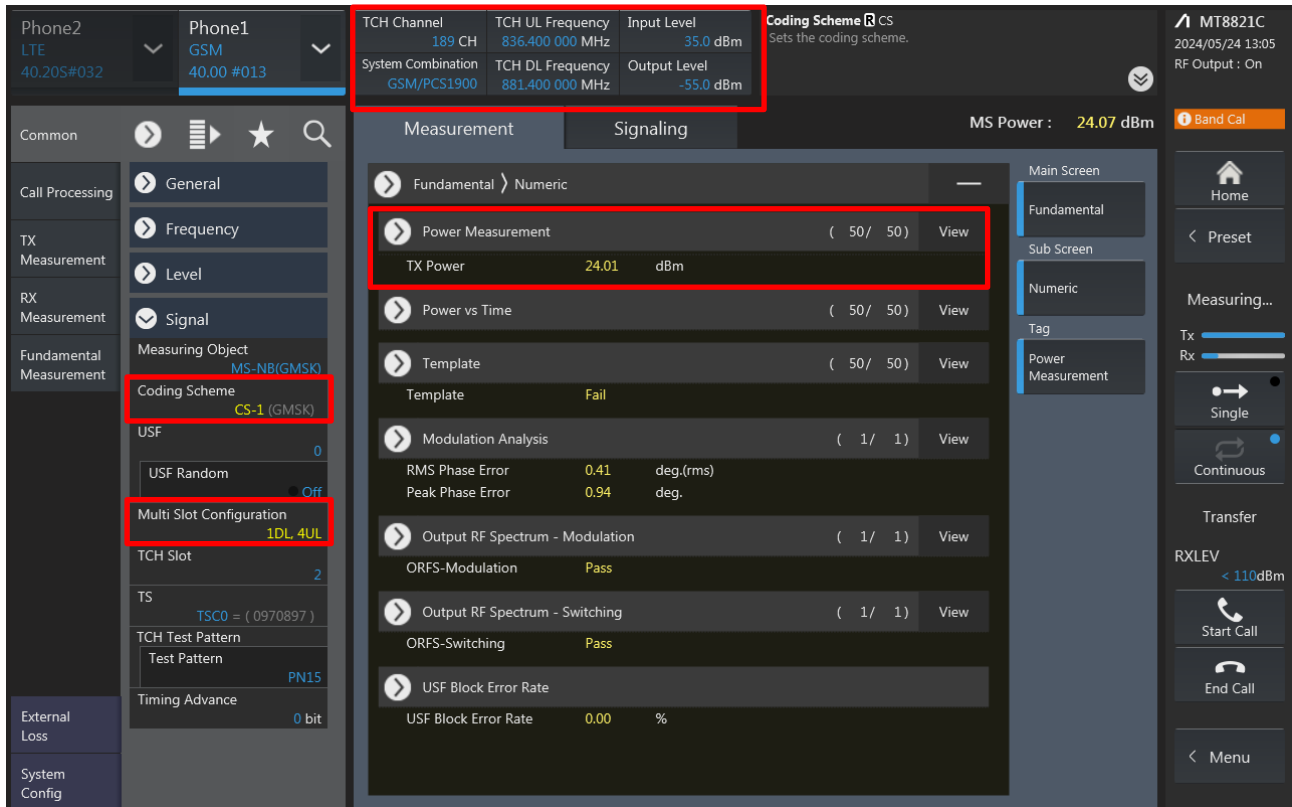


Power measurement connection diagram:

The power measurement for 2G/3G/LTE/5G FR1/UL and DL CA is to establish a connection between device and call box, and via call box to configure Bands, channel, BWs, RB size, carrier aggregation of CA, frequency channels, SCS and maximum output power. Hereunder is screenshot call box connection information for 2G/3G/LTE/5G FR1/UL and DL CA.

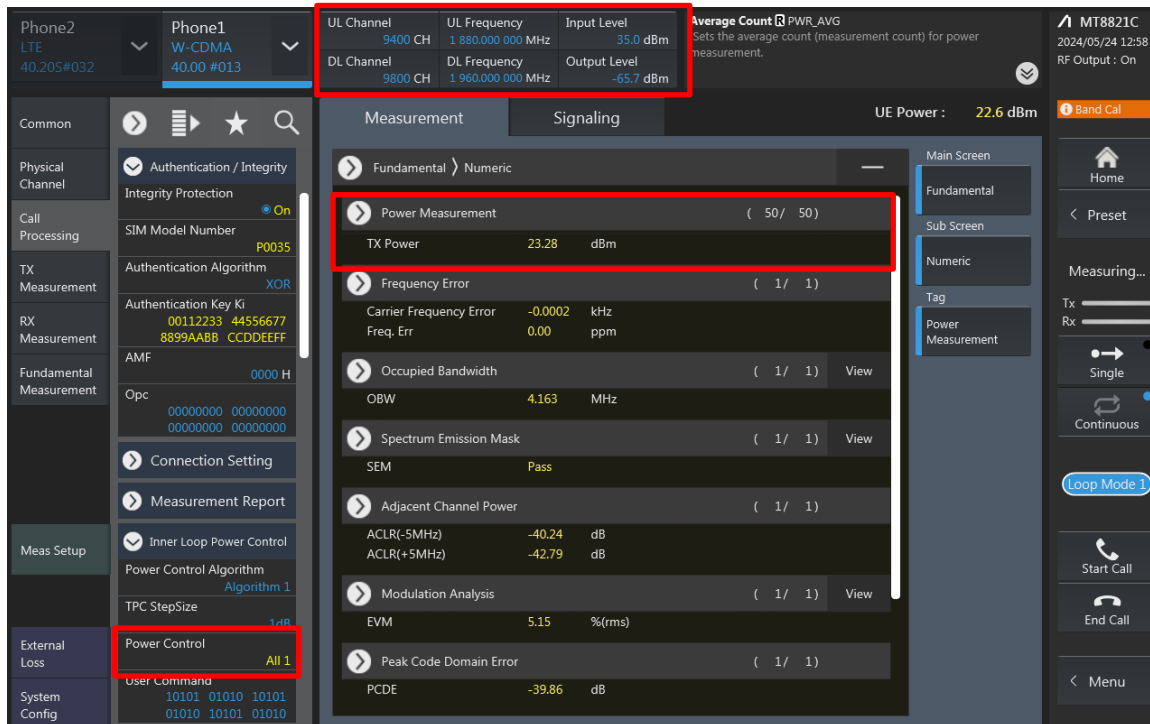
<GSM>



The screenshot displays the SPORTON LAB. software interface for GSM power measurement. The interface is divided into several sections:

