AG35 QuecCell

AT Commands Manual

LTE Module Series

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About the Document

History

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1 Introduction

QuecCell is a featured function embedded in Quectel modules. It can be used to scan the detailed information of base stations.

This document introduces the AT commands relating to QuecCell function of Quectel AG35 module.

2 Description of QuecCell AT Commands

2.1. AT+QENG Switch on/off Engineering Mode

Engineering mode is designed to report the information of serving cell, neighbour cells and packet switch parameters. The command is used to switch on/off the mode.

AT+QENG Switch on/off Engineering Mode	
Test Command **AT+QENG=?**	Response **+QENG:** (list of supported **<celltype>**s) **OK**
Query the information of serving cell **AT+QENG="servingcell"**	Response In the case of GSM mode: **+QENG: "servingscell",<state>,"GSM",<mcc>,<mnc>,<lac>,<cellid>,<bsic>,<arfcn>,<band>,<rxlev>,<txp>,<rla>,<drx>,<c1>,<c2>,<gprs>,<tch>,<ts>,<ta>,<maio>,<hsn>,<rxlevsub>,<rxlevfull>,<rxqualsub>,<rxqualfull>,<voicecodec>** **OK** In the case of WCDMA mode: **+QENG: "servingcell",<state>,"WCDMA",<mcc>,<mnc>,<lac>,<cellid>,<uarfcn>,<psc>,<rac>,<rscp>,<ecio>,<phych>,<sf>,<slot>,<speech_code>,<comMod>** **OK** In the case of LTE mode: **+QENG: "servingcell",<state>,"LTE",<is_tdd>,<mcc>,<mnc>,<cellid>,<pcid>,<earfcn>,<freq_band_ind>,<ul_bandwidth>,<dl**

	_bandwidth>,<tac>,<rsrp>,<rsrq>,<rssi>,<sinr>,<srxlev> **OK** In the case of TD-SCDMA mode: **+QENG: "servingscell",<state>,"TDSCDMA",<mcc>,<mnc>,<lac>,<cellid>,<pfreq>,<rssi>,<rscp>,<ecio>** **OK** In the case of CDMA mode or CDMA+HDR mode: **+QENG: "servingscell",<state>,"CDMA",<mcc>,<mnc>,<lac>,<cellid>,<bcch>,<rxpwr>,<ecio>,<txpwr>** **[+QENG: "servingscell",<state>,"HDR",<mcc>,<mnc>,<lac>,<cellid>,<bcch>,<rxpwr>,<ecio>,<txpwr>]** **OK** In the case of SRLTE mode: **+QENG: "servingscell",<state>,"CDMA",<mcc>,<mnc>,<lac>,<cellid>,<bcch>,<rxpwr>,<ecio>,<txpwr>** **+QENG: "servingcell",<state>,"LTE",<is_tdd>,<mcc>,<mnc>,<cellid>,<pcid>,<earfcn>,<freq_band_ind>,<ul_bandwidth>,<dl_bandwidth>,<tac>,<rsrp>,<rsrq>,<rssi>,<sinr><srxlev>** **OK**
Query the information of neighbour cells **AT+QENG="neighbourcell"**	Response In the case of GSM mode: **[+QENG: "neighbourcell","GSM",<mcc>,<mnc>,<lac>,<cellid>,<bsic>,<arfcn>,<rxlev>,<c1>,<c2>,<c31>,<c32>** **[…]]** **[+QENG: "neighbourcell","WCDMA",<uarfcn>,<psc>,<rscp>,<ecno>** **[…]]** **[+QENG: "neighbourcell","LTE":<earfcn>,<pcid>,<rsrp>,<rsrq>** **[…]]**

