

Radio Communication Analyzer MT8821C



Radio Communication Analyzer MT8821C

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MT8821C is an all-in-one tester designed for RF verification and functional tests of mobile phone incl. Smartphone. It supports all cellular technologies including LTE-Advanced and IoT in accordance with 3GPP RF relating test specifications: TS36.521-1 Chapter 6, 7. It also equips Call-processing mode which must remove the difficulty of chipset control and reduce development terms with simple operation.

LTE/LTE- Advanced

- DL CA 8CCs 4x4MIMO ***
- DL CA 6CCs 4x4MIMO **
- DL CA 4CCs 4x4MIMO *
- DL CA 4CCs 2x2 MIMO
- UL CA 2CCs

IoT systems

- LTE Cat-M1
- NB-IoT, Cat-NB2
- ✓ W-CDMA
 - HSPA Evolution
 - DB/DC-HSDPA
 - 4C-HSDPA
 - · DC-HSUPA
- ✓ GSM
 - GPRS
 - EGPRS
 - TD-SCDMA
 - HSPA
 - HSPA Evolution
- Enhanced GUI with large touch panel
- ParallelPhone measurement (e.g. Cat.M1 + NB-IoT)
- Built-in application/IMS server
- Compatibility with MT8820C



All-In One Tester for LTE-Advanced UE Development



The all-in-one MT8821C supports RF parametric tests through to UE functional and performance tests in one box. It is the perfect solution for development of RF chipsets and UE.



Internal RF Frontend

The MT8821C supports up to 8 TX RF (when AUX ports used). It can also combine RF signals using the built-in RF frontend for LTE CA.

This is the original feature of MT8821C which enables users to simplify the test connection diagram because users do not need to prepare the external combiner.

Combining RF signals

The following combination can be selected according to the user's purpose.





Multi-RAT Measurement



One MT8821C can perform two measurements simultaneously. Anritsu calls this function Parallel-Phone Measurement or PPM.

It supports simultaneous and independent testing of two UEs.

The MT8821C contribute to reduce user's burden for test...

- SGLTE/SVLTE
- DSDA
- RRM (Inter-RAT measurement)
- Two UEs measurement (e.g. LTE Cat-M1 and NB-IoT)



MT8821C LTE Support Status (Physical layer)





*1: When PCC is TDD with FDD/TDD joint CA, UL/DL Configuration 1 is supported. *2: PCC is FDD. SCC is FDD or TDD or LAA.

DL CA Throughput (No limitation even with inter-band non-contiguous CA case)

4x4 MIMO (256QAM)	400 Mbps	800 Mbps	1200 Mbps	J ^{∗3} LAA 1600 Mbps	J ^{*3} LAA 2000 Mbps	2400 Mbps	J ^{≭3} LAA 2800 Mbps]*3 LA/ 3200 Mbps
2x2 MIMO (256QAM)	200 Mbps	400 Mbps	600 Mbps	800 Mbps	J ^{*3} 1000 Mbps	1200 Mbps	J ^{⊮3} 1400 Mbps ^{LA}	A ^{J*3} 1600 Mbps
SISO (256QAM)	100 Mbps	200 Mbps	300 Mbp	400 Mbps	500 MbpsLAA	600 Mbps	³ 700 Mbps	A 800 Mbps
СА	1	2	3	4	5	6 ^{*4}	7 *4	8 *4

*3: Only supports PCC FDD frame structure among several CCs. Considering future support for TDD *4: CA with all-TDD band combination is not supported.

UL CA Throughput

SISO (<mark>64QAM</mark>)	75 Mbps	150 Mbps		
CA	1	2		

RF Test Configuration for 5G NSA (MT8000A + MT8821C NSA)



Outline of the option

- 4G Anchor function^{*1} to realize RF measurement of 5G NSA UE by connecting with 5G tester
- 4G Anchor also supports MIMO and CA if required options are equipped. (required options are same as MT8821C LTE configuration)

i elte 5 G NSA UE 5 G NSA UE

NSA-NR Network Configuration Image

<u>Required minimum unit</u>

*1: LTE IP data transfer function during connected with 5G tester is not supported.

<MT8821C FDD Configuration>

Product Num.	Product Name
MT8821C	Radio Communication Analyzer
MT8821C-008	LTE Measurement Hardware
MX882112C	LTE FDD Measurement Software
MX882112C-010	LTE FDD 5G NSA Anchor

<MT8821C TDD Configuration >

Product Num.	Product Name
MT8821C	Radio Communication Analyzer
MT8821C-008	LTE Measurement Hardware
MX882113C	LTE TDD Measurement Software
MX882113C-010	LTE TDD 5G NSA Anchor



Product Overview

MT8821C will support RF Tx/Rx measurements for Cat M and NB-IoT to be specified in Chapter 6/7 of 3GPP TS 36.521-1.



Configuration

Cat M

Model	Name
MT8821C	Radio Communication Analyzer
MT8821C-008	LTE Measurement Hardware
MX882116C	LTE Category M1 Measurement Software
MX882116C-006	LTE Category M1 IP Data Transfer

NB-IoT

Model	Name
MT8821C	Radio Communication Analyzer
MT8821C-008	LTE Measurement Hardware
MX882117C	NB-IoT Measurement Software
MX882117C-001	Category NB2 Measurement Software
MX882117C-002	NB-loT Multi Carrier
MX882117C-006	NB-IoT IP Data Transfer

MT8821C Cat M/NB-IoT Measurement Software

Available features

Advancing beyond

RF TRX measurement

- 3GPP TS36.521-1 test case
- Maximum Throughput

ΟΤΑ

- Some OTA vendors have already supported Cat M of MT8821C.
- Some OTA vendors have already supported NB-IoT of MT8821C.

Power consumption

- For Idle status
 - eDRX : Extended DRX
 - PSM : Power Saving Mode



- For Connected status
 - Maximum Throughput
 - IP data feature

Function/Stress testing

- Maximum Throughput
- IP data feature
 - Internal Server/Iperf



3GPP Cat M test cases

These items are based on 3GPP TS36.521-1 (2019-06).

TX Measurer	ments These items are based on 3GPP TS36.521-1 (20)19-06).	
Section	Item	Supporting status	Note
6.2.2EA	UE Maximum Output Power for UE category M1	Supported	
6.2.3EA	Maximum Power Reduction (MPR) for UE category M1	Supported	
6.2.4EA	Additional Maximum Power Reduction (A-MPR) for UE category M1	Supported	
6.2.5EA	Configured UE transmitted Power for UE category M1	Supported	
6.3.2EA	Minimum Output Power for UE category M1	Supported	
6.3.3EA	UE Transmit OFF power for UE category M1	Supported	
6.3.4EA1	General ON/OFF time mask for UE category M1	Supported	
6.3.4EA2.1	PRACH time mask for UE category M1	Supported	
6.3.4EA2.2	SRS time mask for UE category M1	Supported	
6.3.5EA1	Power Control Absolute power tolerance for UE category M1	Supported	
6.3.5EA2	Power Control Relative power tolerance for UE category M1	Supported	
6.3.5EA3	Aggregate power control tolerance for category M1	Supported	
6.5.1EA	Frequency Error for UE category M1	Supported	
6.5.2.1EA.1	Error Vector Magnitude (EVM) for UE category M1	Supported	
6.5.2.1EA.2	PUSCH-EVM with exclusion period for UE categoryM1	Supported	
6.5.2.2EA	Carrier leakage for UE category M1	Supported	
6.5.2.3EA	In-band emissions for non allocated RB for UE category M1	Supported	
6.5.2.4EA	EVM equalizer spectrum flatness for UE category M1	Supported	
6.6.1EA	Occupied bandwidth for UE category M1	Supported	
6.6.2.1EA	Spectrum Emission Mask for UE category M1	Supported	
6.6.2.2EA	Additional Spectrum Emission Mask for UE category M1	Supported	
6.6.2.3EA	Adjacent Channel Leakage power Ratio for UE category M1	Supported	
6.6.3EA	Spurious emission for UE category M1	Supported	External spectrum analyzer is required

RX Measurements

Section	Item	Supporting status	Note
7.3EA	Reference sensitivity level for UE category M1	Supported	
7.4EA	Maximum input level for UE category M1	Supported	
7.5EA	Adjacent Channel Selectivity (ACS) for UE category M1	Supported	External signal generator is required
7.6.1EA	In-band blocking for UE category M1	Supported	External signal generator is required
7.6.2EA	Out-of-band blocking for UE category M1	Supported	External signal generator is required
7.6.3EA	Narrow band blocking for UE Category M1	Supported	External signal generator is required
7.7EA	Spurious response for UE category M1	Supported	External signal generator is required
7.8.1EA	Wide band Intermodulation for UE category M1	Supported	External signal generator is required
7.9EA	Spurious emissions for UE category M1	Supported	External spectrum analyzer is required

Note. - Only FDD-LTE half-duplex is supported. FDD-LTE full- duplex and TDD-LTE is under consideration.

