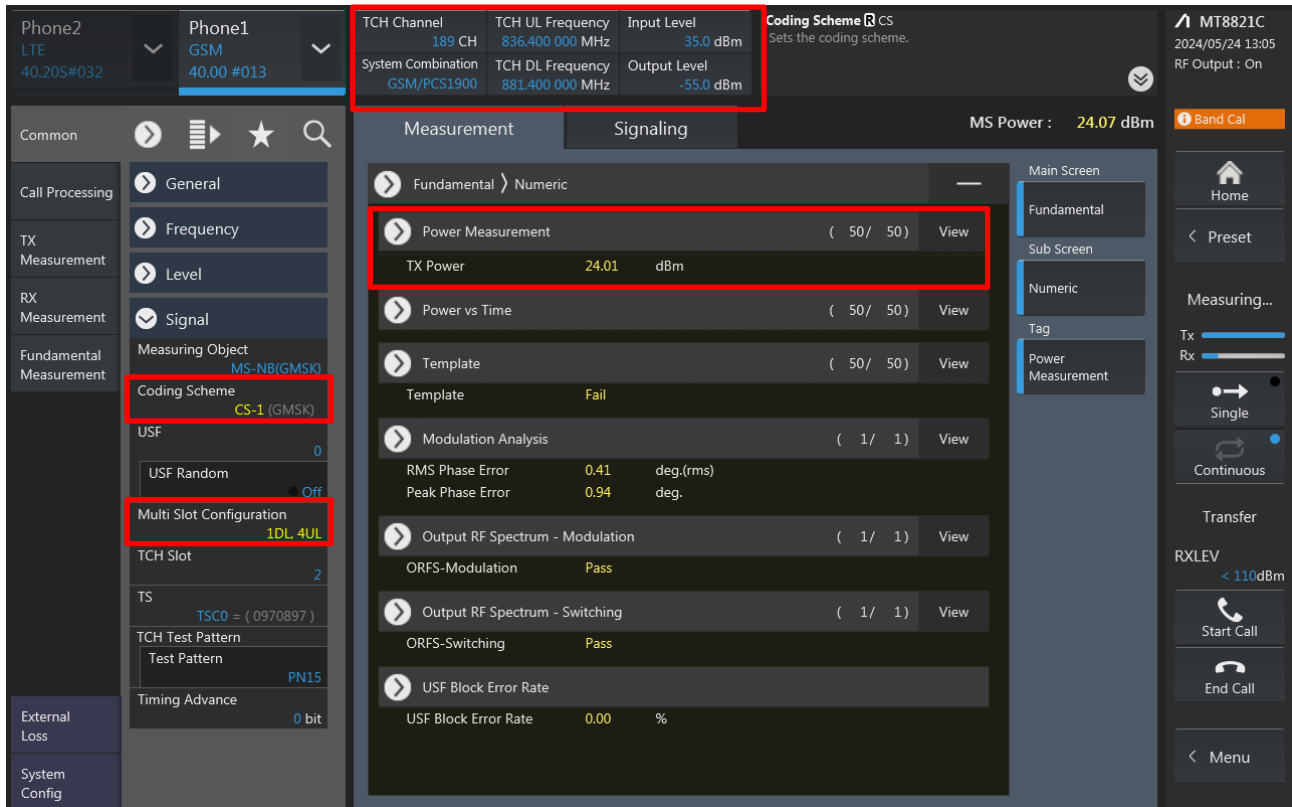


Power measurement connection diagram:

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 configuration and measurement settings for a GSM call. Key parameters are highlighted with red boxes:

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

Other visible settings include: Phone1 GSM 40.00 #013, MS Power: 24.07 dBm, Measuring Object: MS-NB(GMSK), USF: 0, USF Random: Off, TCH Slot: 2, TS: TSCO = (0970897), TCH Test Pattern: PN15, and Timing Advance: 0 bit.