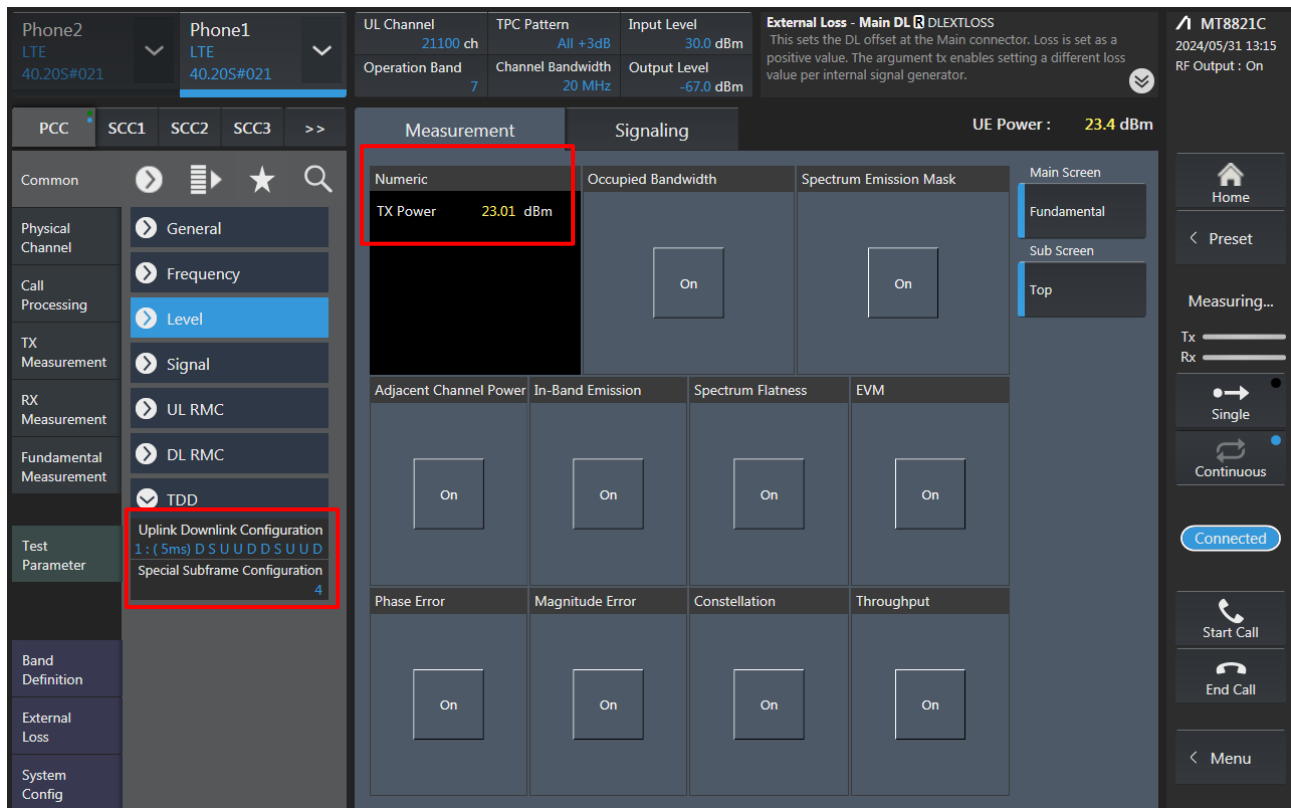
- Top Bar:** Shows Phone2 (LTE, 40.205#032) and Phone1 (GSM, 40.00 #013). The TCH Channel is 189 CH, TCH UL Frequency is 836.400 000 MHz, Input Level is 35.0 dBm, and Coding Scheme is CS. The TCH DL Frequency is 881.400 000 MHz, and Output Level is -55.0 dBm.
- Left Sidebar:** Contains navigation options like Common, Call Processing, TX Measurement, RX Measurement, Fundamental Measurement, and External Loss.
- Main Area:**
 - Measurement Tab:** Shows the Power Measurement section with a red box highlighting the TX Power value of 24.01 dBm. Other sections include Power vs Time, Template, Modulation Analysis, Output RF Spectrum - Modulation, Output RF Spectrum - Switching, and USF Block Error Rate.
 - Signaling Tab:** Shows the Template section with a red box highlighting the Template value of Fail.
- Right Sidebar:** Contains navigation options like Main Screen, Fundamental, Sub Screen, Numeric, Tag, Power Measurement, and a list of buttons (Home, Preset, Measuring..., Single, Continuous, Transfer, Start Call, End Call, Menu).

<WCDMA>



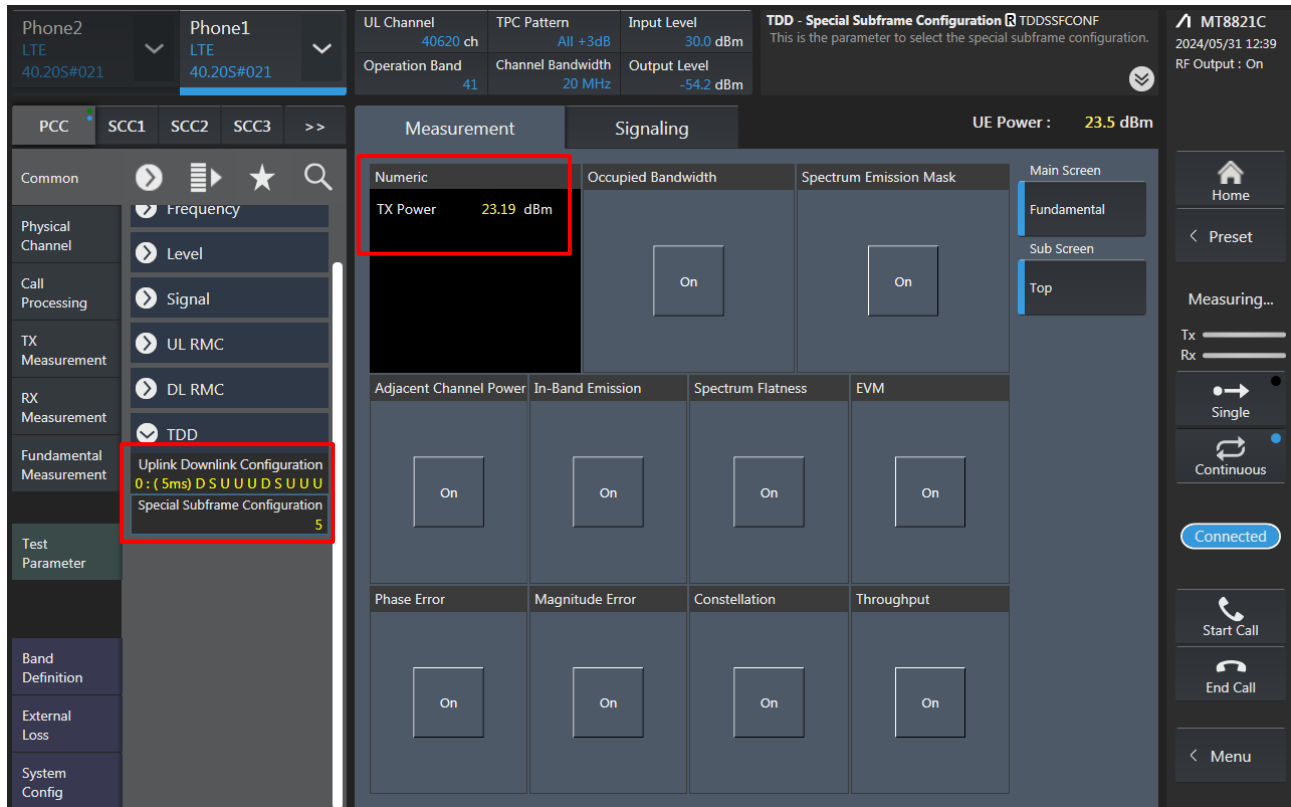
The screenshot shows the WCDMA measurement interface. The top bar displays 'Phone2 LTE 40.20S#032' and 'Phone1 W-CDMA 40.00 #013'. The 'Measurement' tab is active, showing 'Fundamental' and 'Numeric' views. The 'Power Measurement' section is highlighted with a red box, showing 'TX Power' at 23.28 dBm. The 'Occupied Bandwidth' section shows 'OBW' at 4.163 MHz. The 'Adjacent Channel Power' section shows 'ACLR(-5MHz)' at -40.24 dB and 'ACLR(+5MHz)' at -42.79 dB. The 'Modulation Analysis' section shows 'EVM' at 5.15 % (rms). The 'Peak Code Domain Error' section shows 'PCDE' at -39.86 dB. The 'UE Power' is 22.6 dBm. The 'Band Cal' button is visible on the right. The 'Meas Setup' section on the left shows 'Power Control' set to 'All 1'.