Advancing beyond

3GPP NB-IoT test cases

These items are based on 3GPP TS36.521-1 (2019-06).



TX Measurements Note. – MX882117C-001 Category NB2 Measurement Software is required for NB2 RF TRX tests

Section	Item	Support status	Note
6.2.2F	UE Maximum Output Power for category NB1 and NB2	Supported	
6.2.2FA	UE Maximum Output Power for category NB1 and NB2 / Power Class 6	Supported	
6.2.3F	Maximum Power Reduction (MPR) for category NB1 and NB2	Supported	
6.2.3FA	Maximum Power Reduction (MPR) for category NB1 and NB2 / Power Class 6	Supported	
6.2.5F	Configured UE transmitted Output Power for UE category NB1 and NB2	Supported	
6.2.5FA	Configured UE transmitted Output Power for UE category NB1 and NB2/Power Class 6	Supported	
6.3.2F	Minimum Output Power for category NB1 and NB2	Supported	
6.3.3F	Transmit OFF power for Category NB1 and NB2	Supported	This test is included in 6.3.4F.1
6.3.4F.1	General ON/OFF time mask for category NB1 and NB2	Supported	
6.3.4F.2	NPRACH time mask for category NB1 and NB2	Supported	
6.3.5F.1	Power Control Absolute power tolerance for category NB1 and NB2	Supported	
6.3.5F.2	Power Control Relative power tolerance for category NB1 and NB2	Supported	
6.3.5F.3	Aggregate power control tolerance for category NB1 and NB2	Supported	
6.3.5FA.1	Power Control Absolute power tolerance for category NB1 and NB2/Power Class 6	Supported	
6.3.5FA.2	Power Control Relative power tolerance for category NB1 and NB2/Power Class 6	Supported	
6.3.5FA.3	Aggregate power control tolerance for category NB1 and NB2/Power Class 6	Supported	
6.5.1F	Frequency Error for category NB1 and NB2	Supported	
6.5.2.1F.1	Error Vector Magnitude (EVM) for category NB1 and NB2	Supported	
6.5.2.1FA.1	Error Vector Magnitude (EVM) for category NB1 and NB2/Power Class 6	Planning	3GPP test spec has not finalized yet
6.5.2.2F	Carrier leakage for category NB1 and NB2	Supported	
6.5.2.2FA	Carrier leakage for category NB1 and NB2/Power class 6	Planning	3GPP test spec has not finalized yet
6.5.2.3F	In-band emissions for non allocated RB for category NB1 and NB2	Supported	
6.5.2.3FA	In-band emissions for non allocated RB for category NB1 and NB2/Power Class 6	Planning	3GPP test spec has not finalized yet
6.6.1F	Occupied bandwidth for category NB1 and NB2	Supported	
6.6.2.1F	Spectrum Emission Mask for category NB1 and NB2	Supported	
6.6.2.3F	Adjacent Channel Leakage power Ratio for category NB1 and NB2	Supported	
6.6.3F.1	Transmitter Spurious emissions for category NB1 and NB2	Supported	External spectrum analyzer is required
6.6.3F.2	Spurious emission band UE co-existence for category NB1 and NB2	Supported	External spectrum analyzer is required
6.7F	Transmit intermodulation for category NB1 and NB2	Supported	External signal generator is required

RX Measurements

Section	Item	Support status	Note
7.3F.1	Reference sensitivity level without repetitions for category NB1 and NB2	Supported	
7.3F.2	Reference sensitivity level with repetitions for category NB1 and NB2		3GPP test spec was deleted
7.4F	Maximum input level for category NB1 and NB2	Supported	
7.5F	Adjacent Channel Selectivity (ACS) for category NB1 and NB2	Supported	External signal generator is required
7.6.1F	In-band blocking for category NB1 and NB2	Supported	External signal generator is required
7.6.2F	Out-of-band blocking for Category NB1 and NB2	Supported	External signal generator is required
7.7F	Spurious response for category NB1 and NB2	Supported	External signal generator is required
7.8.1F	Wide band Intermodulation for category NB1 and NB2	Supported	External signal generator is required
7.9F	Spurious emissions for Category NB1	Supported	External spectrum analyzer is required

OTA Implementation status

MT8821C continues to support leading edge features like LTE 4CA, 4x4 MIMO. OTA vendor and Anritsu provide OTA solution for leading edge features.

Reference : CTIA_OTA_Test_Plan v3.8.2

CTIA Test Plan for 2x2MIMO Downlink MIMO v1.2

Indicator	Meaning	
\checkmark	Supported	
V	Supported(not verified)	
D	Under development	
С	Under consideration	
-	Not supported	

Mandated by CTIA Wireless Device OTA Performance Planned by CTIA Wireless Device OTA Performance

		Bluetest	ETS-Lindgren	MVG (SATIMO)	EMITE	
			(Reverb)	(Anechoic)	(Anechoic)	(Reverb)
LTE		SISO/2x2 MIMO 📩	\checkmark	\checkmark	\checkmark	\checkmark
		4x4 MIMO	\checkmark	\checkmark	\checkmark	\checkmark
		SISO/2x2 MIMO 📩	\checkmark	\checkmark	\checkmark	\checkmark
	DL ZCA	4x4 MIMO	\checkmark	-	\checkmark	\checkmark
		SISO/2x2 MIMO 📩	\checkmark	\checkmark	\checkmark	\checkmark
	DL SCA	4x4 MIMO	\checkmark	-	-	V
LTE-A		SISO/2x2 MIMO 📩	\checkmark	\checkmark	\checkmark	\checkmark
	DL 4CA	4x4 MIMO	\checkmark	-	-	D
		SISO/2x2 MIMO 📩	\checkmark	-	-	-
	DL SCA	4x4 MIMO	\checkmark	-	-	-
	UL 2CA	SISO	\checkmark	-	-	-
		HSPA 📩	\checkmark	\checkmark	\checkmark	\checkmark
VVCL		DC-HSDPA	\checkmark	-	-	\checkmark
GSM		GPRS/EGPRS 📩	\checkmark	\checkmark	\checkmark	\checkmark
TD-SCDMA		HSPA	\checkmark		✓ (HSDPA only)	✓ (HSDPA only)
CDMA2K		1xEV-DO 📩	✓ *	✓ *	V*	✓ *
ΙοΤ		Cat-M 📩	\checkmark			
		NB-IoT 📩 📩	\checkmark			

* CDMA2K : Discontinued

SAR

SAR (Specific absorption rate) is a measure of the rate at which energy is absorbed by the human body when exposed to a radio electromagnetic field. It is defined as the power absorbed per mass of tissue and has units of watts per kilogram (W/kg).

SPEAG in Switzerland is a biggest SAR system vendor.

 MT8821C is supported as a subset for LTE/W/G by automated test s/w (V2.6 ~) of SPEAG system in DASY6 and cSA3D as of Mar. 2016.

http://www.speag.com/products/csar3d/csar3d-overview/

• News release from SPEAG below.

http://www.speag.com/news-events/news/measurement/anritsu-mt8820c-integrates-with-dasy6-and-csar3d/



SAR Test Setup



Automated 3GPP RF TRx Test Measurement System



An automated measurement system is easily configured using the ATS tools (remote control sample tools) running on an external PC controller.

Measurement, Pass/Fail evaluation, and report creation are performed simply by selecting test cases from a list, supporting 3GPP RF TRx testing even by inexperienced operators.

