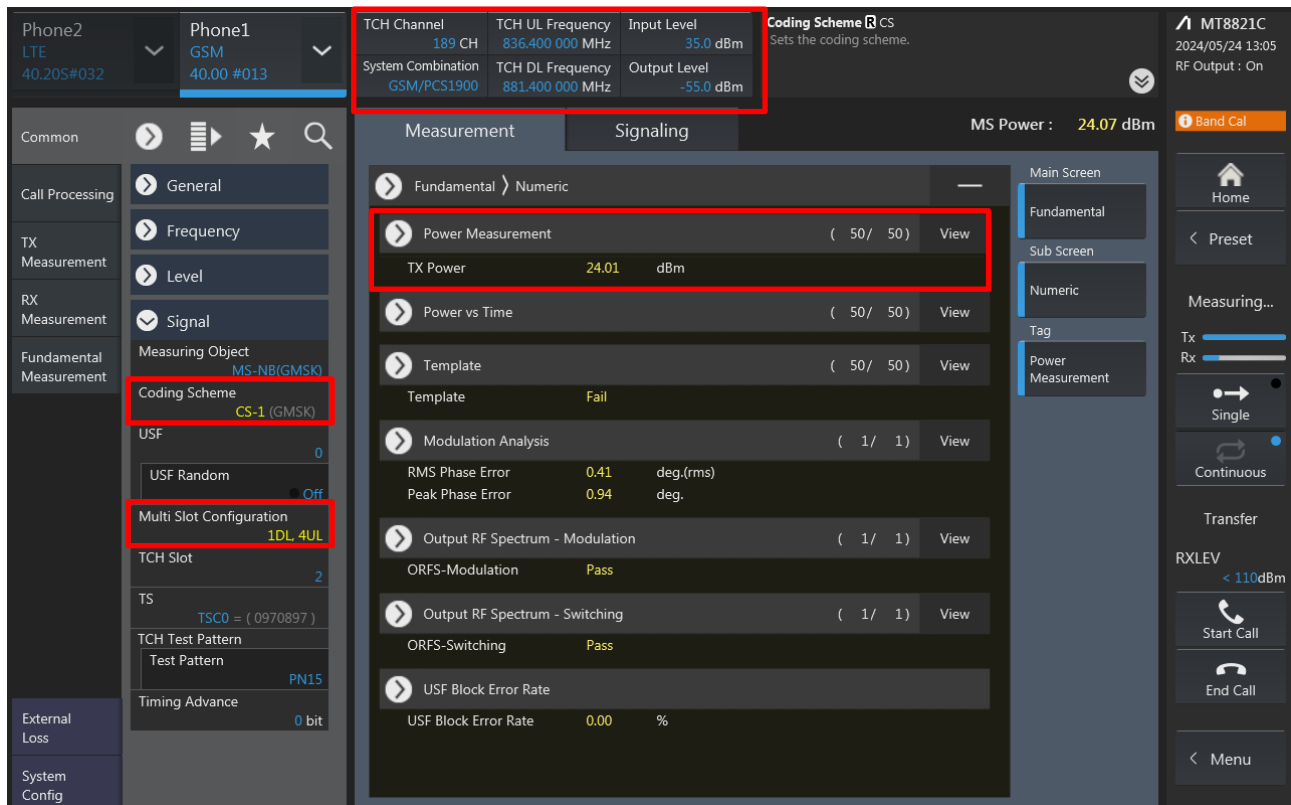


Power measurement connection diagram:

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.

