

E2 Manager R4 Interface Design

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API Request Overview



In the URI of each method in this document we write "V#" instead of V1, since when moving from Version to Version sometimes we forgot to update it in the document. So to make our life easier, V# covers the Latest version.

Standard API Request Headers

Approved Standard Headers are documented at <https://www.w3.org/Protocols/rfc2616/rfc2616-sec14.html>

#	Header	Required?	Description
1	Accept	YES	Specifies the format of the response message body. Structured text message payloads are required to support application/json. No other format is permitted. As they are the only supported format, the accept header is not relevant for those requests.
2	Content-type	YES	Determines the format of the request content. Only application/json is supported.

RESTful Web Services Interface Specification

#	API	Resource After base URI	HTTP Verb
	X2 Setup Request Message Request (deprecated)	/v#/nodeb/x2-setup	POST
	ENDC Setup Request Message Request (deprecated)	/v#/nodeb/encd-setup	POST
	Reset nodeb Request (deprecated)	/v#/nodeb/<ranName>/reset *	PUT
1	Health Check Request	/v#/health	GET
2	Get nodeb data Request (Changed)	/v#/nodeb/<ranName>	GET
3	Update GNB Request (New)	/v#/nodeb/<ranName>/update	PUT
4	Shut Down Request	/v#/nodeb/shutdown	PUT
5	Get All nodeb	/v#/nodeb/ids	GET
6	Get All E2T Request	/v#/e2t/list	GET

Note: Due to router problem we change the Endpoint of Reset nodeb to /v1/nodeb-reset/<ranName>.

Error Handling

Note that, in some scenarios, Client may receive error responses that originate from the network layers. The content of these responses will not conform to the exception schema specified here.

#	Header	Required?	Description
1	errorCode	YES	Code which identifies the error
2	errorMessage	YES	Human readable text

Error Example:

```
{
  "errorCode": 402,
  "errorMessage": "Mandatory fields are missing"
}
```

Here is the list of HTTP status code:

HTTP Error	errorCode	errorMessage	Details
202 Accepted	510	No E2T Instance available.	The existing RAN can't associated with any available E2T Instance. When E2T will be identified, this RAN will be served.
	511	No Routing Manager Available	Currently there is connectivity to the Routing Manager. E2M will try later.
400 Bad Request	401	corrupted json	Can't parse the payload of the body
	402	validation error	E.G: Mandatory fields are missing or invalid (The value isn't according expected);
	403	Activity <activity name> rejected. RAN current state <state> does not allow its execution	E.G: Reset request is sent when state isn't Connected
	405	command already in progress	E.G: 2 parallel Red Button were sent
404 Not Found			If the resource name doesn't exist (e.g.: nodec instead of nodeb) - the system returns HTTP Error 404 with "404 page not found" text.
	404	resource not found	The classic 404 - Resource ID doesn't exist in the system
	406	No RAN in Connected State	e.g.: RAN Health Check and no one in Connected
415 Unsupported Media Type	415	Header validation error	In case there is a body and header application/json is missing - error.
500 Internal Server Error	500	RNIB error	
	501	Internal Server Error. Please try again later	
	502	RMR error	
503 Service Unavailable	510	No E2T Instance available.	The New RAN can't be added, please try later.
	511	No Routing Manager Available	The New RAN can't be added, please try later.

Here is the list of HTTP status code and list of the error codes for our APIs:

	HTTP 202 Accepted	HTTP Error 400 Bad Request	HTTP Error 404 Not Found	HTTP Error 500 Internal Server Error
Get nodeb data			404	500, 501
Update GNB		401, 402	404	500, 501
Shut Down	511	405		500, 501, 502
Get All nodeb				500, 501
Get All E2T				500, 501

In addition, there are 2 Basic HTTP error happens before the handlers are calling:

- HTTP Error 404 Not Found (Body is empty) - The Resource name isn't found (e.g.: Call /v#/nodec instead of /v#/nodeb)
- HTTP Error 405 Method Not Allowed (Body is empty) - Wrong HTTP VERB to known resource name *e.g.: Call HTTP GET v#/nodeb/x2-setup)

Table 1 – Common Type, Enum values

#	Attribute Type	Legal Values
1	Connection Status	UNKNOWN_CONNECTION_STATUS = 0; CONNECTED = 1; DISCONNECTED = 2; CONNECTED_SETUP_FAILED = 3; CONNECTING = 4; SHUTTING_DOWN = 5; SHUT_DOWN = 6;
2	Failure Type	UNKNOWN_TYPE = 0; X2_SETUP_FAILURE = 1; ENDC_X2_SETUP_FAILURE = 2;
3	Node Type	UNKNOWN = 0; ENB = 1; GNB = 2;
4	Radio Network Layer Cause	UNKNOWN = 0; HANDOVER_DESIRABLE_FOR_RADIO_REASONS = 1; TIME_CRITICAL_HANDOVER = 2; RESOURCE_OPTIMISATION_HANDOVER = 3; REDUCE_LOAD_IN_SERVING_CELL = 4; PARTIAL_HANDOVER = 5; UNKNOWN_NEW_ENB_UE_X2AP_ID = 6; UNKNOWN_OLD_ENBME_UE_X2AP_ID = 7; UNKNOWN_PAIR_OF_UE_X2AP_ID = 8; HO_TARGET_NOT_ALLOWED = 9; TX2_RELOC_OVERALL_EXPIRY = 10; T_RELOC_PREP_EXPIRY = 11; CELL_NOT_AVAILABLE = 12; NO_RADIO_RESOURCES_AVAILABLE_IN_TARGET_CELL = 13; INVALID_MME_GROUP_ID = 14; UNKNOWN_MME_CODE = 15; ENCRYPTION_INTEGRITY_PROTECTION_ALGORITHMS_NOT_SUPPORTED = 16; REPORT_CHARACTERISTICS_EMPTY = 17; NO_REPORT_PERIODICITY = 18; EXISTING_MEASUREMENT_ID = 19; UNKNOWN_ENB_MEASUREMENT_ID = 20; MEASUREMENT_TEMPORARILY_NOT_AVAILABLE = 21; UNSPECIFIED = 22; LOAD_BALANCING = 23;