<LTE>



The screenshot shows the LTE measurement interface. The top bar displays 'Phone2 LTE 40.20S#021' and 'Phone1 LTE 40.20S#021'. The 'Measurement' tab is active, showing 'Numeric' and 'Occupied Bandwidth' views. The 'Power Measurement' section is highlighted with a red box, showing 'TX Power' at 23.01 dBm. The 'Occupied Bandwidth' section shows 'OBW' at 20 MHz. The 'Spectrum Emission Mask' section shows 'SEM' at Pass. The 'Adjacent Channel Power' section shows 'ACLR(-5MHz)' at -40.24 dB and 'ACLR(+5MHz)' at -42.79 dB. The 'Modulation Analysis' section shows 'EVM' at 5.15 % (rms). The 'Peak Code Domain Error' section shows 'PCDE' at -39.86 dB. The 'UE Power' is 23.4 dBm. The 'Band Cal' button is visible on the right. The 'Meas Setup' section on the left shows 'Uplink Downlink Configuration' set to '1: (5ms) D S U U D D S U U D' and 'Special Subframe Configuration' set to '4'.

<LTE TDD Power class 3>



Phone2 LTE 40.20S#021

Phone1 LTE 40.20S#021

UL Channel 40620 ch

TPC Pattern All +3dB

Input Level 30.0 dBm

Operation Band 41

Channel Bandwidth 20 MHz

Output Level -54.2 dBm

TDD - Special Subframe Configuration TDDSSFCNF

This is the parameter to select the special subframe configuration.