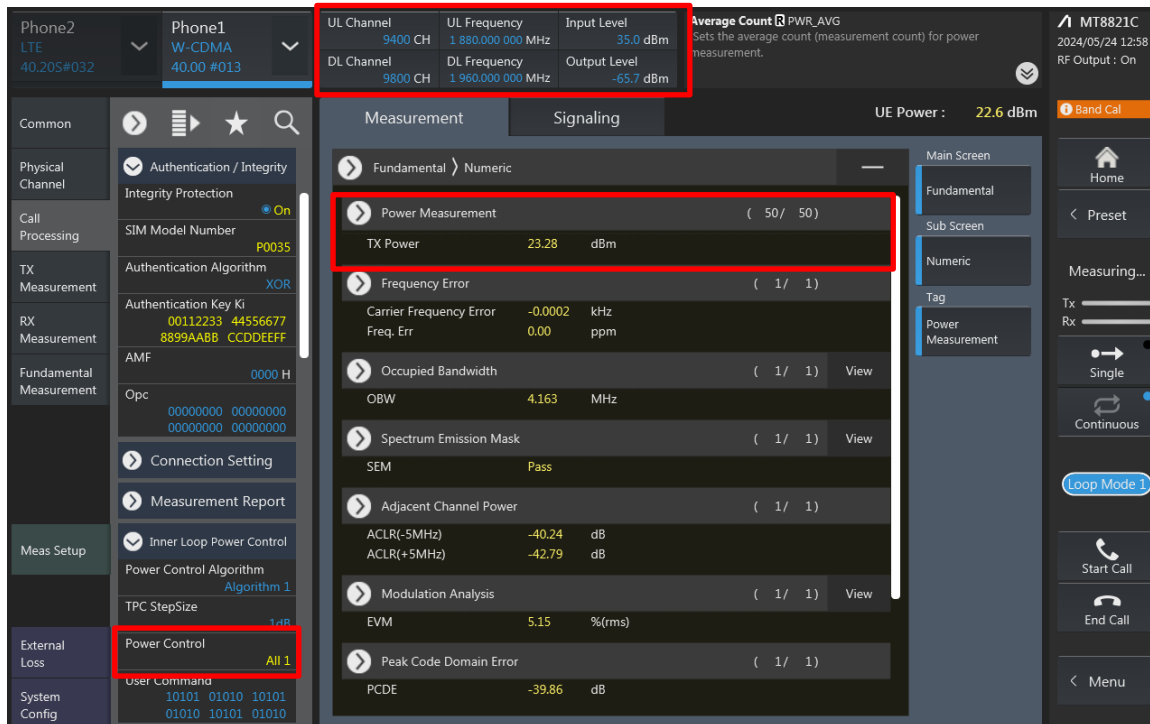
<GSM>



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

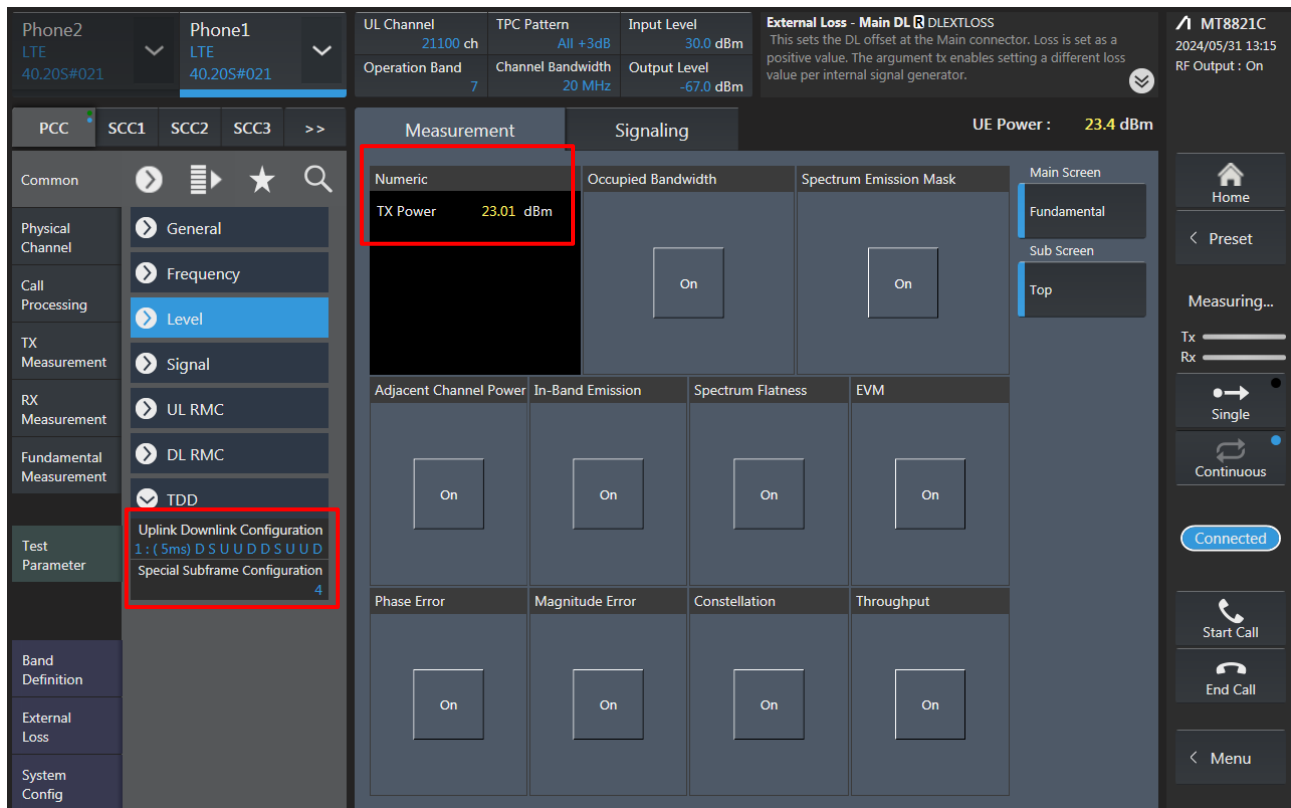
- Top Bar:** Shows Phone2 (LTE, 40.205#032) and Phone1 (GSM, 40.00 #013). The TCH Channel is 189 CH, TCH UL Frequency is 836.400 000 MHz, Input Level is 35.0 dBm, and TCH DL Frequency is 881.400 000 MHz. The Coding Scheme is CS.
- Left Sidebar:** Contains navigation options like Call Processing, TX Measurement, 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 Home, Preset, Measuring..., Single, Continuous, Transfer, RXLEV, Start Call, End Call, and Menu.

<WCDMA>



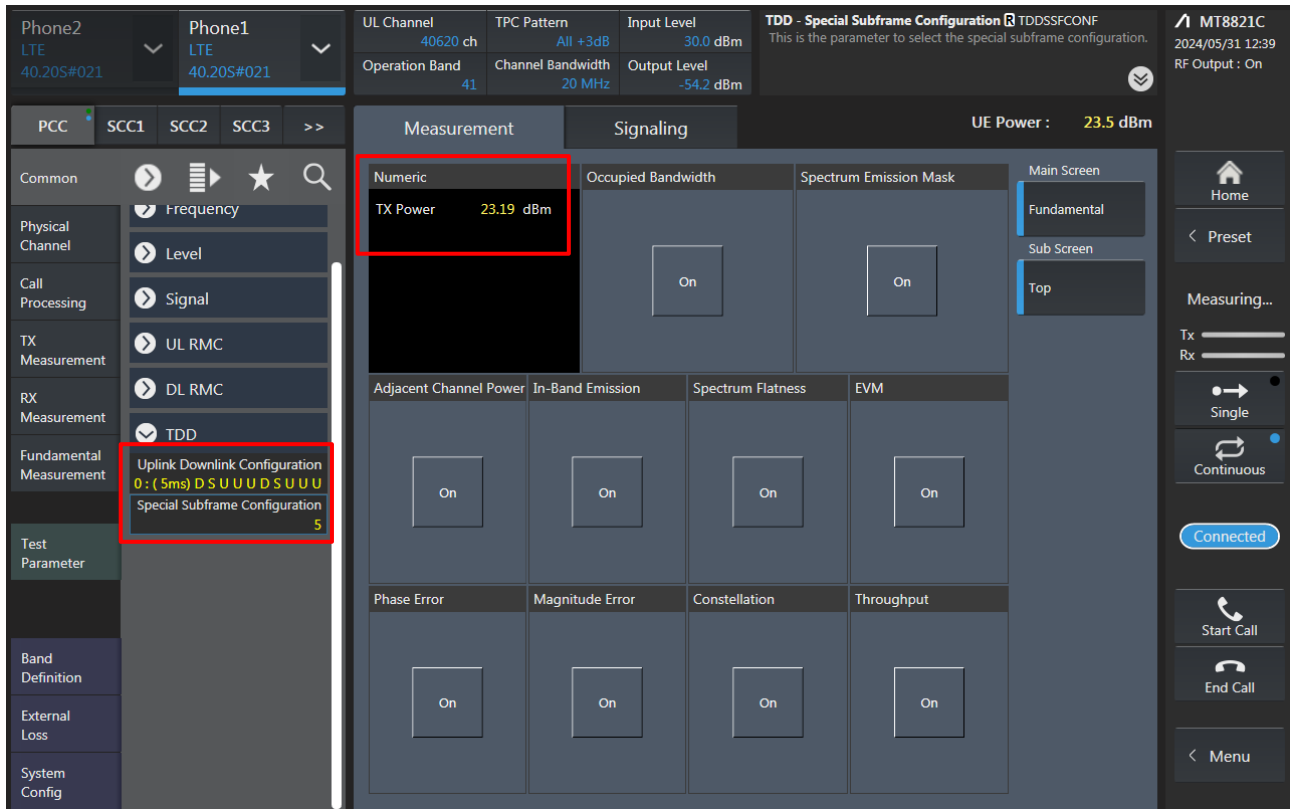
The WCDMA interface shows two phone configurations: Phone2 (LTE, 40.20S#032) and Phone1 (W-CDMA, 40.00 #013). The main measurement area is divided into 'Measurement' and 'Signaling' tabs. The 'Measurement' tab is active, showing a 'Fundamental' screen with 'Power Measurement' selected. The 'Power Measurement' screen displays 'TX Power' as 23.28 dBm. The 'Signaling' tab shows 'Occupied Bandwidth' as 4.163 MHz and 'Spectrum Emission Mask' as Pass. The 'External Loss' section shows 'Power Control' as All 1. The 'UE Power' is 22.6 dBm. The 'Main Screen' shows 'Fundamental' and 'Sub Screen' options. The 'Tag' section shows 'Power Measurement'.