		<p>HANDOVER_OPTIMISATION = 24;</p> <p>VALUE_OUT_OF_ALLOWED_RANGE = 25;</p> <p>MULTIPLE_E_RAB_ID_INSTANCES = 26;</p> <p>SWITCH_OFF_ONGOING = 27;</p> <p>NOT_SUPPORTED_QCI_VALUE = 28;</p> <p>MEASUREMENT_NOT_SUPPORTED_FOR_THE_OBJECT = 29;</p> <p>TDC_OVERALL_EXPIRY = 30;</p> <p>TDC_PREP_EXPIRY = 31;</p> <p>ACTION_DESIRABLE_FOR_RADIO_REASONS = 32;</p> <p>REDUCE_LOAD = 33;</p> <p>RESOURCE_OPTIMISATION = 34;</p> <p>TIME_CRITICAL_ACTION = 35;</p> <p>TARGET_NOT_ALLOWED = 36;</p> <p>NO_RADIO_RESOURCES_AVAILABLE = 37;</p> <p>INVALID_QOS_COMBINATION = 38;</p> <p>ENCRYPTION_ALGORITHMS_NOT_SUPPORTED = 39;</p> <p>PROCEDURE_CANCELLED = 40;</p> <p>RRM_PURPOSE = 41;</p> <p>IMPROVE_USER_BIT_RATE = 42;</p> <p>USER_INACTIVITY = 43;</p> <p>RADIO_CONNECTION_WITH_UE_LOST = 44;</p> <p>FAILURE_IN_THE_RADIO_INTERFACE_PROCEDURE = 45;</p> <p>BEARER_OPTION_NOT_SUPPORTED = 46;</p> <p>MCG_MOBILITY = 47;</p> <p>SCG_MOBILITY = 48;</p> <p>COUNT_REACHES_MAX_VALUE = 49;</p> <p>UNKNOWN_OLD_EN_GNB_UE_X2AP_ID = 50;</p> <p>PDCP_OVERLOAD = 51;</p>
5	Transport Layer Cause	<p>UNKNOWN = 0;</p> <p>TRANSPORT_RESOURCE_UNAVAILABLE = 1;</p> <p>UNSPECIFIED = 2;</p>
6	Protocol Cause	<p>UNKNOWN = 0;</p> <p>TRANSFER_SYNTAX_ERROR = 1;</p> <p>ABSTRACT_SYNTAX_ERROR_REJECT = 2;</p> <p>ABSTRACT_SYNTAX_ERROR_IGNORE_AND_NOTIFY = 3;</p> <p>MESSAGE_NOT_COMPATIBLE_WITH_RECEIVER_STATE = 4;</p> <p>SEMANTIC_ERROR = 5;</p> <p>UNSPECIFIED = 6;</p> <p>ABSTRACT_SYNTAX_ERROR_FALSEELY_CONSTRUCTED_MESSAGE = 7;</p>

7	Miscellaneous Cause	UNKNOWN = 0; CONTROL_PROCESSING_OVERLOAD = 1; HARDWARE_FAILURE = 2; OM_INTERVENTION = 3; NOT_ENOUGH_USER_PLANE_PROCESSING_RESOURCES = 4; UNSPECIFIED = 5;
8	Time To Wait	UNKNOWN_TIMEOUT = 0; V1S = 1; V2S = 2; V5S = 3; V10S = 4; V20S = 5; V60S = 6;
9	Type Of Error	UNKNOWN_ERROR = 0; NOT_UNDERSTOOD = 1; MISSING = 2;
10	Triggering Message	UNKNOWN_MESSAGE = 0; INITIATING_MESSAGE = 1; SUCCESSFUL_OUTCOME = 2; UNSUCCESSFUL_OUTCOME = 3;
11	Criticality	UNKNOWN_CRITICALITY = 0; REJECT = 1; IGNORE = 2; NOTIFY = 3;
12	Bandwidth Reduced SI	UNKNOWN_BANDWIDTH_REDUCED_SI = 0; SCHEDULED = 1;
13	Eutra Mode / Nr Mode	UNKNOWN = 0; FDD = 1; TDD = 2;
14	Freq Band Indicator Priority	UNKNOWN_FREQ_BAND_INDICATOR_PRIORITY = 0; NOT_BROADCASTED = 1; BROADCASTED = 2;
15	Number Of Antenna Ports	UNKNOWN_NUMBER_OF_ANTENNA_PORTS = 0; AN1 = 1; AN2 = 2; AN4 = 3;

