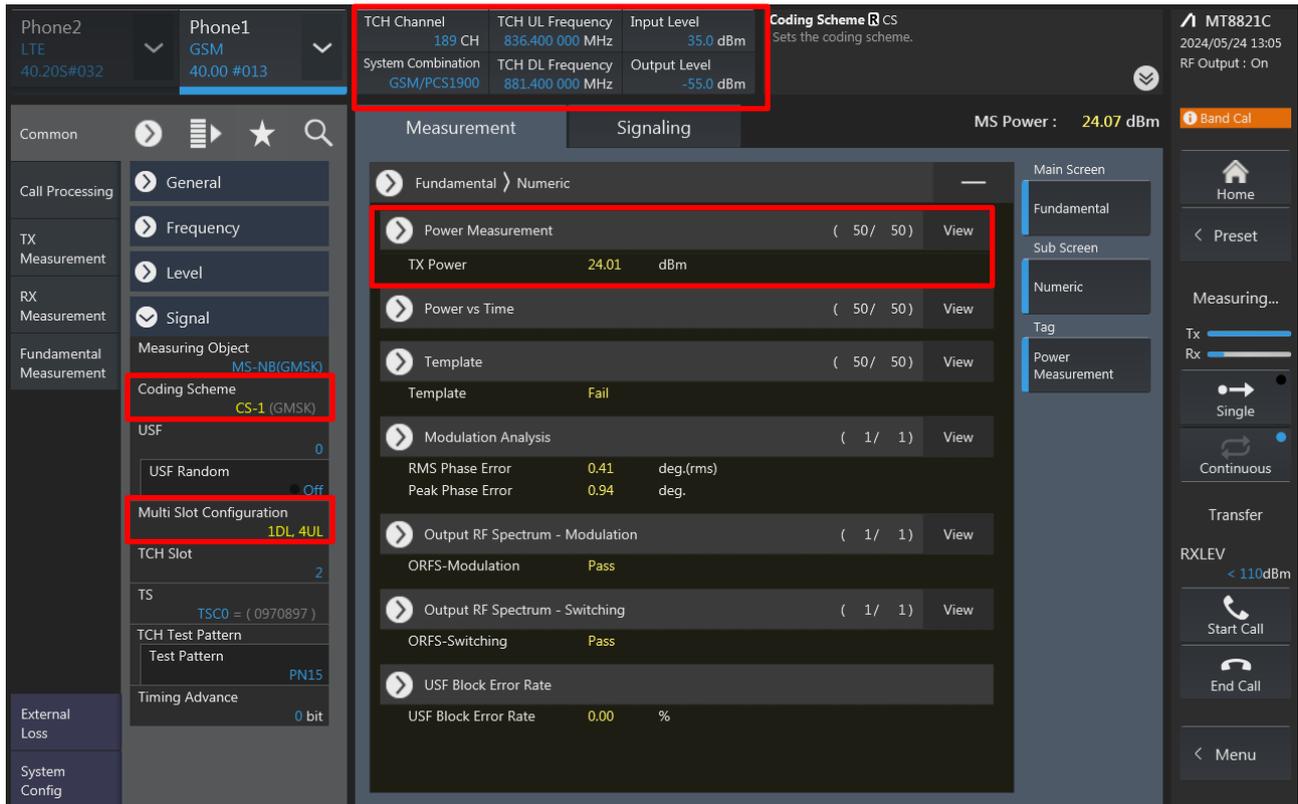


**Power measurement connection diagram:**

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>**



Parameter	Value
TCH Channel	189 CH
TCH UL Frequency	836.400 000 MHz
Input Level	35.0 dBm
System Combination	GSM/PCS1900
TCH DL Frequency	881.400 000 MHz
Output Level	-55.0 dBm
Coding Scheme	CS
Multi Slot Configuration	1DL, 4UL
TX Power	24.01 dBm

<WCDMA>

The screenshot displays the WCDMA measurement interface. At the top, it shows 'Phone2 LTE 40.20S#032' and 'Phone1 W-CDMA 40.00 #013'. The 'Measurement' section is highlighted with a red box, showing:

- UL Channel: 9400 CH
- UL Frequency: 1 880.000 000 MHz
- Input Level: 35.0 dBm
- DL Channel: 9800 CH
- DL Frequency: 1 960.000 000 MHz
- Output Level: -65.7 dBm

The 'Average Count' section shows 'PWR\_AVG' with a note: 'Sets the average count (measurement count) for power measurement.' The 'UE Power' is 22.6 dBm. The 'Measurement' list includes:

- Power Measurement (50/50): TX Power 23.28 dBm
- Frequency Error (1/1): Carrier Frequency Error -0.0002 kHz, Freq. Err 0.00 ppm
- Occupied Bandwidth (1/1): OBW 4.163 MHz
- Spectrum Emission Mask (1/1): SEM Pass
- Adjacent Channel Power (1/1): ACLR(-5MHz) -40.24 dB, ACLR(+5MHz) -42.79 dB
- Modulation Analysis (1/1): EVM 5.15 %(rms)
- Peak Code Domain Error (1/1): PCDE -39.86 dB

On the left sidebar, 'Power Control' is set to 'All 1'.