<LTE>



The LTE interface shows two phone configurations: Phone2 (LTE, 40.20S#021) and Phone1 (LTE, 40.20S#021). The main measurement area is divided into 'Measurement' and 'Signaling' tabs. The 'Measurement' tab is active, showing a 'Numeric' screen with 'TX Power' as 23.01 dBm. The 'Signaling' tab shows 'Occupied Bandwidth' as 20 MHz and 'Spectrum Emission Mask' as On. The 'External Loss - Main DL' section shows 'DLEXTLOSS' as 30.0 dBm. The 'UE Power' is 23.4 dBm. The 'Main Screen' shows 'Fundamental' and 'Sub Screen' options. The 'Tag' section shows 'Top'. The 'Test Parameter' section shows 'Uplink Downlink Configuration 1: (5ms) D S U U D D S U U D' and 'Special Subframe Configuration 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 TDD - Special Subframe Configuration TDDSSFCNF This is the parameter to select the special subframe configuration. MT8821C 2024/05/31 12:39 RF Output : On

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

UE Power : 23.5 dBm

Measurement Signaling

Numeric TX Power 23.19 dBm

Occupied Bandwidth Spectrum Emission Mask

On On

Adjacent Channel Power In-Band Emission Spectrum Flatness EVM

On On On On

Phase Error Magnitude Error Constellation Throughput

On On On On

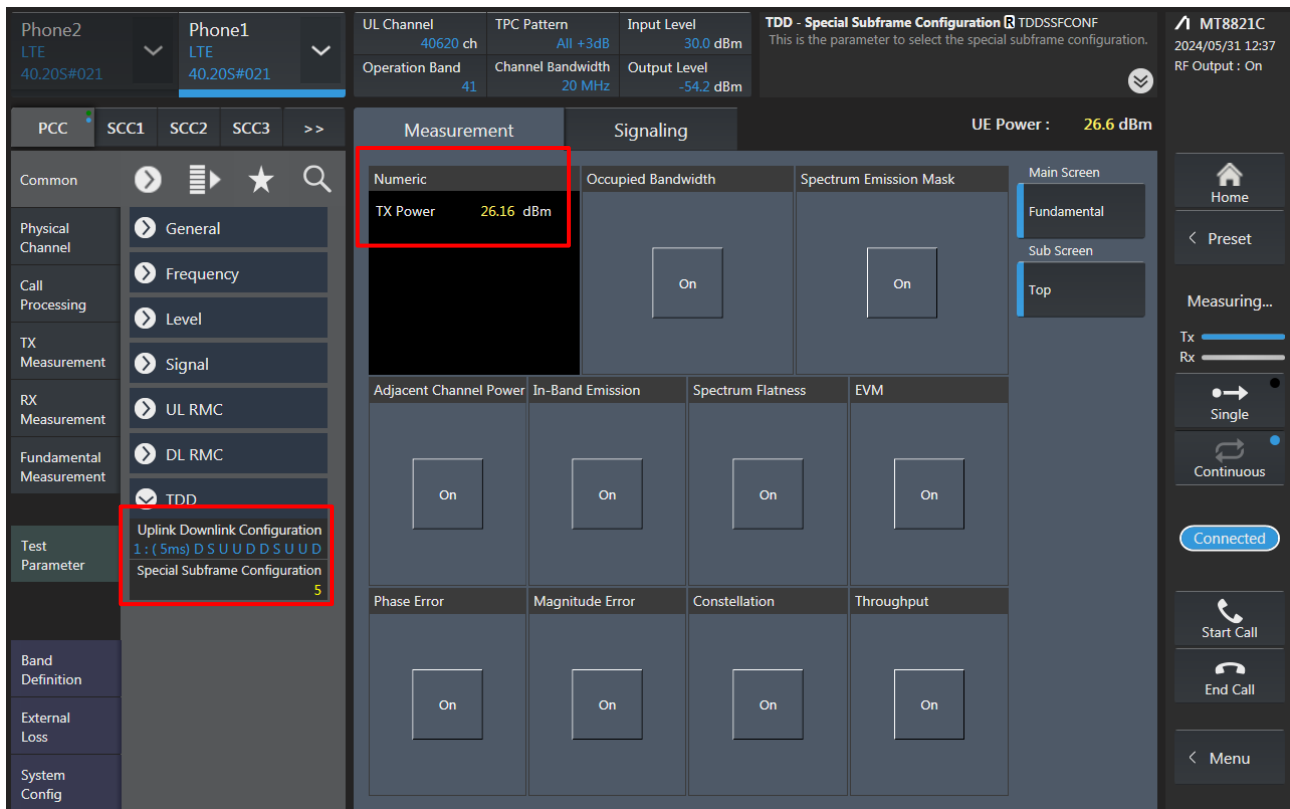
Common Frequency Level Signal UL RMC DL RMC TDD Uplink Downlink Configuration 0 : (5ms) D S U U U D S U U U Special Subframe Configuration 5

Physical Channel Call Processing TX Measurement RX Measurement Fundamental Measurement Test Parameter Band Definition External Loss System Config

Main Screen Fundamental Sub Screen Top

Home Preset Measuring... Tx Rx Single Continuous Connected Start Call End Call Menu

<LTE TDD Power class 2>



Phone2 LTE 40.20S#021 Phone1 LTE 40.20S#021

UL Channel 40620 ch TPC Pattern All +3dB Input Level 30.0 dBm TDD - Special Subframe Configuration TDDSSFCNF This is the parameter to select the special subframe configuration. MT8821C 2024/05/31 12:37 RF Output : On

