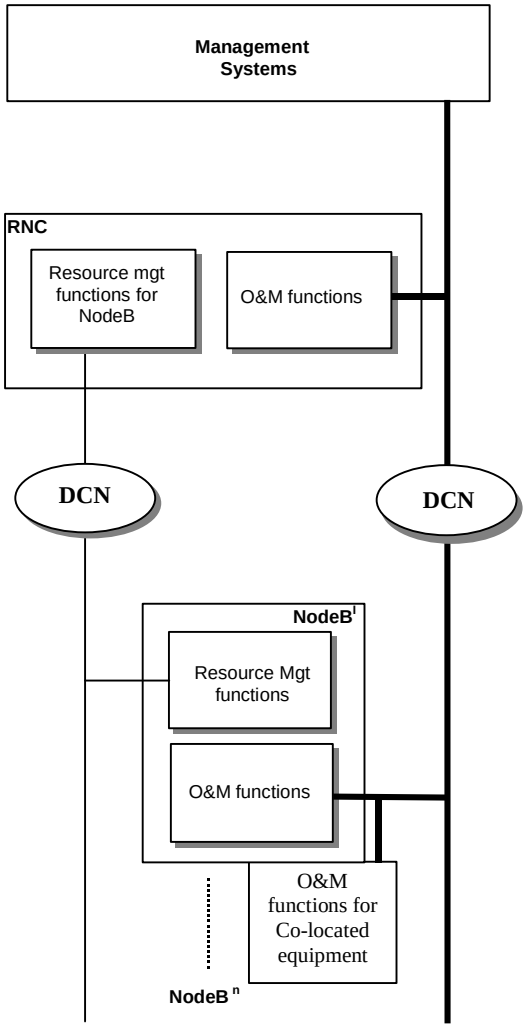
| Item | Compliance conditions |
|---|---|
| 1 | Implements relevant 3GPP IRP Information Services and Network Resource ModelsModel<br>For an interface illustrated by the dashed line in figure 4 the object model is not standardised but it shall be open |
| 2 | Application protocol ( e.g. CMIP,SNMP,CORBA IIOP)<br>(Defined in TS 32.101 [2], Annex A)<br>If 3GPP has specified one or more IRP Solution Sets corresponding to the IRP Information Models in item 1 then at least one of those IRP Solution Sets shall be supported.<br><br>(Defined in TS 32.101 [2], Annex C) |
| 3 | Valid Network Layer Protocol<br>(see Annex B of TS 32.101 [2]) |
| 4 | Lower protocol levels required by Item 1,2 and 3 |

## 8.3 Network & Subnetwork Element Management Architecture

(Example UMTS RNC / NodeB)

An important special case of the network element management architecture is where one type of network element as the RNC will need management information for co-ordination of a subnetwork of other types of network elements as NodeB.

This management information shared between the RNC and NodeB will not reach the operators and is not considered to be a part of the UMTS TMN. All other management information related to NodeB will transparently be transferred by the RNC towards the UMTS TMN.




Interface for resource management functions for NodeB.
Will be fully standardised by other 3GPP bodies.

Network element management interface.

**Figure 8.2: ~~Network and~~ Subnetwork Management Architecture**

~~For a UMTS entity (network element, subnetwork element or management system) to be compliant to a given UMTS Management Interface the following conditions shall be satisfied:~~The same compliance conditions apply for the subnetwork management ~~element~~ architecture as for the network element management architecture (see clause 8.2).

| ~~Item~~ | ~~Compliance conditions~~ |
|---|---|
| ~~1~~ | ~~Implements relevant 3GPP UMTS Management Information Model and flows~~ |
| ~~2~~ | ~~Application protocol ( e.g. CMIP,SNMP,CORBA IIOP)~~<br>~~(Defined in [2], Annex A)~~<br>~~Implements relevant IRP Solution Sets, if available for that application protocol.~~<br>~~(Defined in [2], Annex C)~~ |
| ~~3~~ | ~~Valid Network Layer Protocol~~<br>~~(see Annex B of TS 32.101 [2])~~ |
| ~~4~~ | ~~Lower protocol levels required by Item 1,2 and 3~~ |

# 8.4 Operations Systems interoperability architecture.

Interoperability between operations systems is an important issue in a UMTS. Different organisations may take different roles in a UMTS. The need to share information across corporate boundaries will be a consequence of this.

