7.69   Device diagnostic metrics +XMETRIC

This command is used to configure the URC for a specific device diagnostic metric.

- Set command enables/disables the URC for a specific device diagnostic metric.

- Test command returns values supported for the diagnostic metric URC configuration.

This command will work only if feature FEAT_CIQ_METRICS or FEAT_ENG_MODE_METR ICS is enabled.

7.69.1   syntax of the command

Command syntax : AT+XMETRIC = <mode>,<metricId>,<groupId>

FEAT_CIQ_METRICS define enables below 2 metrics

Network Information Metric URC for GERAN and UTRAN:

+XMETRIC :<metricId>,<groupId>,<fieldValidity>,<RAC>,<accessTech>,<freqBand>,
<MCC>,<MNC>,<LAC>,<cellId>, <RNCId>

Serving Cell Information URC for UTRAN :

+XMETRIC :<metricId>,<groupId>,<Uarfcn>,<ScellScramblingCode>,<ScellRssi>,<Scell
EcNo>,<ScellRscp>, <TxPower>

FEAT_ENG_MODE_METRICS define enables

below 6 metrics E-UTRA RRC ASN.1-encode-

message URC :

+XMETRIC :<metricId>,<groupId>,[<TimeStamp>],[<RRCMsgClass>],<TotalFragments>
, <CurrentFragment>,<RRCMsg>

Note :   As Max size of E-UTRA RRC is not defined in 3GPP, and due to a limitaion in the transfer size between AP and CP, a single E-UTRA RRC message can be fragmented and sent in multiple URC's. Here <TotalFragments> indicates the number of fragments expected for single E-UTRA RRC message.

Scan_Cells & Measurements URC for LTE :

+XMETRIC:<metricId>,<groupId>,<noOfCells>,<CurrentCell>,<MCC>,<MNC>,<CI>,<
TAC>,<PHYCI>,<EARFCN>,[<DLBW>],[<ULBW>],<OperBand>,<DUPLEXMode>,<RSRP>
,<RSRQ>

Serving Cell Information URC for LTE :

+XMETRIC:<metricId>,<groupId>,<MCC>,<MNC>,<CI>,<TAC>,<PHYCI>,<ServCellCamp
Status>,<ERRCState>,<EARFCN>,[<DLBW>],[<ULBW>],<OperBand>,<DuplexMode>,<
AntennaMode>,[<RSRP_0>],[<RSRQ_0>],[<RSSNR_0>],[<RSRP_1>],[<RSRQ_1>],[<R
SSNR_1>],[<RSRP_2>],[<RSRQ_2>],[<RSSNR_2>],[<RSRP_3>],[<RSRQ_3>],[<RSSN
R_3>][,<Cid1>,<ApnAmbr_DL>,<ApnAmbr_UL>,<ApnAmbr_DL_ext>,<ApnAmbr_UL_ext>
,<ApnAmbr_DL_ext2>,<ApnAmbr_UL_ext2>[,<Cid2>,<ApnAmbr_DL>,<ApnAmbr_UL>,
<ApnAmbr_DL_ext>,<ApnAmbr_UL_ext>,<ApnAmbr_DL_ext2>,<ApnAmbr_UL_ext2>[,
<Cid3>,<ApnAmbr_DL>,<ApnAmbr_UL>,<ApnAmbr_DL_ext>,<ApnAmbr_UL_ext>,<Apn
Ambr_DL_ext2>,<ApnAmbr_UL_ext2>[,<Cid4>,<ApnAmbr_DL>,<ApnAmbr_UL>,<ApnAmbr
_DL_ext>,<ApnAmbr_UL_ext>,<ApnAmbr_DL_ext2>,<ApnAmbr_UL_ext2>[,
<Cid5>,<Apn
Ambr_DL>,<ucApnAmbr_UL>,<ApnAmbr_DL_ext>,<ApnAmbr_UL_ext>,<ApnAmbr_DL_
ext2>,<ApnAmbr_UL_ext2>[,<Cid6>,<ApnAmbr_DL>,<ApnAmbr_UL>,<ApnAmbr_DL_ext>
,<ApnAmbr_UL_ext>,<ApnAmbr_DL_ext2>,<ApnAmbr_UL_ext2>[,<Cid7>,<ApnAmbr_
DL>,<ApnAmbr_UL>,<ApnAmbr_DL_ext>,<ApnAmbr_UL_ext>,<ApnAmbr_DL_ext2>,<
ApnAmbr_UL_ext2>[,<Cid8>,<ApnAmbr_DL>,<ApnAmbr_UL>,<ApnAmbr_DL_ext>,<Apn
Ambr_UL_ext>,<ApnAmbr_DL_ext2>,<ApnAmbr_UL_ext2>[,<Cid9>,<ApnAmbr_DL>,<
ApnAmbr_UL>,<ApnAmbr_DL_ext>,<ApnAmbr_UL_ext>,<ApnAmbr_DL_ext2>,<ApnAmbr
_UL_ext2>[,<Cid10>,<ApnAmbr_DL>,<ApnAmbr_UL>,<ApnAmbr_DL_ext>,<ApnAmbr_
UL_ext>,<ApnAmbr_DL_ext2>,<ApnAmbr_UL_ext2>[,<Cid11>,<ApnAmbr_DL>,<ApnAmbr