<LTE>

The screenshot displays the LTE measurement interface. At the top, it shows 'Phone2 LTE 40.20S#021' and 'Phone1 LTE 40.20S#021'. The 'Measurement' section is highlighted with a red box, showing:

- UL Channel: 21100 ch
- TPC Pattern: All +3dB
- Input Level: 30.0 dBm
- Operation Band: 7
- Channel Bandwidth: 20 MHz
- Output Level: -67.0 dBm

The 'External Loss - Main DL' section shows 'DLEXTLOSS' with a note: 'This sets the DL offset at the Main connector. Loss is set as a positive value. The argument tx enables setting a different loss value per internal signal generator.' The 'UE Power' is 23.4 dBm. The 'Measurement' list includes:

- Numeric: TX Power 23.01 dBm
- Occupied Bandwidth: On
- Spectrum Emission Mask: On
- Adjacent Channel Power: On
- In-Band Emission: On
- Spectrum Flatness: On
- EVM: On
- Phase Error: On
- Magnitude Error: On
- Constellation: On
- Throughput: On

On the left sidebar, 'Uplink Downlink Configuration 1: (5ms) D S U U D D S U U D' and 'Special Subframe Configuration 4' are highlighted with a red box.



<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: On  
 Spectrum Emission Mask: On

Uplink Downlink Configuration: 0 : (5ms) DSUUUSUUU  
 Special Subframe Configuration: 5

Adjacent Channel Power: On  
 In-Band Emission: On  
 Spectrum Flatness: On  
 EVM: On

Phase Error: On  
 Magnitude Error: On  
 Constellation: On  
 Throughput: On

Phone2 LTE 40.20S#032 | Phone1 LTE 40.20S#032

UL Channel: 18900 ch | TPC Pattern: All +3dB | Input Level: 35.0 dBm  
 Operation Band: 2 | Channel Bandwidth: 20 MHz | Output Level: -54.2 dBm