16	Transmission Bandwidth	UNKNOWN_TRANSMISSION_BANDWIDTH = 0; BW6 = 1; BW15 = 2; BW25 = 3; BW50 = 4; BW75 = 5; BW100 = 6; BW1 = 7;
17	Subframe Allocation Type	UNKNOWN_SUBFRAME_ALLOCATION_TYPE = 0; ONE_FRAME = 1; FOUR_FRAME = 2;
18	Radio frame Allocation Period	UNKNOWN_RADIOFRAME_ALLOCATION_PERIOD = 0; N1 = 1; N2 = 2; N4 = 3; N8 = 4; N16 = 5; N32 = 6;
19	Enb Type	UNKNOWN_ENB_TYPE = 0; MACRO_ENB = 1; HOME_ENB = 2; SHORT_MACRO_ENB = 3; LONG_MACRO_ENB = 4;
20	Additional Special Subframe	UNKNOWN = 0; SSP0 = 1; SSP1 = 2; SSP2 = 3; SSP3 = 4; SSP4 = 5; SSP5 = 6; SSP6 = 7; SSP7 = 8; SSP8 = 9; SSP9 = 10;

21	Special Subframe	UNKNOWN = 0; SSP0 = 1; SSP1 = 2; SSP2 = 3; SSP3 = 4; SSP4 = 5; SSP5 = 6; SSP6 = 7; SSP7 = 8; SSP8 = 9;
22	Subframe Assignment	UNKNOWN_SUBFRAME_ASSIGNMENT = 0; SA0 = 1; SA1 = 2; SA2 = 3; SA3 = 4; SA4 = 5; SA5 = 6; SA6 = 7;
23	Cyclic Prefix	UNKNOWN_CYCLIC_PREFIX = 0; NORMAL = 1; EXTENDED = 2;
24	Additional Special Subframe Patterns	UNKNOWN = 0; SSP10 = 1
25	nrscs	UNKNOWN_NRSCS = 0; SCS15 = 1; SCS30 = 2; SCS60 = 3; SCS120 = 4;

26	ncnrb	<div>UNKNOWN_NCNRB = 0;</div> <div>NRB11 =1;</div> <div>NRB18 =2;</div> <div>NRB24 =3;</div> <div>NRB25 =4;</div> <div>NRB31 =5;</div> <div>NRB32 =6;</div> <div>NRB38 =7;</div> <div>NRB51 =8;</div> <div>NRB52 =9;</div> <div>NRB65 =10;</div> <div>NRB66 =11;</div> <div>NRB78 =12;</div> <div>NRB79 =13;</div> <div>NRB93 =14;</div> <div>NRB106 =15;</div> <div>NRB107 =16;</div> <div>NRB121 =17;</div> <div>NRB132 =18;</div> <div>NRB133 =19;</div> <div>NRB135 =20;</div> <div>NRB160 =21;</div> <div>NRB162 =22;</div> <div>NRB189 =23;</div> <div>NRB216 =24;</div> <div>NRB217 =25;</div> <div>NRB245 =26;</div> <div>NRB264 =27;</div> <div>NRB270 =28;</div> <div>NRB273 =29;</div>
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27	cause	<p>misc:control-processing-overload, misc:hardware-failure, misc:om-intervention, misc:not-enough-user-plane-processing-resources, misc:unspecified</p> <p>protocol:transfer-syntax-error, protocol:abstract-syntax-error-reject, protocol:abstract-syntax-error-ignore-and-notify, protocol:message-not-compatible-with-receiver-state, protocol:semantic-error, protocol:unspecified, protocol:abstract-syntax-error-falsely-constructed-message transport:transport-resource-unavailable</p> <p>radioNetwork:handover-desirable-for-radio-reasons, radioNetwork:time-critical-handover, radioNetwork:resource-optimisation-handover, radioNetwork:reduce-load-in-serving-cell, radioNetwork:partial-handover, radioNetwork:unknown-new-eNB-UE-X2AP-ID, radioNetwork:unknown-old-eNB-UE-X2AP-ID, radioNetwork:unknown-pair-of-UE-X2AP-ID, radioNetwork:ho-target-not-allowed, radioNetwork:tx2relocoverall-expiry, radioNetwork:trellocprep-expiry, radioNetwork:cell-not-available, radioNetwork:no-radio-resources-available-in-target-cell, radioNetwork:invalid-MME-GroupID, radioNetwork:unknown-MME-Code, radioNetwork:encryption-and-or-integrity-protection-algorithms-not-supported, radioNetwork:reportCharacteristicsEmpty, radioNetwork:noReportPeriodicity, radioNetwork:existingMeasurementID, radioNetwork:unknown-eNB-Measurement-ID, radioNetwork:measurement-temporarily-not-available, radioNetwork:unspecified, radioNetwork:load-balancing, radioNetwork:handover-optimisation, radioNetwork:value-out-of-allowed-range, radioNetwork:multiple-E-RAB-ID-instances, radioNetwork:switch-off-ongoing, radioNetwork:not-supported-QCI-value, radioNetwork:measurement-not-supported-for-the-object, radioNetwork:tDCoverall-expiry, radioNetwork:tDCprep-expiry, radioNetwork:action-desirable-for-radio-reasons, radioNetwork:reduce-load, radioNetwork:resource-optimisation, radioNetwork:time-critical-action, radioNetwork:target-not-allowed, radioNetwork:no-radio-resources-available, radioNetwork:invalid-QoS-combination, radioNetwork:encryption-algorithms-not-aupported, radioNetwork:procedure-cancelled, radioNetwork:rRM-purpose, radioNetwork:improve-user-bit-rate, radioNetwork:user-inactivity, radioNetwork:radio-connection-with-UE-lost, radioNetwork:failure-in-the-radio-interface-procedure, radioNetwork:bearer-option-not-supported, radioNetwork:mCG-Mobility, radioNetwork:sCG-Mobility, radioNetwork:count-reaches-max-value, radioNetwork:unknown-old-en-gNB-UE-X2AP-ID,</p> <p>radioNetwork:pDCP-Overload</p>
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~~X2 Setup Request (Deprecated)~~