_UL>,<ApnAmbr_DL_ext>,<ApnAmbr_UL_ext>,<ApnAmbr_DL_ext2>,<ApnAmbr_UL_ext2>

]]]]]]]]]]]]

Neighbour Cell(s) Measurements URC for LTE :

+XMETRIC :<metricId>,<groupId>,<noOfCells>,<CurrentCell>,<EARFCN>,<PHYCI>,<
RSRP>,<RSRQ>,<OperBand>,<DuplexMode>

Cell Uplink Channel Information providing PUSCH Tx Power Information URC :

+XMETRIC :<metricId>,<groupId>,<TotalPUSCHTxPower>

In-Device Coexistence E-UTRA Serving Cell Info URC :

+XMETRIC :<metricId>,<groupId>,<OperBand>,[<MCC>],[<MNC>],[<CI>],[<TAC>],
<PHYCI>,<DL_FREQ>,<DLBW>,[<UL_FREQ>],[<ULBW>],[<TDD_DLULConfig>],[<TDD
_SubFrameConfig>]

Uplink HARQ and MCS (Modulation and Coding scheme) statistic information URC for
LTE:

+XMETRIC:<metricId>,<groupId>,<noOfMCS>,<currentMCS>,<mcs_count>,<acks_count>
,<discard_count>,<nacks_count>,<bytes_count>

Downlink HARQ and MCS (Modulation and Coding scheme) statistic information URC for
LTE:

+XMETRIC:<metricId>,<groupId>,<noOfMCS>,<currentMCS>,<mcs_count>,<crc_error
_count>,<bytes_count>

Command	Possible responses
AT+ XMETRIC = 1, 7, 0	OK or +CME ERROR: <err>
AT+XMETRIC =?	[+XMETRIC: (list of supported modes),(list of supported <metricId>s for a particular group),<group Id>][....] OK Example: +XMETRIC: (0,1),(7,22),0 +XMETRIC: (0,1),(0,1,2,3,4,6,7,8),2 OK

7.69.2 Defined values

<mode>

0: Disables the URC for a specific diagnostic metric

1: Enables the URC for a specific diagnostic metric

<metricId>

The metric ID of a specific diagnostic metric. The following are supported under a specific
<groupId> as of now.

DEVICE_DIAGNOSTIC_METRI

C_GROUP_ID :

7: Metric ID for Network Information

22: Metric ID for Serving Cell information

DEVICE_DIAGNOSTIC_METRIC_EM_LTE_GROUP_ID :

0 : Metric ID for Scan_Cells & Measurements

1 : Metric ID for Serving Cell Information

2 : Metric ID for Neighbor Cells Measurements

3 : Metric ID for Total Tx power for PUSCH(dBm)

4 : Metric ID for E-UTRA RRC ASN.1-encode-message

6 : Metric ID for In-Device Coexistence LTE Serving Cell Metric

7 : Metric ID for Uplink HARQ and MCS (Modulation and Coding scheme)

8 : Metric ID for Downlink HARQ and MCS (Modulation and Coding scheme)

<groupId>

The group to which the device diagnostic metrics belong to.

0 DEVICE_DIAGNOSTIC_METRIC_GROUP_ID

2

DEVICE_DIAGNOSTIC_METRIC_EM_LT

E_GROUP_ID Network information

parameters :

<fieldvalidity> :

This field provides information

regarding the validity of some of the

other fields within this metric, plus an

indication of roaming.

0 bit (LSB): MCC is valid (=1), MCC is

invalid (=0)

1 bit: MNC is valid (=1), MNC is

invalid (=0)

2 bit: LAC is valid (=1), LAC is invalid

(=0)

3 bit: CellID is valid (=1), CellID is

invalid (=0)

4 bit: RAC is valid (=1), RAC is invalid

(=0)

5 bit: RNC ID is valid (=1), RNC ID is

invalid (=0)

6 bit: Reserved. Shall be set to 0

7 bit (MSB): Home network (=0),

Foreign network (=1) (An indication of

whether the

UE has selected a home or foreign

PLMN)

<RAC> :

The Routing Area Code is a fixed length code (of 1 octets) identifying a routing area within a location area.

