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RE: Common sessions at SA5#50 and comments & questions regarding RET Antennas

Dear Mr. Toche,

First, thank you for your 3GPP SA5 liaison entitled “LS on Common Session for XSD Subclassing & IMS Harmonization”. 3GPP2 TSG-S WG5 participants accept the invitation to attend SA5#50.

Second, 3GPP2 TSG-S WG5 is progressing on developing 3GPP2 S.S0028 Revision C, incorporating via reference and delta definitions various 3GPP R6 IRP specifications. During this process, 3GPP2 TSG-S WG5 came across a number of issues regarding RET antennas, which are listed below as well as suggested modifications to 3GPP specifications.

1. *Latitude and Longitude Attributes*
   3GPP2 TSG-S WG5 noted several issues regarding the latitude and longitude attributes.

   - *Clarification of legal values for Latitude and Longitude.*

   3GPP2 TSG-S WG5 noted that although a precision for the latitude and longitude attributes are to 4 digits beyond the decimal point, the legal values in TS32.642 v.6.7.0 indicate “an integral

values." For example, for latitude: "A single integral value in the range of -90.0000 to +90.0000". Should this instead be float?

- *Conflict between CORBA type and XSD type for latitude and longitude*

Adding to this uncertainty, 3GPP2 TSG-S WG5 discovered a conflict in solution set definitions. In the XSD definitions, decimal types are used. In the CORBA IDL definitions, long types are used. 3GPP2 TSG-S WG5 suggests that the CORBA IDL definitions be changed to use float types.

- *Reference to WGS84*

Originally, 3GPP2 TSG-S WG5 included a reference to World Geodetic System 1984 (WGS84 Implementation Manual, v2.4) for representing latitude and longitude. However, the web site for WGS84 appears to be inoperative and it is not certain if this is still a valid document. Can 3GPP SA5 provide guidance on the appropriate reference for latitude and longitude values?

2. *Availability of AISG v.2.0.*
3GPP2 TSG-S WG5 noted that AISG has issued v.2.0 of the RET antenna specification. Does 3GPP SA5 foresee any impact to RET Antenna Configuration Management specifications as a result of this updated specification?

3. *Clarification of tilt angle.*
In TR 25.802, a positive value indicates a "down tilt" angle (i.e., angle down from the horizon). If "up tilting" is implemented (i.e., tilting above the horizon), would a negative value be used or would 360 minus the angle be used (i.e., would tilting 5 degrees above the horizon would be -5 degrees or 355 degrees)? This clarification also applies to mechanical Offset.

4. *Ambiguity of bearing, minAzimuthValue, and maxAzimuthValue.*

Are the minAzimuthValue and maxAzimuthValue absolute values or are they relative to the bearing? If they are relative to the bearing, then this would imply that they would change each time the bearing value is changed. If they are absolute values, then, like tilt, they would remain fixed when the bearing value changes. Please clarify the relationship between these attribute values.

5. *Proposed Attribute Definition changes*

3GPP2 TSG-S WG5 recommends the following changes to TS32.642 Section 6.5:

- Support is needed for negative values for elevation.
- Clarification of the attributes that are also applicable for fixed antenna systems and setting of range values (maxAzimuthValue, maxTiltValue, minAzimuthValue, minTiltValue) for fixed antennas.
- A few of the attributes have a maximum value that is below 360 degrees.
- A marked up version of the attribute definition table is attached, see Annex 1.

6. *Suggested Annex updates*

   3GPP2 TSG-S WG5 recommends changes to the RET Annex in TS32.642 to indicate what the expected actions would be if attribute changes are made. A modified version of the Annex is attached, see Annex 2.

7. *List updates*

   The write qualifier for UtranCell's retAntennaFunctionList needs to be "-" instead of M, this is similar to other Distinguished Name lists. In 3GPP2, we feel the agent will report what antennas are connected to which cells and that that cannot be changed under Itf-N management control. Same comment for retUtranCellList in AntennaFunction.

3GPP2 TSG-S would appreciate consideration of these questions as well as adoption of the proposed changes, and welcome further discussions. If you have additional questions, please contact: Randy Scheer (rjscheer@lucent.com).

Regards,

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Attachments
Proposed changes to TS32.642 v.6.7.0, Section 6.5 and Annex B (below).

Annex 1. Proposed changes to TS32.642 v.6.7.0 Section 6.5

6.5.1 Definition and legal values

The following table defines the attributes that are present in several Information Object Classes (IOCs) of the present document.