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

UE Power : 26.6 dBm

Measurement Signaling

Numeric TX Power 26.16 dBm

Occupied Bandwidth Spectrum Emission Mask

On On

Adjacent Channel Power In-Band Emission Spectrum Flatness EVM

On On On On

Phase Error Magnitude Error Constellation Throughput

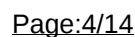
On On On On

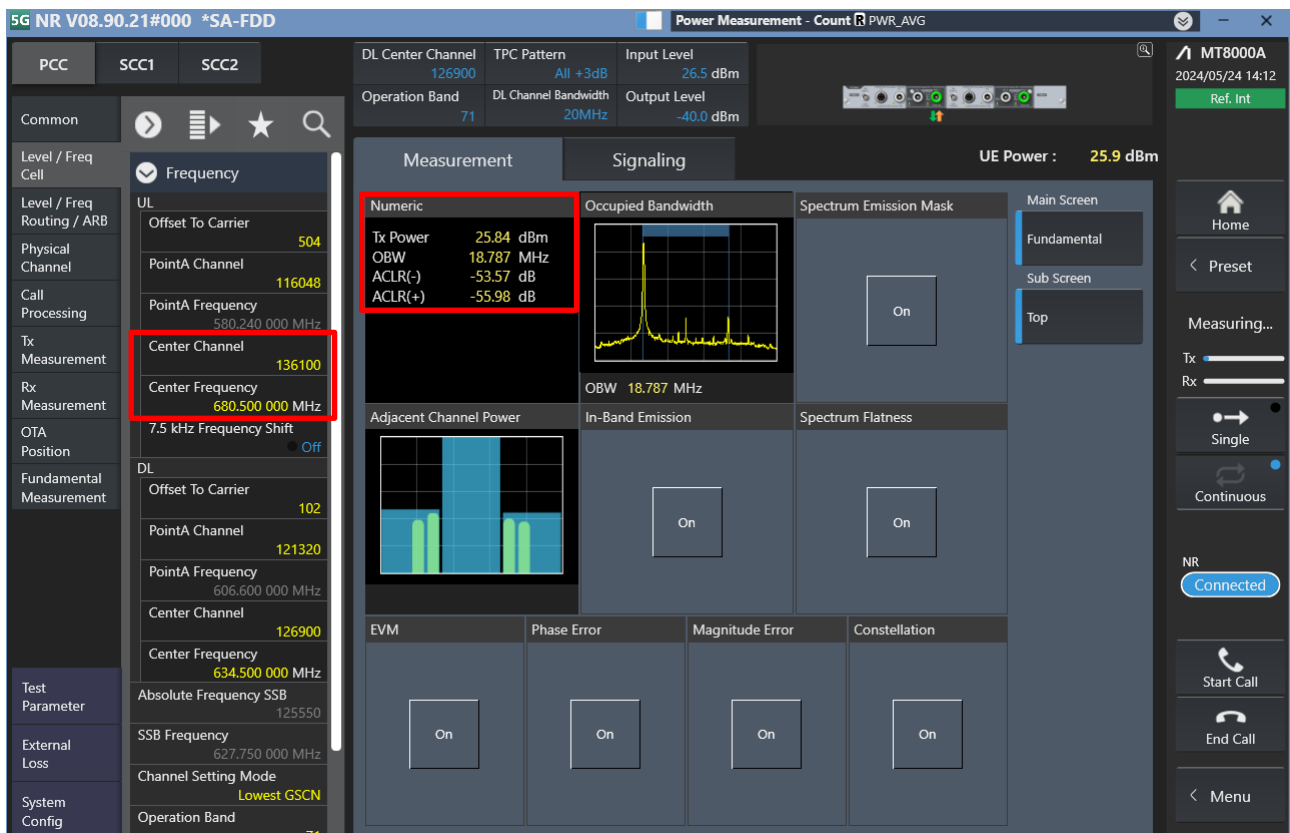
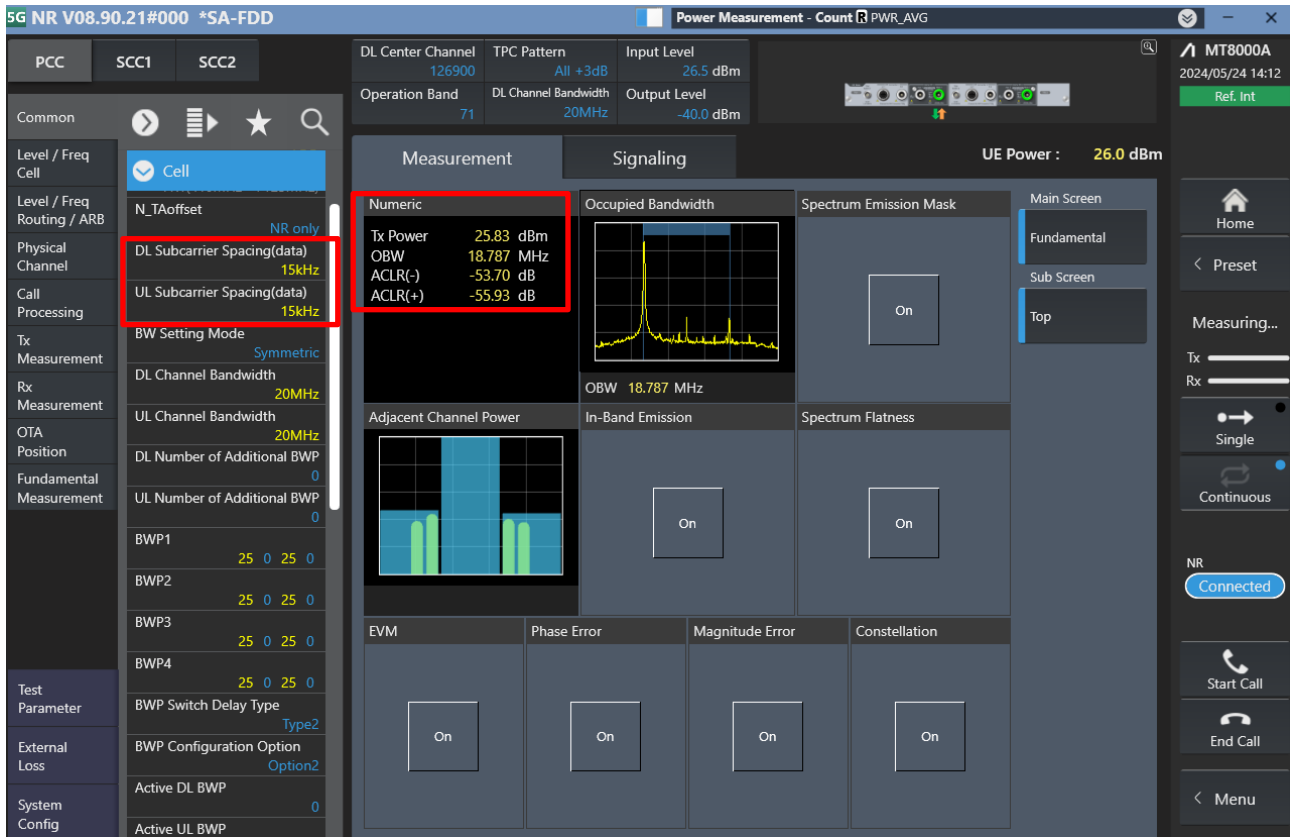
Common General Frequency Level Signal UL RMC DL RMC TDD Uplink Downlink Configuration 1 : (5ms) D S U U U D D S U U U Special Subframe Configuration 5

Physical Channel Call Processing TX Measurement RX Measurement Fundamental Measurement Test Parameter Band Definition External Loss System Config

