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Technical Specification

**Universal Mobile Telecommunications System (UMTS);
LTE;
Access Network Discovery and Selection Function (ANDSF)
Management Object (MO)
(3GPP TS 24.312 version 8.0.0 Release 8)**



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This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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1 Scope

The present document defines management objects that can be used by the Access Network Discovery and Selection Function (ANDSF) and the UE.

The Management Object (MO) is compatible with the OMA Device Management (DM) protocol specifications, version 1.2 and upwards, and is defined using the OMA DM Device Description Framework (DDF) as described in the Enabler Release Definition OMA-ERELD-DM-V1_2 [5].

The MO consists of relevant parameters for intersystem mobility policy- and access network discovery information that can be managed by the ANDSF.

The service requirements and the functional requirements for the access network discovery and selection are described in 3GPP TS 22.278 [2] and in 3GPP TS 23.402 [4] respectively.

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 22.278: "Service requirements for the Evolved Packet System (EPS)".
- [3] 3GPP TS 23.003: "Numbering, addressing and identification".
- [4] 3GPP TS 23.402: "Architecture enhancements for non-3GPP accesses".
- [5] OMA-ERELD-DM-V1_2: "Enabler Release Definition for OMA Device Management".
- [6] WiMAX Forum Network Architecture Release 1.0 version 1.2.2 – Stage 2: "Architecture Tenets, Reference Model and Reference Points", May 2008.
- [7] WiMAX Forum Network Architecture Release 1.0 version 1.2.2 – Stage 3: "Detailed Protocols and Procedures", May 2008.
- [8] WiMAX Forum Mobile System Profile Release 1.0 Approved Specification Revision 1.4.0, April 2007.
- [9] IEEE Std 802.11™-2007: "Information Technology- Telecommunications and information exchange between systems-Local and metropolitan area networks-Specific requirements-Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications".
- [10] IEEE Std 802.16e-2005 and IEEE Std 802.16-2004/Cor1-2005: "IEEE Standard for Local and Metropolitan Area Networks, Part 16: Air Interface for Fixed and Mobile Broadband Wireless Access Systems Amendments 2 and Corrigendum 1", February 2006.
- [11] IETF RFC 3629 (November 2003): "UTF-8, a transformation format of ISO 10646".
- [12] "Unicode 5.1.0, Unicode Standard Annex #15; Unicode Normalization Forms", March 2008.
<http://www.unicode.org>

- [13] 3GPP2 C.S0005: "Upper Layer (Layer 3) Signaling Standard for cdma2000 Spread Spectrum Systems".
- [14] 3GPP2 C.S0016: "Over-the-Air Service Provisioning of Mobile Stations in Spread Spectrum Standards".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] apply.

3.3 Abbreviations

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

ANDSF	Access Network Discovery and Selection Function
DDF	Device Description Framework
DM	Device Management
MO	Management Object
OMA	Open Mobile Alliance
RSSI	Receive Signal Strength Indicator
UE	User Equipment
WNDS	WiMAX Network Discovery and Selection

4 ANDSF MO

The ANDSF MO is used to manage intersystem mobility policy- as well as access network discovery information stored in a UE supporting provisioning of such information from an ANDSF.

The ANDSF may initiate the provision of information from the ANDSF using a server initiated session alert message.

The UE may initiate the provision of information from the ANDSF, using a client initiated session alert message of code "Generic Alert". The "Type" element of the OMA DM generic alert message shall be set to "Reserved-Domain-Name: org.3gpp.ANSDF.clientinitiatedsessionalert".

Editor's note: The proposed value of the "Type" element of the OMA DM generic alert message needs to be registered by OMA on request by 3GPP.

Editor's note: The mechanism to be used for session alert is FFS.

The intersystem mobility policy information consists of a set of one or more intersystem mobility policy rules. At any point in time there shall be at most one rule applied, that rule is referred to as the 'active' rule. There may hence be zero or one 'active' rule.

The rules have a number of conditions (e.g. current access technology and location) where one or more may be present and set to a value. The rules also have a number of results (e.g. preferred access technology and restricted access technology) to be used whenever a rule is 'active'. If there are no results for the 'active' rule, it is implementation dependent how UE performs network selection. Irrespective of whether any rule is 'active' or not, the UE shall periodically re-evaluate ANDSF policies. When ANDSF policy selection rules identify an available network, the highest priority rule becomes 'active' rule and network re-selection is performed.

While the rule remains 'active', UE shall keep considering higher priority networks, than currently selected, in the prioritized network list of the rule. In addition to conditions and results there is a rule-priority that shall be set for each rule in order for the UE to determine which rule, out of potentially several valid rules, it should consider as 'active'. The trigger for (re-)evaluating rules is that the 'active' rule becomes invalid (conditions no longer fulfilled), the expiration of the validity period (as possibly indicated by the ValidityPeriod value) of the 'active' rule, or some other manufacturer specific trigger.

The relation between Policy and DiscoveryInformation is that Policies prioritize the access network, while DiscoveryInformation provide further information for the UE to access the access network defined in the policy.

The validity of the policy takes into account ValidityArea, Roaming and TimeOfDay, which must all match in order to make the Policy valid.

Editor's note: It is FFS how to limit to the frequency of access technology change as well as frequency of UE initiated requests towards the ANDSF as described in 23.402.

The MO has a node indicating the position of the UE. The trigger for updating the value of this node is that the location information it contains is no longer valid (i.e. the UE has changed its position) or some other manufacturer specific trigger. The update of the information contained in this node doesn't necessarily imply any interaction with the ANDSF server.

The MO defines validity areas, position of the UE and availability of access networks in terms of geographical coordinates. The way such coordinates are retrieved is implementation dependant (e.g. GPS receiver).

Editor's note: the encoding of nodes containing geographical coordinates and its relation with OMA SUPL and 3GPP TS 23.032 are FFS.

The Management Object Identifier is: urn:oma:mo:XXXX:1:0.

Editor's note: This value needs to be replaced with the value registered for this MO by OMA. Proposed value is urn:oma:mo:andsf:1:0

The OMA DM Access Control List (ACL) property mechanism as standardized (see Enabler Release Definition OMA-ERELED-DM-V1_2 [5]) may be used to grant or deny access rights to OMA DM servers in order to modify nodes and leaf objects of the ANDSF MO.

The following nodes and leaf objects are possible under the ANDSF node as described in figure 4.1:

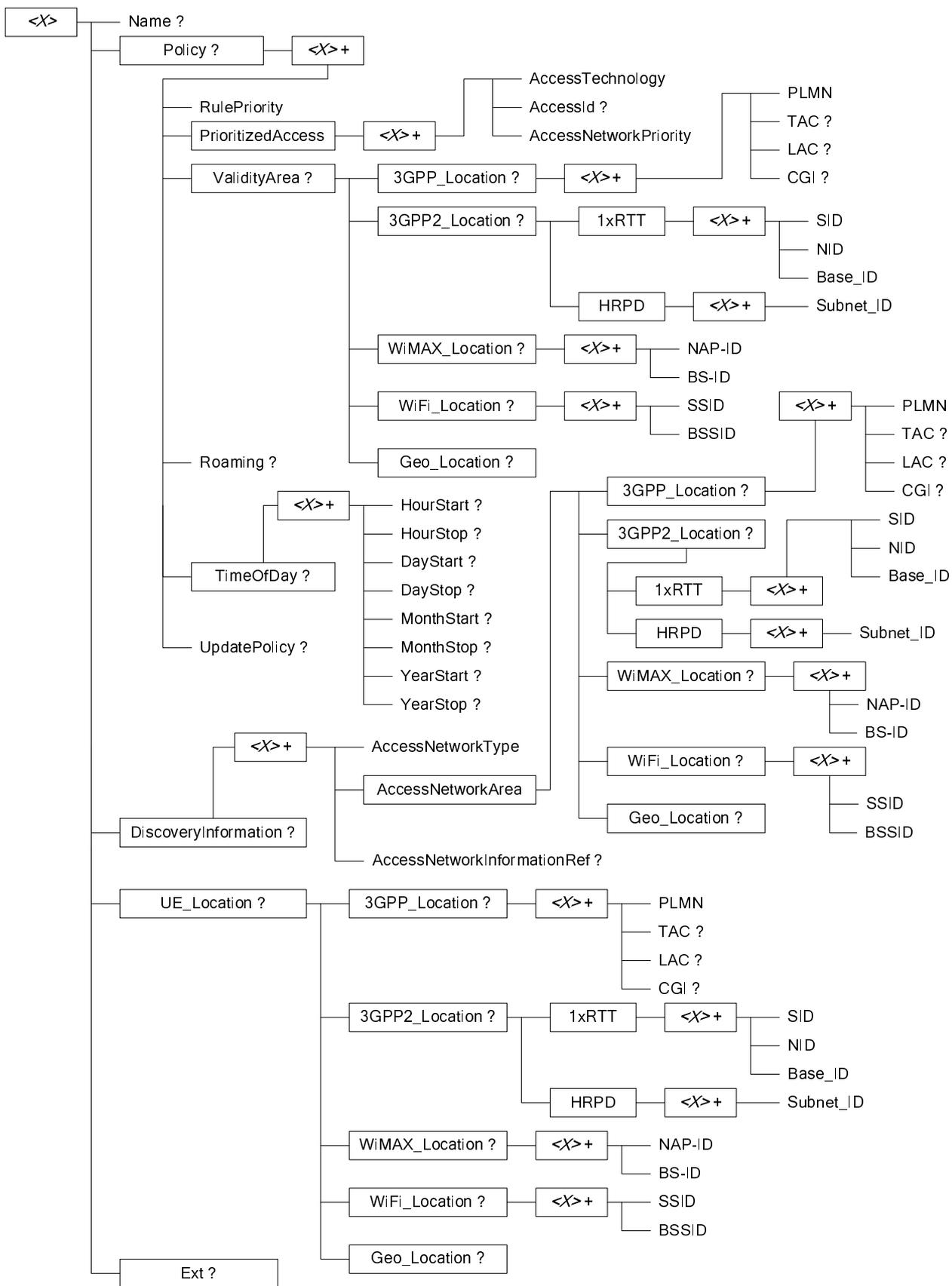


Figure 4.1: The ANDSF MO

5 ANDSF MO parameters

5.1 General

This clause describes the parameters for the ANDSF MO.