Attributes

Attribute Name	Definition	Legal Values
adjacentCell	It carries the DN of the UtranCell or the ExternalUtranCell.	
antennaFunctionId	An attribute whose "name+value" can be used as an RDN (according to the rules in TS 32.300 [13]) when naming an instance of the object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
baseElevation	The elevation in meters above sea level or, if a negative value, the depth below sea level at the base of the antenna structure. This value, when subtracted from height, provides the height of the antenna above or the depth below the ground.	An integral value representing a number of meters in 0.1 meter increments.
bchPower	The power of the broadcast channel in the FDD mode cell (Ref. 3GPP TS 25.433 [5]).	Type: Numeric value Range: (-35..+15 dB) Steps of 0.1dB
bearing	The bearing in degrees that the antenna is pointing in. Note that bearing is the "true" heading (the compass heading offset by a true north variation).	A single integral value corresponding to an angle in degrees between 0 and 359.
cellMode	An attribute that identifies the cell mode.	Type: Enumerated value Range: ("FDD mode", "1.28McpsTDD mode", "3.84McpsTDD mode")
cellParameterId	For IOCs UtranCell and ExternalUtranCell,this attribute identifies unambiguously the TDD mode cell (Ref. TS 25.433 [5]): • 3.84 Mcps TDD - Code Groups, Scrambling Codes, Midambles and Toffset, or • 1.28 Mcps TDD - SYNC-DL and SYNC-UL sequences, the scrambling codes and the midamble codes. For IOC UtranRelation, this parameter will be broadcast in the system information of associated cell. The associated cell can be: • another UTRAN TDD cell (1.28 Mcps TDD or 3.84 Mcps TDD), or • the external UTRAN TDD cell (1.28 Mcps TDD or 3.84 Mcps TDD).	Type: Integral numeric value Range: (0..127)
cId	The attribute is the identifier of a cell in one RNC (Ref. 3GPP TS 25.401 [4], 3GPP TS 25.433 [5]).	Type: Integral numeric value Range: (0..65535)
dwPchPower	DwPCH Power is the power that shall be used for transmitting the DwPCH in a 1.28 Mcps TDD cell (Ref. 3GPP TS 25.433 [5]).	Type: Numeric value Range: (-15..+40 dBm) Steps of 0.1dB
externalRncFunctionId	An attribute whose "name+value" can be used as an RDN when naming an instance of the object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	

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externalUtranCellId	An attribute whose "name+value" can be used as an RDN when naming an instance of the object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
height	The height of an antenna above sea level or a negative value indicates depth below sea level. Planning permission (for a cell site) is normally granted on the antenna height. This parameter also determines the site coverage and feeds into the planning tool.	A single integral value representing a number of metres in 0.1 meter increments.
horizBeamwidth	The 3 dB power beamwidth of the antenna pattern in the horizontal plane. A value of 360 indicates an omni-directional antenna.	A single integral value corresponding to an angle in degrees between 0 and 360.
iubLinkId	An attribute whose "name+value" can be used as an RDN when naming an instance of the object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
lac	IOCs UtranCell and ExternalUtranCell: Location Area Code, LAC (Ref. 3GPP TS 23.003 [3]). IOC UtranRelation: Location Area Code, LAC (Ref. 3GPP TS 23.003 [3]), for another UTRAN cell or the external UTRAN Cell that is broadcast in the system information in the Cell.	Type: Integral numeric value Range: (1..65533, 65535)
latitude	The latitude of the antenna location based on World Geodetic System (1984 version) global reference frame (WGS 84). Positive values correspond to the northern hemisphere.	A single integral value in the range of -90.0000 to +90.0000.
localCellId	Local Cell id is used to uniquely identify the set of resources defined in a Node B to support a cell (as defined by a Cid Ref. 3GPP TS 25.401 [4], 3GPP TS 25.433 [5]). It must be unique in Node B at a minimum, but may be unique in UTRAN. It can be used to tie the cell in the RNC to a specific set of resources in the Node B.	Type: Integral numeric value Range: (0..268435455)
longitude	The longitude of the antenna location based on World Geodetic System (1984 version) global reference frame (WGS 84). Positive values correspond to degrees east of 0 degrees longitude.	A single integral value in the range of -180.0000 to +180.0000.
maxAzimuthValue	The maximum amount of change of azimuth (bearing) the RET system can support. This is the change in degrees clockwise from bearing. For fixed antenna systems, it shall be set to 0.	A single integral value corresponding to an angle in degrees between 0 and 359.9 with a resolution of 0.1 degrees, see Note.
maxTiltValue	The maximum amount of tilt the RET system can support. This helps in preventing the user from entering any unrealistic value for retTiltValue and hence prevents the motors on the RET unit from getting jammed / burnt out. For fixed antenna systems, it shall be set to retTiltValue.	A single integral value corresponding to an angle in degrees between 0 and 359.9. In 0.1 degree increments (see TR.25.802 [19] clause 7.7.5.11 RET.
maximumTransmissionPower	The maximum transmission power of a cell. It is the maximum power for all downlink channels added together, that is allowed to be used simultaneously in a cell. (Ref. 3GPP TS 25.433 [5]).	Type: Numeric value Range: (0..50 dBm) Steps of 0.1 dB
mcc	Mobile Country Code, MCC (part of the PLMN Id, Ref. 3GPP TS 23.003 [3]).	
mechanicalOffset	This is a value representing a non-adjustable tilt value, which is imparted to the antenna due to the physical installation. The actual tilt at any point in time is the summation of mechanicalOffset and retTiltValue.	A single integral value corresponding to an angle in degrees between 0 and 359.9 with a resolution of 0.1 degrees, see Note.