<accessTech>:

The radio access network (GERAN or UTRAN) which the device is currently using or camped on. Shall be set to IQ_ACCESS_TECH_NONE when not camped on any cell.

ACCESS_TECH_UNKNOWN = 0 Serving RAN type is unknown. This value may be used when a device just started searching for a cell while coming out from "power off" state or when entering "flight mode" state.

ACCESS_TECH_GERAN = 1 Serving RAN is GERAN. ACCESS_TECH_UTRAN = 2 Serving RAN is UTRAN. ACCESS_TECH_NONE = 255 There is no serving RAN. This value may be used when a device is performing cell selection and cannot find a cell.

<freqBand> :

The frequency band that the cell uses

These bands are derived from 3GPP

TS 45.005 section 2. Frequency bands

and channel arrangement and 3GPP

TS 25.101 section 5.4 Frequency

bands.

BAND_INFO_T_GSM_380 TETRA-GSM

380 Band BAND_INFO_T_GSM_410

TETRA-GSM 410 Band

BAND_INFO_GSM_450 GSM 450 Band

BAND_INFO_GSM_480 GSM 480 Band

BAND_INFO_GSM_710 GSM 710 Band

BAND_INFO_GSM_750 GSM 750 Band

BAND_INFO_T_GSM_810 TETRA-GSM

810

BAND_INFO_GSM_850 GSM 850

BAND_INFO_P_GSM_900 Primary

GSM 900 Band

BAND_INFO_E_GSM_900 Extended

GSM 900 (inc. Primary GSM 900)

Band

BAND_INFO_R_GSM_900 Railways

GSM 900 (inc. Primary GSM 900 &

Extended GSM

900)

BAND_INFO_T_GSM_900 TETRA-GSM

900

BAND_INFO_DCS_1800 DCS 1800

BAND_INFO_PCS_1900 PCS 1900

BAND_INFO_UTRA_FDD_I UTRA FDD

Operating Band I

BAND_INFO_UTRA_FDD_II UTRA FDD

Operating Band II

BAND_INFO_UTRA_FDD_III UTRA FDD

Operating Band III

BAND_INFO_UTRA_FDD_IV UTRA FDD

Operating Band IV

BAND_INFO_UTRA_FDD_V UTRA FDD

Operating Band V

BAND_INFO_UTRA_FDD_VI UTRA FDD

Operating Band VI

BAND_INFO_UTRA_FDD_VII UTRA

FDD Operating Band VII

BAND_INFO_UTRA_FDD_VIII UTRA

FDD Operating Band VIII

BAND_INFO_UTRA_FDD_IX UTRA FDD

Operating Band IX

BAND_INFO_UTRA_FDD_X UTRA FDD

Operating Band X

BAND_INFO_UTRA_FDD_XI UTRA FDD

Operating Band XI

BAND_INFO_NOT_AVAILABLE = 255

The operating frequency band is

unknown or not available

<MCC>:

The Mobile Country Code. The MCC is a three-digit number.

<MNC>:

The Mobile Network Code. The MNC is a two or three digit number.

<LAC> :

The Location Area Code is a fixed length code (of 2 octets) identifying a

group of base stations (BTS/Node Bs) within a PLMN.

<cellId>:

When ucAccessTech is ACCESS_TECH_UTRAN: The 16-bit cell identity
as described in
3GPP TS 25.401/6.1.5

<RNCId>:

The 12-bit RNC identifier as described in 3GPP TS 25.401/6.1.3 and
6.1.5 or, equivalently, the most-significant 12 bits of the 28-bit UTRAN
cell identity as described in 3GPP TS
25.331. Shall be set to 65535 when ucAccessTech is not equal to
ACCESS_TECH_UTRAN.

Serving Cell Information parameters: The UMTA/HSPA RF Info metric
contains a standard set of RF information for WCDMA (UMTS FDD).

<Uarfcn>:

The UTRA Absolute Radio Frequency Channel Number [UARFCN]
identifies the radio channel of the active base station. Ref. 3GPP TS
25.101

<ScellScramblingCode>:

The scrambling code of the Primary CPICH.