MT8821C

2024/05/31 12:39

RF Output : On

UE Power : 23.5 dBm

Measurement

Numeric

TX Power 23.19 dBm

Occupied Bandwidth

Spectrum Emission Mask

Main Screen

Fundamental

Sub Screen

Top

Adjacent Channel Power

In-Band Emission

Spectrum Flatness

EVM

Phase Error

Magnitude Error

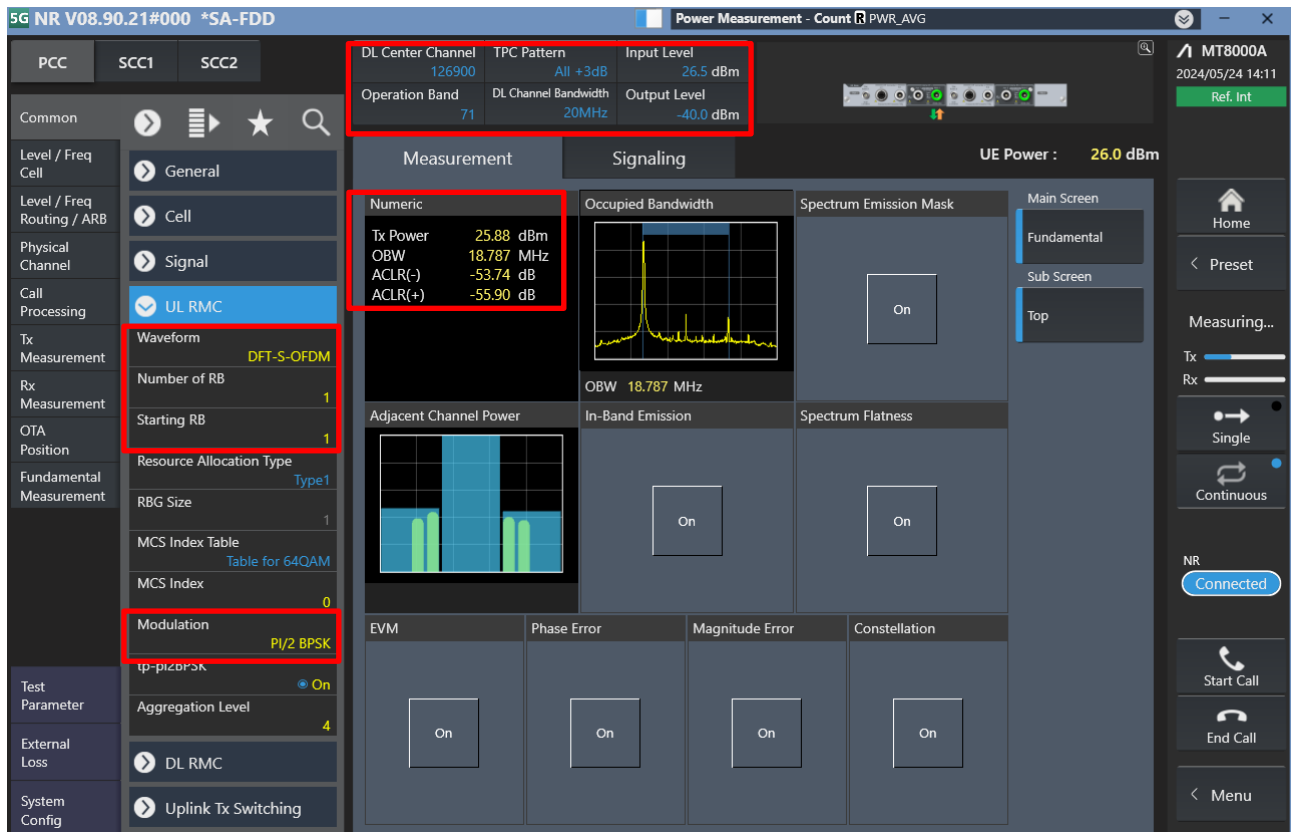
Constellation

Throughput

Uplink Downlink Configuration 0:(5ms)DSUUUSUUU

Special Subframe Configuration 5

<5G NR FR1>



5G NR V08.90.21#000 *SA-FDD

Power Measurement - Count PWR_AVG

PCC SCC1 SCC2

DL Center Channel 126900

TPC Pattern All +3dB

Input Level 26.5 dBm

Operation Band 71

DL Channel Bandwidth 20MHz

Output Level -40.0 dBm

MT88000A

2024/05/24 14:11

Ref. Int

UE Power : 26.0 dBm

Measurement

Numeric

Tx Power 25.88 dBm

OBW 18.787 MHz

ACLR(-) -53.74 dB

ACLR(+) -55.90 dB

Occupied Bandwidth

Spectrum Emission Mask

Main Screen

Fundamental

Sub Screen

Top

Adjacent Channel Power

In-Band Emission

Spectrum Flatness

EVM

Phase Error

Magnitude Error

Constellation

Waveform DFT-S-OFDM

Number of RB 1

Starting RB 1

Resource Allocation Type Type1

RBG Size 1

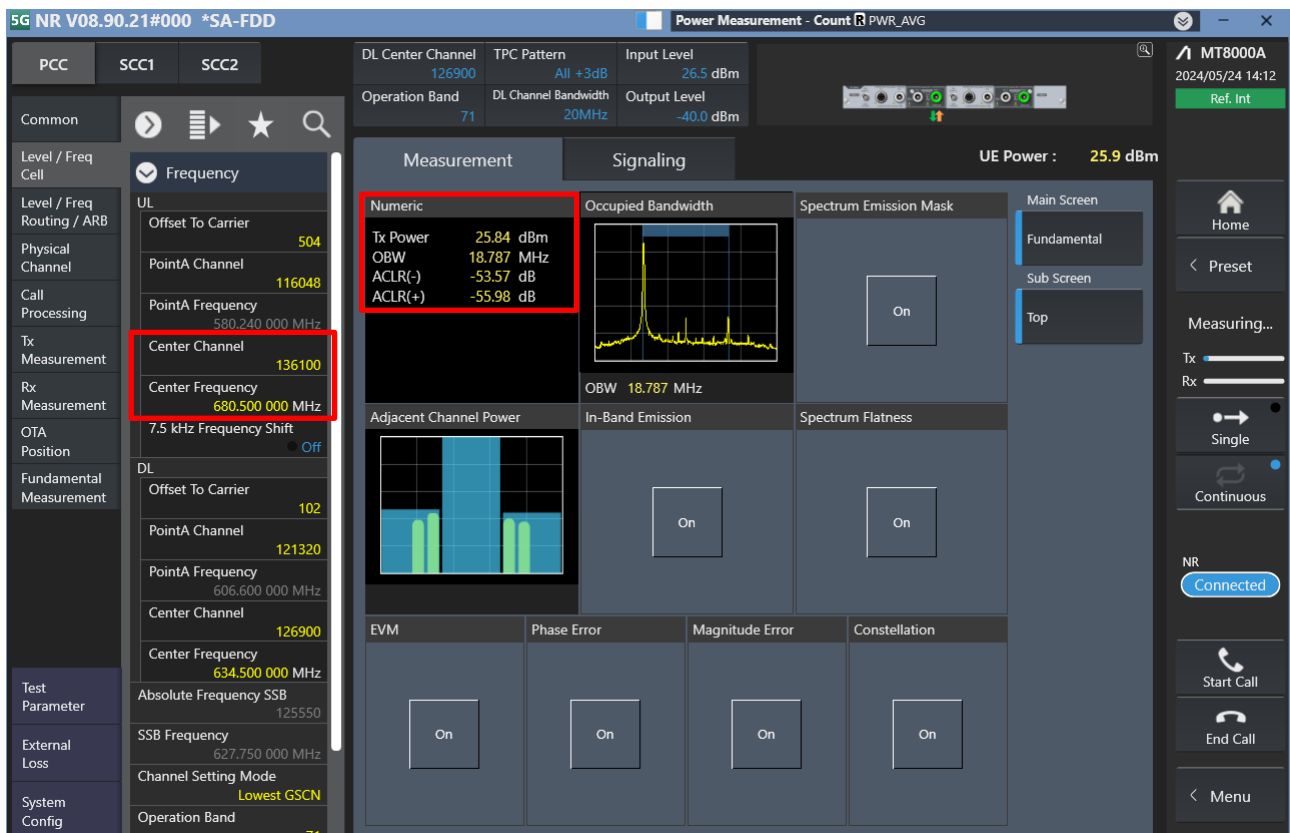
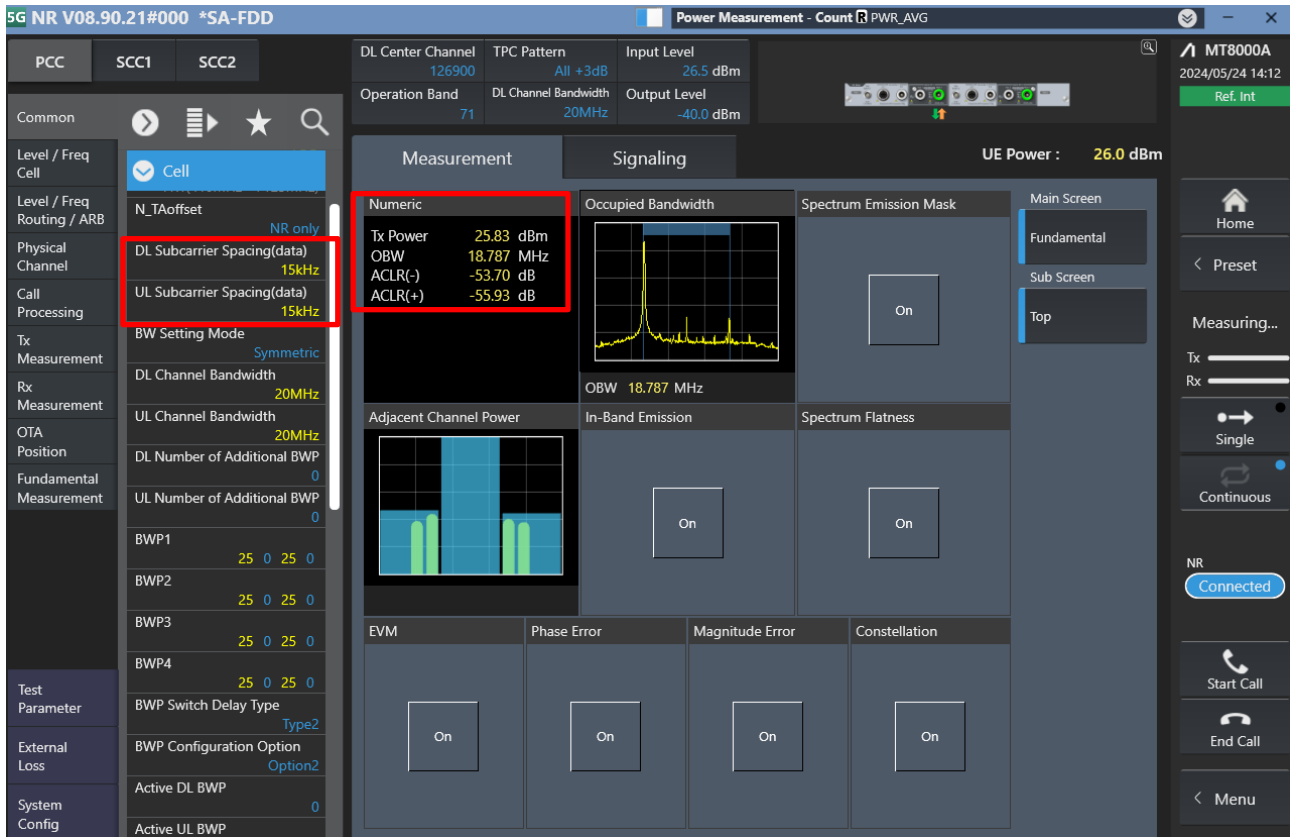
MCS Index Table Table for 64QAM

