# Anritsu MT8820C TD-LTE/TD-SCDMA/GSM All-In-One RF Tester



Version 2.0 Jul 2020

**ANRITSU CORPORATION** 

## **Key Features**

- ✓ All-in-One TD-LTE/TD-SCDMA/GSM RF Tester w/ Signaling
- ✓ Available all R&D RF and Manufacturing process
- ✓ Importance of Signaling mode
- ✓ All 3GPP TRX compliance
- ✓ Easy execution of 3GPP test
- ✓ ALL 3GPP Bands supported
- ✓ Various and Useful features
- ✓ TD-LTE DL 2x2 MIMO Throughput w/ UE Cat.4
- ✓ TD-SCDMA HSPA, Function Test
- ✓ GSM/EGPRS(EDGE) features
- ✓ Technical Support in China

#### All-in-One TD-LTE/TD-SCDMA/GSM RF Tester w/ Signaling

#### Anritsu MT8820C is ONLY RF Tester with Signaling of TD-LTE/TD-SCDMA/GSM in One Box in the world!

As you know, CMCC which is one of the largest network operator in the world plan to launch TD-LTE in years in addition to current TD-SCDMA/GSM service. Therefore, the TD-LTE/TD-SCDMA/GSM mobile terminals are demanded.

All-in-One MT8820C supporting all test functions, including signaling, is the ideal RF tester for RF R&D and manufacturing of TD-LTE/TD-SCDMA/GSM mobile terminals . It gives you cost-benefit, small footprint, and efficient work over other solutions like two boxes.



#### Available all R&D RF and Manufacturing process

The various MT8820C functions, such as calibration, RF parametric testing, signaling, non-signaling, voice calling, video calling, HSPA, 2x2 MIMO support all RF R&D and Manufacturing process for TD-LTE/TD-SCDMA/GSM terminals shown below.

	Call Connection	FTM (Non-signaling)	Chip-specific Calibration	TX test	RX test	Function Test
GSM/GPRS/ EGPRS	Supported	Supported	Supported	Supported	Supported	Audio, Voice call
TD-SCDMA/ HSPA	Supported	Supported	Supported	Supported	Supported	Audio, Voice call, video call, HO to GSM
LTE TDD	Supported	Supported	Supported	Supported	Supported	DL 2x2 MIMO, IP throughput





## Importance of Signaling mode

Some of 3GPP TRX test items to be executed requires "Signaling" function in the RF tester, Since the UE is controlled dynamically by signaling messages during the test. Without signaling function, all 3GPP TRX test item could not be supported. MT8820C support signaling function of all TD-LTE/TD-SCDMA/GSM in one box.

	TD-LTE w/ Signaling	TD-SCDMA w/ Signaling	GSM w/ Signaling
Anritsu MT8820C	Supported	Supported	Supported
Competitor A Product 1 Product 2	Not Supported Supported	Supported Not Supported	Supported Not Supported
Competitor B Product 3	Supported	Not Supported	Supported
Competitor C Product 4	Not Supported	Supported	Supported

In addition, MT8820C signaling function is very reliable and stable, because GSM, TD-SCDMA, and TD-LTE has been supported since 2001, 2007, and 2010, respectively.

### **All 3GPP TRX Compliance**

#### Anritsu MT8820C supports all 3GPP TRX test items of TD-LTE/TD-SCDMA, and almost of GSM. For more detail, refer to MT8820C Application Notes http://www.anritsu.com/en-us/products-solutions/products/mt8820c.aspx