The heterogeneous, distributed and complex network of a UMTS will be a market for many different vendors. All operations systems have to interoperate and shall be able to share information. This is a critical issue in the management of third generation systems.

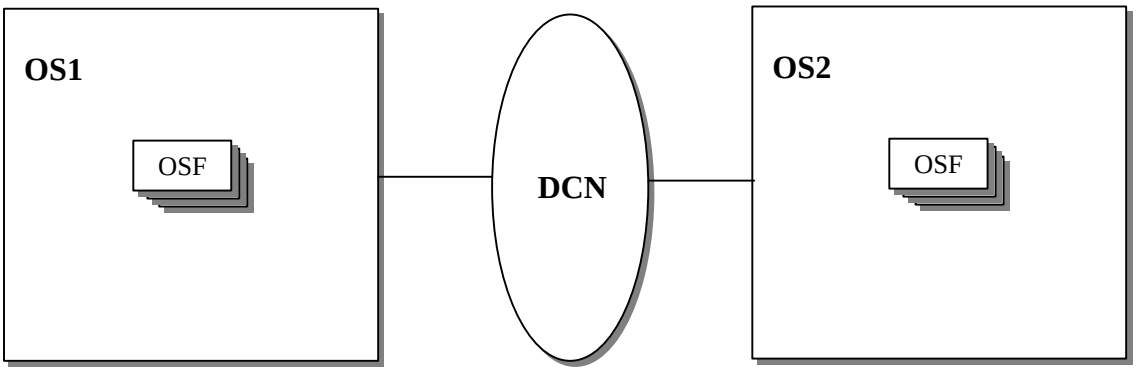



**Figure 8.3: Operations Systems interoperability Architecture**

For a Operations System to be UMTS TMN compliant the following conditions shall all be satisfied:

| Item | Compliance conditions |
|---|---|
| 1 | Implements relevant 3GPP ~~UMTS Management~~IRP Information ~~Model and flows~~Services and Network Resource Models |
| 2 | Application protocol ( e.g. CMIP,SNMP,CORBA IIOP)<br>(Defined in TS 32.101 [2], Annex A)<br>~~Implements relevant IRP Solution Sets, if available for that application protocol.~~If 3GPP has specified one or more IRP Solution Sets corresponding to the IRP Information Models in item 1 then at least one of those IRP Solution Sets shall be supported.<br>(Defined in [2], Annex C) |
| 3 | Valid Network Layer Protocol<br>(see Annex B of TS 32.101 [2]) |
| 4 | Lower protocol levels required by Item 1,2 and 3 |

## 8.5 Operations Systems intra-operability architecture

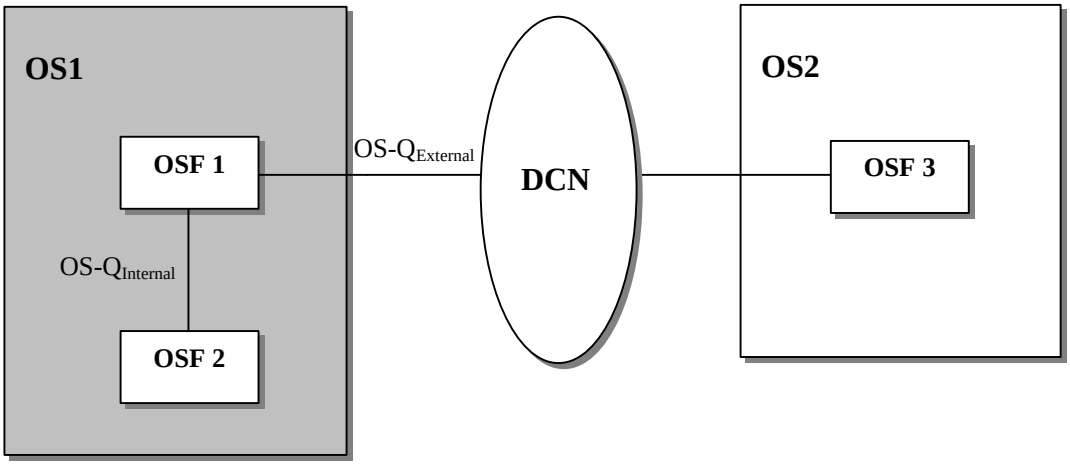



**Figure 8.4: Operations Systems intra-operability Architecture**

OS-$Q_{Internal}$ indicates an internal flow and ~~should to be compliant with a given UMTS Management Interface satisfy the following conditions:~~is not standardised.