5.2 Node: <X>

This interior node acts as a placeholder for zero or one accounts for a fixed node.

- Occurrence: ZeroOrOne
- Format: node
- Access Types: Get
- Values: N/A

5.3 <X>/Name

The Name leaf is a name for the ANDSF MO settings.

- Occurrence: ZeroOrOne
- Format: chr
- Access Types: Get
- Values: <User displayable name>

The User displayable name shall be represented by Unicode characters encoded as UTF-8 as specified in IETF RFC 3629 [11] and formatted using Normalization Form KC (NFKC) as specified in Unicode Standard Annex #15; Unicode Normalization Forms [12].

5.4 <X>/Policy

The Policy node acts as a placeholder for policies for intersystem mobility.

- Occurrence: ZeroOrOne
- Format: node
- Access Types: Get, Replace
- Values: N/A

5.5 <X>/Policy/<X>

This interior node acts as a placeholder for one or more intersystem mobility policy rules.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get, Replace
- Values: N/A

5.6 <X>/Policy/<X>/RulePriority

The RulePriority leaf represents the priority given to one particular rule and is represented as a numerical value.

- Occurrence: One
- Format: int
- Access Types: Get, Replace
- Values: <Rule priority>

In case more than one valid intersystem mobility policy rule exists, the UE shall treat the rule with the lowest RulePriority value as the rule having the highest priority among the valid rules. If there are overlapping rules (e.g. by location, for example: rule by CGI, rule by PLMN), they should not have the same priority. If the UE finds multiple rules with the same priority, the choice of the rule is UE implementation specific. If there are no matching access networks according to the rule, other rules with the same priority shall be considered.

5.7 <X>/Policy/<X>/PrioritizedAccess

The PrioritizedAccess interior node indicates the preferred access for one particular rule.

- Occurrence: One
- Format: node
- Access Types: Get, Replace
- Values: N/A

5.8 <X>/Policy/<X>/PrioritizedAccess/<X>

This interior node acts as a placeholder for one or more prioritized accesses.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get, Replace
- Values: N/A

5.9 <X>/Policy/<X>/PrioritizedAccess/<X>/AccessTechnology

The AccessTechnology leaf indicates a prioritized access technology.

- Occurrence: One
- Format: int
- Access Types: Get, Replace
- Values: <Access technology>

Possible values for the Access technology are specified in table 5.9.1.

Table 5.9.1: Possible values for the AccessTechnology leaf

Value	Description
0	Reserved
1	3GPP
3	WiFi
4	WiMAX
5-255	Reserved

5.10 <X>/Policy/<X>/PrioritizedAccess/<X>/AccessId

The AccessId leaf represents an access network identifier.

- Occurrence: ZeroOrOne
- Format: chr
- Access Types: Get, Replace
- Values: <Access id>

The AccessId contains an identifier for a specific radio access network. Only SSID for WiFi and NAP-ID for WiMAX radio access network are contained in this leaf. AccessIds in numerical format shall be encoded as character string. The AccessId be represented by Unicode characters encoded as UTF-8 as specified in IETF RFC 3629 [11] and formatted using Normalization Form KC (NFKC) as specified in Unicode Standard Annex #15; Unicode Normalization Forms [12].

5.11 <X>/Policy/<X>/PrioritizedAccess/<X>/AccessNetworkPriority

The AccessNetworkPriority leaf represents an access technology priority.

- Occurrence: One
- Format: int
- Access Types: Get, Replace
- Values: <Access network priority>

In case more than one valid PrioritizedAccess are available and if the value of the priority belongs to the range 1-250, the UE shall consider the access network (with the corresponding access identifier if present) with the lowest AccessNetworkPriority value as the access network (with the corresponding access identifier if present) having the highest priority, as defined in table 5.11.1. The AccessNetworkPriority value 'Restricted access' (254) indicates an access that should not be used by the UE. The AccessNetworkPriority value 'Forbidden' (255) indicates an access that shall not be used by the UE. The same AccessNetworkPriority value may be used for more than one AccessId. If the UE is not able to find an access network according to ANDSF policies, it is implementation dependent how to proceed with network selection.

Table 5.11.1: Values of AccessNetworkPriority leaf

Value	Description
0	Reserved
1-250	Priority value
251-253	Reserved
254	Restricted access. This access should be avoided if the current rule is active.
255	Forbidden. UE is not allowed to use this access if the current rule is active.

NOTE: It is implementation dependent if or when a restricted access is selected if there are no other accesses available.

5.12 <X>/Policy/<X>/ValidityArea

The ValidityArea node acts as a placeholder for location conditions for a particular rule.

- Occurrence: ZeroOrOne
- Format: node
- Access Types: Get, Replace
- Values: N/A

This is considered to be fulfilled if either 3GPP_Location or Non3GPP_Location is a match. If UE is not able to deduce its location by any means, only rules without Validity Area can be considered for active rule.

5.13 <X>/Policy/<X>/ValidityArea/3GPP_Location

The 3GPP_Location node acts as a placeholder for 3GPP location descriptions.

- Occurrence: ZeroOrOne
- Format: node
- Access Types: Get, Replace
- Values: N/A

If the UE is currently aware that it is located in the coverage area described by this node, the UE shall consider the corresponding rule as valid. In case of overlapping validity domains of multiple policy rules, RulePriority leaf is used as discriminator.

5.14 <X>/Policy/<X>/ValidityArea/3GPP_Location/<X>

This interior node acts as a placeholder for one or more 3GPP location descriptions.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get, Replace
- Values: N/A

5.15 <X>/Policy/<X>/ValidityArea/3GPP_Location/<X>/PLMN

The PLMN leaf indicates a PLMN code for one particular 3GPP location condition for the intersystem mobility policy rule.

- Occurrence: One
- Format: chr
- Access Types: Get, Replace
- Values: <PLMN>

The format of the PLMN is defined by 3GPP TS 23.003 [3].

5.16 <X>/Policy/<X>/ValidityArea/3GPP_Location/<X>/TAC

The TAC leaf indicates a Tracking Area Code for one particular 3GPP location condition for the intersystem mobility policy rule.

- Occurrence: ZeroOrOne
- Format: chr
- Access Types: Get, Replace
- Values: <Tracking area code>

The format of the TAC is defined by 3GPP TS 23.003 [3].

5.17 <X>/Policy/<X>/ValidityArea/3GPP_Location/<X>/LAC

The LAC leaf indicates a Location Area Code for one particular 3GPP location condition for the intersystem mobility policy rule.

- Occurrence: ZeroOrOne
- Format: chr
- Access Types: Get, Replace
- Values: <Location area code>

The format of the LAC is defined by 3GPP TS 23.003 [3].

5.18 <X>/Policy/<X>/ValidityArea/3GPP_Location/<X>/CGI

The CGI leaf indicates a Cell Global Identity for one particular 3GPP location condition for the intersystem mobility policy rule.

- Occurrence: ZeroOrOne
- Format:chr
- Access Types: Get, Replace
- Values: <Cell global identity>

The format of the GCI is defined by 3GPP TS 23.003 [3].

5.19 <X>/Policy/<X>/ValidityArea/3GPP2_Location

This 3GPP2_Location node acts as a placeholder for 3GPP2 location descriptions.

- Occurrence: ZeroOrOne
- Format: node
- Access Types: Get, Replace
- Values: N/A

If the UE is currently aware that it is located in the coverage area described by this node, the UE shall consider the corresponding rule as valid. In case of overlapping validity domains of multiple policy rules, RulePriority leaf is used as discriminator.

5.20 <X>/Policy/<X>/ValidityArea/3GPP2_Location/1xRTT

This 1xRTT node acts as a placeholder for 3GPP2 1xRTT RAT location descriptions.

- Occurrence: ZeroOrOne
- Format: node
- Access Types: Get, Replace
- Values: N/A

5.21 <X>/Policy/<X>/ValidityArea/3GPP2_Location/1xRTT/<X>

This interior node acts as a placeholder for one or more 3GPP2 1xRTT RAT location descriptions.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get, Replace
- Values: N/A

5.22 <X>/Policy/<X>/ValidityArea/3GPP2_Location/1xRTT/<X>/SID

This SID leaf indicates a System Identification code for one particular 3GPP2 1xRTT RAT location condition for the intersystem mobility policy rule.