#### **TD-LTE**

	Item	Comment	Non Call	Call
	100111	Comment	Processing <sup>11</sup>	Processing
8	Transmitter Characteristics			
622	LE Maximum output notion		15	11
0.2.2	Maximum Dawar Reduction (MDR)		1	44
0.2.3	Additional Maximum Datum Reduction (A MDR)		4172	44
0.2.4	Configured LIE transmitted output neuror		1010	NN N
0.2.3	Configured OE transmitted output power		NY	YY .
0.3	Visial			
0.3.1	Void		-	-61
0.3.2	Terrenal OFF annual		NV V	VV .
6.3.3	ON/OFF time mark		^	NY .
0.3.4	Canada ONIOFE fina mask		×	-61
0.3.4.1	OPhot land OPC time mask		^	NN N
0.3.4.2	PRACH and SRS time mask		M	
6.3.4.2.1	PRACH time mask		X	NN .
0.3.4.2.2	SRS time mask		X	VV
6.3.5	Power control		N.	
0.3.5.1	Power control absolute power tolerance		X	NN.
6.3.5.2	Power control relative power tolerance		X	NN .
6.3.5.3	Aggregate power control tolerance		X	VV
6.4	Void			
6.5	Transmit signal quality			
6.5.1	Frequency error		NN .	NN .
6.5.2	Transmit modulation			
6.5.2.1	Error Vector Magnitude (EVM)		NN	NN.
6.5.2.1A	PUSCH-EVM with exclusion period		NN	NN .
6.5.2.2	Carrier leakage		NN .	NN.
6.5.2.3	In-band emissions for non allocated RB		NV .	NN .
6.5.2.4	EVM equalizer spectrum flatness		NN.	NN .
6.6	Output RF spectrum emissions			
6.6.1	Occupied bandwidth		NV.	NN .
6.6.2	Out-of-band emission			
6.6.2.1	Spectrum emission mask		NV.	NN .
6.6.2.2	Additional spectrum emission mask		NV 3	NN.
6.6.2.3	Adjacent Channel Leakage power Ratio		NV.	NN.
6.6.2.4	Additional ACLR requirements			
6.6.3	Spurious emissions			
6.6.3.1	Transmitter Spurious emissions	Requires external equipment	-	V.2
6.6.3.2	Spurious emission band UE co-existence	Requires external equipment	-	12
6.6.3.3	Additional spurious emissions	Requires external equipment	-	12
67	Transmit intermodulation	Requires external equipment	-	12
-	Develope Observation in the			-
7.2	Receiver Characteristics		.6.14	-
7.5	Reference sensitivity level		1012	NN NN
7.4	Adjacent Channel Calenti (1000)	Devices external environment	12.9	12
1.3	Placking abaratoriation	rvequires external equipment	¥	Y -
7.0	blocking characteristics	Desident external conference	1.2.2	19
7.0.1	in-band blocking	requires external equipment	N	N I I
7.0.2	Cut-oi-band blocking	requires external equipment	123	12
1.0.3	Narrow band blocking	requires external equipment	12.4	12
1.1	Spunous response	Requires external equipment	V	N-
1.8	Intermodulation characteristics			
7.8.1	Wide band Intermodulation	Requires external equipment	N.	N -
7.8.2	Void			
7.9	Spurious emissions	Requires external equipment	X	N

n-Call Processing does not support call processing function. In addition, because Loop Back and UL Power Control of payload data

In-car inclusions grows not support can processing function in advances coop data and out of in to controlled, Use must output signation maching sets conditions. Inclusive coop data and out in is application note does not explain measurement procedures for appropriate test items. upport measurements only (broadscart information as face). Upputs DL RNC defined from 153 8521-1 Annex A Table A.3.2-1 to Table A.3.2-4 in fixed pattern (ARB). Incorport, measurements supported as UE side.