MCS Index 0

Modulation PI/2 BPSK

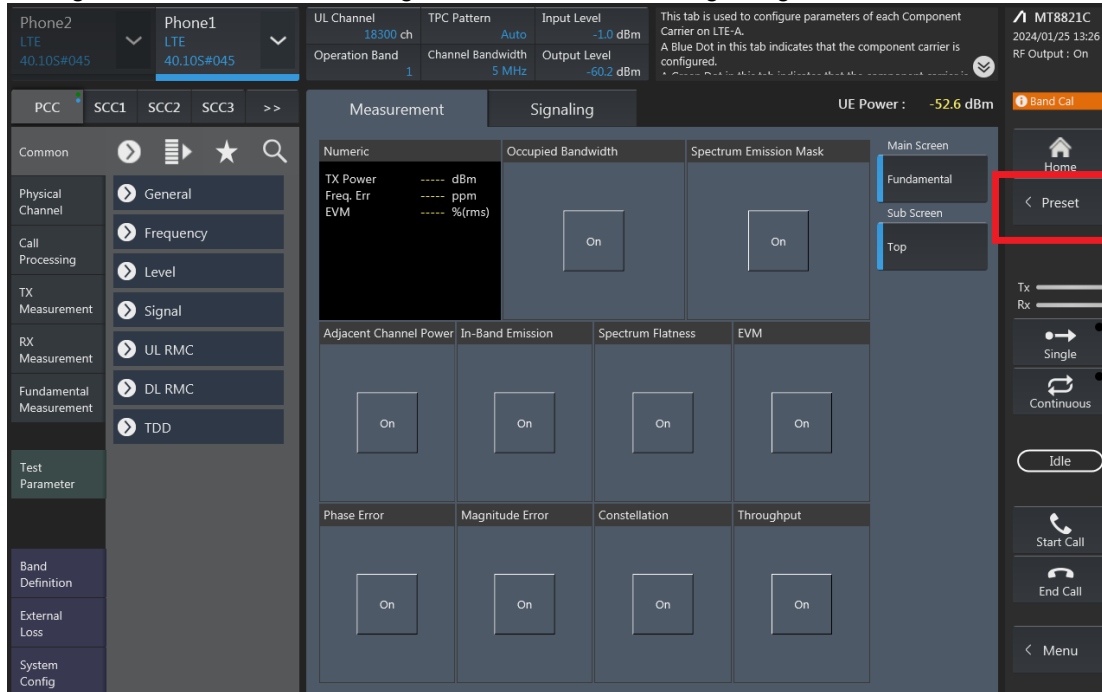
Aggregation Level 4

Uplink Tx Switching



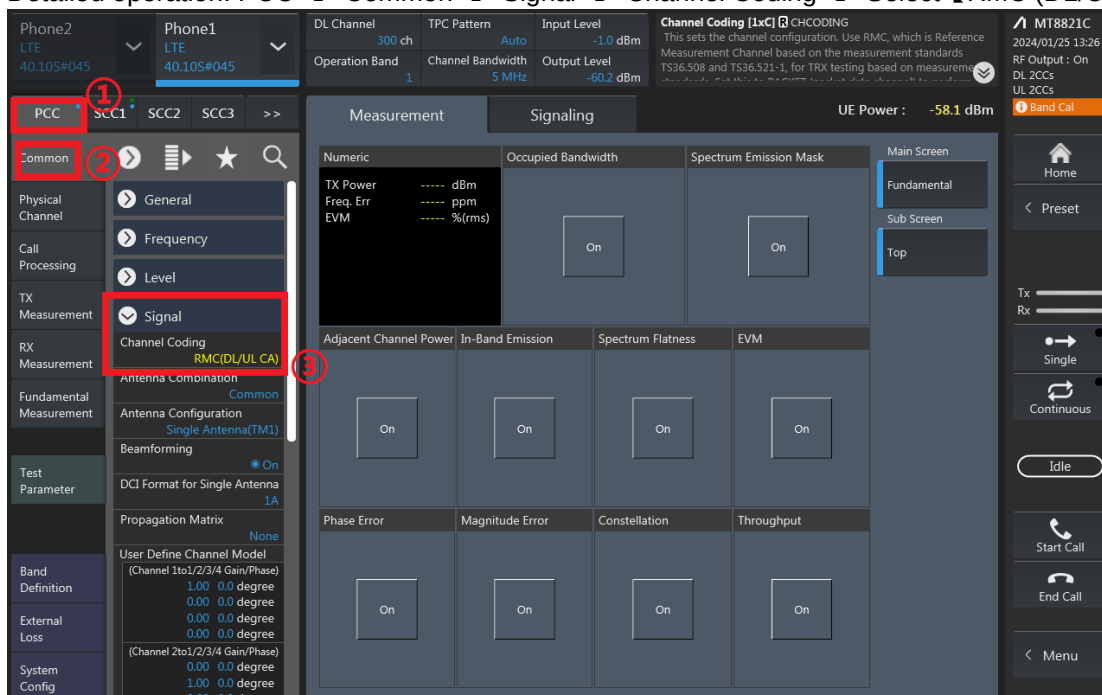
LTE Uplink and Downlink Carrier Aggregation configurations:

1. Change the Scenario in the Configuration of Phone1 LTE Signaling and Preset.

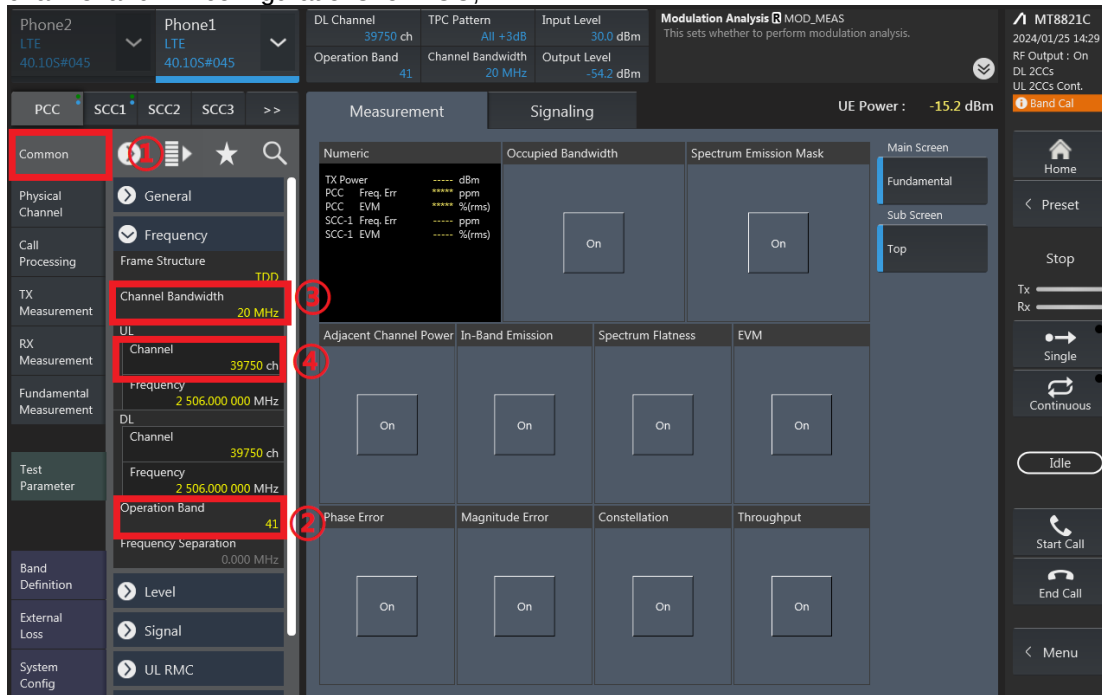


2. If Select "RMC (DL/UL CA)" for Uplink Carrier Aggregation;
If Select "RMC (DL CA)" for Downlink Carrier Aggregation.
For example, Uplink Carrier Aggregation:

Detailed operation: PCC → Common → Signal → Channel Coding → Select 【RMC (DL/UL CA)】



3. PCC parameter Settings: on the screen, and then select the PCC tab and Set operating band, BW, channel and RB configurations for PCC;



Phone2 LTE 40.10S#045 Phone1 LTE 40.10S#045

DL Channel 39750 ch TPC Pattern All +3dB Input Level 30.0 dBm Modulation Analysis MOD_MEAS This sets whether to perform modulation analysis.

Operation Band 41 Channel Bandwidth 20 MHz Output Level -54.2 dBm

MT8821C 2024/01/25 14:29 RF Output : On DL 2CCs UL 2CCs Cont.

UE Power : -15.2 dBm

Measurement Signaling

Common

Physical Channel General

Call Processing Frequency

TX Measurement Channel Bandwidth 20 MHz

RX Measurement Channel 39750 ch

Fundamental Measurement Frequency 2 506.000 000 MHz

Test Parameter Channel 39750 ch Frequency 2 506.000 000 MHz Operation Band 41 Frequency Separation 0.000 MHz

Band Definition Level

External Loss Signal

System Config UL RMC

Numeric

TX Power PCC Freq. Err. dBm PCC EVM ppm SCC-1 Freq. Err. ppm SCC-1 EVM ppm

Occupied Bandwidth

Spectrum Emission Mask

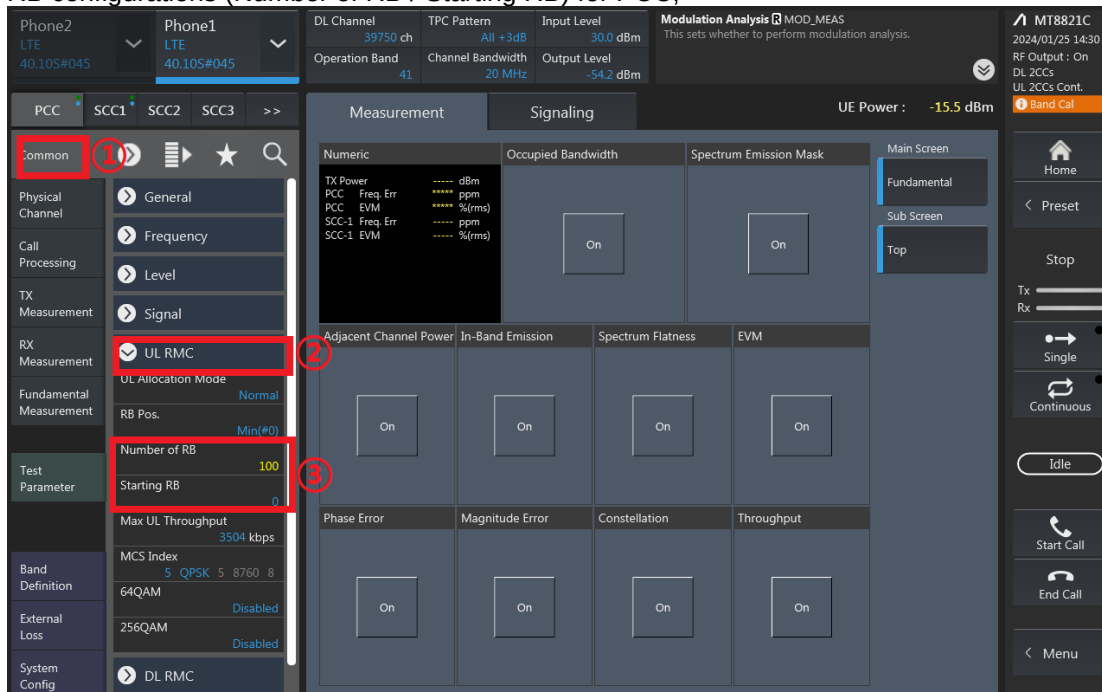
Main Screen Fundamental Sub Screen Top

Home Preset Stop Tx Rx Single Continuous Idle Start Call End Call Menu

Adjacent Channel Power In-Band Emission Spectrum Flatness EVM

Phase Error Magnitude Error Constellation Throughput

RB configurations (Number of RB / Starting RB) for PCC;



Phone2 LTE 40.10S#045 Phone1 LTE 40.10S#045

DL Channel 39750 ch TPC Pattern All +3dB Input Level 30.0 dBm Modulation Analysis MOD_MEAS This sets whether to perform modulation analysis.

Operation Band 41 Channel Bandwidth 20 MHz Output Level -54.2 dBm

MT8821C 2024/01/25 14:30 RF Output : On DL 2CCs UL 2CCs Cont.

UE Power : -15.5 dBm

Measurement Signaling

Common

Physical Channel General

Call Processing Frequency

TX Measurement Level

RX Measurement Signal

Fundamental Measurement UL RMC

Test Parameter UL Allocation Mode Normal RB Pos. Min(#0) Number of RB 100 Starting RB 0 Max UL Throughput 3504 kbps MCS Index 5 QPSK 5 8760 8 64QAM 256QAM Disabled Disabled