- Occurrence: One
- Format: chr
- Access Types: Get, Replace
- Values: <System Identification>

The format of the SID is defined by 3GPP2 C S0016 [14].

5.23 <X>/Policy/<X>/ValidityArea/3GPP2_Location/1xRTT/<X>/NID

This NID leaf indicates a Network Identification code for one particular 3GPP2 1xRTT RAT location condition for the intersystem mobility policy rule.

- Occurrence: ZeroOrOne
- Format: chr
- Access Types: Get
- Values: <Network Identification>

The format of the NID is defined by 3GPP2 C.S0016 [14].

5.24 <X>/Policy/<X>/ValidityArea/3GPP2_Location/1xRTT/<X>/Base_ID

This Base_ID leaf indicates a Base Station Identification code for one particular 3GPP2 1xRTT RAT location condition for the intersystem mobility policy rule.

- Occurrence: ZeroOrOne
- Format: chr
- Access Types: Get, Replace
- Values: <Base Station Identification>

The format of the Base_ID is defined by 3GPP2 C.S0005 [13].

5.25 <X>/Policy/<X>/ValidityArea/3GPP2_Location/HRPD

This HRPD node acts as a placeholder for 3GPP2 HRPD RAT location descriptions.

- Occurrence: ZeroOrOne
- Format: node
- Access Types: Get, Replace
- Values: N/A

5.26 <X>/Policy/<X>/ValidityArea/3GPP2_Location/HRPD/<X>

This interior node acts as a placeholder for one or more 3GPP2 HRPD RAT location descriptions.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get, Replace
- Values: N/A

5.27 <X>/Policy/<X>/ValidityArea/3GPP2_Location/HRPD/<X>/Subnet_ID

This Subnet_ID leaf indicates a Subnet Identification code for one particular 3GPP2 HRPD RAT location condition for the intersystem mobility policy rule.

- Occurrence: One
- Format: bit
- Access Types: Get, Replace
- Values: < Subnet_ID >

The format of the Subnet_ID is defined by 3GPP2 C.S0016 [14]. The length of Subnet ID contained in this node is 128 bits.

5.28 <X>/Policy/<X>/ValidityArea/WiMAX_Location

The WiMAX_Location node acts as a placeholder for WiMAX location descriptions.

- Occurrence: ZeroOrOne
- Format: node
- Access Types: Get, Replace
- Values: N/A

If the UE is currently aware that it is located in the coverage area described by this node, the UE shall consider the corresponding rule as valid. In case of overlapping validity domains of multiple policy rules, RulePriority leaf is used as discriminator.

5.29 <X>/Policy/<X>/ValidityArea/WiMAX_Location/<X>

This interior node acts as a placeholder for one or more WiMAX location descriptions.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get, Replace
- Values: N/A

5.30 <X>/Policy/<X>/ValidityArea/WiMAX_Location/<X>/NAP-ID

The NAP-ID leaf indicates the Network Access Provider for a particular WiMAX location condition for the intersystem mobility policy rule.

- Occurrence: One
- Format: chr
- Access Types: Get, Replace
- Values: <NAP-ID>

The format of the NAP-ID is defined by the WiMAX Forum Network Architecture Release 1.0 version 1.2.2 – Stage 2 [6] and WiMAX Forum Network Architecture Release 1.0 version 1.2.2 – Stage 3 [7].

5.31 <X>/Policy/<X>/ValidityArea/WiMAX_Location/<X>/BS-ID

The BS-ID leaf indicates the BS identifier for a particular WiMAX location condition for the intersystem mobility policy rule.

- Occurrence: One
- Format: chr
- Access Types: Get, Replace
- Values: <BS-ID>

The format of the BS-ID is defined by the IEEE Std 802.16e-2005 and IEEE Std 802.16-2004/Cor1-2005 [10].

5.32 <X>/Policy/<X>/ValidityArea/WiFi_Location

The WiFi_Location node acts as a placeholder for WiFi location descriptions.

- Occurrence: ZeroOrOne
- Format: node

- Access Types: Get, Replace
- Values: N/A

If the UE is currently aware that it is located in the coverage area described by this node, the UE shall consider the corresponding rule as valid. In case of overlapping validity domains of multiple policy rules, RulePriority leaf is used as discriminator.

5.33 <X>/Policy/<X>/ValidityArea/WiFi_Location/<X>

This interior node acts as a placeholder for one or more WiFi location descriptions.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get, Replace
- Values: N/A

5.34 <X>/Policy/<X>/ValidityArea/WiFi_Location/<X>/SSID

The SSID leaf indicates the SSID for a particular WiFi location condition for the intersystem mobility policy rule.

- Occurrence: ZeroOrOne
- Format: chr
- Access Types: Get, Replace
- Values: <SSID>

The format of the SSID is defined by IEEE Std 802.11™-2007 [9].

5.35 <X>/Policy/<X>/ValidityArea/WiFi_Location/<X>/BSSID

The BSSID leaf indicates the AP identifier for one particular WiFi location condition for the intersystem mobility policy rule.

- Occurrence: One
- Format: chr
- Access Types: Get, Replace
- Values: <BSSID>

The format of the BSSID is defined by IEEE Std 802.11™-2007 [9].

5.36 <X>/Policy/<X>/ValidityArea/Geo_Location

This Geo_Location node acts as a placeholder for Geographical location descriptions for one intersystem mobility policy rule.

- Occurrence: ZeroOrOne
- Format: node
- Access Types: Get, Replace
- Values: N/A

If the UE is currently aware that it is located in the area described by this node, the UE shall consider the corresponding rule as valid. In case of overlapping validity domains of multiple policy rules, RulePriority leaf is used as discriminator.

5.37 <X>/Policy/<X>/Roaming

The Roaming leaf indicates the roaming condition for the intersystem mobility policy rule.

- Occurrence: ZeroOrOne
- Format: bool
- Access Types: Get, Replace
- Values: 0, 1
 - 0 Indicates that the rule is only valid when the UE is not roaming.
 - 1 Indicates that the rule is only valid when the UE is roaming.

The UE shall consider a rule with the Roaming present as valid only if the current roaming state (roaming/not roaming) of the UE matches the one indicated in the Roaming value.

NOTE: When the UE is roaming, how it discovers and interacts with the ANDSF is not specified in the specification of this release.

5.38 <X>/Policy/<X>/TimeOfDay

The TimeOfDay leaf indicates the time of day condition for the intersystem mobility policy rule.

- Occurrence: ZeroOrOne
- Format: node
- Access Types: Get, Replace
- Values: <Time interval>

Editor's note: The format of the TimeOfDay is FFS.

The UE shall consider a rule with the TimeOfDay present as valid only if the time of day in the current time zone, as indicated by the UE, matches the time interval indicated in the TimeOfDay value.

UE that does not support calendar or clock application does not need to interpret the TimeOfDay leaf.

5.39 <X>/Policy/<X>/TimeOfDay/<X>

This interior node acts as a placeholder for one or more time of day condition for the intersystem mobility policy rule.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get, Replace
- Values: N/A

5.40 <X>/Policy/<X>/TimeOfDay/<X>/HourStart

The HourStart leaf node acts as a place holder containing the hour of the day that indicates when the UE shall start to apply the intersystem policy rule.

- Occurrence: ZeroOrOne

- Format: int
- Access Types: Get, Replace
- Values: <hour>

The value this leaf node can assume is an integer number with value range from 0 to 23 and is represented in a 5 bits unsigned integer.

5.41 <X>/Policy/<X>/TimeOfDay/<X>/HourStop

The HourStop leaf node acts as a place holder containing the hour of the day that indicates when the UE shall stop to apply the intersystem policy rule.

- Occurrence: ZeroOrOne
- Format: int
- Access Types: Get, Replace
- Values: <hour>

The value this leaf node can assume is an integer number with value range from 0 to 23 and is represented in a 5 bits unsigned integer.

If within the same occurrence of TimeOfDay the value of HourStop is smaller than HourStart, the UE shall consider as validity period of the policy the time starting at HourStart and ending at HourStop of the following day.

5.42 <X>/Policy/<X>/TimeOfDay/<X>/DayStart

The DayStart leaf node acts as a place holder containing the day that indicates when the UE shall start to apply the intersystem policy rule.

- Occurrence: ZeroOrOne
- Format: int
- Access Types: Get, Replace
- Values: <day>

The value this leaf node can assume is an integer number with value range from 1 to 31 and is represented in a 5 bits unsigned integer. The UE handling of semantical error where DayStop node indicates date number that does not exist in the month indicated in the MonthStop node is UE implementation specific.

5.43 <X>/Policy/<X>/TimeOfDay/<X>/DayStop

The DayStop leaf node acts as a place holder containing the day that indicates when the UE shall stop to apply the intersystem policy rule.

- Occurrence: ZeroOrOne
- Format: int
- Access Types: Get, Replace
- Values: <day>

The value this leaf node can assume is an integer number with value range from 1 to 31 and is represented in a 5 bits unsigned integer.