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minAzimithValue	The minimum amount of change of azimuth the RET system can support. This is the change in degrees counter-clockwise from bearing. For fixed antenna systems, it shall be set to 0	A single integral value corresponding to an angle in degrees between 0 and 359.9 with a resolution of 0.1 degrees, see Note.
minTiltValue	The minimum amount of tilt the RET system can support. This helps in preventing the user from entering any unrealistic value for retTiltValue and hence prevents the motors on the RET unit from getting jammed / burnt out. For fixed antenna systems, it shall be set to retTiltValue.	A single integral value corresponding to an angle in degrees between 0 and 359.9 with a resolution of 0.1 degrees, see Note (see also 3GPP TR.25.802 [19] clause 7.7.5.11 RET Note 1).
mnc	Mobile Network Code, MNC (part of the PLMN Id, Ref. 3GPP TS 23.003 [3]).	
primaryCcpchPower	IOCs UtranCell and ExternalUtranCell: The power of the primary CCPCH channel in the TDD cell (Ref. 3GPP TS 25.433 [5]). IOC UtranRelation: The power of the primary CCPCH channel in the TDD cell (Ref. 3GPP TS 25.433 [5]), for another UTRAN TDD cell or the external UTRAN TDD Cell that is broadcast in the system information in the Cell.	Type: Numeric value Range: (-15..+40 dBm) Steps of 0.1dB
nodeBFunctionId	An attribute whose "name+value" can be used as an RDN when naming an instance of the object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
patternLabel	The pattern name is a textual, alpha-numeric string to allow identification of the antenna pattern along with the antenna vendor information such as model number, etc.	
primaryCpichPower	IOCs UtranCell and ExternalUtranCell: The power of the primary CPICH channel in the FDD mode cell (Ref. 3GPP TS 25.433 [5]). IOC UtranRelation: The power of the primary CPICH channel in the FDD mode cell (Ref. 3GPP TS 25.433 [5]), for another UTRAN FDD mode cell or the external UTRAN FDD mode cell that is broadcast in the system information in the cell.	Type: Numeric value Range: (-10..50 dBm) Steps of 0.1 dB
primarySchPower	The power of the primary synchronisation channel in the FDD mode cell, DL Power (Ref. 3GPP TS 25.433 [5]).	Type: Numeric value Range: (-35..+15 dB) Steps of 0.1dB
primaryScramblingCode	IOCs UtranCell and ExternalUtranCell: The primary DL scrambling code used by the FDD mode cell (Ref. 3GPP TS 25.433 [5]). IOC UtranRelation: The primary DL scrambling code used by the FDD mode cell (Ref. 3GPP TS 25.433 [5]), for another UTRAN FDD mode cell or the external UTRAN FDD mode cell that is broadcast in the system information in the cell.	Type: Integral numeric value Range: (0..511)
rac	Routing Area Code, RAC (Ref. 3GPP TS 23.003 [3]).	Type: Integral numeric value Range: (0..255)
retAntennaFunctionList	This is a referential attribute to list the DNs of AntennaFunction(s) that support the UtranCell.	A list of DNs as defined in TS 32.300 [13].