Main Screen Fundamental Sub Screen Top

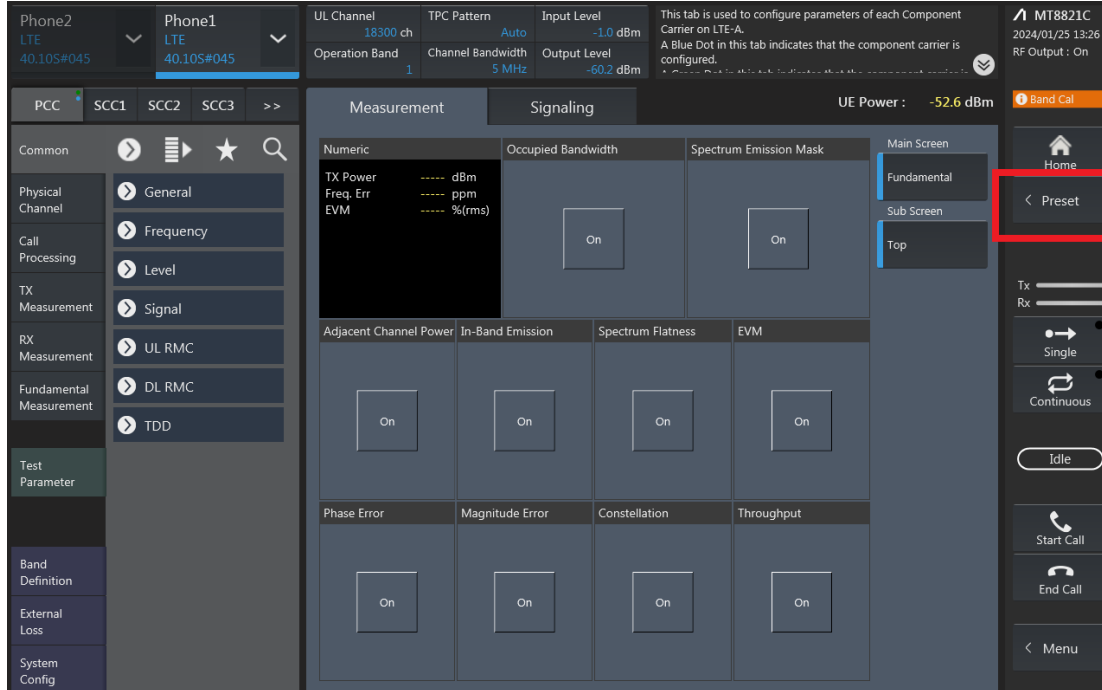
Home Preset Measuring... Tx Rx Single Continuous Connected Start Call End Call Menu





LTE Uplink and Downlink Carrier Aggregation configurations:

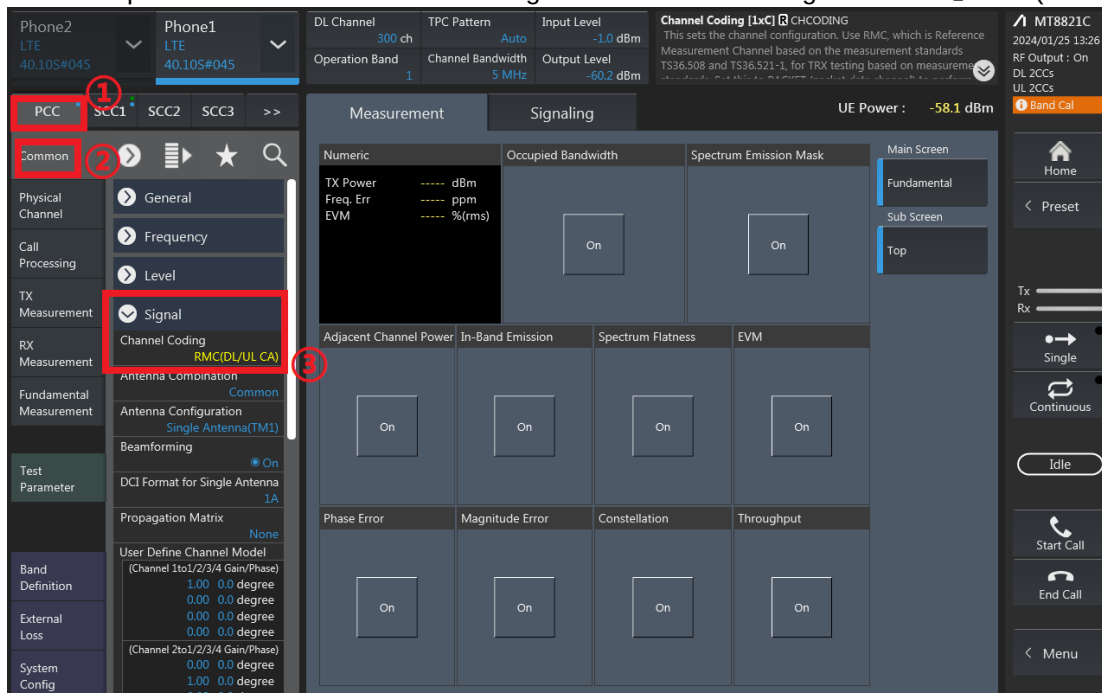
1. Change the Scenario in the Configuration of Phone1 LTE Signaling and Preset.



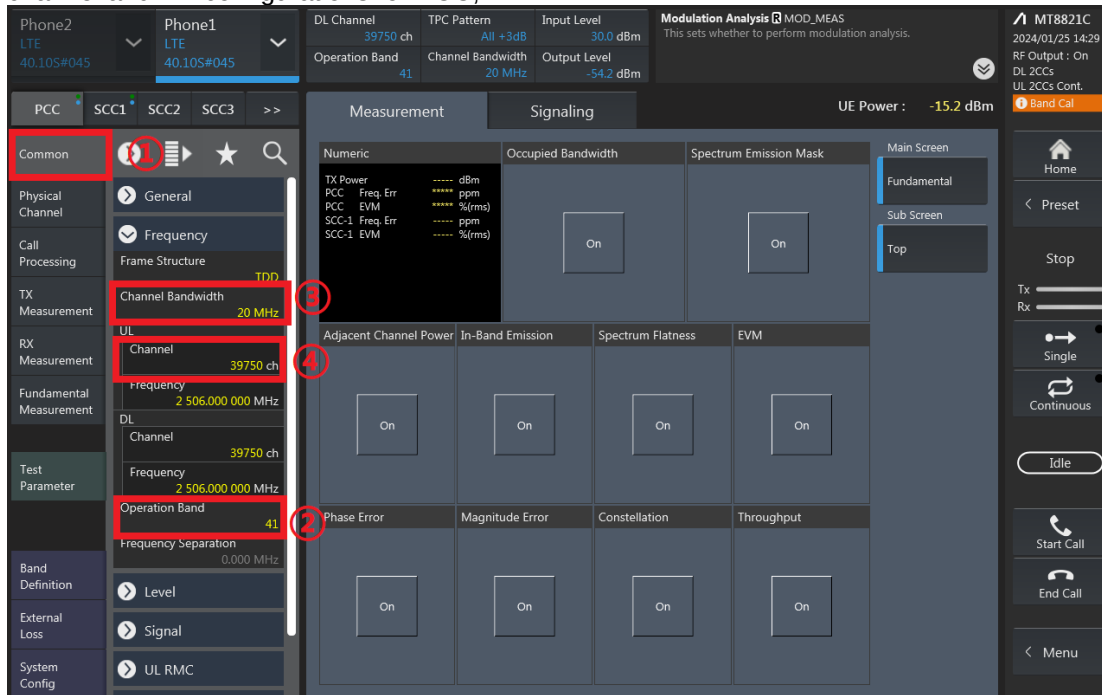
2. If Select "RMC (DL/UL CA)" for Uplink Carrier Aggregation;
If Select "RMC (DL CA)" for Downlink Carrier Aggregation.