Resource	Resource for this interface /v#/nodeb
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Description	E2 Manager exchange with this eNodeB RAN Setup Request and Response.
HTTP Method	POST
Supported Representation Formats	Request: Request Format ie application/json, none, etc Response: Response Format ie application/json, none, etc
Successful HTTP Response Code	204 No Content

```
POST http://<serverBaseURL>/v#/nodeb/x2-setup
```

Request Data Details

Listed below are the key elements included in the request.

#	Parameter	Location	Data Type	Required?	Description and Value Rules
1	accept	Header	String	YES	Refer to Standard API Request Headers
2	content-type	Header	String	YES	Refer to Standard API Request Headers
3	ranIp	Body	String	YES	IP of the RAN
4	ranPort	Body	Int	YES	Port of the RAN
5	ranName	Body	String	YES	Name of the RAN

```
POST http://localhost:3800/v1/nodeb/x2-setup
accept: application/json
content-Type: application/json
{
  "ranIp": "10.0.2.15",
  "ranPort": 5577,
  "ranName": "test1"
}
```

Response Data Details

The body is empty in case 204 No Content, and with specific HTTP code and error details in case failure

~~ENDC Setup Request (Deprecated)~~

Resource	Resource for this interface /v#/nodeb
Description	E2 Manager exchange with this gNodeB RAN Setup Request and Response.
HTTP Method	POST
Supported Representation Formats	Request: Request Format ie application/json, none, etc Response: Response Format ie application/json, none, etc
Successful HTTP Response Code	204 No Content

```
POST http://<serverBaseURL>/v#/nodeb/endc-setup
```

Request Data Details

Listed below are the key elements included in the request.

#	Parameter	Location	Data Type	Required?	Description and Value Rules
1	accept	Header	String	YES	Refer to Standard API Request Headers
2	content-type	Header	String	YES	Refer to Standard API Request Headers
3	ranIp	Body	String	YES	IP of the RAN
4	ranPort	Body	Int	YES	Port of the RAN
5	ranName	Body	String	YES	Name of the RAN

```
POST http://localhost:3800/v1/nodeb/ndc-setup
accept: application/json
content-Type: application/json
{
  "ranIp": "10.0.2.15",
  "ranPort": 5577,
  "ranName": "test1"
}
```

Response Data Details

The body is empty in case 204 No Content, and with specific HTTP code and error details in case failure

~~Reset nodeb Request (Deprecated)~~

Resource	Resource for this interface /v#/nodeb/<ran name>/reset Note: Due to router problem we change the Endpoint of Reset nodeb to /v1/nodeb/<ran name>/reset
Description	E2 Manager is requested to Reset specific RAN
HTTP Method	PUT
Supported Representation Formats	Request: Request Format ie application/json, none, etc Response: Response Format ie application/json, none, etc
Successful HTTP Response Code	204 No Content

```
PUT http://<serverBaseURL>/v#/nodeb/<ran name>/reset
(See remark above about changing the Endpoint)
```

Request Data Details

Listed below are the key elements included in the request.

#	Parameter	Location	Data Type	Required?	Description and Value Rules
1	accept	Header	String	YES	Refer to - Standard API Request Headers
2	content-type	Header	String		See above - Standard API Request Headers
3	cause	Body	String		Reason of the Reset (Cause enum). If not provided - E2M will send misc:om-intervention

Note: Due to router problem we change the Endpoint of Reset nodeb to /v1/nodeb/<ranName>/reset.

```
PUT http://localhost:3800/v1/nodeb/NYC213123/reset

accept: application/json

{

"cause":  "misc:om-intervention"

}
```

Response Data Details

There is no Body in case 204 No Content, and with error details in case failure

1. Health Check Request

Resource	Resource for this interface /v#/health
Description	For simple health check the client should send GET request to /health endpoint. If client receives 200OK it means the server is up and running
HTTP Method	GET
Supported Representation Formats	Request: Request Format ie application/json, none, etc Response: Response Format ie application/json, none, etc
Successful HTTP Response Code	200 OK

```
GET http://<serverBaseURL>/v#/health
```

Request Data Details

Listed below are the key elements included in the request.

#	Parameter	Location	Data Type	Required?	Description and Value Rules
1	accept	Header	String	YES	Refer to Standard API Request Headers

```
GET http://localhost:3800/v1/health
accept: application/json
```

Response Data Details

The body is empty in case 200 OK. No other response expected. If no answer - there is a problem....