#### **TD-SCDMA**

#### 1.2. 3GPP Measurement Specification (3GPP TS 34.122 V9.4.0) Table

	Item	Comment	
5	Transmitter Characteristics		$^{\prime}$
52	Lear Equipment maximum output nower		11
5.24	User Equipment maximum output power with E-DCH	MX882007C-021	33
5.28	User Equipment maximum output power with HS-SICH and	MX882007C-011	33
0.20	DPCH		
5.3	UE frequency stability		11
5.4	Output Power Dynamics		~
5413	Open loop power control		NV T
5.4.1.4	Closed loop power control		NV.
5.4.2	Minimum output power		NN I
5.4.3	Transmit OFF power		11
5.4.4	Transmit ON/OFF Time mask		NV .
5.4.5	Out-of-synchronisation handling of output power for continuous transmission		11
5.4.6	Out-of-synchronisation handling of output power for discontinuous transmission		11
5.5	Output RF spectrum emissions		
5.5.1	Occupied bandwidth		VV
5.5.2	Out of band emission		
5.5.2.1	Spectrum emission mask		11
5.5.2.1A	Spectrum emission mask	MX882007C-021	W
5.5.2.1B	Spectrum emission mask	MX882007C-011	NN I
5.5.2.2	Adjacent Channel Leakage power Ratio (ACLR)		NV
5.5.2.2A	Adjacent Channel Leakage power Ratio (ACLR) with E-DCH	MX882007C-021	11
5.5.2.2B	Adjacent Channel Leakage power Ratio (ACLR) with HS-SICH and DPCH	MX882007C-011	11
5.5.3	Sourious Emissions	Requires SPA	V
5.6	Transmit Intermodulation	Requires SG and SPA	N
5.7	Transmit Modulation		
5.7.1	Error Vector Magnitude		NV I
5.7.1A	Error Vector Magnitude with E-DCH 16QAM	MX882007C-021	NV I
5.7.1B	Error Vector Magnitude with HS-SICH and DPCH	MX882007C-011	NN I
5.7.2	Peak code domain error		MN I
6	Receiver Characteristics		/
6.2	Reference sensitivity level		NV I
6.3	Maximum Input Level		NV.
6.3A	Maximum Input Level for HS-PDSCH Reception (16QAM)	MX882007C-011	NN I
6.4	Adjacent Channel Selectivity (ACS)	Requires SG	V
6.5	Blocking Characteristics	Requires SG	1
6.6	Spurious Response	Requires SG	V
6.7	Intermodulation Characteristics	Requires SG	V
6.8	Spurious Emissions	Requires SPA	V
7	Performance Requirements		/
7.2	Demodulation in static propagation conditions	Requires SG	V
7.3	Demodulation of DCH in multipath fading conditions		
7.3.1	Multipath fading Case 1	Requires Fading Simulator and SG	1
7.3.2	Multipath fading Case 2	Requires Fading Simulator and SG	V
7.3.3	Multipath fading Case 3	Requires Fading Simulator	V
7.5	Power control in downlink	Requires Fading Simulator	V
9	Performance requirements for HSDPA	and SO	
93	Performance Requirements for 1 28 Mons TDD option		
931	HS-DSCH Throughout for Fixed Reference Chappele	1	$\sim$
9314	HS-DSCH throughput for Fixed Reference Channels 0.5 Mine	MX882007C-011	1
	UE dass OPSK	Requires Fading Simulator	1
9.3.1B	HS-DSCH throughout for Fixed Reference Channels 1.1 Mbps	MX882007C-011	V
	LIE class 160AM	Requires Fading Simulator	