If within the same occurrence of TimeOfDay the value of DayStop is smaller than DayStart, the UE shall consider as validity period of the policy the time starting at DayStart and ending at DayStop of the following month. The UE

handling of semantical error where DayStop node indicates date number that does not exist in the month indicated in the MonthStop node is UE implementation specific.

5.44 <X>/Policy/<X>/TimeOfDay/<X>/MonthStart

The MonthStart leaf node acts as a place holder containing the month that indicates when the UE shall start to apply the intersystem policy rule.

- Occurrence: ZeroOrOne
- Format: int, Replace
- Access Types: Get
- Values: <month>

The value this leaf node can assume is an integer number with value range from 1 to 12 and is represented in a 4 bits unsigned integer.

5.45 <X>/Policy/<X>/TimeOfDay/<X>/MonthStop

The MonthStop leaf node acts as a place holder containing the month that indicates when the UE shall stop to apply the intersystem policy rule.

- Occurrence: ZeroOrOne
- Format: int, Replace
- Access Types: Get
- Values: <month>

The value this leaf node can assume is an integer number with value range from 1 to 12 and is represented in a 4 bits unsigned integer.

If within the same occurrence of TimeOfDay the value of MonthStop is smaller than MonthStart, the UE shall consider as validity period of the policy the time starting at MonthStart and ending at MonthStop of the following year.

5.46 <X>/Policy/<X>/TimeOfDay/<X>/YearStart

The YearStart leaf node acts as a place holder containing the year that indicates when the UE shall start to apply the intersystem policy rule.

- Occurrence: ZeroOrOne
- Format: int
- Access Types: Get, Replace
- Values: <year>

The value this leaf node can assume is a 4 digit integer number and is represented in a 32 bits unsigned integer.

5.47 <X>/Policy/<X>/TimeOfDay/<X>/YearStop

The YearStop leaf node acts as a place holder containing the year that indicates when the UE shall stop to apply the intersystem policy rule.

- Occurrence: ZeroOrOne
- Format: int

- Access Types: Get, Replace
- Values: <year>

The value this leaf node can assume is a 4 digit integer number and is represented in a 32 bits unsigned integer.

5.48 <X>/Policy/<X>/UpdatePolicy

The UpdatePolicy leaf indicates the update policy for the intersystem mobility policy rule.

- Occurrence: ZeroOrOne
- Format: bool
- Access Types: Get, Replace
- Values: 0, 1
 - 0 Indicates that the UE is not required to request an update of the rules.
 - 1 Indicates that the UE is required to request an update of the rules.

The UpdatePolicy value may be used by the UE to determine whether or not to request an update of its intersystem mobility policy when the rule is no longer considered to be valid by the UE.

5.49 <X>/DiscoveryInformation

The DiscoveryInformation node acts as a placeholder for access network discovery information.

- Occurrence: ZeroOrOne
- Format: node
- Access Types: Get, Replace
- Values: N/A

The operator may provide information on available access networks through the ANDSF. The UE may use the information as an aid in discovering other access networks.

5.50 <X>/DiscoveryInformation/<X>

This interior node acts as a placeholder for one or more access network information elements.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get, Replace
- Values: N/A

5.51 <X>/DiscoveryInformation/<X>/AccessNetworkType

The AccessNetworkType leaf represents the type of an access network.

- Occurrence: One
- Format: int
- Access Types: Get, Replace
- Values: <Access network type>

The value of AccessNetworkType indicates the type of the network for which discovery assistance information is provided. Possible values are specified in table 5.51.1.

Table 5.51.1: Possible values for the AccessNetworkType leaf

Value	Description
0	Reserved
1	3GPP
3	WiFi
4	WiMAX
5-255	Reserved

5.52 <X>/DiscoveryInformation/<X>/AccessNetworkArea

The AccessNetworkArea leaf represents a description of the location where one particular access network is expected to be available.

- Occurrence: One
- Format: node
- Access Types: Get, Replace
- Values: N/A

The value of Position indicates the position of the network for which discovery assistance information is provided.

5.53 <X>/DiscoveryInformation/<X>/AccessNetworkArea/ 3GPP_Location

The 3GPP_Location node acts as a placeholder for 3GPP location descriptions.

- Occurrence: ZeroOrOne
- Format: node
- Access Types: Get, Replace
- Values: N/A

If the UE is currently aware that it is located in the coverage area described by this node, the networks described in the correspondent AccessNetworkInformationRef are expected to be available.

5.54 <X>/DiscoveryInformation/<X>/AccessNetworkArea/ 3GPP_Location/<X>

This interior node acts as a placeholder for one or more 3GPP location descriptions.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get, Replace
- Values: N/A

5.55 <X>/DiscoveryInformation/<X>/AccessNetworkArea/ 3GPP_Location/<X>/PLMN

The PLMN leaf indicates a PLMN code for one particular 3GPP location condition for the intersystem mobility policy rule.

- Occurrence: One
- Format: chr
- Access Types: Get, Replace
- Values: <PLMN>

The format of the PLMN is defined by 3GPP TS 23.003 [3].

5.56 <X>/DiscoveryInformation/<X>/AccessNetworkArea/ 3GPP_Location/<X>/TAC

This TAC leaf indicates a Tracking Area Code for one particular 3GPP location description.

- Occurrence: ZeroOrOne
- Format: chr
- Access Types: Get, Replace
- Values: <Tracking area code>

The format of the TAC is defined by 3GPP TS 23.003 [3].

5.57 <X>/DiscoveryInformation/<X>/AccessNetworkArea/ 3GPP_Location/<X>/LAC

This LAC leaf indicates a Location Area Code for one particular 3GPP location description.

- Occurrence: ZeroOrOne
- Format: chr
- Access Types: Get, Replace
- Values: <Location area code>

The format of the LAC is defined by 3GPP TS 23.003 [3].

5.58 <X>/DiscoveryInformation/<X>/AccessNetworkArea/ 3GPP_Location/<X>/CGI

The CGI leaf indicates a Cell Global Identity for one particular 3GPP location condition for the intersystem mobility policy rule.

- Occurrence: ZeroOrOne
- Format:chr
- Access Types: Get, Replace
- Values: <Cell global identity>

The format of the CGI is defined by 3GPP TS 23.003 [3].

5.59 <X>/DiscoveryInformation/<X>/AccessNetworkArea/ 3GPP2_Location

This 3GPP2_Location node acts as a placeholder for 3GPP2 location descriptions for one or more access networks.

- Occurrence: ZeroOrOne
- Format: node
- Access Types: Get, Replace
- Values: N/A

If the UE is currently aware that it is located in the coverage area described by this 3GPP2_Location node, the networks described in the correspondent AccessNetworkInformationRef are expected to be available.

5.60 <X>/DiscoveryInformation/<X>/AccessNetworkArea/ 3GPP2_Location/1xRTT

This 1xRTT node acts as a placeholder for one or more 3GPP2 1xRTT RAT location descriptions.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get, Replace
- Values: N/A

5.61 <X>/DiscoveryInformation/<X>/AccessNetworkArea/ 3GPP2_Location/1xRTT/<X>

This interior node acts as a placeholder for one or more 3GPP2 1xRTT RAT location descriptions.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get, Replace
- Values: N/A

5.62 <X>/DiscoveryInformation/<X>/AccessNetworkArea/ 3GPP2_Location/1xRTT/<X>/SID

This SID leaf indicates a System Identification code for one particular 3GPP2 1xRTT RAT location condition for one or more access networks.

- Occurrence: One
- Format: chr
- Access Types: Get, Replace
- Values: <System Identification>

The format of the SID is defined by 3GPP2 C.S0016 [14].

5.63 <X>/DiscoveryInformation/<X>/AccessNetworkArea/ 3GPP2_Location/1xRTT/<X>/NID

This NID leaf indicates a Network Identification code for one particular 3GPP2 1xRTT RAT location condition for one or more access networks.

- Occurrence: ZeroOrOne
- Format: chr
- Access Types: Get, Replace
- Values: <Network Identification>

The format of the NID is defined by 3GPP2 C.S0016 [14].

5.64 <X>/DiscoveryInformation/<X>/AccessNetworkArea/ 3GPP2_Location/1xRTT/<X>/Base_ID

This Base_ID leaf indicates a Base Station Identification Code for one particular 3GPP2 1xRTT RAT location condition for one or more access networks.

- Occurrence: ZeroOrOne
- Format: chr
- Access Types: Get, Replace
- Values: <Base Station Identification>

The format of the Base_ID is defined by 3GPP2 C.S0005 [13].

5.65 <X>/DiscoveryInformation/<X>/AccessNetworkArea/ 3GPP2_Location/HRPD

This HRPD node acts as a placeholder for one or more 3GPP2 HRPD RAT location descriptions.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get, Replace
- Values: N/A

5.66 <X>/DiscoveryInformation/<X>/AccessNetworkArea/ 3GPP2_Location/HRPD/<X>

This interior node acts as a placeholder for one or more 3GPP2 HRPD RAT location descriptions.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get, Replace
- Values: N/A

5.67 <X>/DiscoveryInformation/<X>/AccessNetworkArea/ 3GPP2_Location/HRPD/<X>/Subnet_ID

This Subnet_ID leaf indicates a Subnet Identification code for one particular 3GPP2 HRPD RAT location condition for one or more access networks.