2. Get NodeB Request

Resource	Resource for this interface /v#/nodeb
Description	For fetching nodeb data from Redis, the client should send GET request
HTTP Method	GET
Supported Representation Formats	Request: Request Format ie application/json, none, etc Response: Response Format ie application/json, none, etc
Successful HTTP Response Code	200 OK

```
GET http://<serverBaseURL>/v#/nodeb/<ranName>
```

Request Data Details

Listed below are the key elements included in the request.

#	Parameter	Location	Data Type	Required?	Description and Value Rules
1	accept	Header	String	YES	Refer to Standard API Request Headers
2	content-type	Header	String	YES	Refer to Standard API Request Headers
3	ranIp	Body	String	YES	IP of the RAN
4	ranPort	Body	Int	YES	Port of the RAN
5	ranName	Body	String	YES	Name of the RAN

```
GET http://localhost:3800/v1/nodeb/NYC213123
accept: application/json
Content-Type: application/json
```

Response Data Details

In case 200 OK, this is the payload

#	Parameter	Location	Data Type	Required?	Value Rules
1	content-type	Header	String	YES	
2	connectionStatus	Body	ENUM	YES	
3	ip	Body	String	YES	
4	port	Body	Integer	YES	
5	nodeType	Body	ENUM	YES	
6	ranName	Body	String		
7	enb (or gnb)	Body	Object	NO	According the nodetype – ENB or GNB Mandatory when the status is CONNECTED
8	failureType	Body	ENUM	NO	Mandatory when the status is CONNECTED_SETUP_FAILED
9	setupFailure	Body	Object	NO	Mandatory when the status is CONNECTED_SETUP_FAILED
10	globalNbId	Body	Object	NO	Mandatory when the status is CONNECTED. Refer to object globalNbId

ENB

Contains information of the eNodeB

#	Parameter	Data Type	Required?	Value Rules
1	enbType	ENUM	YES	Refer to ENB Type ENUM
2	guGroupIds	Array of String	NO	
3	servedCells	Array of Object	YES	Refer to served Cells object

Served Cells

Contains information of the cell

#	Parameter	Data Type	Required?	Value Rules
1	bandwidthReducedSi	ENUM	NO	Refer to bandwidthReducedSi ENUM
2	broadcastPlmns	Array of String	YES	Array of PLMNs
3	cellId	String	YES	
4	choiceEutraMode	Object	YES	Refer to choice Eutra Mode Object. One of them must appear
5	csgId	String	NO	
6	eutraMode	ENUM	YES	Refer to eutraMode ENUM
7	freqBandIndicatorPriority	ENUM	NO	Refer to freqBandIndicatorPriority ENUM
8	mbmsServiceAreaIdentities	Array of String	NO	
9	mbsfnSubframeInfos	Array of Object	NO	Refer to mbsfn Subframe Object
10	multibandInfos	Array of Integer	NO	
11	neighbourInfos	Array of Object	NO	Refer to neighbour Information Object
12	numberOfAntennaPorts	ENUM	NO	Refer to numberOfAntennaPorts ENUM
13	pci	Integer	YES	
14	prachConfiguration	Object	NO	Refer to prach Configuration Object
15	Tac	String	YES	Refer to tac Object

Choice Eutra Mode

Contains information of the Cell – It is either FDD or TDD - Only one should exist

#	Parameter	Data Type	Required?	Value Rules
1	fdd	Object		Refer to FDD Info
2	tdd	Object		Refer to TDD Info

FDD Info

Contains information of the FDD Cell

#	Parameter	Data Type	Required?	Value Rules
1	dlTransmissionBandwidth	ENUM	YES	Refer to TransmissionBandwidth ENUM
2	dlearFcn	Integer	YES	
3	ulTransmissionBandwidth	ENUM	YES	Refer to TransmissionBandwidth ENUM
4	ulearFcn	Integer	YES	

TDD Info

Contains information of the TDD Cell

#	Parameter	Data Type	Required?	Value Rules
1	additionalSpecialSubframeExtensionInfo	Object	NO	Refer to Additional Special Subframe Extension Info
2	additionalSpecialSubframeInfo	Object	NO	Refer to Additional Special Subframe Info
3	earFcn	Integer	YES	
4	specialSubframeInfo	Object	YES	Refer to Special Subframe Info

5	subframeAssignment	ENUM	YES	
6	transmissionBandwidth	ENUM	YES	

Additional Special Subframe Extension Info

Contains information of the Sub Frame

#	Parameter	Data Type	Required?	Value Rules
1	additionalSpecialSubframePatternsExtension	ENUM	YES	Refer to Additional Special Subframe Patterns ENUM
2	cyclicPrefixDL	ENUM	YES	Refer to CyclicPrefix ENUM
3	cyclicPrefixUL	ENUM	YES	Refer to CyclicPrefix ENUM

Additional Special Subframe Info

Contains information of the Sub Frame

#	Parameter	Data Type	Required?	Value Rules
1	additionalSpecialSubframePatterns	ENUM	YES	Refer to Additional Special Subframe ENUM
2	cyclicPrefixDL	ENUM	YES	Refer to CyclicPrefix ENUM
3	cyclicPrefixUL	ENUM	YES	Refer to CyclicPrefix ENUM