**Power Measurement - Meas. Count** PWR\_AVG  
 This sets the measurement count of the power measurement.

MT8821C 2024/05/24 12:51  
 RF Output : On

UE Power : 25.4 dBm

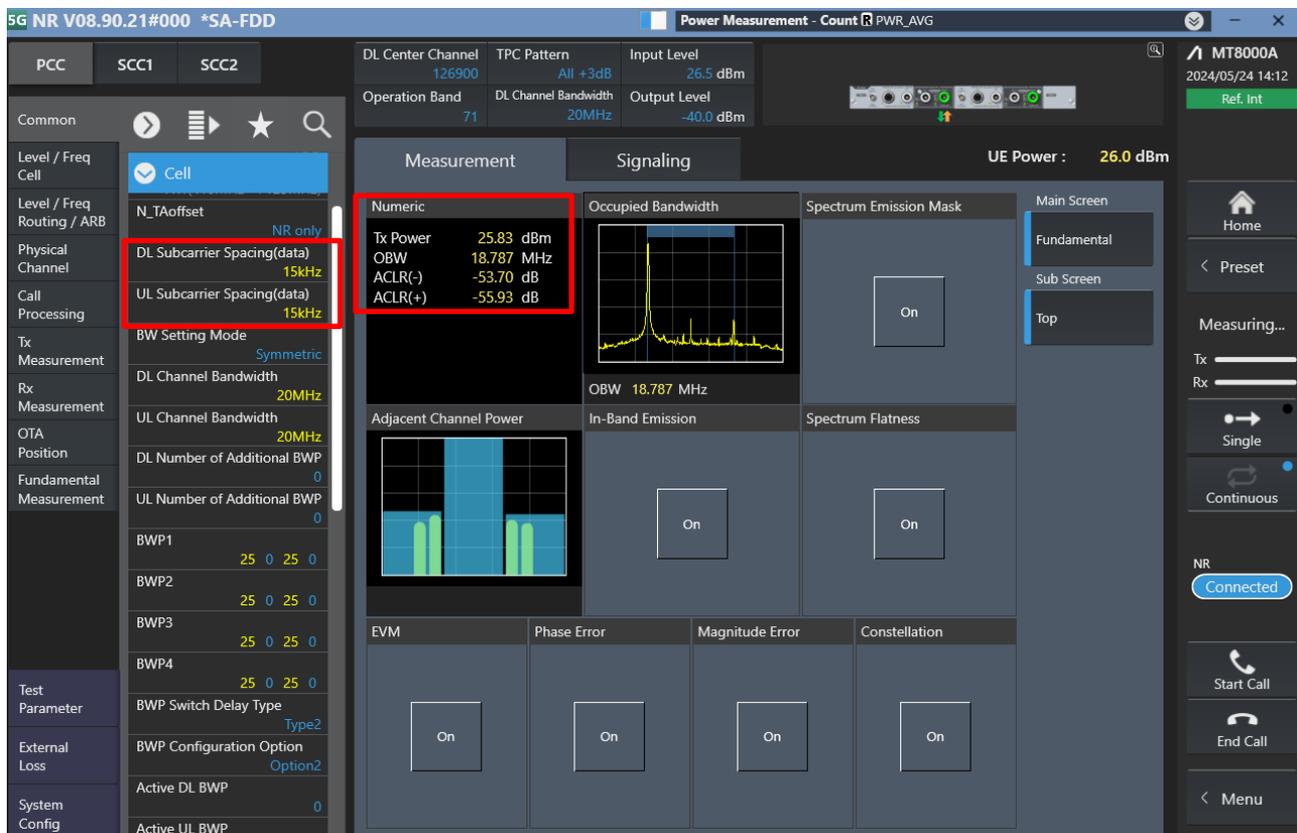
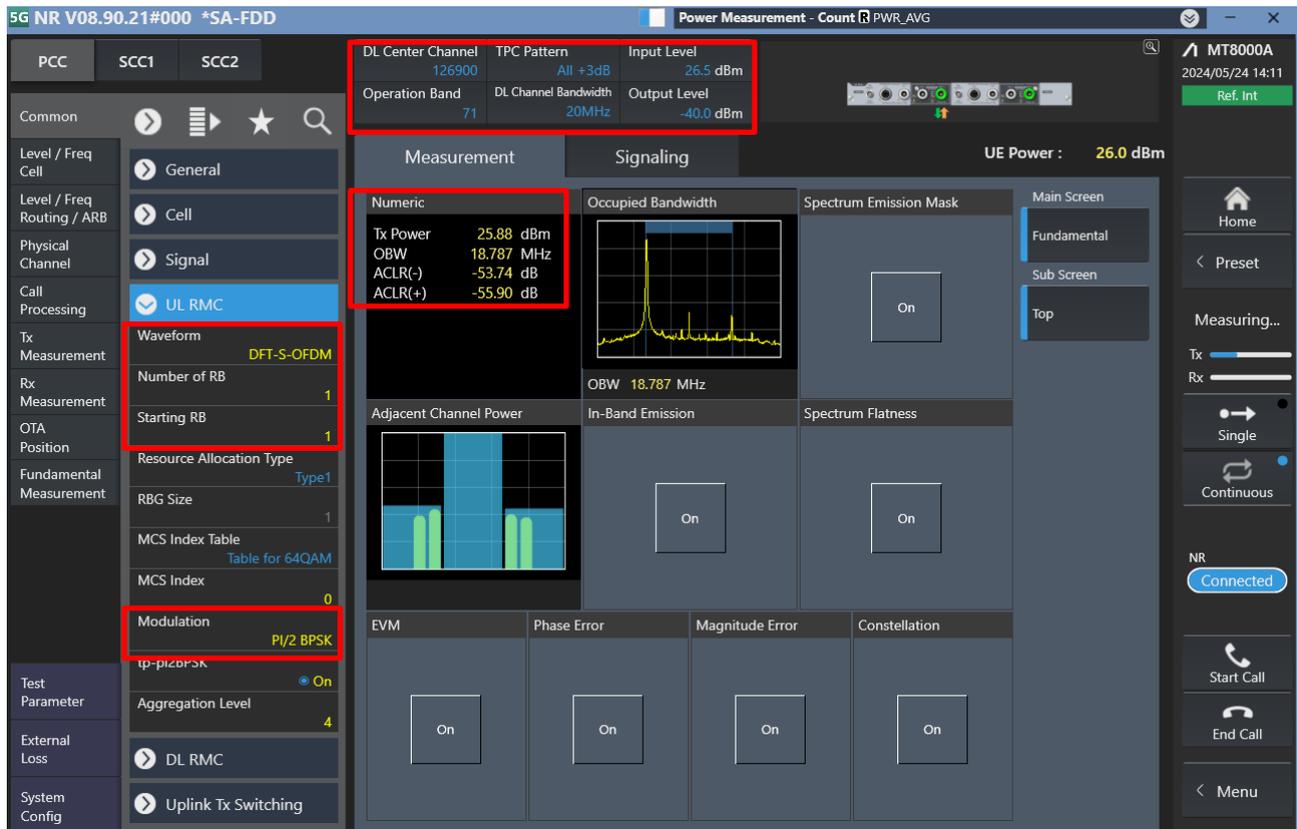
Measurement: Fundamental Numeric  
 Power Measurement ( 50 / 50 )  
 TX Power 25.12 dBm

Modulation Analysis ( 1 / 1 ) View  
 Freq. Err: 0.00 ppm  
 EVM: 1.35 %(rms)