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

Call Processing

TX Measurement

RX Measurement

Fundamental Measurement

Test Parameter

Band Definition

External Loss

System Config

General

Frequency

Channel Bandwidth 20 MHz

Channel 39750 ch

Frequency 2 506.000 000 MHz

DL Channel 39750 ch

Frequency 2 506.000 000 MHz

Operation Band 41

Frequency Separation 0.000 MHz

Level

Signal

UL RMC

Numeric

Occupied Bandwidth

Spectrum Emission Mask

Main Screen

Fundamental

Sub Screen

Top

Home

Preset

Stop

Tx

Rx

Single

Continuous

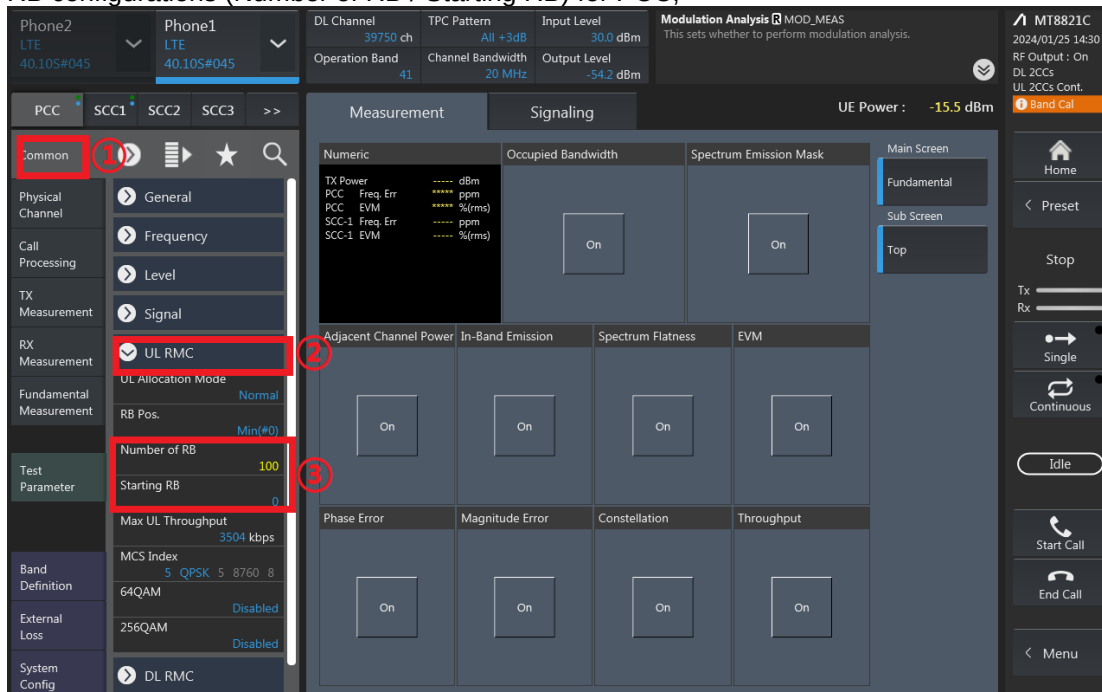
Idle

Start Call

End Call

Menu

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

Call Processing

TX Measurement

RX Measurement

Fundamental Measurement

Test Parameter

Band Definition

External Loss

System Config

General

Frequency

Level

Signal

UL RMC