- Occurrence: One
- Format: bit
- Access Types: Get, Replace
- Values: <System Identification>

The format of the Subnet ID is defined by 3GPP2 C.S0016 [14]. The length of Subnet ID contained in this node is 128 bits.

5.68 <X>/DiscoveryInformation/<X>/AccessNetworkArea/ WiMAX_Location

The WiMAX_Location node acts as a placeholder for WiMAX location descriptions.

- Occurrence: ZeroOrOne
- Format: node
- Access Types: Get, Replace
- Values: N/A

If the UE is currently aware that it is located in the coverage area described by this node, the networks described in the correspondent AccessNetworkInformationRef are expected to be available.

5.69 <X>/DiscoveryInformation/<X>/AccessNetworkArea/ WiMAX_Location/<X>

This interior node acts as a placeholder for one or more WiMAX location descriptions.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get, Replace
- Values: N/A

5.70 <X>/DiscoveryInformation/<X>/AccessNetworkArea/ WiMAX_Location/<X>/NAP-ID

The NASP-ID leaf indicates the Network Access Provider for a particular WiMAX location condition for the intersystem mobility policy rule.

- Occurrence: One
- Format: chr
- Access Types: Get, Replace
- Values: <NAP-ID>

The format of the NAP-ID is defined by the WiMAX Forum Network Architecture version 1.2.2 – Stage 2 [6] and WiMAX Forum Network Architecture Release 1.0 version 1.2.2 – Stage 3 [7].

5.71 <X>/DiscoveryInformation/<X>/AccessNetworkArea/ WiMAX_Location/<X>/BS-ID

The BS-ID leaf indicates the BS identifier for a particular WiMAX location condition for the intersystem mobility policy rule.

- Occurrence: One
- Format: chr
- Access Types: Get, Replace
- Values: <BS-ID>

The format of the BS-ID is defined by the IEEE Std 802.16e-2005 and IEEE Std 802.16-2004/Cor1-2005 [10].

5.72 <X>/DiscoveryInformation/<X>/AccessNetworkArea/ WiFi_Location

The WiFi_Location node acts as a placeholder for WiFi location descriptions.

- Occurrence: ZeroOrOne
- Format: node
- Access Types: Get, Replace
- Values: N/A

If the UE is currently aware that it is located in the coverage area described by this node, the networks described in the correspondent AccessNetworkInformationRef are expected to be available.

5.73 <X>/DiscoveryInformation/<X>/AccessNetworkArea/ WiFi_Location/<X>

This interior node acts as a placeholder for one or more WiFi location descriptions.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get, Replace
- Values: N/A

5.74 <X>/DiscoveryInformation/<X>/AccessNetworkArea /WiFi_Location/<X>/SSID

The SSID leaf indicates the SSID for a particular WiFi location condition for the intersystem mobility policy rule.

- Occurrence: One
- Format: chr
- Access Types: Get, Replace

- Values: <SSID>

The format of the SSID is defined by IEEE Std 802.11™-2007 [9].

5.75 <X>/DiscoveryInformation/<X>/AccessNetworkArea/ WiFi_Location/<X>/BSSID

The BSSID leaf indicates the AP identifier for one particular WiFi location condition for the intersystem mobility policy rule.

- Occurrence: One
- Format: chr
- Access Types: Get, Replace
- Values: <BSSID>

The format of the BSSID is defined by IEEE Std 802.11™-2007 [9].

5.76 <X>/DiscoveryInformation/<X>/AccessNetworkArea/ Geo_Location

This Geo_Location node acts as a placeholder for geographical location descriptions for location of one or more access networks.

- Occurrence: ZeroOrOne
- Format: node
- Access Types: Get, Replace
- Values: N/A

If the UE is currently aware that it is located in the area described by this Geo_Location node, the networks described in the correspondent AccessNetworkInformationRef are expected to be available.

5.77 <X>/DiscoveryInformation/<X>/ AccessNetworkInformationRef

The AccessNetworkInformationRef leaf represents a reference to an access network information object.

- Occurrence: ZeroOrOne
- Format: chr
- Access Types: Get, Replace
- Values: <An access network information object>

The value of AccessNetworkInformationRef is a reference to an object with access network type specific information (such as a list of SSIDs, the WiMAX MO in clause 6, etc.).

5.78 <X>/UE_Location

The UE_Location node acts as a placeholder for describing the current location of the UE.

- Occurrence: One
- Format: node

- Access Types: Get
- Values: N/A

Editor's note: It is FFS how to comply with location services requirements in 3GPP TS 22.071, especially referring to local, national and regional privacy requirements and to the confidentiality of location information. In some countries it is not allowed to store the user's location information.

5.79 <X>/UE_Location/3GPP_Location

The 3GPP_Location node acts as a placeholder for 3GPP location descriptions.

- Occurrence: ZeroOrOne
- Format: node
- Access Types: Get, Replace
- Values: N/A

The UE should insert the parameters of all the 3GPP networks it can discover when updating this node.

5.80 <X>/UE_Location/3GPP_Location/<X>

This interior node acts as a placeholder for one or more 3GPP location descriptions.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get, Replace
- Values: N/A

5.81 <X>/UE_Location/3GPP_Location/<X>/PLMN

The PLMN leaf indicates a PLMN code for one particular 3GPP location condition for the intersystem mobility policy rule.

- Occurrence: One
- Format: chr
- Access Types: Get, Replace
- Values: <PLMN>

The format of the PLMN is defined by 3GPP TS 23.003 [3].

5.82 <X>/UE_Location/3GPP_Location/<X>/TAC

This TAC leaf indicates a Tracking Area Code for one particular 3GPP location condition for the UE Location.

- Occurrence: ZeroOrOne
- Format: chr
- Access Types: Get
- Values: <Tracking area code>

The format of the TAC is defined by 3GPP TS 23.003 [3].

5.83 <X>/UE_Location/3GPP_Location/<X>/LAC

This LAC leaf indicates a Location Area Code for one particular 3GPP location condition for the UE location.

- Occurrence: ZeroOrOne
- Format: chr
- Access Types: Get
- Values: <Location area code>

The format of the LAC is defined by 3GPP TS 23.003 [3].

5.84 <X>/UE_Location/3GPP_Location/<X>/CGI

The CGI leaf indicates a Cell Global Identity for one particular 3GPP location condition for the intersystem mobility policy rule.

- Occurrence: ZeroOrOne
- Format: chr
- Access Types: Get, Replace
- Values: <Cell global identity>

The format of the CGI is defined by 3GPP TS 23.003 [3].

5.85 <X>/UE_Location/3GPP2_Location

This 3GPP2_Location node acts as a placeholder for 3GPP2 location description of UE position.

- Occurrence: ZeroOrOne
- Format: node
- Access Types: Get
- Values: N/A

The UE should insert the parameters of all the 3GPP2 networks it can discover when updating this node.

5.86 <X>/UE_Location/3GPP2_Location/1xRTT

This 1xRTT node acts as a placeholder for one or more 3GPP2 1xRTT RAT location descriptions of UE position.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get
- Values: N/A

5.87 <X>/UE_Location/3GPP2_Location/1xRTT/<X>

This interior node acts as a placeholder for one or more 3GPP2 1xRTT RAT location descriptions of UE position.

- Occurrence: OneOrMore
- Format: node

- Access Types: Get
- Values: N/A

5.88 <X>/UE_Location/3GPP2_Location/1xRTT/<X>/SID

This SID leaf indicates a System Identification code for one particular 3GPP2 1xRTT RAT location used to indicate UE position.

- Occurrence: One
- Format: chr
- Access Types: Get
- Values: <SID>

The format of the SID is defined by 3GPP2 C.S0016 [14].

5.89 <X>/UE_Location/3GPP2_Location/1xRTT/<X>/NID

This NID leaf indicates a Network Identification code for one particular 3GPP2 1xRTT RAT location used to indicate UE position.

- Occurrence: ZeroOrOne
- Format: chr
- Access Types: Get
- Values: <NID>

The format of the NID is defined by 3GPP2 C.S0016 [14].

5.90 <X>/UE_Location/3GPP2_Location/1xRTT/<X>/Base_ID

This Base_ID leaf indicates a Base Station Identification code for one particular 3GPP2 1xRTT RAT location used to indicate UE position.

- Occurrence: ZeroOrOne
- Format: chr
- Access Types: Get
- Values: <Base_ID>

The format of the Base_ID is defined by 3GPP2 C.S0005 [13].

5.91 <X>/UE_Location/3GPP2_Location/HRPD

This HRPD node acts as a placeholder for one or more 3GPP2 HRPD RAT location descriptions of UE position.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get
- Values: N/A

5.92 <X>/UE_Location/3GPP2_Location/HRPD/<X>

This interior node acts as a placeholder for one or more 3GPP2 HRPD RAT location descriptions of UE position.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get
- Values: N/A

5.93 <X>/UE_Location/3GPP2_Location/HRPD/<X>/Subnet_ID

This Subnet_ID leaf indicates a Subnet Identification code for one particular 3GPP2 HRPD RAT location used to indicate UE position.

- Occurrence: One
- Format: bit
- Access Types: Get
- Values: <Subnet_ID>

The format of the Subnet_ID is defined by 3GPP2 C.S0016 [14]. The length of Subnet ID contained in this node is 128 bits.