N Plan	
Ban OK VincitsU envision: ensure OK Plan: No Plan Loaded Plan: No Plan Loaded	
TEST, FDDRAND: LTE, BandClass: 1: Band 1, BandWidth: 10HHZ, CH: 18300/1/18300, ITHE! Transmitter, MaxPwrMPR, MaxPwrMPR, CellFower (-60), UFPower (- TEST, FDDRAND: LTE, BandClass: 1: Band 1, BandWidth: 20HHZ, CH: 18300/1/18300, ITHE! Transmitter, MaxPwrMPR, MinPwr, GeneralMask, FAME, GeneralMask, FA TEST, FDDRAND: LTE, BandClass: 1: Band 1, BandWidth: SHHZ, CH: 18300/1/18300, ITHE! Transmitter, MaxPwrM, MinPwr, GeneralMask, FAME, GeneralMask, FA TEST, FDDRAND: LTE, BandClass: 1: Band 1, BandWidth: SHHZ, CH: 18500/1/18300, ITHE! Transmitter, MaxPwrM, MinPwr, GeneralMask, FAME, G	Measured Results Pass/Fail Evaluation
Add Insert Modify Delete Item Moble Command Port: COM1 Baud Rate: 115200 Please Input AT command Plan Edit Band Channel Range LTE Band LTE Band LTE Band	Auto Text System (Ver: 1.4.02-160628) Plan Pgrameters Setup Instrument Loss Tool DUT Control Help Ver: 1.4.02-160628 / Model: MT8821C
LTE 18025,18300,18575 FDD 1: Band 1 5MHZ I User Define Channel Test Item ITransmitter Test Items Multi-Tester Items Tput I Est Items I Est Items <th>Mobile Process Plan : W wait registration Mobile Process Screen Pause Screen Screen Stop</th>	Mobile Process Plan : W wait registration Mobile Process Screen Pause Screen Screen Stop
Sensthirty C.2.4 Madditional Max. Power Reduction (Verk) C.2.4 Diardivector Magnitude (Levit) - V-U.C.H C.2.4 Madditional Max. Power Reduction (Verk) C.2.5 Configured UE transmitted Output Power C.5.2.1 Enror Vector Magnitude (Levit) - PAICH RSRP C.5.2.5 Configured UE transmitted Output Power C.5.2.1 APUSCH - ENR with exclusion period C.5.2.4 Configured UE transmitted Output Power C.5.2.1 APUSCH - ENR with exclusion period C.5.2.4 Configured UE transmitted Output Power C.5.2.1 APUSCH - ENR with exclusion period C.5.2.4 Configured UE transmitted Output Power C.5.2.1 APUSCH - ENR with exclusion period C.5.2.4 Configured UE transmitted Output Power C.5.2.1 APUSCH - ENR with exclusions for non allocated RB - PUSCH	PASS
Cel Power 60 dbm Cel Al Tx Items Step Test Config Env) Cel Al Tx Items Step Test Config Env) Cel Config Env Cel Config Env Cel Power 60 dbm dbm Cel Power 60 dbm	нерот НССМА/TDSCDMA 0.9/0.9 ССМА2К 1/1 GSM 0.4/0.4 DCS 0.7/0.7 EFS 0.9/0.9
	GSM050 0.4/0.4 AUX 1 dB(Out)N/A M03700A 0 dB(Out)N/A M0389/B 0 dB(Out)N/A M0589/B 0 dB(Out)N/A
Measurement Item Selection Window	Pass item count: 12 Fail item count: 0 PLAN END TIME: 2016-11-21 11:33:26
	Total Test Time 01 min 37 sec

APPENDIX



Limitation

• IP Throughput measurement is not supported

DL 6CA 4x4 MIMO

· HARQ re-transmission is not supported

DL 6CA 4x4 MIMO

Required options

No	b. PCC	SCC1	SCC2	SCC3	SCC4	SCC5
1	FDD 4x4					
2	FDD 4x4	TDD 4x4				

* LAA (band46) is supported

If you want to test the CA/ MIMO combination shown in the right, following options are required.

* All TDD pattern is not verified

Primary			
Measurement In	struments	No.1	No.2
MT8821C	Radio Communication Analyzer	1	1
Hardware Optio	ns	No.1	No.2
MT8821C-008	LTE Measurement Hardware	2	2
MT8821C-012	Parallel Phone Measurement Hardware	1	1
MT8821C-025	2nd RF for Phone1	1	1
MT8821C-026	3rd RF for Phone1	1	1
MT8821C-027	4th RF for Phone1	1	1
MT8821C-028	2nd RF for Phone2	1	1
MT8821C-029	3rd RF for Phone2	1	1
MT8821C-030	4th RF for Phone2	1	1
Software Option	15	No.1	No.2
MX882112C	LTE FDD Measurement Software	1	1
MX882112C-011	LTE FDD 2x2 MIMO DL	1	1
MX882112C-012	LTE FDD 4x4 MIMO DL	1	1
MX882112C-021	LTE-Advanced FDD DL CA Measurement Software	1	1
MX882112C-031	LTE-Advanced FDD DL 3CCs Measurement Software	1	1
MX882112C-041	LTE-Advanced FDD DL 4CCs Measurement Software	1	1
MX882112C-051	LTE-Advanced FDD DL 5CCs Measurement Software	1	1
MX882112C-061	LTE-Advanced FDD DL 6CCs Measurement Software	1	1
MX882113C	LTE TDD Measurement Software	-	1
MX882113C-011	LTE TDD 2x2 MIMO DL	-	1
MX882113C-012	LTE TDD 4x4 MIMO DL	-	1
MX882113C-021	LTE-Advanced TDD DL CA Measurement Software	-	1
MX882113C-031	LTE-Advanced TDD DL 3CCs Measurement Software	-	1
MX882113C-041	LTE-Advanced TDD DL 4CCs Measurement Software	-	1
MX882113C-051	LTE-Advanced TDD DL 5CCs Measurement Software	-	1
MX882113C-061	LTE-Advanced TDD DL 6CCs Measurement Software	-	1
Othors		~ 1/2/2	

	Others		No.1/2/3
	J1606A	Cable	1
	-	BNC Cable	2
NRITS	-	Ethernet Cable	2

Secondary1			
Measurement In	nstruments	No.1	No.2
MT8821C	Radio Communication Analyzer	1	1
Hardware Options			No.2
MT8821C-008	LTE Measurement Hardware	2	2
MT8821C-012	Parallel Phone Measurement Hardware	1	1
MT8821C-025	2nd RF for Phone1	1	1
MT8821C-026	3rd RF for Phone1	1	1
MT8821C-027	4th RF for Phone1	1	1
MT8821C-028	2nd RF for Phone2	1	1
MT8821C-029	3rd RF for Phone2	1	1
MT8821C-030	4th RF for Phone2	1	1
Software Option	ns	No.1	No.2
MX882112C	LTE FDD Measurement Software	1	1
MX882113C	LTE TDD Measurement Software	-	1

Secondary2

Measurement	No.1	No.2	
MT8821C	Radio Communication Analyzer	1	1
Hardware Opt	No.1	No.2	
MT8821C-008	LTE Measurement Hardware	2	2
MT8821C-012	Parallel Phone Measurement Hardware	1	1
MT8821C-025	2nd RF for Phone1	1	1
MT8821C-026	3rd RF for Phone1	1	1
MT8821C-027	4th RF for Phone1	1	1
MT8821C-028	2nd RF for Phone2	1	1
MT8821C-029	3rd RF for Phone2	1	1
MT8821C-030	4th RF for Phone2	1	1
Software Opti	ons	No.1	No.2
MX882112C	TE FDD Measurement Software	1	1
MX882113C	TE TDD Measurement Software	-	1

DL 7CA 2x2 MIMO

MT8821C supports DL 7CA 2x2 MIMO 256QAM (1.4 Gbps)

CA/MIMO Combination

- No. PCC SCC1 SCC2 SCC3 SCC4 SCC5 SCC6
- 1 FDD 2x2 FDD
- 2 FDD 2x2 FDD 2x2 TDD 2x2 TDD 2x2 TDD 2x2 TDD 2x2 TDD 2x2 TDD 2x2
- Maximum Physical Throughput <u>1.4 Gbps</u>
- DL Modulation QPSK, 16QAM, 64QAM, 256QAM
- Test by controlling only Primary MT8821C

Setup



Note

- IP Throughput measurement is not supported
- HARQ re-transmission is not supported
- All TDD combination is not supported.
- During FDD/TDD Joint 7CA measurement, only FDD can be set for PCC.

Advancing beyond

DL 7CA 2x2 MIMO

Required options

If you want to test the CA/ MIMO combination shown in the right, following options are required.