Special Subframe Info

Contains information of the Sub Frame

#	Parameter	Data Type	Required?	Value Rules
1	SpecialSubframePatterns	ENUM	YES	Refer to Special Subframe ENUM
2	cyclicPrefixDL	ENUM	YES	Refer to CyclicPrefix ENUM
3	cyclicPrefixUL	ENUM	YES	Refer to CyclicPrefix ENUM

mbsfn Subframe

Contains information of the Sub Frame

#	Parameter	Data Type	Required?	Value Rules
1	radioframeAllocationOffset	Integer	YES	
2	radioframeAllocationPeriod	ENUM	YES	
3	subframeAllocation	String	YES	
4	subframeAllocationType	ENUM	YES	

Neighbor Information

Contains information of the Neighbor

#	Parameter	Data Type	Required?	Value Rules
1	ecgi	String	YES	
2	pci	Integer	YES	
3	earfcn	Integer	YES	

4	tac	String	NO	
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Prach Configuration

Contains information of the Prach

#	Parameter	Data Type	Required?	Value Rules
1	highSpeedFlag	Boolean	YES	
2	prachConfigurationIndex	Integer	YES	
3	prachFrequencyOffset	Integer	YES	
4	rootSequenceIndex	Integer	NO	
5	zeroCorrelationZoneConfiguration	Integer	YES	

Gnb

Contains information of the gnodeb

#	Parameter	Data Type	Required?	Value Rules
1	servedNrCells	Array of Object	YES	Refer to served NR Cells object
2	ranFunctions	Array of Object	YES	Refer to served RAN function object

Served NR Cells

Contains information of the GNB cell

#	Parameter	Data Type	Required?	Value Rules
1	nrNeighbourInfos	Array of object	NO	Refer to NrNeighbourInformation object
2	servedNrCellInformation	Object	YES	Refer to ServedNRCellInformation object

Nr Neighbour Information

Contains information of the Neighbor of this GNB Note it is quite similar to Served NR Cell Information

#	Parameter	Data Type	Required?	Value Rules
1	nrCgi	String	YES	
2	choiceNrMode	Object	YES	Refer to Choice NR Mode Object
3	configuredStac	String	NO	
4	nrMode	ENUM	YES	Refer to NR Mode ENUM
5	nrPci	Integer	YES	
6	stac5g	String	NO	

Served NR Cell Information

Contains information of the cell

#	Parameter	Data Type	Required?	Value Rules
1	cellId	String	YES	
2	choiceNrMode	Object	YES	Refer to Choice NR Mode Object

3	configuredStac	String	NO	
4	nrMode	ENUM	YES	Refer to NR Mode ENUM
5	nrPci	Integer	YES	
6	servedPlmns	Array of String	YES	Array of PLMNs
7	stac5g	String	NO	

Choice NR Mode

Contains information of the TBD – Note – It is either FDD or TDD, one of them must exist

#	Parameter	Data Type	Required?	Value Rules
1	fdd	Object		Refer to NR FDD Info
2	tdd	Object		Refer to NR TDD Info

NR FDD Info

Contains information of the NR FDD Cell

#	Parameter	Data Type	Required?	Value Rules
1	dlFreqInfo	Object		Refer to dl Freq Info Object
2	dlTransmissionBandwidth	Object		Refer to dl Transmission Bandwidth Object
3	ulFreqInfo	Object		Refer to ul Freq Info Object
4	ulTransmissionBandwidth	Object		Refer to ul Transmission Bandwidth Object

dl Freq Info or ul Freq Info or nr Freq Info NR

Contains information of the Cell

#	Parameter	Data Type	Required?	Value Rules
1	frequencyBands	Object		Refer to frequency Bands Object
2	nrArFcn	integer	YES	
3	sulInformation	Object		Refer to sul Information Object

Frequency Bands

Contains information of the Frequency Bands

#	Parameter	Data Type	Required?	Value Rules
1	nrFrequencyBand	integer	YES	
2	supportedSulBands	Array of integer	NO	

sul Information

Contains information of the TBD

#	Parameter	Data Type	Required?	Value Rules
1	sulArFcn	integer		
2	sulTransmissionBandwidth	object		Refer to sul Transmission Bandwidth object

dl Transmission Bandwidth or ul Transmission Bandwidth or sul Transmission Bandwidth or Transmission Bandwidth

Contains information of the TBD

#	Parameter	Data Type	Required?	Value Rules
1	ncnrb	ENUM		Refer to ncnrb ENUM
2	nrscs	ENUM		Refer to nrscs ENUM

NR TDD Info

Contains information of the NE Cell TDD

#	Parameter	Data Type	Required?	Value Rules
1	nrFreqInfo	Object		Refer to nr Freq Info Object
2	transmissionBandwidth	Object		Refer to transmission Bandwidth Object

RAN Function

Contains information of the Function this RAN supports - Please refer to O-RAN Working Group 3, E2 Application Protocol (E2AP)

#	Parameter	Data Type	Required?	Value Rules
1	ranFunctionId	Integer	YES	
2	ranFunctionDefinition	String	YES	
3	ranFunctionRevision	Integer	YES	