	OK In the case of WCDMA mode: **[+QENG:"neighbourcell","WCDMA",<uarfcn>,<srxqual>,<psc>,<rscp>,<ecno>,<set>,<rank>,<srxlev>** **[…]]** **[+QENG:** **"neighbourcell","GSM",<bsic>,<rssi>,<rxlev>,<rank>** **[…]]** **[+QENG:** **"neighbourcell","LTE",<earfcn>,<cellid>,<rsrp>,<rsrq>,<s_rxlev>** **[…]]** **OK** In the case of LTE mode: **[+QENG:** **"neighbourcell intra","LTE",<earfcn>,<pcid>,<rsrq>,<rsrp>,<rssi>,<sinr>,<srxlev>,<cell_resel_priority>,<s_non_intra_search>,<thresh_serving_low>,<s_intra_search>** **[…]]** **[+QENG:** **"neighbourcell inter","LTE",<earfcn>,<pcid>,<rsrq>,<rsrp>,<rssi>,<sinr>,<srxlev>,<threshX_low>,<threshX_high>,<cell_resel_priority>** **[…]]** **[+QENG:** **"neighbourcell","GSM",<arfcn>,<cell_resel_priority>,<thresh_gsm_high>,<thresh_gsm_low>,<ncc_permitted>,<band>,<bsic_id>,<rssi>,<srxlev>** **[…]]** **[+QENG:** **"neighbourcell","WCDMA",<uarfcn>,<cell_resel_priority>,<thresh_Xhigh>,<thresh_Xlow>,<psc>,<cpich_rscp>,<cpich_ecno>,<srxlev>** **[…]]** **OK**
Reference	

Parameter

<celltype>	String format. The information of different cells. "servingcell" The information of 2G/3G/4G serving cell "neighbourcell" The information of 2G/3G/4G neighbour cells
<state>	String format. UE state. "SEARCH" UE is searching but could not (yet) find a suitable 2G/3G/4G cell. "LIMSRV" UE is camping on a cell but has not registered on the network. "NOCONN" UE is camping on a cell and has registered on the network, and it is in idle mode. "CONNECT" UE is camping on a cell and has registered on the network, and a call is in progress.
<rat>	String format. Access technology, include: "GSM" "WCDMA" "LTE" "CDMA" "HDR" "TDSCDMA"
<mcc>	Number format. Mobile Country Code (first part of the PLMN code) "-" Invalid
<mnc>	Number format. Mobile Network Code (second part of the PLMN code) "-" Invalid
<lac>	Hexadecimal format. Location Area Code. The parameter determines the two-byte location area code in hexadecimal format (e.g. 00C1 equals 193 in decimal) of the cell that was scanned. Range: 0-65535. "-" Invalid
<cellid>	Hexadecimal format. Cell ID. The parameter determines the 16-bit (GSM) or 28-bit (UMTS) cell ID. Range: 0-0xFFFFFFF. "-" Invalid
<bsic>	Number format. Base Station Identification Code. Range: 0-63.
<arfcn>	Number format. The parameter determines the ARFCN of the cell that was scanned. Range: 0-1023.
<band>	Number format. The current band. 0 DCS_1800 1 PCS_1900 "-" Other bands
<rac>	Number format. Routing Area Code. Range: 0-255.
<pfreq>	Primary frequency.
<rxlev>	Number format. RX level value for base station selection in dB (see *3GPP 25.304*). RX level range: 0-63. Subtracting 111 from the RX level value, a dBm value will be got.
<txp>	Number format. MS maximum TX power in CCH.
<rla>	Number format. Minimum access RX level.
<drx>	Number format. Discontinuous reception cycle length.

<c1>	Number format. Cell selection criterion.
<c2>	Number format. Cell reselection criterion.
<gprs>	Number format. Whether the current cell supports GPRS or not. 0 Not support GPRS 1 Support GPRS
<tch>	Number format. In hopping, displays 'h', otherwise displays the current ARFCN in voice call.
<ts>	Number format. Timeslot number.
<ta>	Number format. Timing advance for the base station. Range: 0-63.
<maio>	Number format. Mobile Allocation Index Offset.
<hsn>	Number format. Hopping Sequence Number.
<rxqualsub>	Number format. RX quality (sub). Range: 0-7.
<rxqualfull>	Number format. RX quality (full). Range: 0-7.
<rxlevsub>	Number format. RX level (sub). Range: 0-63.
<rxlevfull>	Number format. RX level (full). Range: 0-63.
<voicecodec>	String format. Channel mode during voice call. "HR" Half rate "FR" Full rate "EFR" Enhanced full rate "AMR" Adaptive Multi-Rate "AMRHR" AMR half rate "AMRFR" AMR full rate "AMRWB" AMR wide band "-" Invalid
<uarfcn>	Number format. The parameter determines the UTRA-ARFCN of the cell that was scanned.
<earfcn>	Number format. The parameter determines the E-UTRA-ARFCN of the cell that was scanned.
<psc>	Number format. The parameter determines the primary scrambling code of the cell that was scanned.
<rssi>	Number format. The parameter shows the Received Signal Strength Indication.
<sinr>	Number format. Logarithmic value of SINR, and the values are only the first 1/5 part of the dB value. Range: 0-250, which translates to -20dB - +30dB.
<rscp>	Number format. The Received Signal Code Power level of the cell that was scanned.
<srxlev>	Number format. Select RX Level Value for base station in dB (see *3GPP 25.304*).
<SF>	Number format. Spreading Factor. Values are 4, 8, 16, 32, 64, 128, 256, and 512. 0 SF_4 1 SF_8 2 SF_16 3 SF_32 4 SF_64 5 SF_128 6 SF_256 7 SF_512