Primary			
Measurement Ir	nstruments	No.1	No.2
MT8821C	Radio Communication Analyzer	1	1
Hardwara Optic		No 1	No 2
		NO.1	N0.2
MT8821C-008	LIE Measurement Hardware	2	2
MT8821C-012	Parallel Phone Measurement Hardware	1	1
MT8821C-025	2nd RF for Phone1	1	1
MT8821C-026	3rd RF for Phone1	1	1
MT8821C-027	4th RF for Phone1	1	1
MT8821C-028	2nd RF for Phone2	1	1
MT8821C-029	3rd RF for Phone2	1	1
MT8821C-030	4th RF for Phone2	1	1
Software Option	s	No.1	No.2
MX882112C	LTE FDD Measurement Software	1	1
MX882112C-011	LTE FDD 2x2 MIMO DL	1	1
MX882112C-021	LTE-Advanced FDD DL CA Measurement Software	1	1
MX882112C-031	LTE-Advanced FDD DL 3CCs Measurement Software	1	1
MX882112C-041	LTE-Advanced FDD DL 4CCs Measurement Software	1	1
MX882112C-051	LTE-Advanced FDD DL 5CCs Measurement Software	1	1
MX882112C-061	LTE-Advanced FDD DL 6CCs Measurement Software	1	1
MX882112C-071	LTE-Advanced FDD DL 7CCs Measurement Software	1	1
MX882113C	LTE TDD Measurement Software	-	1
MX882113C-011	LTE TDD 2x2 MIMO DL	-	1
MX882113C-021	LTE-Advanced TDD DL CA Measurement Software	-	1
MX882113C-031	LTE-Advanced TDD DL 3CCs Measurement Software	-	1
MX882113C-041	LTE-Advanced TDD DL 4CCs Measurement Software	-	1
MX882113C-051	LTE-Advanced TDD DL 5CCs Measurement Software	-	1
MX882113C-061	LTE-Advanced TDD DL 6CCs Measurement Software	-	1
MX882113C-071	LTE-Advanced TDD DL 7CCs Measurement Software	-	1

No.	PCC	SCC1	SCC2	SCC3	SCC4	SCC5	SCC6
1	FDD 2x2						
2	FDD 2x2	FDD 2x2	TDD 2x2				

Secondary		
Measurement Instruments	No.1	No.2
MT8821C Radio Communication Analyzer	1	1
Hardware Options	No.1	No.2
MT8821C-008 LTE Measurement Hardware	1	1
MT8821C-012 Parallel Phone Measurement Hardware	e 1	1
MT8821C-025 2nd RF for Phone1	1	1
MT8821C-026 3rd RF for Phone1	1	1
MT8821C-027 4th RF for Phone1	-	-
MT8821C-028 2nd RF for Phone2	1	1
MT8821C-029 3rd RF for Phone2	1	1
MT8821C-030 4th RF for Phone2	-	-

Software Options	No.1	No.2	
MX882112C	LTE FDD Measurement Software	1	-
MX882113C	LTE TDD Measurement Software	-	1

Others		No.1	No.2
J1249	CDMA2000 Cable	1	1
-	BNC Cable	1	1
-	Ethernet Cable	1	1

DL 8CA 2x2 MIMO

MT8821C supports DL 8CA 2x2 MIMO 256QAM (1.6 Gbps)

CA/MIMO Combination

No.	РСС	SCC1	SCC2	SCC3	SCC4	SCC5	SCC6	SCC7
1	FDD 2x2							
2	FDD 2x2	FDD 2x2	TDD 2x2					

- Maximum Physical Throughput <u>1.6 Gbps</u>
- DL Modulation QPSK, 16QAM, 64QAM, 256QAM
- Test by controlling only Primary MT8821C

Setup



Note

- IP Throughput measurement is not supported
- HARQ re-transmission is not supported
- · All TDD combination is not supported.
- During FDD/TDD Joint 7CA measurement, only FDD can be set for PCC.

Advancing beyond

DL 8CA 2x2 MIMO

Required options

Advancing beyond 8CA 2x2 MIMO Combination example

If you want to test t	the CA/ MIMO combination
shown in the right,	following options are required.

Primary			
Measurement Ir	nstruments	No.1	No.2
MT8821C	Radio Communication Analyzer	1	1
Hardware Optio	ns	No.1	No.2
MT8821C-008	LTE Measurement Hardware	2	2
MT8821C-012	Parallel Phone Measurement Hardware	1	1
MT8821C-025	2nd RF for Phone1	1	1
MT8821C-026	3rd RF for Phone1	1	1
MT8821C-027	4th RF for Phone1	1	1
MT8821C-028	2nd RF for Phone2	1	1
MT8821C-029	3rd RF for Phone2	1	1
MT8821C-030	4th RF for Phone2	1	1
Software Options	5	No.1	No.2
MX882112C	LTE FDD Measurement Software	1	1
MX882112C-011	LTE FDD 2x2 MIMO DL	1	1
MX882112C-021	LTE-Advanced FDD DL CA Measurement Software	1	1
MX882112C-031	LTE-Advanced FDD DL 3CCs Measurement Software	1	1
MX882112C-041	LTE-Advanced FDD DL 4CCs Measurement Software	1	1
MX882112C-051	LTE-Advanced FDD DL 5CCs Measurement Software	1	1
MX882112C-061	LTE-Advanced FDD DL 6CCs Measurement Software	1	1
MX882112C-071	LTE-Advanced FDD DL 7CCs Measurement Software	1	1
MX882112C-081	LTE-Advanced FDD DL 8CCs Measurement Software	1	1
MX882113C	LTE TDD Measurement Software	-	1
MX882113C-011	LTE TDD 2x2 MIMO DL	-	1
MX882113C-021	LTE-Advanced TDD DL CA Measurement Software	-	1
MX882113C-031	LTE-Advanced TDD DL 3CCs Measurement Software	-	1
MX882113C-041	LTE-Advanced TDD DL 4CCs Measurement Software	-	1
MX882113C-051	LTE-Advanced TDD DL 5CCs Measurement Software	-	1
MX882113C-061	LTE-Advanced TDD DL 6CCs Measurement Software	-	1
MX882113C-071	LTE-Advanced TDD DL 7CCs Measurement Software	-	1
MX882113C-081	LTE-Advanced TDD DL 8CCs Measurement Software	-	1

No.	PCC	SCC1	SCC2	SCC3	SCC4	SCC5	SCC6	SCC7
1	FDD 2x2							
2	FDD 2x2	FDD 2x2	TDD 2x2					

Secondary]		
	3		
Measurement In	struments	No.1	No.2
MT8821C	Radio Communication Analyzer	1	1
Hardware Opti	ons	No.1	No.2
MT8821C-008	LTE Measurement Hardware	1	1
MT8821C-012	Parallel Phone Measurement Hardware	1	1
MT8821C-025	2nd RF for Phone1	1	1
MT8821C-026	3rd RF for Phone1	1	1
MT8821C-027	4th RF for Phone1	1	1
MT8821C-028	2nd RF for Phone2	1	1
MT8821C-029	3rd RF for Phone2	1	1
MT8821C-030	4th RF for Phone2	1	1
Software Optio	ns	No.1	No.2
MX882112C	LTE FDD Measurement Software	1	-
MX882113C	LTE TDD Measurement Software	-	1

Others		No.1	No.2
J1249	CDMA2000 Cable	1	1
-	BNC Cable	1	1
-	Ethernet Cable	1	1

ritsu

DL 7CA 4x4 MIMO MT8821C supports 7CA 4x4 MIMO 256QAM physical throughput testing.



Advancing beyond

DL 7CA 4x4 MIMO Required options

Λ	Π	٢i	ts	U
Adv	and	ing	beyo	nd

Primary Unit		
Product Number	Product Name	Set
MT8821C	Radio Communication Analyzer	1
MT8821C-008	LTE Measurement Hardware	2
MT8821C-012	Parallel Phone Measurement Hardware	1
MT8821C-025	2nd RF for Phone1	1
MT8821C-026	3rd RF for Phone1	1
MT8821C-027	4th RF for Phone1	1
MT8821C-028	2nd RF for Phone2	1
MT8821C-029	3rd RF for Phone2	1
MT8821C-030	4th RF for Phone2	1
MX882112C	LTE FDD Measurement Software	1
MX882112C-011	LTE FDD 2x2MIMO DL	1
MX882112C-012	LTE FDD 4x4MIMO DL	1
MX882112C-021	LTE-Advanced FDD DL CA Measurement Software	1
MX882112C-031	LTE-Advanced FDD DL 3CCs Measurement Software	1
MX882112C-041	LTE-Advanced FDD DL 4CCs Measurement Software	1
MX882112C-051	LTE-Advanced FDD DL 5CCs Measurement Software	1
MX882112C-061	LTE-Advanced FDD DL 6CCs Measurement Software	1
MX882112C-071	LTE-Advanced FDD DL 7CCs Measurement Software	1
MX882113C	LTE TDD Measurement Software	1
MX882113C-011	LTE TDD 2x2MIMO DL	1
MX882113C-012	LTE TDD 4x4MIMO DL	1
MX882113C-021	LTE-Advanced TDD DL CA Measurement Software	1
MX882113C-031	LTE-Advanced TDD DL 3CCs Measurement Software	1
MX882113C-041	LTE-Advanced TDD DL 4CCs Measurement Software	1
MX882113C-051	LTE-Advanced TDD DL 5CCs Measurement Software	1
MX882113C-061	LTE-Advanced TDD DL 6CCs Measurement Software	1
MX882113C-071	LTE-Advanced TDD DL 7CCs Measurement Software	1