<ScellRssi> :

UTRA Carrier Received Signal Strength Indication (RSSI) is the wide-
band received power (including thermal noise and noise generated
within the receiver) within the relevant channel bandwidth. This field
shall be encoded per 3GPP TS 25.133/9.1.3. Range: 0 to
76 - Shall be set to 255 if not available.

<ScellEcNo>

CPICH Ec/No or Ec/Io is the received energy per chip of the
pilot channel (CPICH) divided by the power density in the band. This
parameter is generally used to estimate the interference from other
cells. This field shall be encoded per 3GPP TS 25.133/9.1.2. Range: 0 to
49

<ScellRscp> :

Received Signal Code Power, the received power on one code measured on the Primary
CPICH. This field shall be encoded per 3GPP TS 25.113/9.1.1. Range: -5 to 91

<TxPower> :

The total UE transmitted power on one carrier. This field shall be encoded per 3GPP TS
25.133/9.1.6. Range: 21 to 104 or 255 - Shall be set to 255 if not applicable or not available.

<RRCMsg> :

this is a string parameter in hexadecimal format containing the E-UTRA RRC message encoded in ASN.1.

<TotalFragments>:

Is the total number of fragments for one such E-UTRA RRC message.

<CurrentFragment>:

Is the current fragment number in the RRC message.

<TimeStamp>:

is the time that this event was produced in milli seconds since UE bootup.

<RRCMsgClass>:

is the E-UTRA RRC message class type as defined in 3GPP 36.331, , section 6.2.1. Valid range 0..6

0 BCCH-BCH messages

1 BCCH-DL-SCH messages

2 PCCH messages

3 DL-CCCH messages

4 DL-DCCH messages

5 UL-CCCH messages

6 UL-DCCH messages

<noOfCells>

Is the Number of Cells being Reported

<CurrentCell>

Current cell for which the URC is generated

<CI>

Is the cell identity of the LTE cell, valid range: 0.... 0x0FFFFFFF. (Ref: 3GPP TS 36.331,
6.3.4, CellIdentity IE)

<TAC>

Is the tracking area code of the LTE cell within the scope of a PLMN, valid range: 0...
0xFFFF. (Ref: 3GPP TS 36.331, 6.3.4, TrackingAreaCode IE)

<PHYCI>

Is the physical cell ID of the LTE cell, valid range : 0 .. 503 (Ref: 3GPP TS 36.331, 6.3.4, PhysCellId IE)

<EARFCN>

Is the carrier frequency of the LTE cell designated by the EUTRA Absolute Radio Frequency
Channel Number (EARFCN), valid range: 0...0xFFFF. (Ref: 3GPP TS 36.101, 5.7.3)

<DLBW>

Is the Downlink bandwidth configuration of the LTE cell. valid range:
0..5. (Ref: 3GPP TS 36.331, dl-Bandwidth in MasterInformationBlock)

<ULBW>

Is the Uplink bandwidth configuration of the LTE cell. valid range: 0..5.
(Ref: 3GPP TS
36.331, ul-Bandwidth in SystemInformationBlockType2)

<OperBand>

Is the operating band of the LTE cell.   valid range: 1..64.   (Ref:
3GPP TS 36.331, freqBandIndicator in SystemInformationBlockType1),
for supported bands referring to
3GPP TS 36.101 Table 5.5-1 (Rel. 9)

<DUPLEXMode>

Is the duplexing mode of the measured cell, 0:FDD , 1:TDD

<RSRP>

Is the average RSRP of the LTE cell over last measurement period, only neighbor cell with valid measurement to be included, valid range: 1..97. (Ref: 3GPP TS 36.331, 6.3.5, RSRP-Range IE)

<RSRQ>

Is the average RSRQ of the LTE cell over last measurement period, only neighbor cell with valid measurement to be included, valid range: 0..34. (Ref: 3GPP TS 36.331, 6.3.5, RSRQ-Range IE)

<ServCellCampStatus>

Is the camping status of the LTE serving cel. valid range: 0..1.

0 not camped

1 camped on a cell

<ERRCState>

Is the E-UTRA RRC states of the LTE serving cell. valid range: 0 ..2.
(Ref: 3GPP TS
36.331, 4.2.1)

0 ERRC_NULL (prior entering in ERRC_IDLE state)

1 ERRC_IDLE

2 ERRC_CONNECTED

<AntennaMode>

Is

0 - Antenna Mode SIMO for serving cell.

1 - Antenna Mode MIMO for serving cell.

2 - Antenna Mode tx diversity for serving cell

255 - Antenna Mode UNAVAILABLE when there is no DL traffic or in Idle state for serving cell.