Number of RB: 1  
 Starting RB: 0

Max UL Throughput: 72 kbps  
 MCS Index: 5 QPSK 5 72 8

<5G NR FR1>





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

Power Measurement - Count PWR\_AVG

MT8000A  
2024/05/24 14:12  
Ref. Int

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

Common

Level / Freq Cell

Level / Freq Routing / ARB

Physical Channel

Call Processing

Tx Measurement

Rx Measurement

OTA Position

Fundamental Measurement

Test Parameter

External Loss

System Config

Frequency

UL

Offset To Carrier 504

PointA Channel 116048

PointA Frequency 580.240 000 MHz

Center Channel 136100

Center Frequency 680.500 000 MHz

7.5 kHz Frequency Shift Off

DL

Offset To Carrier 102

PointA Channel 121320

PointA Frequency 606.600 000 MHz

Center Channel 126900

Center Frequency 634.500 000 MHz

Absolute Frequency SSB 125550

SSB Frequency 627.750 000 MHz

Channel Setting Mode Lowest GSCN

Operation Band 71

Measurement

Numeric

Tx Power 25.84 dBm

OBW 18.787 MHz

ACLR(-) -53.57 dB

ACLR(+) -55.98 dB

Occupied Bandwidth

OBW 18.787 MHz

Spectrum Emission Mask

On

Adjacent Channel Power

In-Band Emission

On

Spectrum Flatness

On

EVM

On

Phase Error

On

Magnitude Error

On

Constellation

On

UE Power : 25.9 dBm

Main Screen

Fundamental

Sub Screen

Top

Home

Preset

Measuring...