5.94 <X>/UE_Location/WiMAX_Location

The WiMAX_Location node acts as a placeholder for WiMAX location descriptions.

- Occurrence: ZeroOrOne
- Format: node
- Access Types: Get, Replace
- Values: N/A

The UE should insert the parameters of all the WiMAX networks it can discover when updating this node.

5.95 <X>/UE_Location/WiMAX_Location/<X>

This interior node acts as a placeholder for one or more WiMAX location descriptions.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get, Replace
- Values: N/A

5.96 <X>/UE_Location/WiMAX_Location/<X>/NAP-ID

The NAP-ID leaf indicates the Network Access Provider for a particular WiMAX location condition for the intersystem mobility policy rule.

- Occurrence: One
- Format: chr

- Access Types: Get, Replace
- Values: <NAP-ID>

The format of the NAP-ID is defined by the WiMAX Forum Network Architecture version 1.2.2 – Stage 2 [6] and WiMAX Forum Network Architecture Release 1.0 version 1.2.2 – Stage 3 [7].

5.97 <X>/UE_Location/WiMAX_Location/<X>/BS-ID

The BS-ID leaf indicates the BS identifier for a particular WiMAX location condition for the intersystem mobility policy rule.

- Occurrence: One
- Format: chr
- Access Types: Get, Replace
- Values: <BS-ID>

The format of the BS-ID is defined by the IEEE Std 802.16e-2005 and IEEE Std 802.16-2004/Cor1-2005 [10].

5.98 <X>/UE_Location/WiFi_Location

The WiFi_Location node acts as a placeholder for WiFi location descriptions.

- Occurrence: ZeroOrOne
- Format: node
- Access Types: Get, Replace
- Values: N/A

The UE should insert the parameters of all the WiFi networks it can discover when updating this node.

5.99 <X>/UE_Location/WiFi_Location/<X>

This interior node acts as a placeholder for one or more WiFi location descriptions.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get, Replace
- Values: N/A

5.100 <X>/UE_Location/WiFi_Location/<X>/SSID

The SSID leaf indicates the SSID for a particular WiFi location condition for the intersystem mobility policy rule.

- Occurrence: One
- Format: chr
- Access Types: Get, Replace
- Values: <SSID>

The format of the SSID is defined by IEEE Std 802.11™-2007 [9].

5.101 <X>/UE_Location/WiFi_Location/<X>/BSSID

The BSSID leaf indicates the AP identifier for one particular WiFi location condition for the intersystem mobility policy rule.

- Occurrence: One
- Format: chr
- Access Types: Get, Replace
- Values: <BSSID>

The format of the BSSID is defined by IEEE Std 802.11™-2007 [9].

5.102 <X>/UE_Location/Geo_Location/

This interior node acts as a placeholder for one or more UE Geo_Location location descriptions.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get
- Values: <N/A >

If the UE is aware of its geographical position, it shall insert the coordinates of its position in this Geo_Location node.

5.103 <X>/Ext

The Ext is an interior node for where the vendor specific information about the ANDSF MO is being placed (vendor meaning application vendor, device vendor etc.). Usually the vendor extension is identified by vendor specific name under the ext node. The tree structure under the vendor identifier is not defined and can therefore include one or more un-standardized sub-trees.

- Occurrence: ZeroOrOne
- Format: node
- Access Types: Get
- Values: N/A

6 MO for WiMAX

6.1 Introduction

This section defines the WiMAX Network Discovery and Selection (WNDS) MO and the corresponding behaviour of the UE with regard to discovering and selecting WiMAX access networks in the home operator network. The service requirements for the WiMAX network discovery and selection function are described in 3GPP TS 23.402 [4].

The WNDS MO is compatible with the OMA Device Management (DM) protocol specifications, version 1.2 and upwards, and is defined using the OMA DM Device Description Framework (DDF) as described in the Enabler Release Definition OMA-ERELED-DM-V1_2 [5].

6.2 WNDS MO

The WNDS MO is used to manage WiMAX network discovery and selection information stored in the UE and supports provisioning of such information from the ANDSF.

The ANDSF may initiate the provisioning of WiMAX specific information using a server initiated session alert message. The UE may initiate the provision of information from the ANDSF using a client initiated session alert message.

The Management Object Identifier is: urn:oma:mo:XXXX:1.0.

Editor's note: This value needs to be replaced with the value registered for this MO by OMA. Proposed value is urn:oma:mo:wimaxnds:1.0

The OMA DM Access Control List (ACL) property mechanism as standardized (see Enabler Release Definition OMA-ERELED-DM-V1_2 [5]) may be used to grant or deny access rights to OMA DM servers in order to modify nodes and leaf objects of the WNDS MO.

The following nodes and leaf objects are possible under the WiMAX Network Discovery and Selection node as described in figure 6.2.1:

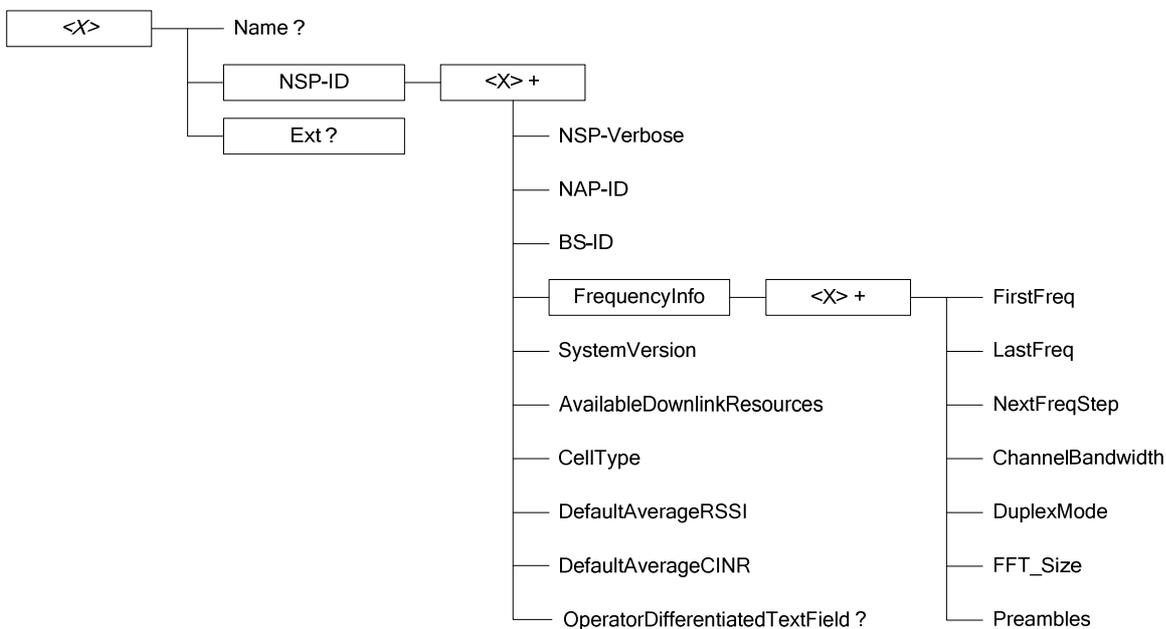


Figure 6.2.1: WNDS MO

6.3 WNDS MO parameters

6.3.1 General

This clause describes the parameters for the WNDS MO.

6.3.2 Node: <X>

This interior node acts as a placeholder for zero or one accounts for a fixed node.

- Occurrence: ZeroOrOne
- Format: node
- Access Types: Get

- Values: N/A

6.3.3 <X>/Name

The Name leaf is a name for the WNDS MO settings.

- Occurrence: ZeroOrOne
- Format: chr
- Access Types: Get
- Values: <User displayable name>

6.3.4 <X>/NSP-ID

The NSP-ID node is the placeholder for identifier of service provider that provides IP connectivity and WiMAX services. For further details on Network Service Provider please refer to the WiMAX Forum Network Architecture version 1.2.2 – Stage 2 [6] and WiMAX Forum Network Architecture Release 1.0 version 1.2.2 – Stage 3 [7].

- Occurrence: One
- Format: int
- Access Types: Get, Replace
- Values: <NSP-ID>

6.3.5 <X>/NSP-ID/<X>

This interior node acts as a placeholder for one or more Network Service Provider properties.

- Occurrence: OneOrMore
- Format: node
- Access Types: Get, Replace
- Values: <N/A>

6.3.6 <X>/NSP-ID/<X>/NSP-Verbose

The NSP-Verbose leaf is the verbose name of the Network Service Provider.

- Occurrence: One
- Format: chr
- Access Types: Get, Replace
- Values: <NSP-Verbose>

6.3.7 <X>/NSP-ID/<X>/NAP-ID

The NAP-ID leaf is the identifier of the WiMAX radio access infrastructure provider. For further details on Network Access Provider please refer to the WiMAX Forum Network Architecture version 1.2.2 – Stage 2 [6] and WiMAX Forum Network Architecture Release 1.0 version 1.2.2 – Stage 3 [7].

- Occurrence: One
- Format: int
- Access Types: Get, Replace

- Values: <NAP-ID>

6.3.8 <X>/NSP-ID /<X>/BS-ID

The BS-ID leaf is the base station identifier. For further details on BS-ID please refer to IEEE Std 802.16e-2005 and IEEE Std 802.16-2004/Cor1-2005 [10].