#### 2.2. 3GPP Measurement Specification Table

	Item	Comment	
12	Transceiver		
12.1	Conducted spurious emissions	Requires SPA	N
12.2	Radiated spurious emissions	Requires SPA	N
2.3	Conducted spurious emissions for MS supporting R-GSM frequency band	Requires SPA	1
2.4	Radiated spurious emissions for MS supporting R-GSM frequency band	Requires SPA	1
3	Transmitter		
3.1	Frequency error and phase error		1
3.2	Frequency error under multipath and interference conditions	Requires Fading Simulator	1
3.3	Transmitter output power and burst timing		W
3.4	Output RF spectrum		W
3.6	Frequency error and phase error in HSCSD multi-slot configurations		-
3.7	Transmitter output power and burst timing in HSCSD configurations		-
3.8	Output RF spectrum in HSCSD multislot configuration		-
3.9	Output RF spectrum for MS supporting the R-GSM band		W
3.16	GPRS Transmitter tests		
3.16.1	Frequency error and phase error in GPRS multi-slot configuration		W
3.16.2	Transmitter output power in GPRS multi-slot configuration	up to 2UL	NV I
3.16.3	Output RF spectrum in GPRS multi-slot configuration	1UL only	W
3.17	EGPRS Transmitter tests	without Call Processing	
3.17.1	Frequency error and modulation accuracy in EGPRS configuration		W
3.17.2	Frequency error under multipath and interference conditions	Requires Fading Simulator	N
3.17.3	EGPRS Transmitter output power	up to 2UL	W
3.17.4	Output RF spectrum in EGPRS configuration	1UL only	NN
√: Supp	orted (except Frequency Hopping)   1/: Requires external equipment (SPA or S	SG)   F: Future Support   -: Not	

GSM

	Item	Comment	
14	Receiver		/
14.1	Bad frame indication		
14.1.1	Bad frame indication - TCH/FS		-
14.1.2	Bad frame indication - TCH/HS		-
14.1.3	Bad frame indication - TCH/FS - Frequency hopping and downlink DTX -		-
	Phase 2 MS in a phase 1 network		
14.1.4	Bad frame indication - TCH/HS – Frequency hopping and downlink DTX - Phase 2 MS in phase 1 network		-
14.1.5	Bad frame indication - TCH/AFS (Speech frame)		-
14.1.6	Bad frame indication - TCH/AHS		-
1416	Bad frame indication - TCH/AHS - Random RE input		-
1			
14.2	Reference sensitivity		
14.2.1	Reference sensitivity - TCH/FS	Static conditions	W
		Propagation conditions	N
44.0.0	Defense construction TOURID (Construction Construction)	(Requires Fading Simulator)	1
14.2.2	Reference sensitivity - TCHVHS (Speech trames)	(Population Conditions	Y
14.2.3	Reference sensitivity - FACCH/F	(requires rading Simulator)	-
14.2.4	Reference sensitivity - FACCH/H		-
14.2.5	Reference sensitivity - full rate data channels		-
14.2.6	Reference constituity half rate data channels		-
14.2.7	Reference sensitivity - TCH/EES	Static conditions	14
19.4.1		Dropagation conditions	1
		(Requires Eading Simulator)	•
1428	Reference sensitivity - full rate data channels in multi-slot configuration	(rieden oo r dang ennourer)	-
1429	Reference sensitivity - TCH/ES for MS supporting the R-GSM band	Static conditions	33
		Propagation conditions	J
		(Requires Fading Simulator)	· ·
14.2.10	Reference sensitivity - TCH/AFS	Static conditions	NV.
		Propagation conditions	1
		(Requires Fading Simulator)	
14.2.18	Reference sensitivity - TCH/AHS	Static conditions	W
		Propagation conditions	1
		(Requires Fading Simulator)	
14.2.19	Reference sensitivity - TCH/AFS-INB		-
14.2.20	Reference sensitivity - TCH/AHS-INB		-
14.3	Usable receiver input level range	Static conditions	M.
		Propagation conditions (Requires Fading Simulator)	1
√V: Sund	orted (except Frequency Hopping) I 1/- Requires external equipment (SPA or S	G)   F: Future Support   - Not	
	(	-//	

Supported

#### Easy execution of 3GPP test – 1/2

"Test Parameter" help user to execute easily 3GPP tests according to 36.521-1 TD-LTE/34.122 TD-SCDMA TRX test conditions, eliminating complex parameter settings and providing easy standard tests. In addition, control is simple and fast using remote commands.



#### Easy execution of 3GPP test – 2/2

For example, pressing



automatically sets related parameters controlling the mobile terminal maximum output level, and measurement items.

After measurement, overall evaluation, pass and fail items (displayed in red) can be seen at a glance.