Accessories		
Product Number	Product Name	Set
J1606A	Cable	1
-	BNC Cable	3
-	Ethernet Cable	3

Secondary Unit 1		
Product Number	Product Name	Set
MT8821C	Radio Communication Analyzer	1
MT8821C-008	LTE Measurement Hardware	2
MT8821C-012	Parallel Phone Measurement Hardware	1
MT8821C-025	2nd RF for Phone1	1
MT8821C-026	3rd RF for Phone1	1
MT8821C-027	4th RF for Phone1	1
MT8821C-028	2nd RF for Phone2	1
MT8821C-029	3rd RF for Phone2	1
MT8821C-030	4th RF for Phone2	1
MX882112C	LTE FDD Measurement Software	1
MX882113C	LTE TDD Measurement Software	1

Secondary Unit 2

Product Number	Product Name	Set
MT8821C	Radio Communication Analyzer	1
MT8821C-008	LTE Measurement Hardware	2
MT8821C-012	Parallel Phone Measurement Hardware	1
MT8821C-025	2nd RF for Phone1	1
MT8821C-026	3rd RF for Phone1	1
MT8821C-027	4th RF for Phone1	1
MT8821C-028	2nd RF for Phone2	1
MT8821C-029	3rd RF for Phone2	1
MT8821C-030	4th RF for Phone2	1
MX882112C	LTE FDD Measurement Software	1
MX882113C	LTE TDD Measurement Software	1

Secondary Unit 3

Secondary onit 5		
Product Number	Product Name	Set
MT8821C	Radio Communication Analyzer	1
MT8821C-008	LTE Measurement Hardware	1
MT8821C-012	Parallel Phone Measurement Hardware	1
MT8821C-026	3rd RF for Phone1	1
MT8821C-029	3rd RF for Phone2	1
MX882112C	LTE FDD Measurement Software	1
MX882113C	LTE TDD Measurement Software	1

When LAA band (band46) is necessary for any SCCs, MT8821C-019 must be equipped with all of MT8821Cs.

DL 8CA 4x4 MIMO

Advancing beyond

MT8821C supports 8CA 4x4 MIMO 256QAM physical throughput testing.



DL 8CA 4x4 MIMO

Required options

AN

CA/MIMO combination example

If you want to test the CA/ MIMO combination shown in the right, following options are required.

Primary		
Measurement In	struments	Q'ty
MT8821C F	Radio Communication Analyzer	1
Hardware Option	ns	Q'ty
MT8821C-008	LTE Measurement Hardware	2
MT8821C-012	Parallel Phone Measurement Hardware	1
MT8821C-025	2nd RF for Phone1	1
MT8821C-026	3rd RF for Phone1	1
MT8821C-027	4th RF for Phone1	1
MT8821C-028	2nd RF for Phone2	1
MT8821C-029	3rd RF for Phone2	1
MT8821C-030	4th RF for Phone2	1
Software Option	s	Q'ty
MX882112C	LTE FDD Measurement Software	1
MX882112C-011	LTE FDD 2x2 MIMO DL	1
MX882112C-012	LTE FDD 4x4 MIMO DL	1
MX882112C-021	LTE-Advanced FDD DL CA Measurement Software	1
MX882112C-031	LTE-Advanced FDD DL 3CCs Measurement Software	1
MX882112C-041	LTE-Advanced FDD DL 4CCs Measurement Software	1
MX882112C-051	LTE-Advanced FDD DL 5CCs Measurement Software	1
MX882112C-061	LTE-Advanced FDD DL 6CCs Measurement Software	1
MX882112C-071	LTE-Advanced FDD DL 7CCs Measurement Software	1
MX882112C-081	LTE-Advanced FDD DL 8CCs Measurement Software	1
MX882113C	LTE TDD Measurement Software	1
MX882113C-011	LTE TDD 2x2 MIMO DL	1
MX882113C-012	LTE TDD 4x4 MIMO DL	1
MX882113C-021	LTE-Advanced TDD DL CA Measurement Software	1
MX882113C-031	LTE-Advanced TDD DL 3CCs Measurement Software	1
MX882113C-041	LTE-Advanced TDD DL 4CCs Measurement Software	1
MX882113C-051	LTE-Advanced TDD DL 5CCs Measurement Software	1
MX882113C-061	LTE-Advanced TDD DL 6CCs Measurement Software	1
MX882113C-071	LTE-Advanced TDD DL 7CCs Measurement Software	1
MX882113C-081	LTE-Advanced TDD DL 8CCs Measurement Software	1

Secondary1,2	2,3				
Measurement Instruments Q'ty					
MT8821C	Radio Communication Analyzer	1			
Hardware Opti	ons	Q′ty			
MT8821C-008	LTE Measurement Hardware	2			
MT8821C-012	Parallel Phone Measurement Hardware	1			
MT8821C-025	2nd RF for Phone1	1			
MT8821C-026	3rd RF for Phone1	1			
MT8821C-027	4th RF for Phone1	1			
MT8821C-028	2nd RF for Phone2	1			
MT8821C-029	3rd RF for Phone2	1			
MT8821C-030	4th RF for Phone2	1			
Software Optio	ons	Q′ty			
MX882112C	LTE FDD Measurement Software	1			
MX882113C	LTE TDD Measurement Software	1			

Others		Q′ty
J1606A	Cable	1
-	BNC Cable	3
-	Ethernet Cable	3

LAA – Frame Structure Type 3



MT8821C supports Band 46 used by LAA, and Band 252, and 255 used by LTE-U



LTE-U only CA by using unlicensed band

LAA CA by using unlicensed band with Frame Structure Type 3

MT8821C supports following features for LAA :

- Frame Structure Type 3
- Max DL Throughput(SISO, 2x2 MIMO, 4x4 MIMO)
- Measurement Report (RSSI)
- Setting of DMTC Periodicity
- Flexible Setting of DL transmission

Notes:

- MT8821C-019 Extended RF 3.8 GHz to 6 GHz required for LTE-U/LAA



Set start transmission on frame boundaries using following parameters 1. LAA Cycle

Set end transmission on symbol boundaries using following parameters 2. LAA ON Duration 3. LAA Last Symbol LAA – 3GPP RF RX Testing



MT8821C supports 3GPP LAA RF test case

RF RX test specifications with LAA (Band 46) are described in Chapter 7 of 3GPP TS 36.521-1 V14.2.0 (2017-03).

The MT8821C has already supported Physical layer Throughput measurement including the following 3GPP test conditions.

- Non-transition on subframe #1/#2
- Full RB allocation on subframe #5

	Test Case	NAT0001C	лтс	Domorka
Chapter	Title	WITOOZIC	AIS	Remarks
7.3A	Reference Sensitivity Level for CA	Supported	Planning	
7.4A	Maximum input level for CA	Supported	Planning	
7.5A	Adjacent Channel Selectivity (ACS) for CA	Supported		Requires external SG
7.6.1A	In-band Blocking for CA	Supported		Requires external SG
7.6.2A	Out-of-band Blocking for CA	Supported		Requires external SG
7.6.3A	Narrow Band Blocking for CA	Supported		Requires external SG
7.7A	Spurious response for CA	Supported		Requires external SG
7.8.1A	Wide Band Intermodulation for CA	Supported		Requires external SG

HPUE – High-Power User Equipment



•MT8821C supports 3GPP HPUE RF test case

Coverage area is increased by strong HPUE Tx signal.