- Occurrence: One
- Format: chr
- Access Types: Get, Replace
- Values: <BS-ID>

6.3.9 <X>/NSP-ID/<X>/FrequencyInfo

The FrequencyInfo node contains WiMAX operating frequency related information.

- Occurrence: One
- Format: node
- Access Types: Get, Replace
- Values: <N/A>

6.3.10 <X>/NSP-ID/<X>/FrequencyInfo/<X>

This interior node acts as a placeholder for one or more FrequencyInfo node properties..

- Occurrence: OneOrMore
- Format: node
- Access Types: Get, Replace
- Values: <N/A>

6.3.11 <X>/NSP-ID/<X>/FrequencyInfo/<X>FirstFreq

The FirstFreq leaf specifies the first center frequency in KHz for this channel.

- Occurrence: One
- Format: int
- Access Types: Get, Replace
- Values: <FirstFreq>

6.3.12 <X>/NSP-ID/<X>/FrequencyInfo/<X>LastFreq

The LastFreq leaf specifies the last center frequency in KHz for this channel. If this value equals to the FirstFreq or the leaf node is omitted, then this entry refers to a single channel rather than a channel range. If this field is present then NextFreqStep shall be present as well.

- Occurrence: One
- Format: int
- Access Types: Get, Replace
- Values: <LastFreq>

6.3.13 <X>/NSP-ID/<X>/FrequencyInfo/<X>NextFreqStep

The NextFreqStep leaf defines the frequency step in KHz to reach the next central frequency when defining the frequency range using FirstFreq and LastFreq.

- Occurrence: One
- Format: int
- Access Types: Get, Replace
- Values: <NextFreqStep>

When this leaf node is omitted there is only one central frequency (i.e FirstFreq). If this field is present LastFreq shall be present as well. The formula to calculate the next central frequency is:

$$\text{CurrentFreq} = \text{FirstFreq}$$

$$\text{While } (\text{CurrentFreq} \leq \text{LastFreq}) \text{ CurrentFreq} = \text{CurrentFreq} + \text{NextFreqStep}$$

6.3.14 <X>/NSP-ID/<X>/ FrequencyInfo/<X>ChannelBandwidth

The ChannelBandwidth leaf is the system bandwith in KHz that is supported by the WiMAX network.

- Occurrence: One
- Format: int
- Access Types: Get, Replace
- Values: <ChannelBandwidth>

6.3.15 <X>/NSP-ID/<X>/ FrequencyInfo/<X>DuplexMode

The DuplexMode leaf is the duplex mode supported by the network. The DuplexMode can be TDD, FDD or hybrid FDD (HFDD)

- Occurrence: One
- Format: int
- Access Types: Get, Replace
- Values: <Duplex mode>

The value of the DuplexMode shall be used as specified in Table 6.3.15.1.

Table 6.3.15.1: Values of DuplexMode

Value	Description
0	Reserved
1	TDD
2	FDD
3	HFDD
4-255	Reserved

6.3.16 <X>/NSP-ID/<X>/ FrequencyInfo/<X>FFT_Size

The FFT_Size leaf specifies the channel's FFT.

- Occurrence: One
- Format: int

- Access Types: Get, Replace
- Values: <FFT size>

6.3.17 <X>/NSP-ID/<X>/ FrequencyInfo/<X>Preambles

The Preambles leaf specifies the valid preambles for each channel in the channel range.

- Occurrence: One
- Format: chr
- Access Types: Get, Replace
- Values: <Preambles>

The value is a hexadecimal string which is 29 digits long. The two MSB are zeroed and the LSB indicates channel 0.

6.3.18 <X>/NSP-ID/<X>/ SystemVersion

The SystemVersion leaf is the Mobile WiMAX release as specified by the WiMAX Forum Mobile System Profile [8].

- Occurrence: One
- Format: chr
- Access Types: Get, Replace
- Values: <System version>

6.3.19 <X>/NSP-ID/<X>/AvailableDownlinkResources

The AvailableDownlinkResources leaf represents the percentage of average downlink radio resources available. This is the ratio of non-assigned DL radio resource to the total available DL radio resources.

- Occurrence: One
- Format: int
- Access Types: Get, Replace
- Values: <Available downlink resources>

6.3.20 <X>/NSP-ID/<X>/CellType

The CellType leaf represents the type of cell. The cell type can be femto, pico, micro or macro.

- Occurrence: One
- Format: chr
- Access Types: Get, Replace
- Values: <Cell type>

6.3.21 <X>/NSP-ID/<X>/DefaultAverageRSSI

The DefaultAverageRSSI leaf represents the default average value of Receive Signal Strength Indicator (RSSI)

- Occurrence: One
- Format: int
- Access Types: Get, Replace

- Values: <Default average RSSI>

6.3.22 <X>/NSP-ID/<X>/DefaultAverageCINR

The DefaultAverageCINR leaf represents the default average value of Carrier to Noise Interference Ratio (CINR)

- Occurrence: One
- Format: int
- Access Types: Get, Replace
- Values: <Default Average CINR>

6.3.23 <X>/NSP-ID/<X>/OperatorDifferentiatedTextField

The OperatorDifferentiatedTextField leaf represents textual information that the operator wants to associate with the access technology.

- Occurrence: ZeroOrOne
- Format: chr
- Access Types: Get, Replace
- Values: <Text field>

The text field contains alphanumeric characters.

6.3.24 <X>/Ext

The Ext is an interior node for where the vendor specific information about the WND5 MO is placed (vendor can be application vendor, device vendor etc.). Usually the vendor extension is identified by vendor specific name under the ext node. The tree structure under the vendor identifier is not defined and can therefore include one or more un-standardized sub-trees.

- Occurrence: ZeroOrOne
- Format: node
- Access Types: Get
- Values: N/A

Annex A (informative): ANDSF MO DDF

Editor's Note: The DDF will be completed when the structure of the MO is agreed.

This DDF is the standardized minimal set. A vendor can define its own DDF for the complete device. This DDF can include more features than this minimal standardized version.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE MgmtTree PUBLIC "-//OMA//DTD SYNCML-DMDDF 1.2//EN"
http://www.openmobilealliance.org/tech/DTD/OMA-SynchML-DMDDF-1_2.dtd>
```

```
<MgmtTree>
  <VerDTD>1.2</VerDTD>
  <Man>--The device manufacturer--</Man>
  <Mod>--The device model--</Mod>

  <Node>
    <NodeName>x</NodeName>
    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <Description>ANDSF settings</Description>
      <DFFormat>
        <node/>
      </DFFormat>
      <Occurrence>
        <ZeroOrOne/>
      </Occurrence>
      <DFTitle>The ANDSF Management Object.</DFTitle>
      <DFType>
        <DDFName/>
      </DFType>
    </DFProperties>

    <Node>
      <NodeName>Name</NodeName>
      <DFProperties>
        <AccessType>
          <Get/>
        </AccessType>
        <DFFormat>
          <chr/>
        </DFFormat>
        <Occurrence>
          <ZeroOrOne/>
        </Occurrence>
        <DFTitle>User displayable name for the node.</DFTitle>
        <DFType>
          <MIME>text/plain</MIME>
        </DFType>
      </DFProperties>
    </Node>
  </MgmtTree>
```

Annex B (informative): WNDS MO DDF

This DDF is the standardized minimal set. A vendor can define its own DDF for the complete device. This DDF can include more features than this minimal standardized version.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE MgmtTree PUBLIC "-//OMA//DTD SYNCML-DMDDF 1.2//EN"
http://www.openmobilealliance.org/tech/DTD/OMA-SyncML-DMDDF-1_2.dtd>

<MgmtTree>
  <VerDTD>1.2</VerDTD>
  <Man>--The device manufacturer--</Man>
  <Mod>--The device model--</Mod>

  <Node>
    <NodeName>WiMAX_NDS</NodeName>
    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <Description>WiMAX NDS settings</Description>
      <DFFormat>
        <node/>
      </DFFormat>
      <Occurrence>
        <OneOrMore/>
      </Occurrence>
      <Scope>
        <Permanent/>
      </Scope>
      <DFTitle>The WiMAX NDS Management Object.</DFTitle>
      <DFType>
        <DDFName/>
      </DFType>
    </DFProperties>

    <Node>
      <NodeName>Name</NodeName>
      <DFProperties>
        <AccessType>
          <Get/>
        </AccessType>
        <DFFormat>
          <chr/>
        </DFFormat>
        <Occurrence>
          <ZeroOrOne/>
        </Occurrence>
        <Scope>
          <Dynamic/>
        </Scope>
        <DFTitle>User displayable name for the node.</DFTitle>
        <DFType>
          <MIME>text/plain</MIME>
        </DFType>
      </DFProperties>
    </Node>

    <Node>
      <NodeName>NSP-ID</NodeName>
      <!-- The NSP-ID node starts here. -->
      <DFProperties>
        <AccessType>
          <Get/>
          <Replace/>
        </AccessType>
        <DFFormat>
          <node/>
        </DFFormat>
        <Occurrence>
          <One/>
        </Occurrence>
      </DFProperties>
    </Node>
  </MgmtTree>
```

```

    <Scope>
      <Permanent/>
    </Scope>
    <DFTitle>Properties for each of the NSP-ID.</DFTitle>
    <DFType>
      <DDFName/>
    </DFType>
  </DFProperties>

<Node>
  <NodeName/>
  <DFProperties>
    <AccessType>
      <Get/>
      <Replace/>
    </AccessType>
    <DFFormat>
      <node/>
    </DFFormat>
    <Occurrence>
      <OneOrMore/>
    </Occurrence>
    <Scope>
      <Dynamic/>
    </Scope>
    <DFTitle>The "name" node for properties of NSP-ID.</DFTitle>
    <DFType>
      <DDFName/>
    </DFType>
  </DFProperties>

<Node>
  <NodeName>NSP-Verbose</NodeName>
  <DFProperties>
    <AccessType>
      <Get/>
      <Replace/>
    </AccessType>
    <DFFormat>
      <chr/>
    </DFFormat>
    <Occurrence>
      <One/>
    </Occurrence>
    <Scope>
      <Permanent/>
    </Scope>
    <DFTitle>The verbose name of Network Service Provider.</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>

<Node>
  <NodeName>NAP-ID</NodeName>
  <DFProperties>
    <AccessType>
      <Get/>
      <Replace/>
    </AccessType>
    <DFFormat>
      <int/>
    </DFFormat>
    <Occurrence>
      <One/>
    </Occurrence>
    <Scope>
      <Permanent/>
    </Scope>
    <DFTitle>The Network Access Provider Identifier.</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>

<Node>