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retGroupName	The group name is a textual, alpha-numeric string to define a logical grouping of antennas which may be in different cells. This attribute permits the definition of a logical grouping of the antennas. This may be defined either at installation time, or by management activity to provisioning the group name via the Itf-N.	Type: string bounded to 80 characters.
retTiltValue	Gives you the tilt value of the antenna that has been made using electrical means (i.e. using RET). This attribute gives the operator an indication of the current setting of the antenna and is at the centre of the RET feature.	A single integral value corresponding to an angle in degrees between 0 and 359.9 in 0.1 degree increments (see Note).
retUtranCellList	This is a list of UtranCell DNs to record the relationship between the AntennaFunction instance and the UtranCell(s) which are supported by the antenna.	A list of DNs as defined in TS 32.300 [13].
rncFunctionId	An attribute whose "name+value" can be used as an RDN when naming an instance of the object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
rncId	IOC ExternalUtranCell: Unique RNC ID for the associated RNC (Ref. 3GPP TS 23.003 [3]). IOC RncFunction: Unique RNC ID (Ref. 3GPP TS 23.003 [3]).	
sac	Service Area Code, SAC (Ref. 3GPP TS 23.003 [3]).	Type: Integral numeric value Range: (0.. 65535)
schPower	The power of the synchronisation channel in 3.84 Mcps TDD cell (Ref. 3GPP TS 25.433 [5]).	Type: Numeric Value Range: (-35..+15 dB) Steps of 0.1dB
secondarySchPower	The power of the secondary synchronisation channel in the cell, DL Power (Ref. 3GPP TS 25.433 [5]).	Type: Numeric value Range: (-35..+15 dB) Steps of 0.1dB
timeSlotList	This attribute defines the time slot configuration information in the TDD cell. It is a list which contains 7 (for 1.28 Mcps TDD cell) or 15 (for 3.84 Mcps TDD cell) items. Within each item there are three parts: timeSlotId, timeSlotDirection, timeSlotStatus (Ref. 3GPP TS 25.433 [5]).	timeSlotId: when applied to 1.28 Mcps TDD cell: Type: Integral numeric value Range: (0..6); when applied to 3.84 Mcps TDD cell: Type: Integral numeric value Rang: (0..14); timeSlotDirection: Type: Enumerated value Range: (UI, DI); timeSlotStatus: Type: Enumerated value Range: (Active, Not active)
uarfcn	IOCs UtranCell and ExternalUtranCell: The UTRA absolute Radio Frequency Channel number for TDD mode cell, UARFCN (Ref. 3GPP TS 25.433 [5]). IOC UtranRelation: The UTRA absolute Radio Frequency Channel number for TDD mode cell, UARFCN (Ref. 3GPP TS 25.433 [5]), for another UTRAN TDD mode cell or the external UTRAN TDD mode Cell that is broadcast in the system information in the Cell.	Type : Integral numeric Value Range: (0..16383)