Tx

Rx

Single

Continuous

NR

Connected

Start Call

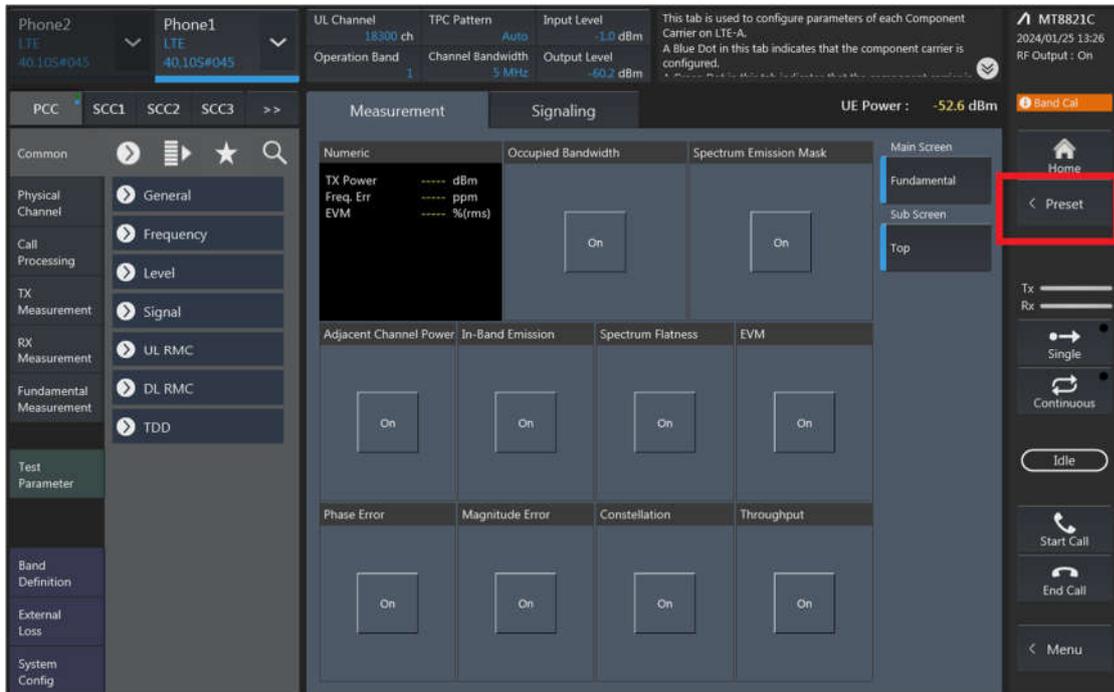
End Call

Menu



**LTE Uplink and Downlink Carrier Aggregation configurations:**

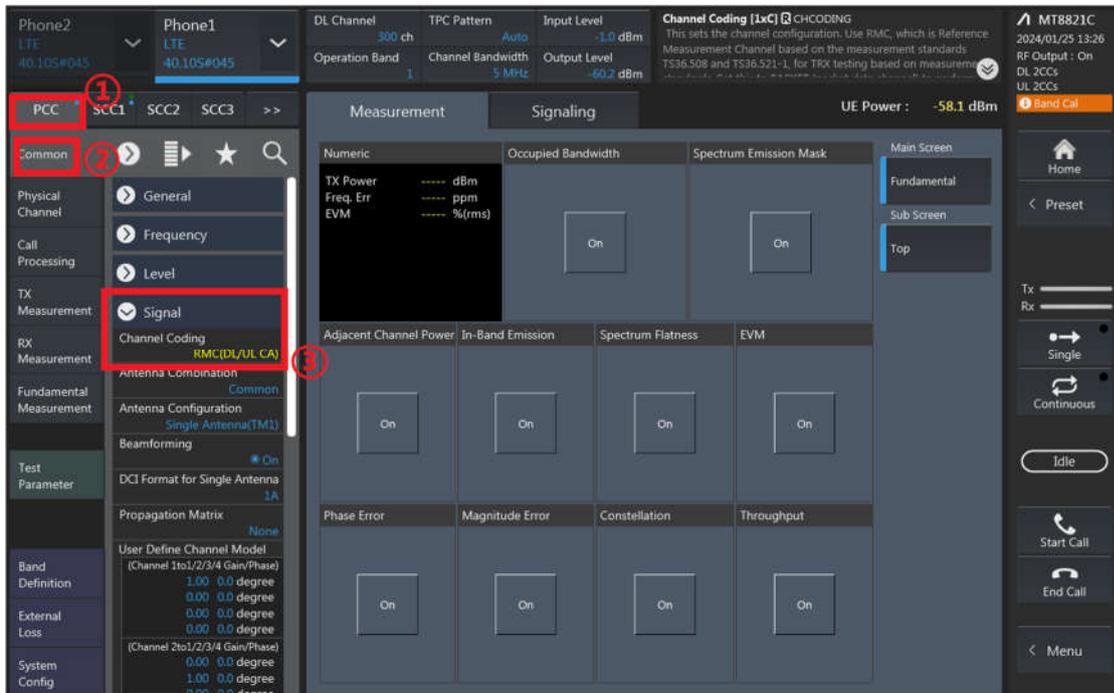
1. Change the Scenario in the Configuration of LTE Signaling and Preset.



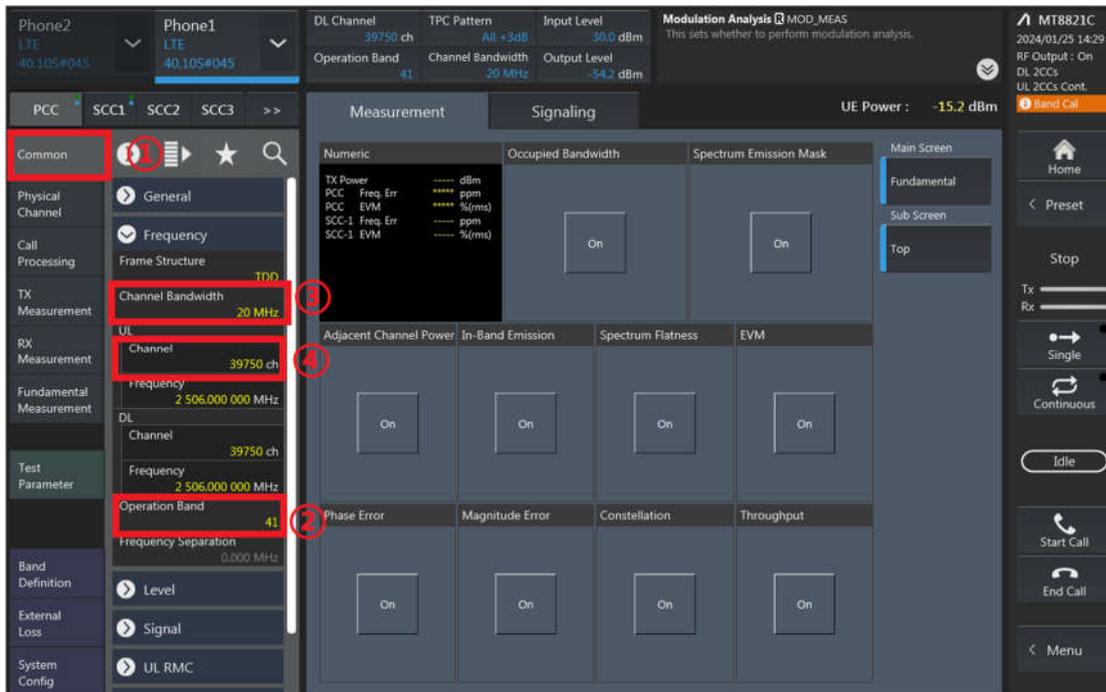
2. If Select "RMC (DL/UL CA)" for Uplink Carrier Aggregation;  
If Select "RMC (DL CA)" for Downlink Carrier Aggregation.

For example, Uplink Carrier Aggregation:

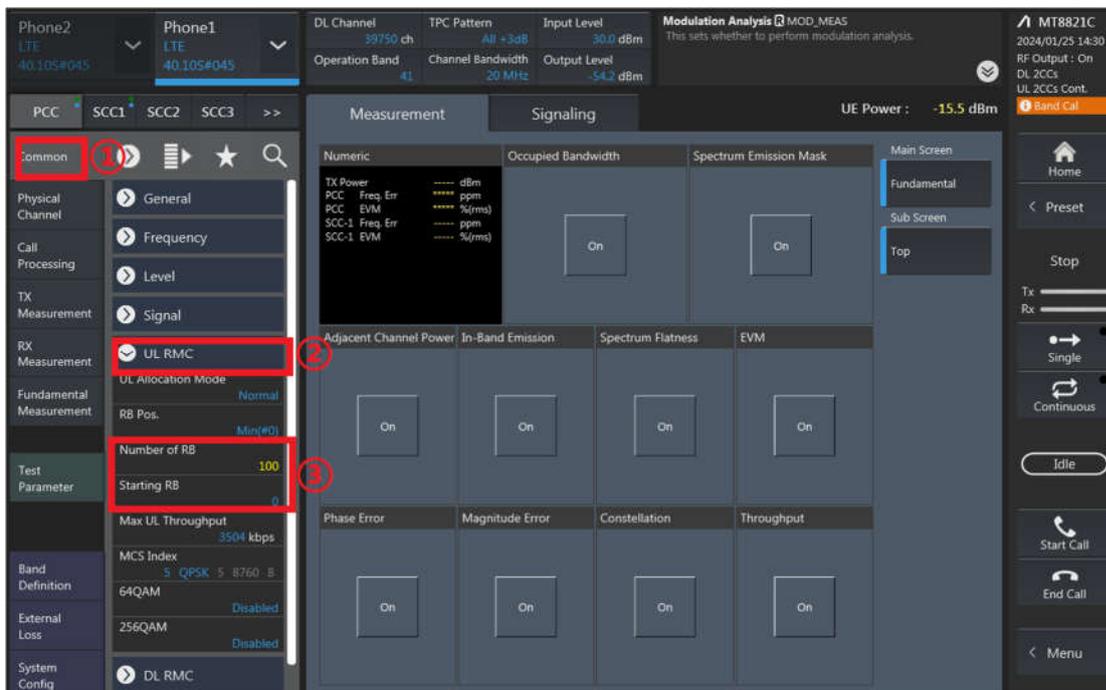
Detailed operation: PCC → Common → Signal → Channel Coding → Select 【RMC (DL/UL CA)】



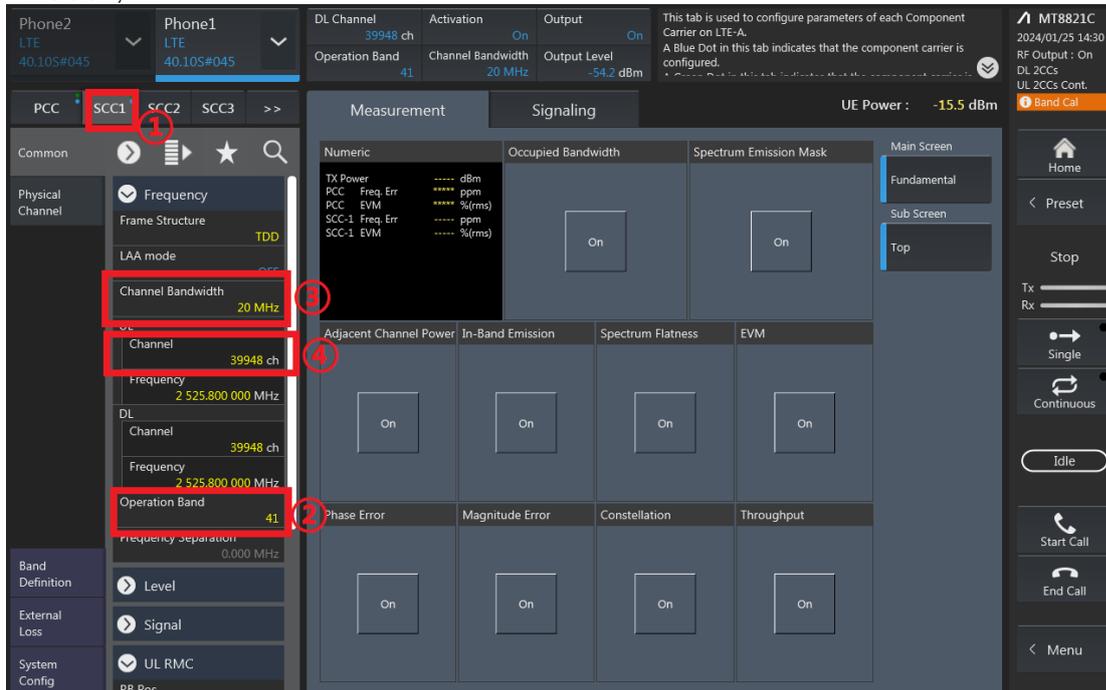
3. PCC parameter Settings: on the screen, and then select the PCC tab and Set operating band, BW, channel and RB configurations for PCC;