MT8821C supports 3GPP TS 36.521-1 V14.1.0 (2016-12) HPUE test cases

			лтс		
Chapter	Title	PC1	PC2	W10021C	AIS
6.2.2_1	UE Maximum Output Power for HPUE	√ ^{*1}	√* ²	\checkmark	\checkmark
6.2.3_1	Maximum Power Reduction (MPR) for HPUE	√ ^{*1}	√* ²	\checkmark	\checkmark
6.2.4_1	Additional Maximum Power Reduction (A-MPR) for HPUE	\checkmark	-	\checkmark	\checkmark
6.2.5_1	Configured UE Transmitted Output Power for HPUE	\checkmark	\checkmark	\checkmark	\checkmark
6.3.5_1.1	Power Control Absolute Power Tolerance for HPUE	\checkmark	\checkmark	\checkmark	\checkmark
6.3.5_1.2	Power Control Absolute Power Tolerance for HPUE	\checkmark	\checkmark	\checkmark	\checkmark
6.3.5_1.3	Aggregate Power Control Tolerance for HPUE	\checkmark	\checkmark	\checkmark	\checkmark
6.6.2.3_1	Adjacent Channel Leakage Power Ratio for HPUE	\checkmark	-	\checkmark	\checkmark

*1: Band 14 defined for Power class 1 in this test case

*2: Band 41 defined for Power class 2 in this test case

VoLTE Echoback MX882164C



Built-in IMS Server

Simple Voice and Video Echoback Test



The following codec rates are supported.

Codec Type	Codec Rate
WB-AMR	6.60 kbps, 8.85 kbps, 12.65 kbps, 14.25 kbps, 15.85 kbps, 18.25 kbps, 19.85 kbps, 23.05 kbps, 23.85 kbps
NB-AMR	4.75 kbps, 5.15 kbps, 5.90 kbps, 6.70 kbps, 7.40 kbps, 7.95 kbps, 10.20 kbps, 12.20 kbps



- MT8862A can be controlled by Web browser on MT8821C without external PC*. Receiver sensitivity under concurrent connection with Cellular (including LTE-U/LAA) and WLAN can be tested.
- Co-existence test in the OTA is defined in CTIA/Wi-Fi Alliance Test Plan as Desense test.

* : External control of MT8821C is done by OTA chamber system in OTA test

Wi-Fi Desense Measurement



(CTIA/Wi-Fi Alliance Test Plan)



<Reference> CTIA/Wi-Fi Alliance Test Plan for RF Performance Evaluation of Wi-Fi Mobile Converged Devices Ver. 2.0.3

SMS send/receive function



Send and receive SMS message with the simple operation



1	Send Message	Inputs a SMS message to send to the UE.
2	Send Button	Sends a SMS message to the UE.
3	Keyboard Button	Starts the screen key board.
4	Send/Receive Log	Displays SMS messages that were sent to and received from the UE.
5	Clear Button	Clears the contents and flag value from the received message.
6	Close Button	Closes the SMS screen.
-	CMC Cuitate Dattage	Sets the SMS reception function to On or Off.
	SWIS SWITCH BUTTON	Displayed only for W-CDMA and TD-SCDMA.

Enhanced GUI: Measurement (All Results)







Touching the test parameter/measurement results displays an explanation or remote commands in the Help window.



Enhanced GUI: Parameter Search



Parameters can be searched by text and settings can be changed.



Enhanced GUI: External Loss separate setting for each of the CC/ PCC,SCC Link setting

- (1) Added function linking PCC and SCC parameter settings (only some parameters, such as Output Level)
- (2) Pressing list button at CA connection setting displays PCC and SCC settings simultaneously
- (3) Supports separate External Loss (Main UL/DL) setting for each CC

Phone2	Phone1	DL Channel TPC Patter 300 ch	n Input Level	Output Level (Total) R OLVL This sets the total output level for	or all channels.	Direct Entry
2nd Antenna for Phone1		Operation Band Channel Ba	andwidth Output Level 20 MHz -70.2 dBm	(1)	8	
PCC SC	C1 [®] SCC2 [®] SCC3 SCC4	Measurement	Signaling	IP Data	UE Power: -21.0 dBm	Close
Common (2	2)	PCC	SCC1	SCC2	SCC3 🕨	A Home
Physical Channel	General	190 MHz	3 Frequency Separation	881.500 000 MHz Operation Band	2 110.000 000 MHz Operation Band	< Preset
Call Processing	Frequency	Input Level -1.0 dBm		Frequency Separation 45 MHz	Frequency Separation 190 MHz	Stop
TX Measurement	Signal	PCC/SCC Common Input Level	Input Level -1.0 dBm	Seterat Level	Sevel	Tx Rx
RX Measurement	UL RMC	• On (Total)	Output Level On (Total)	© On (Total)	Output Level On (Total)	•> Single
Fundamental		-70.2 dBm (EPRE) -101.0 dBm/15kHz	-70.2 dBm (EPRE) -101.0 dBm/15kHz	-70.2 dBm (EPRE) -98.0 dBm/15kHz	-70.2 dBm (EPRE)	Continuous
Measurement		AWGN Level -20.0 dB Off	AWGN -20.0 dB Off	AWGN -20.0 dB Off	AWGN -20.0 dB Off	
	(3)	External Loss Off Main UL (Phone1)	External Loss Main UL (Phone1) 0.0 dB	External Loss Main DL (Phone1) 0.0 dB	External Loss Main DL (Phone1)	Connected
Test Parameter		0.0 dB Main DL (Phone1)	Main DL (Phone1) 0.0 dB	Main DL (Phone2, 2nd Antenna) 0.0 dB	Main DL (Phone2, 2nd Antenna) 0.0 dB	Start Call
IP Data Application		Main DL (Phone2, 2nd Antenna) 0.0 dB	AUX2 (Phone1)	AUX3 (Phone2, 2nd Antenna)	AUX4 (Phone1) 0.0 dB AUX4 (Phone2, 2nd Antenna)	End Call
External Loss		AUX1 (Phone1) 0.0 dB AUX1 (Phone2 2nd Antenna)	0.0 dB AUX2 (Phone2, 2nd Antenna) 0.0 dB	0.0 dB	0.0 dB	
System Config		0.0 dB	Signal	User Define Channel Model (Channel Ito1/2/3/4 Gain/Phase) 1.00 0.0 degree	User Define Channel Model (Channel 1to1/2/3/4 Gain/Phase) 1.00_0.0 degree	< Menu

Easy Parameter Setting



Easier Downlink : Resource Block, MCS Index Settings

Freely settable parameters for each subframe support easy testing even at near-to-real test environment settings.

When Allocation mode = Detail

PR Allocatio	2									Aggregatio	n Lev	el		
Subframe		Number of RB	Starting RB		MCS Index	Modulation	TBS Index	Т	BS	SI-RNTI		C-RNTI		
		80		20	28	64QAM	26		59256					
Subframe		Number of RB	Starting RB		MCS Index	Modulation	TBS Index	Т	BS	SI-RNTI		C-RNTI		
		100			28	64QAM	26		75376					
Subframe		Number of RB	Starting RB		MCS Index	Modulation	TBS Index	Т	BS	SI-RNTI		C-RNTI		
		2		98	25	64QAM	23		1128				8	
Subframe		Number of RB	Starting RB		MCS Index	Modulation	TBS Index	Т	BS	SI-RNTI		C-RNTI		
		2		98	8	QPSK	8		256				8	
Subframe		Number of RB	Starting RB		MCS Index	Modulation	TBS Index	Т	BS	SI-RNTI		C-RNTI		_
		100			25	64QAM	23		57336				8	
Subframe		Number of RB	Starting RB		MCS Index	Modulation	TBS Index	т	BS	SI-RNTI		C-RNTI		
		96			13	16QAM	12		22152				-	
Subframe		Number of RB	Starting RB		MCS Index	Modulation	TBS Index	т	BS	SI-RNTI		C-RNTI		
		100			18	64QAM	16		32856				8	
Subframe		Number of RB	Starting RB		MCS Index	Modulation	TBS Index	T	BS	SI-RNTI		C-RNTI		
		100			18	64QAM	16		32856				8	
Subframe		Number of RB	Starting RB		MCS Index	Modulation	TBS Index	T	BS	SI-RNTI		C-RNTI		
		50		50	28	64QAM	26		36696				8	
Subframe		Number of RB	Starting RB		MCS Index	Modulation	TBS Index	Т	BS	SI-RNTI		C-RNTI		
		50		50	28	64QAM	26							

When Allocation mode = Normal

Aggregation Level Subframe MCS Index Modulation TBS Index TBS SI-RNTI C-RNTI 28 Subframe MCS Index Modulation TBS Index TBS SI-RNTI C-RNTI \ll Subframe MCS Index Modulation TBS Index TBS SI-RNTI C-RNTI 28 Subframe MCS Index Modulation TBS Index TBS SI-RNTI C-RNTI

*Easy legacy setting methods are also supported at measurement based on 3GPP TS 36.521-1.