	8 UNKNOWN
<slot>	Number format. Slot Format for DPCH (0-16). Slot Format for FDPCH (0-9).
<ComMod>	Number format. Whether compress mode is supported. 0 Not support Compress mode 1 Support Compress mode
<c31>	Number format. GPRS cell selection criterion.
<c32>	Number format. GPRS cell reselection criterion.
<set>	Number format. 3G neighbour cell set. 1 Active Set 2 Sync Neighbour Set 3 Async Neighbour Set
<rank>	Rank of this cell as neighbour for inter-RAT cell reselection.
<txpwr>	Number format. TX power level for the UE.
<is_tdd>	TDD or FDD mode.
<pcid>	Physical Cell ID
<freq_band_ind>	E-UTRA frequency band (see *3GPP 36.101*).
<ul_bandwidth>	Number format. UL bandwidth. 0 1.4MHz 1 3MHz 2 5MHz 3 10MHz 4 15MHz 5 20MHz
<dl_bandwidth>	Number format. DL bandwidth. 0 1.4MHz 1 3MHz 2 5MHz 3 10MHz 4 15MHz 5 20MHz
<tac>	Tracking Area Code (see *3GPP 23.003* ***Chapter 19.4.2.3***).
<rsrp>	Reference Signal Received Power (see *3GPP 36.214* ***Chapter 5.1.1***).
<rsrq>	Reference Signal Received Quality (see *3GPP 36.214* ***Chapter 5.1.2***).
<thresh_serving_low>	The threshold of <srxlev> (in dB) used by the UE on the serving cell when reselecting towards a lower priority RAT/ frequency.
<ecio>	Number format. Carrier to noise ratio in dB = measured Ec/Io value in dB.
<phych>	0 DPCH 1 FDPCH
<speech_code>	Destination number on which the call is to be deflected.
<rxpwr>	Rx power value in 1/10 dBm resolution.
<ecno>	Number format. Carrier to noise ratio in dB = measured Ec/Io value in dB.
<srxqual>	Receiver automatic gain control on the camped frequency.
<s_rxlev>	Inter-frequency cell suitable receive level.
<cell_resel_priority>	Cell reselection priority. Range: 0-7.

<s_non_intra_search>	Threshold to control non-intra-frequency searches.
<s_intra_search>	Cell selection parameter for the intra-frequency cell.
<serving_cell_id>	LTE serving cell ID. This is the cell ID for the serving cell and can be found in the cell list. Range: 0-503.
<threshX_low>	To be referenced when reselection. The suitable receive level value of an evaluated lower priority cell must be greater than this value.
<threshX_high>	To be referenced when reselection. The suitable receive level value of an evaluated higher priority cell must be greater than this value.
<thresh_gsm_high>	Reselection threshold for high priority layers.
<thresh_gsm_low>	Reselection threshold for low priority layers.
<ncc_permitted>	Bitmask that specifies whether a neighbor with a particular network color code is to be reported. Bit n set to 1 means that a neighbor with NCC n is to be included in the report.
<bsic_id>	Base station identity code ID.
<thresh_Xhigh>	Reselection threshold for high priority layers.
<thresh_Xlow>	Reselection threshold for low priority layers.
<cpich_rscp>	Absolute power level of the common pilot channel as received by the UE in dBm×10.
<cpich_ecno>	Ratio of the received energy per PN chip for the common pilot channel to the total received power spectral density at the UE antenna connector in dB×10.
<bcch>	EARFCN. Active channel of the current system.

NOTE

If returns “-” or -, it indicates the parameter is invalid under current condition.