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

DL RMC

Numeric

Occupied Bandwidth

Spectrum Emission Mask

Main Screen

Fundamental

Sub Screen

Top

Home

Preset

Stop

Tx

Rx

Single

Continuous

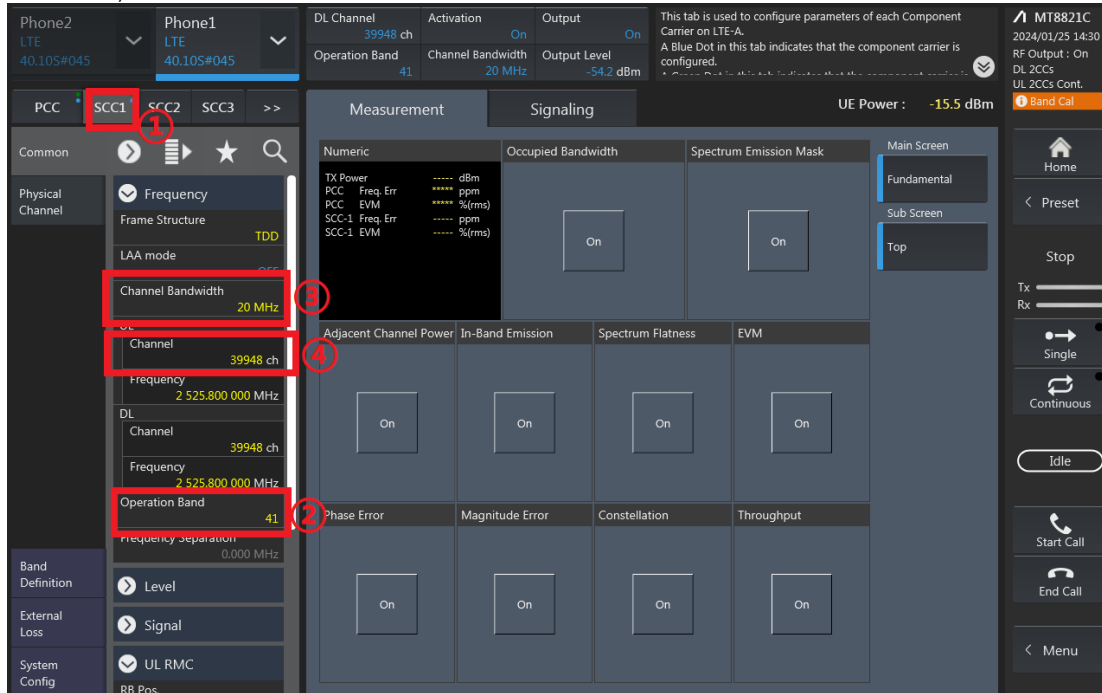
Idle

Start Call

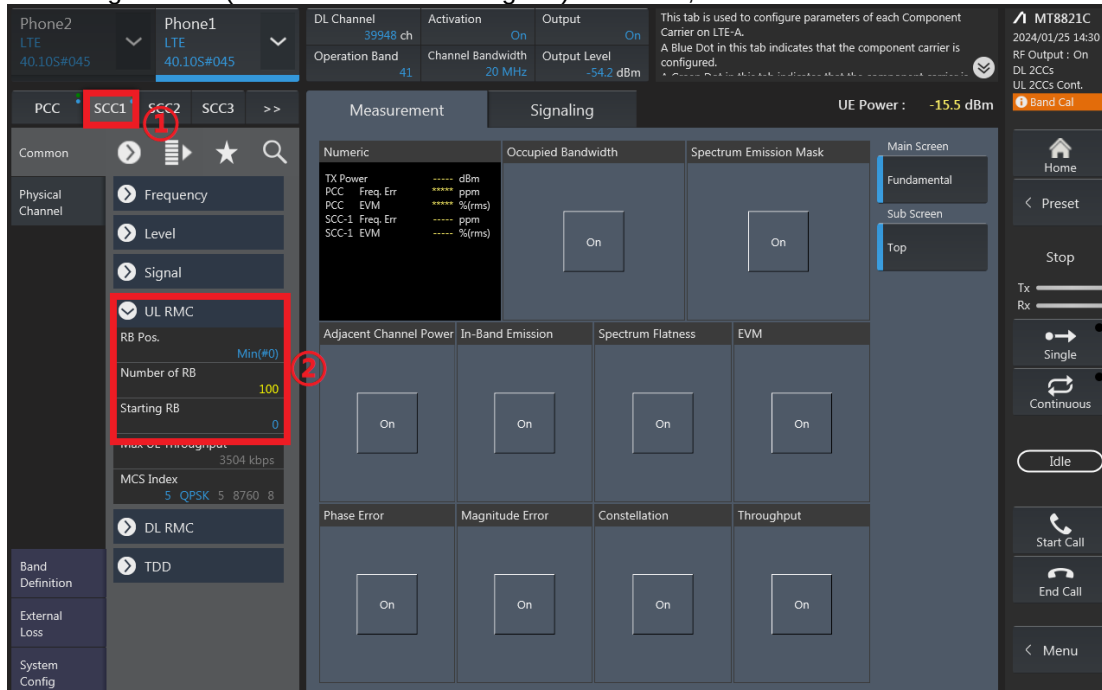
End Call

Menu

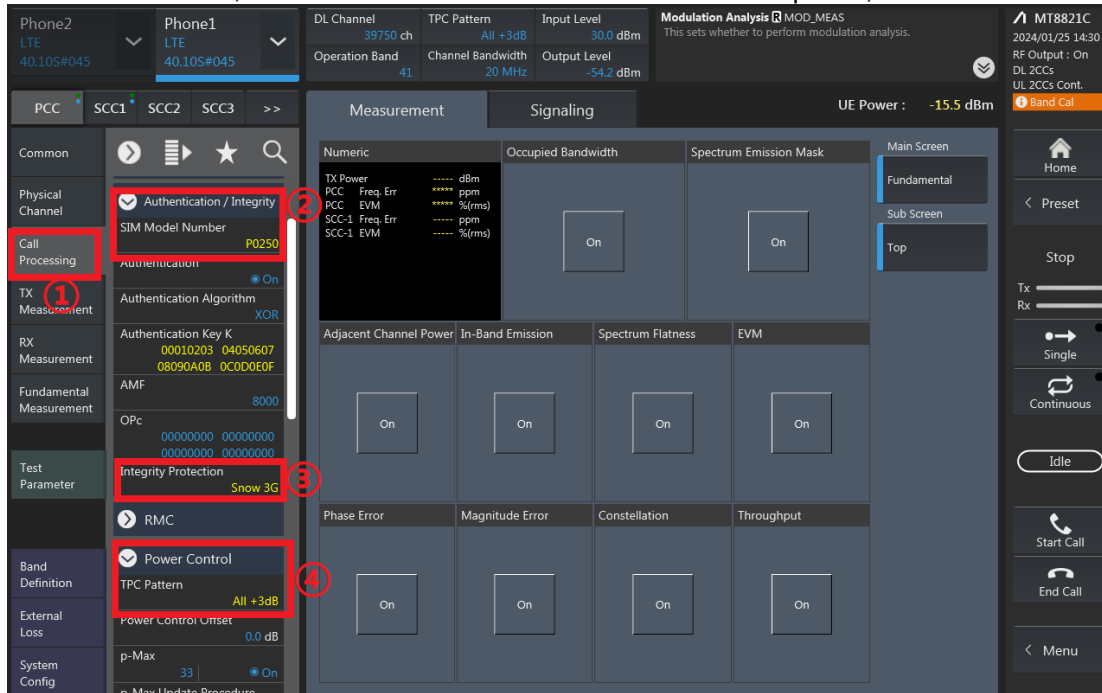
4. SCC parameter Settings: Select the SCC1 tab, Set operating band, BW, channel, and RB configurations for SCC1;



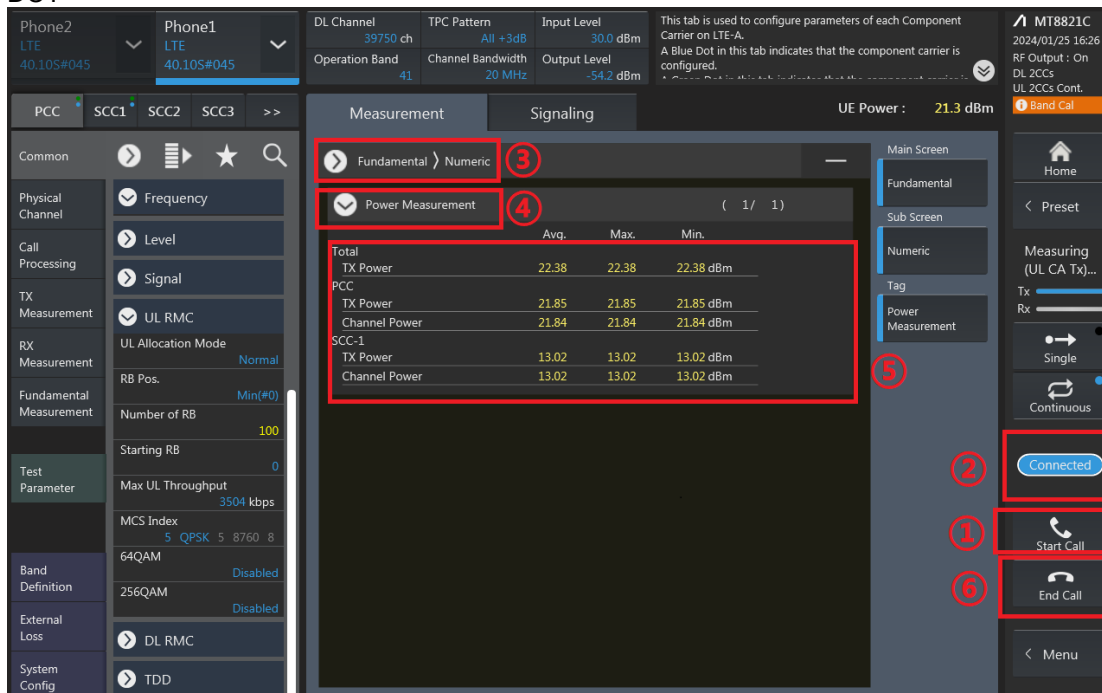
RB configurations (Number of RB / Starting RB) for SCC1;



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

Ant 1 Full Power								
CA_7C								
Combination 20MHz+20MHz (1RB+100RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset		
20850	21048	QPSK	1	99	1	0	22.49	24.00
21100	21298	QPSK	1	99	1	0	22.64	24.00
21350	21152	QPSK	1	0	1	99	22.58	24.00