### ALL 3GPP Bands supported

Anritsu MT8820C support ALL 3GPP Bands for TD-LTE, TD-SCDMA, and GSM, including new TD-LTE band 42/43 in 3.4 to 3.8GHz frequency range.

	3GPP Band
TD-LTE	33 to 43
TD-SCDMA	a, b, c, d, e, f
GSM	GSM850, GSM900, DCS1800, PCS1900

Anritsu MT8820C cover wide frequency range 300 to 2700 MHz (standard), 3400 to 3800 MHz (charged opt). Within this range, to add new band is easy and software upgradable if new band comes up in the future.

### Various and Useful features

Anritsu MT8820C TD-LTE/TD-SCDMA/GSM can offer not only basic requirements like 3GPP tests w/signaling and all band support, but also various and useful features for RF R&D and production line like Graphical views, UE Report, Throughput, auto CLPC test, etc. The following slides introduce some of these features. For more detail, please refer to MT8820C Brochure, Product Introduction and Application Note.

http://www.anritsu.com/en-us/products-solutions/products/mt8820c.aspx



## TD-LTE DL 2x2 MIMO Throughput w/ UE Cat.4

Single MT8820C TD-LTE with MIMO configuration have ability to support LTE UE Category 4 DL Throughput (DL 131 Mbps<sup>\*1</sup> in theory) in L1 layer and IP layer<sup>\*2</sup>. We have confirmed it with one chipset.



\*1: Theoretical maximum data rate,

\*2: IP data throughput measured by external equipment such as PC. The actual IP throughput may be affected by external PC environment.

## **TD-SCDMA HSPA, Functional Test**

Anritsu MT8820C TD-SCDMA HSPA can offer 3GPP TRX HSDPA/HSUPA tests, and HSDPA RF max throughput (Cat.15, 2.8Mbps), CQI, and HSUPA Throughput monitor. In addition, TD-SCDMA Voice Codec opts. offer the end-to-end voice call between a handset and TD-SCDMA UE. TD-SCDMA Video Phone test opt. offer video call test with loopback and end-to end cases. TD-SCDMA to GSM Blind Handover function is supported to shorten the test time in production line.



# **GSM/EGPRS(EDGE)** features

Anritsu MT8820C GSM/EGPRS can offer useful graphical views and support GPRS/EGPRS multi-slot class 1 to 12, 30 to 34. In addition, GSM Voice Codec opts. offer the end-to-end voice call between a handset and GSM UE.







Block Error Rate End				
	Ratio	Event	Rece i ved	Sample
Block Error Rate	0.00 🎖	0	1000/	1000
- 1st Slot	0.00 🎖	0	250	
- 2nd Slot	0.00 🎖	0	250	
- 3rd Slot	0.00 🎖	0	250	
- 4th Slot	0.00 %	0	250	





# Appendix

## What's MT8820C?

#### All-in-One Test Platform Supporting LTE and Compatibility with Existing 3G/2G

The MT8820C is Anritsu's new all-in-one test platform for R&D and manufacturing of LTE/2G/3G UE (User Equipment); it is based on the popular MT8820B for the 2G/3G market.

The MT8820C supports manufacturing of LTE mobiles, including RF calibration, RF parametric testing, and functional tests. It is backwards compatible with the MT8820B/15B.

With MT8820C TD-LTE/TD-SCDMA/GSM configuration, To add LTE FDD and WCDMA is just software upgrade.

\*1: Parallelphone<sup>™</sup> is a registered trademark of Anritsu Corporation.



#### Key Features

- Supports 2G/3G to LTE with Signaling

LTE FDD/TDD W-CDMA/HSPA/HSPA Evolution GSM/GPRS/EGPRS TD-SCDMA/HSPA PHS/ADVANCED PHS

- Backwards compatibility with MT8820A/B
- Supports all manufacturing process.
- Paarllephonce Measurement<sup>\*1</sup>





2020-7 MJM

No. MT8820C-E-L-2-(2.00)