Example

```
AT+QENG="servingcell"
+QENG: "servingcell","SEARCH"

OK
AT+QENG="servingcell"
+QENG:"servingcell","LIMSRV","GSM",460,01,5504,2B55,52,123,0,-67,5,14,64,30,28,0,-,-,-,-,-,-,-,-,-,"
-"

OK
AT+QENG="servingcell"
+QENG:"servingcell","NOCONN","GSM",460,01,5504,2B55,52,123,0,-111,5,14,64,0,0,0,-,-,-,-,-,-,-,-,-,
"-"

OK
AT+QENG="servingcell"
```

```
+QENG:"servingcell","CONNECT","GSM",460,00,550A,2BB9,23,94,0,-61,5,14,4,0,0,0,h,1,0,0,33,50,
52,0,0,"EFR"

OK
AT +QENG="neighbourcell"
[2016-08-15_20:23:32]+QENG: "neighbourcell intra","LTE",38950,276,-3,-88,-65,0,37,7,16,6,44
[2016-08-15_20:23:32]+QENG: "neighbourcell inter","LTE",39148,-,-,-,-,-,37,0,30,7,-,-,-,-
[2016-08-15_20:23:32]+QENG: "neighbourcell inter","LTE",37900,-,-,-,-,-,0,0,30,6,-,-,-,-
[2016-08-15_20:23:32]+QENG: "neighbourcell","GSM",0,3,14,50,255,0,0,-1920,0
[2016-08-15_20:23:32]+QENG: "neighbourcell","GSM",94,3,14,50,255,0,0,-1920,0
[2016-08-15_20:23:32]+QENG: "neighbourcell","GSM",93,3,14,50,255,0,0,-1920,0
[2016-08-15_20:23:32]+QENG: "neighbourcell","GSM",91,3,14,50,255,0,0,-1920,0
[2016-08-15_20:23:32]+QENG: "neighbourcell","GSM",90,3,14,50,255,0,0,-1920,0
[2016-08-15_20:23:32]+QENG: "neighbourcell","GSM",89,3,14,50,255,0,0,-1920,0
[2016-08-15_20:23:32]+QENG: "neighbourcell","GSM",87,3,14,50,255,0,0,-1920,0
[2016-08-15_20:23:32]+QENG: "neighbourcell","GSM",85,3,14,50,255,0,0,-1920,0

OK
AT+QENG="neighbourcell"
[2016-08-15_20:19:54]+QENG: "neighbourcell","WCDMA",10713,-723,398,-880,-155,6,-32768,-
[2016-08-15_20:19:54]+QENG: "neighbourcell","WCDMA",10713,-723,331,-870,-155,2,-32768,-
[2016-08-15_20:19:54]+QENG: "neighbourcell","WCDMA",10713,-723,290,-880,-165,2,-32768,-
[2016-08-15_20:19:54]+QENG: "neighbourcell","WCDMA",10713,-723,397,-910,-190,2,-32768,-
[2016-08-15_20:19:54]+QENG: "neighbourcell","WCDMA",10713,-723,114,-910,-195,2,-32768,-
[2016-08-15_20:19:54]+QENG: "neighbourcell","WCDMA",10713,-723,332,-940,-220,2,-32768,-
[2016-08-15_20:19:54]+QENG: "neighbourcell","WCDMA",10713,-723,379,-950,-230,2,-32768,-
[2016-08-15_20:19:54]+QENG: "neighbourcell","WCDMA",10713,-723,115,-1210,-250,6,-32768,-

OK
```

3 Appendix A Reference

Table 1: Terms and Abbreviations

Abbreviation	Description
ARFCN	Absolute Radio Frequency Channel Number
CCH	Common Transport Channel
CDMA	Code Division Multiple Access
DCS	Digital Cellular System
DL	Downlink
DPCH	Dedicated Physical Channel
EARFCN	E-UTRA Absolute Radio Frequency Channel Number
E-UTRA	Evolved Universal Terrestrial Radio Access
E-UTRA-ARFCN	E-UTRA Absolute Radio Frequency Code Number
FDPCH	Fractional DPCH
GPRS	General Packet Radio Service
GSM	Global System of Mobile Communication
HDR	High Data Rate
LTE	Long-Term Evolution
MS	Mobile Station
NCC	Network Color Code
PCS	Personal Communication Service
PLMN	Public Land Mobile Network
PN	Pseudorandom Noise

RX	Receive
SINR	Signal To Interference Plus Noise Ratio
SRLTE	Single Radio LTE
TDSCDMA	Time Division - Synchronous Code Division Multiple Access
TX	Transmit
UE	User Equipment
UL	Uplink
UMTS	Universal Mobile Telecommunications Service
(U)SIM	(Universal) Subscriber Identity Module
UTRA-ARFCN	UTRA Absolute Radio Frequency Channel Number
WCDMA	Wideband Code Division Multiple Access