<RSRP_0>,<RSRP_1>,<RSRP_2>,<RSRP_3>

Is the average RSRP of the LTE serving cell over last measurement period, valid range:
1..97. (Ref: 3GPP TS 36.331, 6.3.5, RSRP-Range IE). The index (0...3) correponds to each Antenna port as below

0 : TX antenna 0 as seen by RX antenna 0

1 : TX antenna 1 as seen by RX antenna 0

2 : TX antenna 0 as seen by RX antenna 1

3 : TX antenna 1 as seen by RX antenna 1

<RSRQ_0>,<RSRQ_1>,<RSRQ_2>,<RSRQ_3>

Is the average RSRQ of the LTE serving cell over last measurement period, valid range:
0..34. (Ref: 3GPP TS 36.331, 6.3.5, RSRQ-Range IE). The index (0...3) correponds to each Antenna port as below

0 : TX antenna 0 as seen by RX antenna 0

1 : TX antenna 1 as seen by RX antenna 0

2 : TX antenna 0 as seen by RX antenna 1

3 : TX antenna 1 as seen by RX antenna 1

<RSSNR_0>,<RSSNR_1>,<RSSNR_2>,<RSSNR_3>

Is the average RSSNR of the LTE serving cell over last measurement period. The index
(0...3) correponds to each Antenna port as below

0 : TX antenna 0 as seen by RX antenna 0

1 : TX antenna 1 as seen by RX antenna 0

2 : TX antenna 0 as seen by RX antenna 1

3 : TX antenna 1 as seen by RX antenna 1

<Cid1> ... <Cid11>

Is the context ID. For each Context ID<Cid>, the following APN Aggregate Maximum Bit
Rate(APN-AMBR) (as defined in TS 24.301 section 9.9.4.2) will be reported

<ApnAmbr_DL>

Is the APN-AMBR for downlink

<ApnAmbr_UL>

Is the APN-AMBR for uplink

<ApnAmbr_DL_ext>

Is the APN-AMBR for downlink (extended)

<ApnAmbr_UL_ext>

Is the APN-AMBR for uplink (extended)

<ApnAmbr_DL_ext2>

Is the APN-AMBR for downlink (extended-2)

<ApnAmbr_UL_ext2>

Is the APN-AMBR for uplink (extended-2)

< TotalPUSCHTxPower>

Is a numeric parameter. This is the total UE transmit power for PUSCH transmission (measured in dBm) averaged over 480 subframes during the reporting period.(Ref: 3GPP TS 36.213, 5.1.1) Valid range: -23..50

<DL_FREQ>

Is the DownLink carrier frequency of the cell designated by the EUTRA Absolute Radio Frequency Channel Number (EARFCN), valid range: 0... 0xFFFF. (Ref: 3GPP TS 36.101, 5.7.3)

<UL_FREQ>

Is the Uplink carrier frequency of the cell designated by the EUTRA Absolute Radio
Frequency Channel Number (EARFCN), valid range: 0 ... 0xFFFF. (Ref: 3GPP TS 36.101,
5.7.3)

<TDD_DLULConfig>

Is the Cell Downlink and Uplink Configuration operating in TDD mode

<TDD_SubFrameConfig>

Is the Special subframe configuration where 0 indicates Configuration 0,
1 to Configura- tion 1 etc. as specified in TS 36.211

<noOfMCS>

Is the number of MCS's being reported

<currentMCS>

Is the current MCS being reported.

<mcs_count>

Is the Count how many times this MCS was used by the UE for

transmission/reception of UL/DL TBs within the period

<acks_count>

Is the number of times ACKs received for TBs transmitted with MCS within the period

<discard_count>

Is the number of times HARQ retransmissions reach max on certain
HARQ process while last TB sent was using this MCS.

<nacks_count>

Is the number of times NACKs received for TBs transmitted with MCS within the period.

<bytes_count>

Is the Sum of bytes that were transmitted/Received using this MCS within the period.

<crc_error_count>

Is the Counting CRC errors for TB received with MCS within the period.

7.70   Configure thermal sensors with the threshold break point +XTSM

This command is used to configure thermal sensors with the threshold break point.

- Set command enables and disables the alarm for particular sensor.

- Test command returns the possible values of temperature sensor monitoring option, alarm id range for trip point, hysteresis and sampling period.

  URC will be displayed if the threshold is reached and it gets enabled if user has set any alarm.

7.70.1 Syntax of the command

Command syntax: AT+XTSM=<temp_sensor_id>[,<AlarmID>,[<TripPointNumber>, <Hysteresis>
], [<sampling_period>]]