| ~~Item~~ | ~~Compliance conditions~~ |
|---|---|
| ~~1~~ | ~~Implements relevant 3GPP UMTS Management Information Model and flows~~ |
| ~~2~~ | ~~Application protocol ( e.g. CMIP,SNMP,CORBA IIOP) defined in [2], Annex A~~<br>~~Implements relevant IRP Solution Sets, if available for that application protocol. (Defined in [2], Annex C)~~ |

OS-$Q_{External}$ indicates an external flow and shall to be compliant to a given UMTS Management Interface satisfy the following conditions:

| Item | Compliance conditions |
|---|---|
| 1 | Implements relevant 3GPP ~~UMTS Management~~IRP Information ~~Model and flows~~Services and Network Resource Models |
| 2 | Application protocol ( e.g. CMIP,SNMP,CORBA IIOP)<br>(Defined in TS 32.101 [2], Annex A)<br>~~Implements relevant IRP Solution Sets, if available for that application protocol.~~If 3GPP has specified one or more IRP Solution Sets corresponding to the IRP Information Models in item 1 then at least one of those IRP Solution Sets shall be supported.<br>(Defined in TS 32.101 [2], Annex C) |
| 3 | Valid Network Layer Protocol<br>(see Annex B of TS 32.101 [2]) |
| 4 | Lower protocol levels required by Item 1,2 and 3 |

## 8.6 Business System interconnection architecture

The business management layer has in the second-generation systems a very low degree of standardisation. Operators have legacy systems or more IT influenced systems often adopted to every organisations different needs. Business systems are not a part of a UMTS TMN.

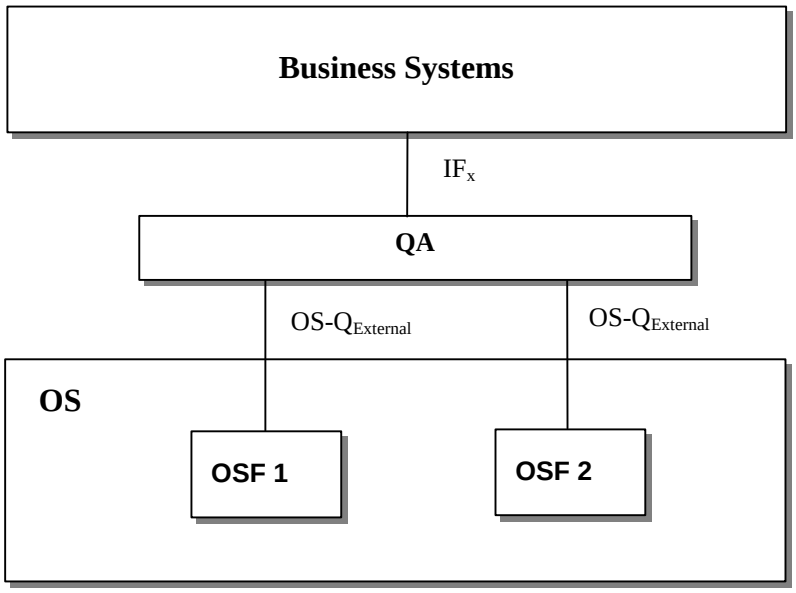



**Figure 8.5: Business Systems interconnection architecture**

OS-$Q_{Exteral}$ Indicates an external flow and shall to be compliant to a given UMTS Management Interface satisfy the following conditions:

| Item | Compliance conditions |
|---|---|
| 1 | Implements relevant 3GPP ~~UMTS Management~~IRP Information ~~Model and flows~~Services and Network Resource Models |
| 2 | Application protocol ( e.g. CMIP,SNMP,CORBA IIOP)<br>(Defined in TS 32.101[2], Annex A)<br>~~Implements relevant IRP Solution Sets, if available for that application protocol.~~If 3GPP has specified one or more IRP Solution Sets corresponding to the IRP Information Models in item 1 then at least one of those IRP Solution Sets shall be supported.<br>(Defined in TS 32.101 [2], Annex C) |
| 3 | Valid Network Layer Protocol<br>(see Annex B of TS 32.101 [2]) |
| 4 | Lower protocol levels required by Item 1,2 and 3 |

$IF_X$ indicates an external flow and shall to be compliant to a given UMTS Management Interface satisfy the following condition:

| Item | Compliance conditions |
|---|---|
| 1 | Not standardised but open |