Setup Failure

Contains information of the error

#	Parameter	Data Type	Required?	Value Rules
1	cause_group	ENUM	NO	One of the following ENUM <ul style="list-style-type: none"> RadioNetworkLayerCause TransportLayerCause ProtocolCause MiscellaneousCause
2	TimeToWait	ENUM		Look on TimeToWait ENUM
3	CriticalityDiagnostics	Object		

Criticality Diagnostics

Contains information of the error

#	Parameter	Data Type	Required?	Value Rules
1	informationElementCriticalityDiagnostics	Object		.
2	procedureCode	Integer		
3	procedureCriticality	ENUM		Refer to Criticality ENUM
4	triggeringMessage	ENUM		Refer to TriggeringMessage ENUM

Information Element Criticality Diagnostics

Contains information of the error

#	Parameter	Data Type	Required?	Value Rules
1	ieCriticality	ENUM		Refer to Criticality ENUM
2	ield	Integer		
3	typeOfError	ENUM		Refer to TypeOfError ENUM

3. Update GNB Request

Resource	Resource for this interface /v#/nodeb
Description	For storing nodeb data to Redis, the client should send PUT request
HTTP Method	PUT
Supported Representation Formats	Request: Request Format ie application/json, none, etc Response: Response Format ie application/json, none, etc
Successful HTTP Response Code	200 OK

```
PUT http://<serverBaseURL>/v#/nodeb/<ranName>/update
```

Request Data Details

#	Parameter	Location	Data Type	Required?	Value Rules
	accept	Header	String	YES	Refer to Standard API Request Headers
	content-type	Header	String	YES	Refer to Standard API Request Headers
	servedNrCells	Body	Array of Object	YES	Please refer to Served NR Cells array inside the gNB Object (In the Get NodeB Response)

Example:

```
PUT http://localhost:3800/v1/nodeb/test1/update
accept: application/json
{
  "servedNrCells": [
    {
      "servedNrCellInformation": {
        "nrPci": 100,
        "cellId": "02f829:0007ab0178",
        "servedPlmns": [
          "02f829"
        ],
        "nrMode": "FDD",
        "choiceNrMode": {
          "fdd": {
            "ulFreqInfo": {
              "nrArFcn": "100",
              "frequencyBands": [
                {
                  "nrFrequencyBand": 9,
                  "supportedSulBands": [
                    9
                  ]
                }
              ]
            },
            "dlFreqInfo": {
              "nrArFcn": "100",
              "frequencyBands": [
                {
                  "nrFrequencyBand": 9,
                  "supportedSulBands": [
                    9
                  ]
                }
              ]
            }
          }
        },
        "ulTransmissionBandwidth": {
```

```

        "nrscs": "SCS15",
        "ncnrb": "NRB11"
    },
    "dlTransmissionBandwidth": {
        "nrscs": "SCS15",
        "ncnrb": "NRB11"
    }
}
},
"nrNeighbourInfos": [
{
    "nrCgi": "string",
    "choiceNrMode": {
        "fdd": {
            "ulFreqInfo": {
                "nrArFcn": "100",
                "frequencyBands": [
                    {
                        "nrFrequencyBand": 9,
                        "supportedSulBands": [
                            9
                        ]
                    }
                ]
            },
            "dlFreqInfo": {
                "nrArFcn": "100",
                "frequencyBands": [
                    {
                        "nrFrequencyBand": 9,
                        "supportedSulBands": [
                            9
                        ]
                    }
                ]
            },
            "ulTransmissionBandwidth": {
                "nrscs": "SCS15",
                "ncnrb": "NRB11"
            },
            "dlTransmissionBandwidth": {
                "nrscs": "SCS15",
                "ncnrb": "NRB11"
            }
        }
    },
    "configuredStac": "string",
    "nrPci": 200,
    "nrMode": "FDD",
    "stac5g": "string"
},
{
    "nrCgi": "string",
    "choiceNrMode": {
        "fdd": {
            "ulFreqInfo": {
                "nrArFcn": "100",
                "frequencyBands": [
                    {
                        "nrFrequencyBand": 9,
                        "supportedSulBands": [
                            9
                        ]
                    }
                ]
            },
            "dlFreqInfo": {
                "nrArFcn": "100",
                "frequencyBands": [
                    {

```

```

        "nrFrequencyBand": 9,
        "supportedSulBands": [
            9
        ]
    }
}
},
"ulTransmissionBandwidth": {
    "nrscs": "SCS15",
    "ncnrb": "NRB11"
},
"dlTransmissionBandwidth": {
    "nrscs": "SCS15",
    "ncnrb": "NRB11"
}
}
},
"configuredStac": "string",
"nrPci": 201,
"nrMode": "FDD",
"stac5g": "string"
}
]
},
{
    "servedNrCellInformation": {
        "nrPci": 101,
        "cellId": "02f829:0007ab0120",
        "servedPlmns": [
            "02f829"
        ],
        "nrMode": "FDD",
        "choiceNrMode": {
            "fdd": {
                "ulFreqInfo": {
                    "nrArFcn": "100",
                    "frequencyBands": [
                        {
                            "nrFrequencyBand": 9,
                            "supportedSulBands": [
                                9
                            ]
                        }
                    ]
                },
                "dlFreqInfo": {
                    "nrArFcn": "100",
                    "frequencyBands": [
                        {
                            "nrFrequencyBand": 9,
                            "supportedSulBands": [
                                9
                            ]
                        }
                    ]
                }
            },
            "ulTransmissionBandwidth": {
                "nrscs": "SCS15",
                "ncnrb": "NRB11"
            },
            "dlTransmissionBandwidth": {
                "nrscs": "SCS15",
                "ncnrb": "NRB11"
            }
        }
    }
}
},
"nrNeighbourInfos": [
    {
        "nrCgi": "string",
        "choiceNrMode": {