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

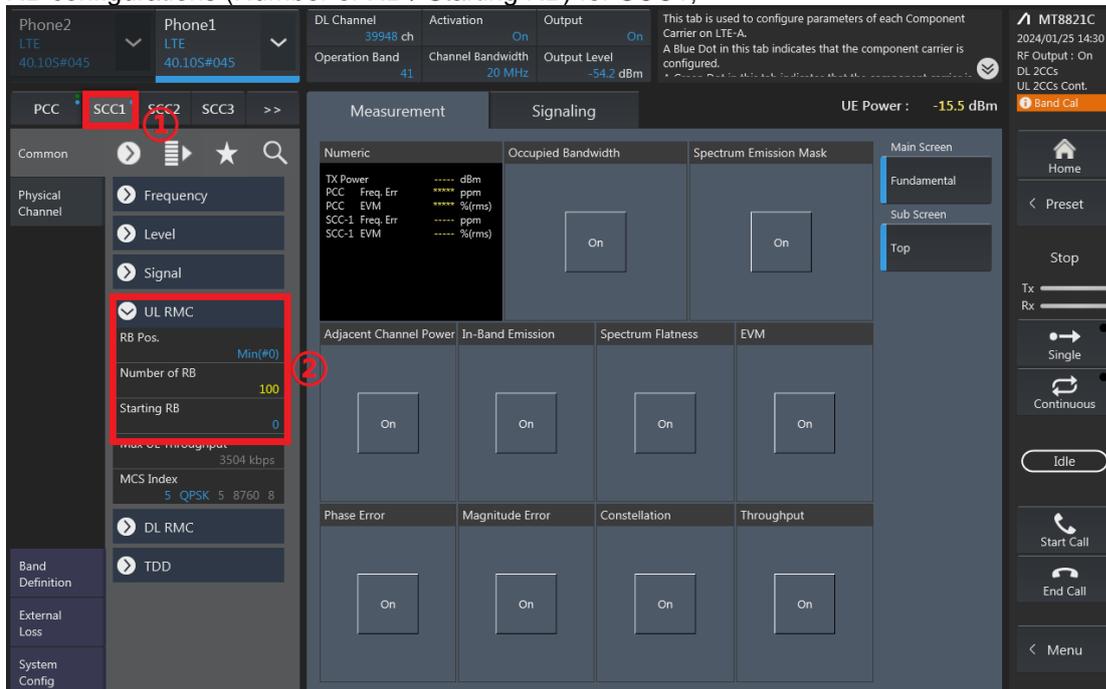


4. SCC parameter Settings: Select the SCC1 tab, Set operating band, BW, channel, and RB configurations for SCC1;



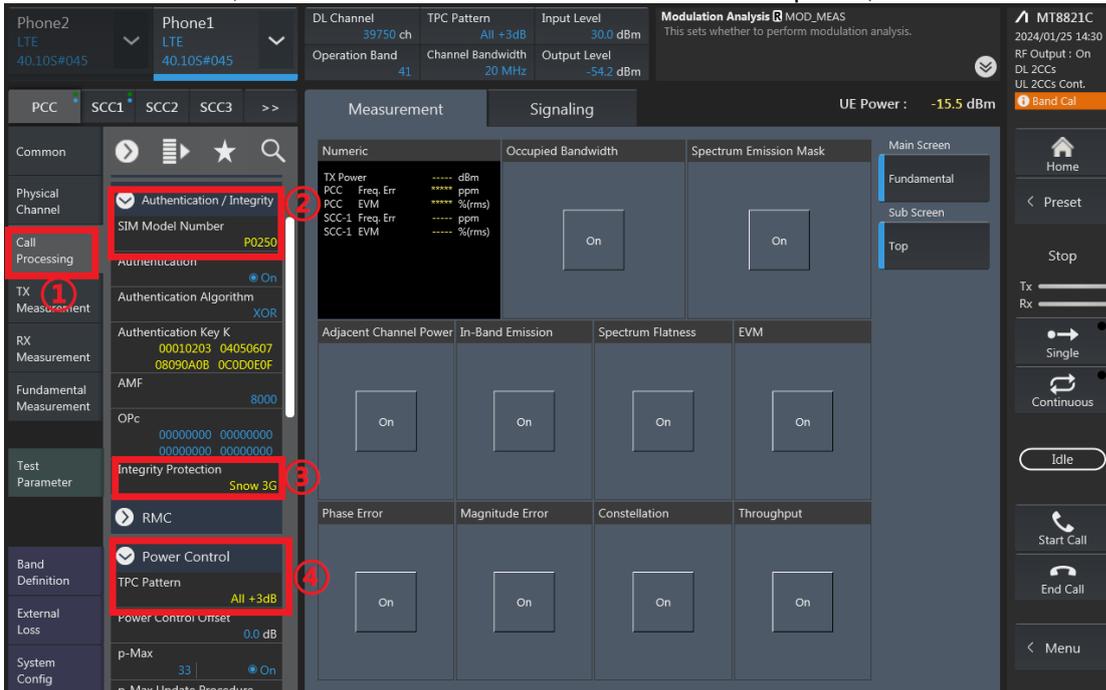
The screenshot shows the SCC1 configuration screen. The 'DL Channel' is set to 39948 ch, 'Operation Band' is 41, 'Channel Bandwidth' is 20 MHz, and 'Channel' is 39948 ch. The 'UE Power' is -15.5 dBm. The interface includes sections for 'Measurement' and 'Signaling' with various 'On' buttons for metrics like TX Power, Occupied Bandwidth, Spectrum Emission Mask, etc.