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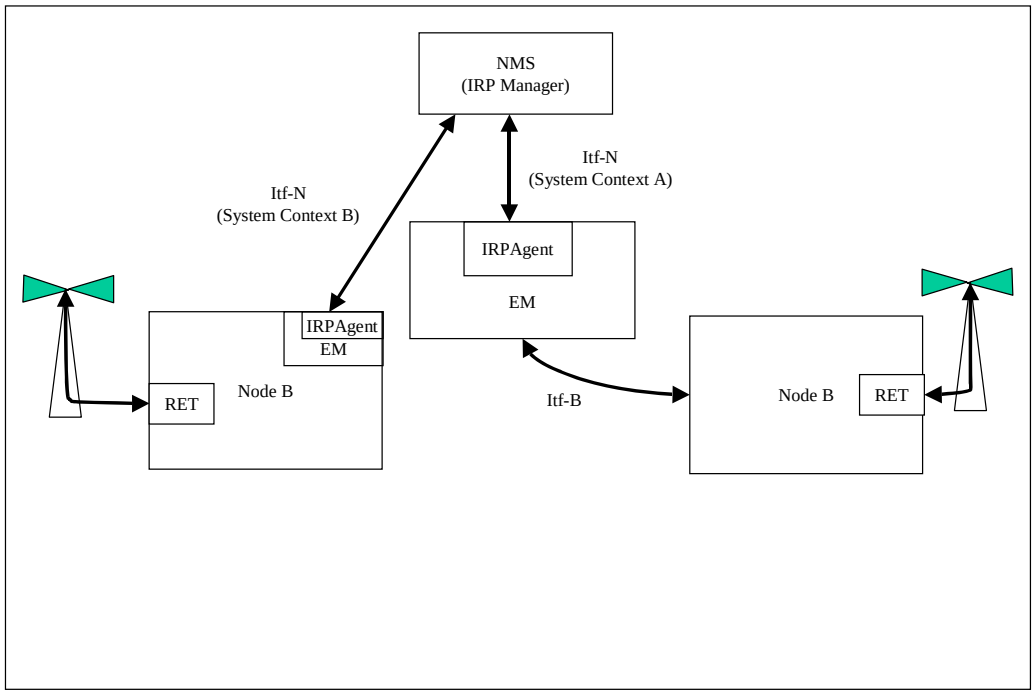
uarfcnDl	IOCs UtranCell and ExternalUtranCell: The DL UTRA absolute Radio Frequency Channel number for FDD mode cell, UARFCN (Ref. 3GPP TS 25.433 [5]). IOC UtranRelation: The DL UTRA absolute Radio Frequency Channel number for FDD mode cell, UARFCN (Ref. 3GPP TS 25.433 [5]), for another UTRAN FDD mode cell or the external UTRAN FDD mode cell that is broadcast in the system information in the Cell.	Type: Integral numeric value Range: (0..16383)
uarfcnUl	IOCs UtranCell and ExternalUtranCell: The UL UTRA absolute Radio Frequency Channel number for FDD mode cell, UARFCN (Ref. 3GPP TS 25.433 [5]). IOC UtranRelation: The UL UTRA absolute Radio Frequency Channel number for FDD mode cell, UARFCN (Ref. 3GPP TS 25.433 [5]) for another UTRAN FDD mode cell or the external UTRAN FDD mode cell, that is broadcast in the system information in the Cell.	Type: Integral numeric value Range: (0..16383)
uraList	A list of UTRAN Registration Area, URA (Ref. 3GPP TS 25.331 (subclause 10.3.10)[9]), that an UtranCell can belong to.	Type: A list of Integral numeric values Range: (0..65535) for each integral numeric value.
userLabel	A user-friendly (and user assigned) name of the associated object. Inherited from ManagedFunction.	
utranCellId	An attribute whose "name+value" can be used as an RDN when naming an instance of the object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
utranRelationId	An attribute whose "name+value" can be used as an RDN when naming an instance of the object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
vertBeamwidth	The 3 dB power beamwidth of the antenna pattern in the vertical plane.	A single integral value corresponding to an angle in degrees between 0 and 180.
NOTE: If an antenna vendor can only support a granularity of tilt value in 5 degree increments, it means that the value of tilt over the Itf-N would be 0, 50, 100, 150 etc, corresponding to an integral number of 0.1 degree values.		

Annex 2. Proposed changes to Annex B of TS32.642 v.6.7.0

Annex B (informative):
RET Control Architecture

The Itf-N provides an abstraction of resources to allow the monitor and control of physical resource from the network level management systems. For RET, the antenna tilt is controlled via a control unit which is located within the NodeB (from a management perspective). The control unit sends commands to actuators located at the tower top, in order to read, and to adjust antenna tilt values. The AntennaFunction class will report failures and malfunctions of either the control unit, or the tilt. There are several configurations of antennae. Some support the transmission of several frequencies from a single radome while others are deployed as an array in order to provide effective coverage. Hence in the UTRAN model there is an N:M relationship between `UtranCell`'s and the `AntennaFunction` class, permitting the model to support all possibilities. The figure B.1 below illustrates the RET architecture.



For the `AntennaFunction` attributes, the following table lists the expected actions if the attribute is changed via management request, assuming that the functionality is supported by the antenna system. If the attribute value is specified beyond the capabilities of the RET Antenna, an error indication is returned.

Attribute Name	Expected Action (if supported)
baseElevation	None, but relationship to `height` should be taken into account.
bearing	Adjust antenna azimuth to a bearing between or equal to `minAzimuthValue` and `maxAzimuthvalue`.
height	None, but relationship to `baseElevation` should be considered.
horizBeamwidth	Adjust horizontal beamwidth
latitude	None
longitude	None
maxAzimuthValue	Setting of `bearing` should be less than or equal to `maxAzimuthValue` to prevent a setting beyond the capability of antenna.
maxTiltValue	Setting of `retTiltValue` should be less than or equal to `maxTiltValue` to prevent a setting beyond

Attribute Name	Expected Action (if supported)
	the capability of antenna.
mechanicalOffset	None
minAzimithValue	Setting of `bearing` should be greater than or equal to `minAzimuthValue` to prevent a setting beyond the capability of antenna
minTiltValue	Setting of `retTiltValue` should be greater than or equal to `minTiltValue` to prevent a setting beyond the capability of antenna.
patternLabel	None
retTiltValue	Adjust antenna vertical plane tilt to a value between or equal to `minTiltValue` and `maxTiltValue`.
userLabel	None
vertBeamwidth	Adjust antenna vertical plane beamwidth