```

```

" fdd": {
  " ulFreqInfo": {
    " nrArFcn": "100",
    " frequencyBands": [
      {
        " nrFrequencyBand": 9,
        " supportedSulBands": [
          9
        ]
      }
    ]
  },
  " dlFreqInfo": {
    " nrArFcn": "100",
    " frequencyBands": [
      {
        " nrFrequencyBand": 9,
        " supportedSulBands": [
          9
        ]
      }
    ]
  },
  " ulTransmissionBandwidth": {
    " nrscs": "SCS15",
    " ncnrb": "NRB11"
  },
  " dlTransmissionBandwidth": {
    " nrscs": "SCS15",
    " ncnrb": "NRB11"
  }
},
" configuredStac": "string",
" nrPci": 300,
" nrMode": "FDD",
" stac5g": "string"
}
]
}
}

```

Response Data Details

In case 200 OK, the payload is identical to Get NodeB <RAN Name>.

4. Shut Down Request

Resource	Resource for this interface /v#/nodeb
Description	E2 Manager is requested to Shut Down all the RANs
HTTP Method	PUT
Supported Representation Formats	Request: Request Format ie application/json, none, etc Response: Response Format ie application/json, none, etc
Successful HTTP Response Code	204 No Content

PUT http://<serverBaseURL>/v#/nodeb/shutdown

Request Data Details

Listed below are the key elements included in the request.

#	Parameter	Location	Data Type	Required?	Description and Value Rules
1	accept	Header	String	YES	Refer to - Standard API Request Headers

```
PUT http://localhost:3800/v1/nodeb/shutdown
accept: application/json
```

Response Data Details

There is no Body in case 204 No Content, and with 202 Accepted with error details in case failure such as Routing Manager (511)

5. Get All NodeB Request

Resource	Resource for this interface /v#/nodeb/ids
Description	E2 Manager is requested to get list of all RANs in its RNIB DB
HTTP Method	GET
Supported Representation Formats	Request: Request Format ie application/json, none, etc Response: Response Format ie application/json, none, etc
Successful HTTP Response Code	200 OK

```
GET http://<serverBaseURL>/v#/nodeb/ids
```

Request Data Details

Listed below are the key elements included in the request.

#	Parameter	Location	Data Type	Required?	Description and Value Rules
1	accept	Header	String	YES	Refer to - Standard API Request Headers

```
GET http://localhost:3800/v1/nodeb/ids
accept: application/json
```

Response Data Details

In case 200 OK, this is the payload

#	Parameter	Location	Data Type	Required?	Value Rules
1	content-type	Header	String	YES	
2	rans	Body	List of Object	YES	Can be empty in case no RANs. See nodebIdentity

nodebIdentity

Contains information of the eNodeb

#	Parameter	Data Type	Required?	Value Rules
---	-----------	-----------	-----------	-------------

1	inventoryName	String	YES	Name of the RAN
2	globalNbld	Object	YES	ID of the RAN - Refer globalNbld object

globalNbld

Contains information of the eNodeb

#	Parameter	Data Type	Required?	Value Rules
1	nbld	String	yes	ID of the RAN. Different ID for eNB or gNB. In case eNB it is according the eNB Type.
2	plmnld	Object	yes	ID of the PLMN (Public Land Mobile Network)

6. Get All E2T Request

Resource	Resource for this interface /v#/e2t/list
Description	E2 Manager is requested to get list of all E2T Instances address and list of RANs associate with each E2T Instance
HTTP Method	GET
Supported Representation Formats	Request: Request Format ie application/json, none, etc Response: Response Format ie application/json, none, etc
Successful HTTP Response Code	200 OK

```
GET http://<serverBaseURL>/v#/e2t/list
```

Request Data Details

Listed below are the key elements included in the request.

#	Parameter	Location	Data Type	Required?	Description and Value Rules
1	accept	Header	String	YES	Refer to - Standard API Request Headers

```
GET http://localhost:3800/v1/e2t/list
accept: application/json
```

Response Data Details

In case 200 OK, this is the payload

#	Parameter	Location	Data Type	Required?	Value Rules
1	content-type	Header	String	YES	
2		Body	List of Object	YES	Can be empty in case no E2T. See e2tIdentity

e2tIdentity

Contains information of the E2T instance

#	Parameter	Data Type	Required?	Value Rules
1	e2tAddress	String	yes	Address of the E2T Instance
2	ranNames	List of string	no	List of the RAN Names associated with this Instance. Can be empty


```
GET http://localhost:3800/v1/e2t/list
accept: application/json
```

```
[
  {
    "e2tAddress": "e2t.att.com:38000",
    "ranNames": ["test1", "test2"]
  },
  {
    "e2tAddress": "e2t.att.com:38001",
    "ranNames": ["test1", "test2", "test3"]
  }
]
```