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

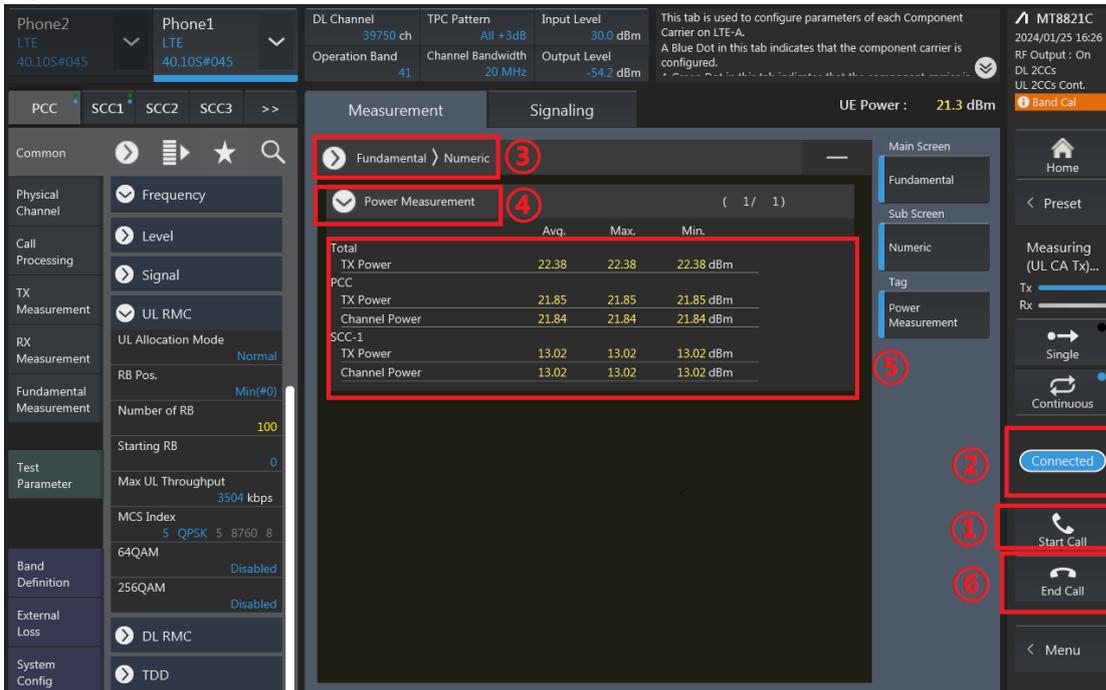


The screenshot shows the 'UL RMC' configuration section. The 'Number of RB' is set to 100 and 'Starting RB' is set to 0. The 'DL RMC' and 'TDD' sections are also visible. The 'UE Power' remains at -15.5 dBm.

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



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 Default Power

Ant4

CA_7C								
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		
20850	21048	QPSK	1	99	1	0	22.33	24.00
21100	21298	QPSK	1	99	1	0	22.54	24.00
21350	21152	QPSK	1	0	1	99	22.48	24.00

Ant4

CA_38C								
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		
37850	38048	QPSK	1	99	1	0	23.01	24.50
37901	38099	QPSK	1	99	1	0	23.08	24.50
38150	37952	QPSK	1	0	1	99	23.07	24.50

Ant4

CA_41C								
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	22.79	24.50
40185	40383	QPSK	1	99	1	0	22.94	24.50
40620	40818	QPSK	1	99	1	0	23.08	24.50
41055	41253	QPSK	1	99	1	0	23.06	24.50
41490	41292	QPSK	1	0	1	99	22.99	24.50

Uplink CA Sensor on Power

Ant4										
CA_7C										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		measured Power (dBm)	Uplink Power (dBm)		
			RB Size	RB offset	RB Size	RB offset				
20850	21048	QPSK	1	99	1	0	11.88	13.50		
21100	21298	QPSK	1	99	1	0	12.18	13.50		
21350	21152	QPSK	1	0	1	99	12.04	13.50		

Ant4										
CA_38C										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		measured Power (dBm)	Uplink Power (dBm)		
			RB Size	RB offset	RB Size	RB offset				
37850	38048	QPSK	1	99	1	0	14.07	15.50		
37901	38099	QPSK	1	99	1	0	14.23	15.50		
38150	37952	QPSK	1	0	1	99	14.01	15.50		

Ant4										
CA_41C										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		measured Power (dBm)	Uplink Power (dBm)		
			RB Size	RB offset	RB Size	RB offset				
39750	39948	QPSK	1	99	1	0	14.12	15.50		
40185	40383	QPSK	1	99	1	0	14.18	15.50		
40620	40818	QPSK	1	99	1	0	14.37	15.50		
41055	41253	QPSK	1	99	1	0	14.10	15.50		
41490	41292	QPSK	1	0	1	99	14.09	15.50		