The MT8821C has a "Test Parameter" function for 3GPP RF tests. It supports following features.

- One-button parameter setting for 3GPP RF TRX tests
- PASS/FAIL judgment



UE Capability Information Function *



• Pressing the [UE Capability Information] button at the Signaling tab in the Result area displays a pop-up window listing the Band/Band Combination supported by the UE.

Phone2 LTE 30.40 #073	UL Channel TPC Pattern Input Level 18300 ch Auto -1.0 dBm Operation Band Channel Bandwidth Output Level 1 5 MHz -60.2 dBm	Freq Band Indicator [1xC] [21C only] [3 UE_CAP_BAND This specifies FreqBandIndicator of requestedFrequencyBands in the UE Capability Enquiry message. Available only when requestedFrequencyBands is enabled.	MT8821C 2016/11/18 09:51 RF Output : On
PCC SCC1 SCC2 SCC3 SCC4	Measurement Signaling	IP Data UE Power : -0.6 dBm	
Common 📎 🗈 ★ 🔍	SequenceMonitor UE Repor	rt Measurement	A Home
Physical Channel	UE Capability Information Viewer	x 01010123456789 report Off	Preset
Call Processing UE Tx	F Access Stratum Release: Rel11 UE Category: 4.7.10.12	DE Capability	/
TX Measurement 💛 UE Capability	Supported Band: 1,2,3,4,5,7,13,18,19,20,21,25,26	E E ENCE C 2) UE Capability	Tx
RX requested Frequency Bands RX Enabled Freq Band Indicator	DL CA Config UL CA Config 5A-1A 5A	E E E E CS Fallbac to W-CDMA	●→ Single
I 3 5 0 Fundamental 0 0 0 0 Measurement 0 0 0 0	1A-5A 1A 5A-1A 5A-1A 3A-1A 3A	ENCE OF ENCE ERATED SMS	Continuous
	U 1A-3A 1A 5A-3A 5A	STRING ENCE	Connected
The UE CA Configuration can be captured and displayed for the		Close 2)	ور
specified Band for UE supporting Rel-11.	38 01 08 2F 4C D9 80 0C 00 10 42 84 08 6 02 0C 61 FF F8 CF FF 8C FF F8 CF FF 8C FF F8 CF F 8C FF F8 FF F0 6E C4 D0 01 01 B8 2C 00 00 00 00 07 05 06 60	33 06 46 0C FF 82 FF 82 64 0C FF 82 52 52 <td< td=""><td>Start Call</td></td<>	Start Call
External Loss	Feature Group Indicators Rel8 View UE Capability Information	ation	End Call
System Config	> ULInformationTransfer SECURITY MODE COMP	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	< Menu

* Cat-M, NB-IoT and LTE are not supported.

Throughput Monitor/Display Expected Throughput



The MAC layer Throughput measurement results can be displayed as a graph. In addition, a function has been added for displaying expected Throughput values.



IP Data Application



Data Application (PING/Iperf) operations can be performed from the MT8821C GUI using the Result – IP Data tab. Settings are made at the Parameter – IP Data Application tab.

Phone2 2nd Antenna for Phone1	V Phone1	DL Channel TPC Pattern Input Level Iperf Mode [1xC] [21C only] [3 IPFMODE 300 ch Auto -1.0 dBm This sets the packet transfer/receive direction of Client/Server of iperf. Operation Band Channel Bandwidth Output Level Output Level 1 20 MHz -70.2 dBm	MT8821C 2016/03/16 12:50 RF Output : On DL 3CCs 2x2
PCC SC	c1 [•] scc2 [•] scc3 scc4	Measurement Signaling IP Data UE Power : -21.1 dBm	
Common	 	Server 1 ping 192.168.20.11 -w 1000 -l 32 -S 192.168.20.10	A Home
Physical Channel	PING(Server1) Destination IPv4 Address	Pinging 192.168.20.11 from 192.168.20.10 with 32 bytes of data: Iperf Reply from 192.168.20.11: bytes=32 time=16ms TTL=64 (Server1)	< Preset
Call Processing	192 168 20 11 Destination IPv6 Address 2001 0000 0000 0000	Reply from 192.168.20.11: bytes=32 time=12ms TTL=64 Reply from 192.168.20.11: bytes=32 time=12ms TTL=64 Reply from 192.168.20.11: bytes=32 time=13ms TTL=64	Stop
TX Measurement	0000 0000 0000 0001 IP Type IPv4	Ping statistics for 192.168.20.11: Packets: Sent = 4, Received = 4, Lost = 0 (0% loss), Approximate rund trin times in milli seconds:	
RX Measurement	Interval 1000 Buffer Size	Minimum = 12ms, Maximum = 16ms, Average = 13ms	Single
Fundamental Measurement	32		Continuous
	Viperf(Server1)	Server 2 PING (Server2) Client connecting to 192.168.20.11, UDP port 5001	Connected
	IP Type IPv4	Binding to local address 192.168.20.100 Iperf Sending 1470 byte datagrams (Server2)	
Test Parameter	IP Protcol UDP	ID] Interval Transfer Bandwidth	Start Call
IP Data Application	Destination IPv4 Address 192 168 20 11 Destination IPv6 Address	0] 0.0- 1.0 sec 610 KBytes 5.00 Mbits/sec 0] 1.0- 2.0 sec 609 KBytes 4.99 Mbits/sec 0] 2.0- 3.0 sec 610 KBytes 5.00 Mbits/sec	End Call
External Loss	2001 0000 0000 0000 0000 0000 0000 0001 Bandwidth	0] 3.0- 4.0 sec 609 KBytes 4.99 Mbits/sec 0] 4.0- 5.0 sec 610 KBytes 5.00 Mbits/sec 0] 5.0- 6.0 sec 609 KBytes 4.99 Mbits/sec	
System Config	Bandwidth Unit	0] 6.0- 7.0 sec 610 KBytes 5.00 Mbits/sec 0] 7.0- 8.0 sec 609 KBytes 4.99 Mbits/sec	< Menu

Compatibility with MT8820C



The MT8821C is compatible with MT8820C functions, performance, remote commands, etc. Previously developed control software and test sequences can be used with the MT8821C.

- Reduces costs for test equipment and test environment configuration
- No risks rebuilding existing LTE and 3G/2G test environment

Compatibility

- Functions and performance
- Remote commands



Control software and test environment can be reutilized.



MT8820C to MT8821C Upgrade



The MT8821C is upgradeable from the MT8820C. The existing MT8820C hardware and all measurement software can be re-used to make the most efficient use of your investment.



MT8821C vs. MT8820C

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	MT8821C	MT8820C
Frequency Range	30 MHz to 6.0 GHz (3.8 GHz to 6.0 GHz Option)	30 MHz to 2.7 GHz, 3.4 GHz to 3.8 GHz (3.4 GHz to 3.8 GHz Option)
Interface	Main: RF In/Out (Max. 4 ports) Aux: RF Out (Max. 8 ports)	Main: RF In/Out (Max. 2 ports) Aux: RF Out (Max. 2 ports)
Output Level	-140 to -10 dBm (Main) -125 to +5 dBm (Aux)	–140 to – 10 dBm (Main) –130 to 0 dBm (Aux)
Bandwidth	Generator bandwidth: 160 MHz Analyzer bandwidth: 160 MHz	Generator bandwidth: 25 MHz Analyzer bandwidth: 25 MHz
System	 LTE FDD/TDD LTE CA (DL CA 4CCs (with SISO)/ DL CA 8CCs (with 4x4 MIMO)**/ DL CA 6CCs (with 4x4 MIMO)*/ DL CA 4CCs (with 4x4 MIMO)*/ DL CA 8CCs (with 2x2 MIMO)*/ UL CA 2CCs/ LTE in unlicensed spectrum : 5 GHz) WCDMA/HSPA/HSPA Evolution/ (DB-)DC-HSDPA/4C-HSDPA/DC-HSUPA GSM/GPRS/EGPRS TD-SCDMA/HSPA/HSDPA Evolution LTE Cat-M, NB-IoT(Cat-NB1,2) 5G NSA Anchor 	 LTE FDD/TDD (up to 2x2 MIMO) LTE CA (DL 3CC + 2x2 MIMO by 3units/ UL 2CC) WCDMA/HSPA/HSPA Evolution/ (DB-)DC-HSDPA/4C-HSDPA/DC-HSUPA GSM/GPRS/EGPRS TD-SCDMA/HSPA/HSDPA Evolution
GUI	Windows 7 OS, touch panel, USB interface	Unix OS, key panel, CF interface
Dimensions	426 (W) × 221.5 (H) × 578 (D) mm (excluding protrusions)	426 (W) × 221.5 (H) × 498 (D) mm (excluding protrusions)
		* Requires 2 boxes of MT8821C ** Requires 3 boxes of MT8821C *** Requires 4 boxes of MT8821C