Band Definition DL RMC

Numeric

TX Power PCC Freq. Err. dBm PCC EVM ppm SCC-1 Freq. Err. ppm SCC-1 EVM ppm

Occupied Bandwidth

Spectrum Emission Mask

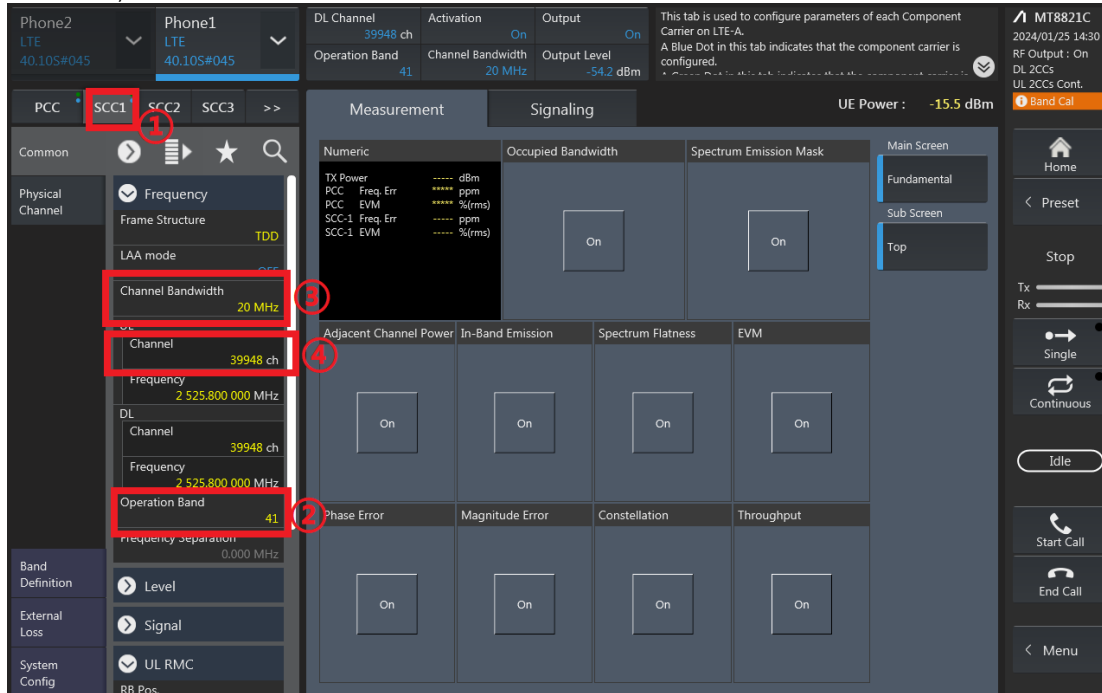
Main Screen Fundamental Sub Screen Top

Home Preset Stop Tx Rx Single Continuous Idle Start Call End Call Menu

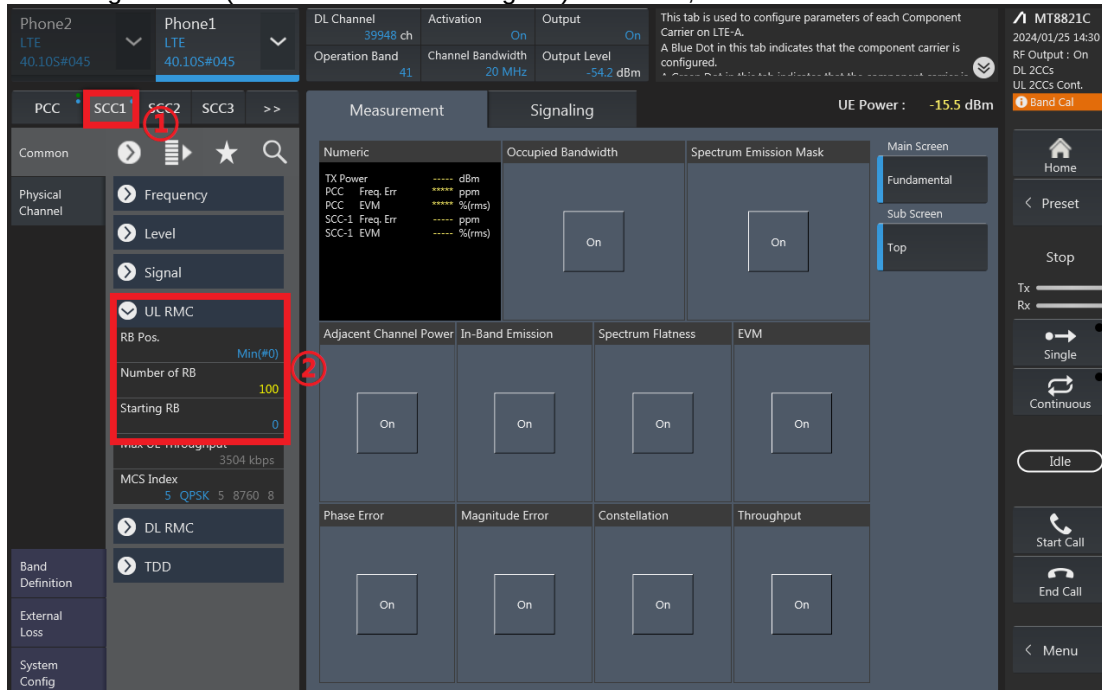
Adjacent Channel Power In-Band Emission Spectrum Flatness EVM

Phase Error Magnitude Error Constellation Throughput

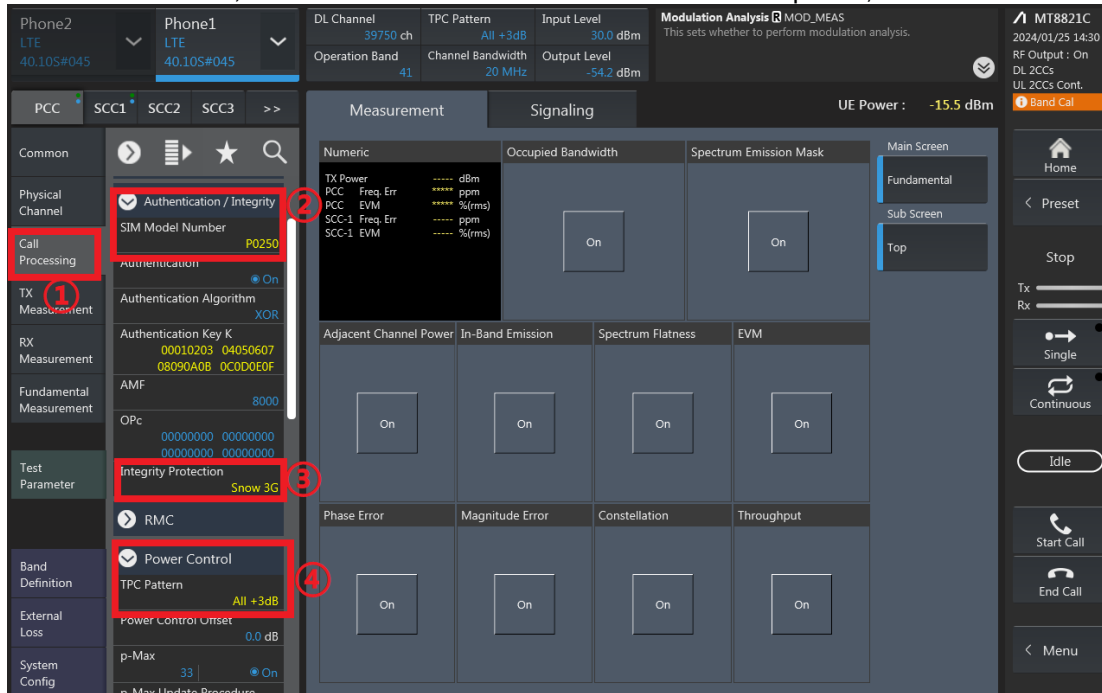
4. SCC parameter Settings: Select the SCC1 tab, Set operating band, BW, channel, and RB configurations for SCC1;