```

```

<NodeName>BS-ID</NodeName>
<DFProperties>
  <AccessType>
    <Get/>
    <Replace/>
  </AccessType>
  <DFFormat>
    <int/>
  </DFFormat>
  <Occurrence>
    <One/>
  </Occurrence>
  <Scope>
    <Permanent/>
  </Scope>
  <DFTitle>The Base Station Identifier.</DFTitle>
  <DFType>
    <MIME>text/plain</MIME>
  </DFType>
</DFProperties>
</Node>

<Node>
  <NodeName>FrequencyInfo</NodeName>
  <!-- The FrequencyInfo node starts here. -->
  <DFProperties>
    <AccessType>
      <Get/>
    </AccessType>
    <DFFormat>
      <node/>
    </DFFormat>
    <Occurrence>
      <One/>
    </Occurrence>
    <Scope>
      <Permanent/>
    </Scope>
    <DFTitle>Frequency Information for the NAP Identifier.</DFTitle>
    <DFType>
      <DDFName/>
    </DFType>
  </DFProperties>

  <Node>
    <NodeName/>
    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <DFFormat>
        <node/>
      </DFFormat>
      <Occurrence>
        <OneOrMore/>
      </Occurrence>
      <Scope>
        <Dynamic/>
      </Scope>
      <DFTitle>The "name" node for frequency Information of NAP-ID.</DFTitle>
      <DFType>
        <DDFName/>
      </DFType>
    </DFProperties>

  <Node>
    <NodeName>FirstFreq</NodeName>
    <DFProperties>
      <AccessType>
        <Get/>
        <Replace/>
      </AccessType>
      <DFFormat>
        <int/>
      </DFFormat>
      <Occurrence>
        <One/>
      </Occurrence>

```

```

    <Scope>
      <Permanent/>
    </Scope>
    <DFTitle>The First Center Frequency.</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>

<Node>
  <NodeName>LastFreq</NodeName>
  <DFProperties>
    <AccessType>
      <Get/>
      <Replace/>
    </AccessType>
    <DFFormat>
      <int/>
    </DFFormat>
    <Occurrence>
      <One/>
    </Occurrence>
    <Scope>
      <Permanent/>
    </Scope>
    <DFTitle>The Last Center Frequency.</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>

<Node>
  <NodeName>NextFreqStep</NodeName>
  <DFProperties>
    <AccessType>
      <Get/>
      <Replace/>
    </AccessType>
    <DFFormat>
      <int/>
    </DFFormat>
    <Occurrence>
      <One/>
    </Occurrence>
    <Scope>
      <Permanent/>
    </Scope>
    <DFTitle>The frequency step for next central frequency.</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>

<Node>
  <NodeName>ChannelBandwidth</NodeName>
  <DFProperties>
    <AccessType>
      <Get/>
      <Replace/>
    </AccessType>
    <DFFormat>
      <int/>
    </DFFormat>
    <Occurrence>
      <One/>
    </Occurrence>
    <Scope>
      <Permanent/>
    </Scope>
    <DFTitle>The channel bandwidth in KHz.</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>

```

```

<Node>
  <NodeName>DuplexMode</NodeName>
  <DFProperties>
    <AccessType>
      <Get/>
      <Replace/>
    </AccessType>
    <DFFormat>
      <int/>
    </DFFormat>
    <Occurrence>
      <One/>
    </Occurrence>
    <Scope>
      <Permanent/>
    </Scope>
    <DFTitle>The duplex mode for this channel.</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>

<Node>
  <NodeName>FFTSIZE</NodeName>
  <DFProperties>
    <AccessType>
      <Get/>
      <Replace/>
    </AccessType>
    <DFFormat>
      <int/>
    </DFFormat>
    <Occurrence>
      <One/>
    </Occurrence>
    <Scope>
      <Permanent/>
    </Scope>
    <DFTitle>The FFT size for this channel.</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>

<Node>
  <NodeName>Preambles</NodeName>
  <DFProperties>
    <AccessType>
      <Get/>
      <Replace/>
    </AccessType>
    <DFFormat>
      <chr/>
    </DFFormat>
    <Occurrence>
      <One/>
    </Occurrence>
    <Scope>
      <Permanent/>
    </Scope>
    <DFTitle>The Preambles for this channel.</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>
</Node>

<Node>
  <NodeName>SystemVersion</NodeName>
  <DFProperties>
    <AccessType>
      <Get/>
      <Replace/>
    </AccessType>
  </DFProperties>
</Node>

```

```

    </AccessType>
    <DFFormat>
      <chr/>
    </DFFormat>
    <Occurrence>
      <One/>
    </Occurrence>
    <Scope>
      <Permanent/>
    </Scope>
    <DFTitle>The System Profile Version suported.</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>

<Node>
  <NodeName>AvailableDownlinkResources</NodeName>
  <DFProperties>
    <AccessType>
      <Get/>
      <Replace/>
    </AccessType>
    <DFFormat>
      <int/>
    </DFFormat>
    <Occurrence>
      <One/>
    </Occurrence>
    <Scope>
      <Permanent/>
    </Scope>
    <DFTitle>The available downlink radio resources.</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>

<Node>
  <NodeName>CellType</NodeName>
  <DFProperties>
    <AccessType>
      <Get/>
      <Replace/>
    </AccessType>
    <DFFormat>
      <int/>
    </DFFormat>
    <Occurrence>
      <One/>
    </Occurrence>
    <Scope>
      <Permanent/>
    </Scope>
    <DFTitle>The Cell Type.</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>

<Node>
  <NodeName>DefaultAverageRSSI</NodeName>
  <DFProperties>
    <AccessType>
      <Get/>
      <Replace/>
    </AccessType>
    <DFFormat>
      <int/>
    </DFFormat>
    <Occurrence>
      <One/>
    </Occurrence>
    <Scope>
      <Permanent/>

```

```

        </Scope>
        <DFTitle>The default average RSSI for this cell.</DFTitle>
        <DFType>
          <MIME>text/plain</MIME>
        </DFType>
      </DFProperties>
    </Node>

    <Node>
      <NodeName>DefaultAverageCINR</NodeName>
      <DFProperties>
        <AccessType>
          <Get/>
          <Replace/>
        </AccessType>
        <DFFormat>
          <int/>
        </DFFormat>
        <Occurrence>
          <One/>
        </Occurrence>
        <Scope>
          <Permanent/>
        </Scope>
        <DFTitle>The default average CINR for this cell.</DFTitle>
        <DFType>
          <MIME>text/plain</MIME>
        </DFType>
      </DFProperties>
    </Node>
  </Node>

  <Node>
    <NodeName>Ext</NodeName>
    <!-- The Extension node starts here. -->
    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <DFFormat>
        <node/>
      </DFFormat>
      <Occurrence>
        <ZeroOrOne/>
      </Occurrence>
      <Scope>
        <Dynamic/>
      </Scope>
      <DFTitle>A collection of all Extension objects.</DFTitle>
      <DFType>
        <DDFName/>
      </DFType>
    </DFProperties>
  </Node>
</Node>
</MgmtTree>

```

Annex C (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
2008-10	CT1#55 bis				Includes the following contributions agreed by CT1: C1-084148, C1-084151, C1-084557, C1-084451, C1-084452, C1-084558, C1-084559, C1-084560		0.1.0
2008-11	CT1#56				Includes the following contributions agreed by CT1: C1-084830, C1-085155, C1-085346, C1-085535, C1-085554, C1-085343, C1-085536, C1-085347, C1-085339 Alignments and cleanups by the rapporteur	0.1.0	0.2.0
2008-11					Version 1.0.0 created for presentation to CT#42 for information and approval	0.2.0	1.0.0
2008-12	CT#42				Version 8.0.0 created after approval in CT#42	1.0.0	8.0.0

History

Document history		
V8.0.0	January 2009	Publication