MT8821C Additional Features for Cellular IoT



System	Model Name / Product Name	Notes
NB-IoT	MX882117C-001 NB-IoT Category NB-2 Measurement Software	Requires MX882117C. Supports RF TRX measurement at NB-IoT Category NB2 condition. Also, IP data transfer can be available by adding MX882117C-001.
NB-IoT	MX882117C-002 NB-IoT Multi Carrier	Requires MX882117C. Supports RF TRX measurement at NB-IoT Category NB2 condition. Also, IP data transfer can be available by adding MX882117C-001. Supports not only primary carrier (=Anchor carrier) which controls both call connection and data communication, but also the secondary carrier (=Non Anchor carrier) which controls only data communication to optimize the efficiency of data transmission. (*: Throughput measurement only. RF measurement is not planned to be supported.)
NB-IoT	3GPP TS36.521-1 RF TRX measurement (Rel-14) following	Follows 3GPP TS 36.521-1 (2019-06). Supports the latest TX measurement test criteria, additional band, etc.
NB-IoT	NIDD (NB-IOT) RF Measurement function	Supports call connection and RF measurement with NIDD state
NB-IoT	NIDD data transfer	Supports data transfer test during NIDD(Non-IP Data Delivery) status
NB-IoT	Release Assistance Indicator	Function to shift to "Idle" state after call connection established which is driven by UE side during communication status without IP data.
NB-IoT	Inactivity Timer	Function to shift to "Idle" state after call connection established which is driven by BTS side during communication status without IP data.
NB-IoT	2HARQ	Enhanced HARQ (Hybrid Automatic Repeat reQuest) to transmit data at double speed at maximum from the existing HARQ.
Cat-M	Full Duplex	Supports Full Duplex Mode with LTE Category M1.
LTE	RSAP, RSARP	Supports technologies to measure the reference signal at the antenna terminal.

(Reference) M8821C minimum configuration incl. Cat-M1, Cat-NB2

Model Name	Product Name	Qty	Notes
MT8821C	Radio Communication Analyzer	1	
MT8821C-008	LTE Measurement Hardware	1	
MX882116C	LTE Category M1 Measurement Software	1	Requires MT8821C-008
MX882116C-006	LTE Category M1 IP Data Transfer	1	Requires MX882116C
MX882117C	NB-IoT Measurement Software	1	Requires MT8821C-008
MX882117C-001	NB-IoT Category NB-2 Measurement Software	1	Requires MX882117C
MX882117C-002	NB-IoT Multi Carrier	1	Requires MX882117C
MX882117C-006	NB-IoT IP Data Transfer	1	Requires MX882117C
MX882164C	LTE VoLTE Echoback	1	Necessary when customers do Cat-M VoLTE test

MT8821C Options

Hardware No.	Hardware Name
MT8821C	Radio Communication Analyzer
MT8821C-001	W-CDMA Measurement Hardware
MT8821C-002	TDMA Measurement Hardware
MT8821C-007	TD-SCDMA Measurement Hardware
MT8821C-008	LTE Measurement Hardware
MT8821C-012	Parallel Phone Measurement Hardware
MT8821C-019	Extended RF 3.8GHz - 6GHz
MT8821C-025	2nd RF for Phone1
MT8821C-026	3rd RF for Phone1
MT8821C-027	4th RF for Phone1
MT8821C-028	2nd RF for Phone2
MT8821C-029	3rd RF for Phone2
MT8821C-030	4th RF for Phone2
Software No.	Software Name
MX882100C	W-CDMA Measurement Software
MX882100C-002	W-CDMA External Packet Data
MX882100C-003	W-CDMA Video Phone Test
MX882100C-005	W-CDMA A-GPS
MX882100C-019	WCDMA HSPA Measurement Software
MX882100C-032	DC-HSDPA Measurement Software
MX882100C-033	DC-HSUPA Measurement Software
MX882100C-034	4C-HSDPA Measurement Software
MX882170C	W-CDMA Ciphering Software
MX882101C	GSM Measurement Software
MX882101C-002	GSM External Packet Data
MX882101C-005	GSM A-GPS
MX882101C-011	EGPRS Measurement Software
MX882107C	TD-SCDMA Measurement Software
MX882107C-002	TD-SCDMA External Packet Data
MX882107C-003	TD-SCDMA Video Phone Test
MX882107C-011	ID-SCDMA HSDPA Measurement Software
MX882107C-012	TD-SCDMA HSDPA Evolution Measurement Software
MX882107C-021	ID-SCDMA HSUPA Measurement Software
MX882112C	
MX882112C-006	
MX882112C-010	
MX882112C-011	
WIX002112C-012	
WIX002112C-010	LTE Advanced EDD DL CA Measurement Seftware
NV992112C-021	LTE Advanced FDD DL CA Measurement Software
IVIA002112C-022	
WIX002112C-020	LTE Advanced FDD DL CA 2006 Maggurament Software
MX882112C-036	LTE-Advanced FDD DL CA 3CCs IP Data Transfer
MX882112C-030	ITE-Advanced FDD DL CA JCCs IF Data Hallstei
MX882112C-041	ITE-Advanced FDD DL CA 4CCs IV leasurement softwale
MX882112C_051	ITE-Advanced FDD DL CA SCCs Measurement Software
MX882112C-061	ITE-Advanced FDD DL CA SCCS Measurement Software
MX882112C-071	ITE Advanced FDD DL CA 7CCs Measurement Software
MX882112C-081	ITE Advanced FDD DL CA 8CCs Measurement Software

	Advancing beyond
Software No.	Software Name
MX882113C	LTE TDD Measurement Software
MX882113C-006	LTE TDD IP Data Transfer
MX882113C-010	LTE TDD Anchor For 5G NSA
MX882113C-011	LTE TDD 2x2 MIMO DL
MX882113C-012	LTE TDD 4x4 MIMO DL
MX882113C-016	LTE TDD CS Fallback to W-CDMA/GSM
MX882113C-018	LTE TDD CS Fallback to TD-SCDMA/GSM
MX882113C-021	LTE-Advanced TDD DL CA Measurement Software
MX882113C-022	LTE-Advanced TDD UL CA Measurement Software
MX882113C-026	LTE-Advanced TDD DL CA IP Data Transfer
MX882113C-031	LTE-Advanced TDD DL CA 3CCs Measurement Software
MX882113C-036	LTE-Advanced TDD DL CA 3CCs IP Data Transfer
MX882113C-041	LTE-Advanced TDD DL CA 4CCs Measurement Software
MX882113C-046	LTE-Advanced TDD DL CA 4CCs IP Data Transfer
MX882113C-051	LTE-Advanced TDD DL CA 5CCs Measurement Software
MX882113C-061	LTE-Advanced TDD DL CA 6CCs Measurement Software
MX882113C-071	LTE Advanced TDD DL CA 7CCs Measurement Software
MX882113C-081	LTE Advanced TDD DL CA 8CCs Measurement Software
MX882115C	W-CDMA HSPA IP Data Transfer
MX882115C-001	W-CDMA DC-HSPA IP Data Transfer
MX882116C	LTE Category M1 Measurement Software
MX882116C-006	LTE Category M1 IP Data Transfer
MX882117C	NB-IoT Measurement Software
MX882117C-001	NB-IoT Category NB-2 Measurement Software
MX882117C-002	NB-IoT Multi Carrier
MX882117C-006	NB-IoT IP Data Transfer
MX882120C	SEQ Measurement Software
MX882120C-001	W-CDMA Measurement Software
MX882120C-002	GSM Measurement Software
MX882120C-004	LTE Measurement Software
MX882120C-005	TD-SCDMA Measurement Software
MX882132C	CDMA2000 Measurement Software Lite
MX882136C	1xEV-DO Measurement Software Lite
MX882142C	LTE FDD Measurement Software Lite
MX882143C	LTE TDD Measurement Software Lite
MX882164C	LTE VoLTE Echoback

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