Ant 1 Full Power								
CA_38C								
Combination 20MHz+20MHz (1RB+100RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset		
37850	38048	QPSK	1	99	1	0	22.78	24.00
37901	38099	QPSK	1	99	1	0	22.85	24.00
38150	37952	QPSK	1	0	1	99	22.63	24.00

Ant 1 Full Power								
CA_41C Ant 2								
Combination 20MHz+20MHz (100RB+100RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset		
39750	39948	QPSK	1	99	1	0	22.55	24.00
40185	40383	QPSK	1	99	1	0	22.56	24.00
40620	40818	QPSK	1	99	1	0	22.79	24.00
41055	41253	QPSK	1	99	1	0	22.48	24.00
41490	41292	QPSK	1	0	1	99	22.43	24.00

Ant 1 Full Power								
CA_41C HPUE Ant 2								
Combination 20MHz+20MHz (100RB+100RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset		
39750	39948	QPSK	1	99	1	0	25.70	27.00
40185	40383	QPSK	1	99	1	0	25.55	27.00
40620	40818	QPSK	1	99	1	0	25.73	27.00
41055	41253	QPSK	1	99	1	0	25.39	27.00
41490	41292	QPSK	1	0	1	99	25.39	27.00

Uplink CA Power

Ant 1 EC12							
CA_7C							
Combination 20MHz+20MHz (1RB+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	22.49
21100	21298	QPSK	1	99	1	0	22.64
21350	21152	QPSK	1	0	1	99	22.58

Ant 1 EC12							
CA_38C							
Combination 20MHz+20MHz (1RB+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	22.78
37901	38099	QPSK	1	99	1	0	22.85
38150	37952	QPSK	1	0	1	99	22.63

Ant 1 EC12							
CA_41C Ant 2							
Combination 20MHz+20MHz (100RB+100RB)							
PCC Channel	SCC Channel	Modulation	PCC		SCC		Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset	
39750	39948	QPSK	1	99	1	0	22.55
40185	40383	QPSK	1	99	1	0	22.56
40620	40818	QPSK	1	99	1	0	22.79
41055	41253	QPSK	1	99	1	0	22.48
41490	41292	QPSK	1	0	1	99	22.43

Ant 1 EC12							
CA_41C HPUE Ant 2							
Combination 20MHz+20MHz (100RB+100RB)							
PCC Channel	SCC Channel	Modulation	PCC		SCC		Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset	
39750	39948	QPSK	1	99	1	0	25.70
40185	40383	QPSK	1	99	1	0	25.55
40620	40818	QPSK	1	99	1	0	25.73
41055	41253	QPSK	1	99	1	0	25.39
41490	41292	QPSK	1	0	1	99	25.39

Uplink CA Power

Ant 1 ECI3								
CA_7C								
Combination 20MHz+20MHz (1RB+100RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset		
20850	21048	QPSK	1	99	1	0	18.10	19.60
21100	21298	QPSK	1	99	1	0	18.33	19.60
21350	21152	QPSK	1	0	1	99	18.14	19.60

Ant 1 ECI3								
CA_38C								
Combination 20MHz+20MHz (1RB+100RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset		
37850	38048	QPSK	1	99	1	0	22.78	24.00
37901	38099	QPSK	1	99	1	0	22.85	24.00
38150	37952	QPSK	1	0	1	99	22.63	24.00

Ant 1 ECI3								
CA_41C Ant 2								
Combination 20MHz+20MHz (100RB+100RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset		
39750	39948	QPSK	1	99	1	0	22.55	24.00
40185	40383	QPSK	1	99	1	0	22.56	24.00
40620	40818	QPSK	1	99	1	0	22.79	24.00
41055	41253	QPSK	1	99	1	0	22.48	24.00
41490	41292	QPSK	1	0	1	99	22.43	24.00

Ant 1 ECI3								
CA_41C HPUE Ant 2								
Combination 20MHz+20MHz (100RB+100RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset		
39750	39948	QPSK	1	99	1	0	25.70	27.00
40185	40383	QPSK	1	99	1	0	25.55	27.00
40620	40818	QPSK	1	99	1	0	25.73	27.00
41055	41253	QPSK	1	99	1	0	25.39	27.00
41490	41292	QPSK	1	0	1	99	25.39	27.00

Uplink CA Power

Ant 1 ECI6							
CA_7C							
Combination 20MHz+20MHz (1RB+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	20.22
21100	21298	QPSK	1	99	1	0	20.38
21350	21152	QPSK	1	0	1	99	20.08

Ant 1 ECI6							
CA_38C							
Combination 20MHz+20MHz (1RB+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	22.78
37901	38099	QPSK	1	99	1	0	22.85
38150	37952	QPSK	1	0	1	99	22.63

Ant 1 ECI6							
CA_41C Ant 2							
Combination 20MHz+20MHz (100RB+100RB)							
PCC Channel	SCC Channel	Modulation	PCC		SCC		Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset	
39750	39948	QPSK	1	99	1	0	22.55
40185	40383	QPSK	1	99	1	0	22.56
40620	40818	QPSK	1	99	1	0	22.79
41055	41253	QPSK	1	99	1	0	22.48
41490	41292	QPSK	1	0	1	99	22.43

Ant 1 ECI6							
CA_41C HPUE Ant 2							
Combination 20MHz+20MHz (100RB+100RB)							
PCC Channel	SCC Channel	Modulation	PCC		SCC		Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset	
39750	39948	QPSK	1	99	1	0	25.70
40185	40383	QPSK	1	99	1	0	25.55
40620	40818	QPSK	1	99	1	0	25.73
41055	41253	QPSK	1	99	1	0	25.39
41490	41292	QPSK	1	0	1	99	25.39

Uplink CA Power

Ant 1 ECI7								
CA_7C								
Combination 20MHz+20MHz (1RB+100RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset		
20850	21048	QPSK	1	99	1	0	18.18	19.40
21100	21298	QPSK	1	99	1	0	18.42	19.40
21350	21152	QPSK	1	0	1	99	18.16	19.40

Ant 1 ECI7								
CA_38C								
Combination 20MHz+20MHz (1RB+100RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset		
37850	38048	QPSK	1	99	1	0	20.89	22.90
37901	38099	QPSK	1	99	1	0	21.02	22.90
38150	37952	QPSK	1	0	1	99	20.90	22.90

Ant 1 ECI7								
CA_41C Ant 2								
Combination 20MHz+20MHz (100RB+100RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset		
39750	39948	QPSK	1	99	1	0	20.95	22.20
40185	40383	QPSK	1	99	1	0	20.94	22.20
40620	40818	QPSK	1	99	1	0	21.17	22.20
41055	41253	QPSK	1	99	1	0	21.01	22.20
41490	41292	QPSK	1	0	1	99	20.91	22.20

Ant 1 ECI7								
CA_41C HPUE Ant 2								
Combination 20MHz+20MHz (100RB+100RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset		
39750	39948	QPSK	1	99	1	0	22.62	23.80
40185	40383	QPSK	1	99	1	0	22.66	23.80
40620	40818	QPSK	1	99	1	0	22.73	23.80
41055	41253	QPSK	1	99	1	0	22.60	23.80
41490	41292	QPSK	1	0	1	99	22.64	23.80