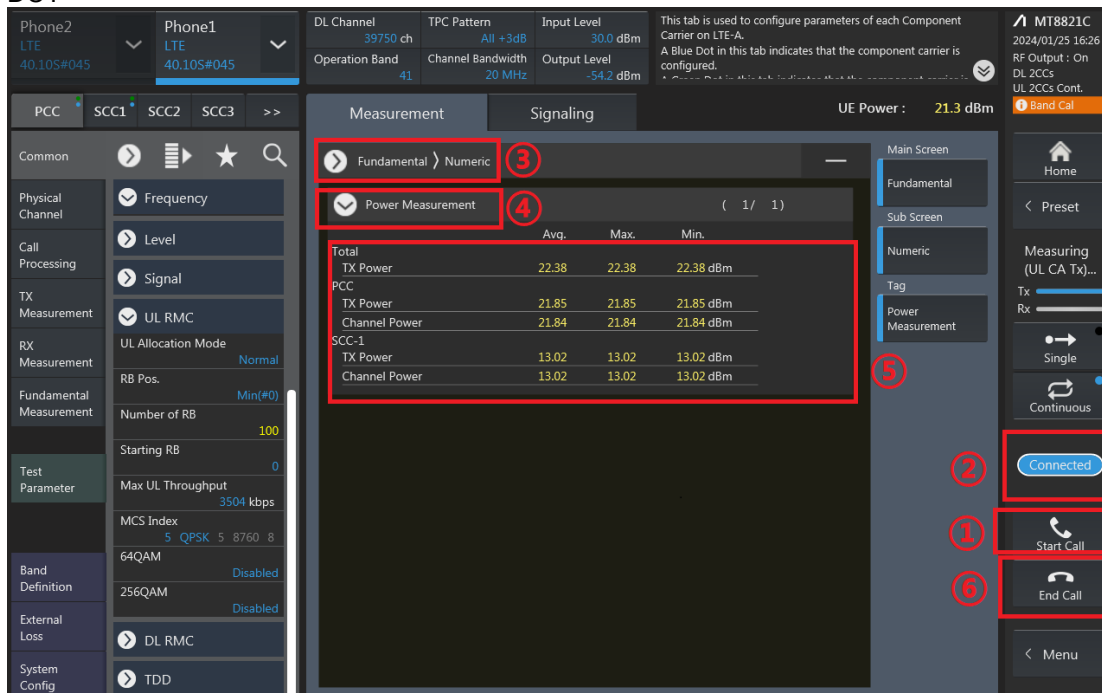
RB configurations (Number of RB / Starting RB) for SCC1;



5. Select the PCC tab, then set “SIM Model Number” and select max power;



6. Click the “Connect” button at the Right of the screen, if necessary, turn the Airplane mode on/off in the DUT



	Avg.	Max.	Min.
Total TX Power	22.38	22.38	22.38 dBm
PCC TX Power	21.85	21.85	21.85 dBm
Channel Power	21.84	21.84	21.84 dBm
SCC-1 TX Power	13.02	13.02	13.02 dBm
Channel Power	13.02	13.02	13.02 dBm

7. The inter-band ULCA test method is similar to intra-band ULCA, and DLCA test method is similar to intra-band ULCA too.

Uplink CA_Power

Full Power&ECI 1&4

CA_7C Ant 1							
Combination 20MHz+20MHz (100RB+100RB)							
PCC Channel	SCC Channel	Modulation	PCC		SCC		Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset	
20850	21048	QPSK	1	99	1	0	24.76
21100	21298	QPSK	1	99	1	0	24.83
21350	21152	QPSK	1	0	1	99	24.59

Full Power&ECI 1&4

CA_38C Ant 1							
Combination 20MHz+20MHz (100RB+100RB)							
PCC Channel	SCC Channel	Modulation	PCC		SCC		Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset	
37850	38048	QPSK	1	99	1	0	24.73
37901	38099	QPSK	1	99	1	0	24.82
38150	37952	QPSK	1	0	1	99	27.76

ECI 3&5

CA_7C Ant 1							
Combination 20MHz+20MHz (100RB+100RB)							
PCC Channel	SCC Channel	Modulation	PCC		SCC		Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset	
20850	21048	QPSK	1	99	1	0	21.25
21100	21298	QPSK	1	99	1	0	21.33
21350	21152	QPSK	1	0	1	99	21.08

ECI 3&5

CA_38C Ant 1							
Combination 20MHz+20MHz (100RB+100RB)							
PCC Channel	SCC Channel	Modulation	PCC		SCC		Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset	
37850	38048	QPSK	1	99	1	0	21.76
37901	38099	QPSK	1	99	1	0	21.83
38150	37952	QPSK	1	0	1	99	21.79

Full Power

CA_7C Ant 5							
Combination 20MHz+20MHz (100RB+100RB)							
PCC Channel	SCC Channel	Modulation	PCC		SCC		Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset	
20850	21048	QPSK	1	99	1	0	24.54
21100	21298	QPSK	1	99	1	0	24.62
21350	21152	QPSK	1	0	1	99	24.59

Full Power

CA_38C Ant 5							
Combination 20MHz+20MHz (100RB+100RB)							
PCC Channel	SCC Channel	Modulation	PCC		SCC		Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset	
37850	38048	QPSK	1	99	1	0	24.81
37901	38099	QPSK	1	99	1	0	24.93
38150	37952	QPSK	1	0	1	99	24.88

ECI 1&5

CA_7C Ant 5							
Combination 20MHz+20MHz (100RB+100RB)							
PCC Channel	SCC Channel	Modulation	PCC		SCC		Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset	
20850	21048	QPSK	1	99	1	0	17.49
21100	21298	QPSK	1	99	1	0	17.44
21350	21152	QPSK	1	0	1	99	17.59

ECI 1&5

CA_38C Ant 5							
Combination 20MHz+20MHz (100RB+100RB)							
PCC Channel	SCC Channel	Modulation	PCC		SCC		Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset	
37850	38048	QPSK	1	99	1	0	20.48
37901	38099	QPSK	1	99	1	0	20.56
38150	37952	QPSK	1	0	1	99	20.51

ECI 3

CA_7C Ant 5							
Combination 20MHz+20MHz (100RB+100RB)							
PCC Channel	SCC Channel	Modulation	PCC		SCC		Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset	
20850	21048	QPSK	1	99	1	0	17.72
21100	21298	QPSK	1	99	1	0	17.76
21350	21152	QPSK	1	0	1	99	17.81

ECI 3

CA_38C Ant 5							
Combination 20MHz+20MHz (100RB+100RB)							
PCC Channel	SCC Channel	Modulation	PCC		SCC		Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset	
37850	38048	QPSK	1	99	1	0	20.98
37901	38099	QPSK	1	99	1	0	21.02
38150	37952	QPSK	1	0	1	99	20.95

ECI 4

CA_7C Ant 5							
Combination 20MHz+20MHz (100RB+100RB)							
PCC Channel	SCC Channel	Modulation	PCC		SCC		Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset	
20850	21048	QPSK	1	99	1	0	22.78
21100	21298	QPSK	1	99	1	0	22.82
21350	21152	QPSK	1	0	1	99	22.91

ECI 4

CA_38C Ant 5							
Combination 20MHz+20MHz (100RB+100RB)							
PCC Channel	SCC Channel	Modulation	PCC		SCC		Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset	
37850	38048	QPSK	1	99	1	0	24.41
37901	38099	QPSK	1	99	1	0	24.53
38150	37952	QPSK	1	0	1	99	24.49