<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)' with 'TX Power 23.28 dBm', 'Frequency Error (1/1)', 'Occupied Bandwidth (1/1) 4.163 MHz', 'Spectrum Emission Mask (1/1) Pass', 'Adjacent Channel Power (1/1)', 'Modulation Analysis (1/1) 5.15 % (rms)', and 'Peak Code Domain Error (1/1) -39.86 dB'. The 'External Loss' 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 'TX Power 23.01 dBm', 'Occupied Bandwidth', 'Spectrum Emission Mask', 'Adjacent Channel Power', 'In-Band Emission', 'Spectrum Flatness', 'EVM', 'Phase Error', 'Magnitude Error', 'Constellation', and 'Throughput'. 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'. The status is 'Connected'.

<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

UE Power : 23.5 dBm

Measurement

Numeric TX Power 23.19 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]

Test Parameter

Uplink Downlink Configuration 0: (5ms) D S U U D S U U U

Special Subframe Configuration 5

<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

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

TDD - Special Subframe Configuration TDDSSFCNF

UE Power : 26.6 dBm

Measurement

Numeric TX Power 26.16 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]

Test Parameter

Uplink Downlink Configuration 1: (5ms) D S U U D D S U U D

Special Subframe Configuration 5

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)

Test Parameter: Number of RB: 1, Starting RB: 0, MCS Index: 5 QPSK 5 72 8

<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

MT8000A 2024/05/24 14:11
 Ref. Int

UE Power: 26.0 dBm

Measurement: Numeric

Numeric: Tx Power: 25.88 dBm, OBW: 18.787 MHz, ACLR(-): -53.74 dB, ACLR(+): -55.90 dB

Occupied Bandwidth: OBW: 18.787 MHz

Waveform: DFT-S-OFDM

Modulation: Pi/2 BPSK



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

Power Measurement - Count PWR_AVG

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

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

UE Power : 26.0 dBm

Common

Level / Freq Cell

Level / Freq Routing / ARB N_TAoffset NR only

Physical Channel DL Subcarrier Spacing(data) 15kHz

Call Processing UL Subcarrier Spacing(data) 15kHz

Tx Measurement BW Setting Mode Symmetric

Rx Measurement DL Channel Bandwidth 20MHz

OTA DL Channel Bandwidth 20MHz

Fundamental Measurement DL Number of Additional BWP 0

UL Number of Additional BWP 0

BWP1 25 0 25 0

BWP2 25 0 25 0

BWP3 25 0 25 0

BWP4 25 0 25 0

Test Parameter BWP Switch Delay Type Type2

External Loss BWP Configuration Option Option2

System Config Active DL BWP 0

Active UL BWP

Measurement

Numeric

Tx Power 25.83 dBm

OBW 18.787 MHz

ACLR(-) -53.70 dB

ACLR(+) -55.93 dB

Occupied Bandwidth

OBW 18.787 MHz

Spectrum Emission Mask

On

Adjacent Channel Power

In-Band Emission

On

Spectrum Flatness

On

EVM

Phase Error

Magnitude Error

Constellation

On

On

On

On

Main Screen

Fundamental

Sub Screen

Top

Home

Preset

Measuring...

Tx

Rx

Single

Continuous

NR

Connected

Start Call

End Call

Menu

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

Power Measurement - Count PWR_AVG

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

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

UE Power : 25.9 dBm

Common

Level / Freq Cell

Level / Freq Routing / ARB UL

Physical Channel Offset To Carrier 504

Call Processing PointA Channel 116048

PointA Frequency 580.240 000 MHz

Tx Measurement Center Channel 136100

Rx Measurement Center Frequency 680.500 000 MHz

OTA 7.5 kHz Frequency Shift Off

Fundamental Measurement DL

Offset To Carrier 102

PointA Channel 121320

PointA Frequency 606.600 000 MHz

Center Channel 126900

Center Frequency 634.500 000 MHz

Test Parameter Absolute Frequency SSB 125550

External Loss SSB Frequency 627.750 000 MHz

System Config 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

Phase Error

Magnitude Error

Constellation

On

On

On

On

Main Screen

Fundamental

Sub Screen

Top

Home

Preset

Measuring...

Tx

Rx

Single

Continuous

NR

Connected

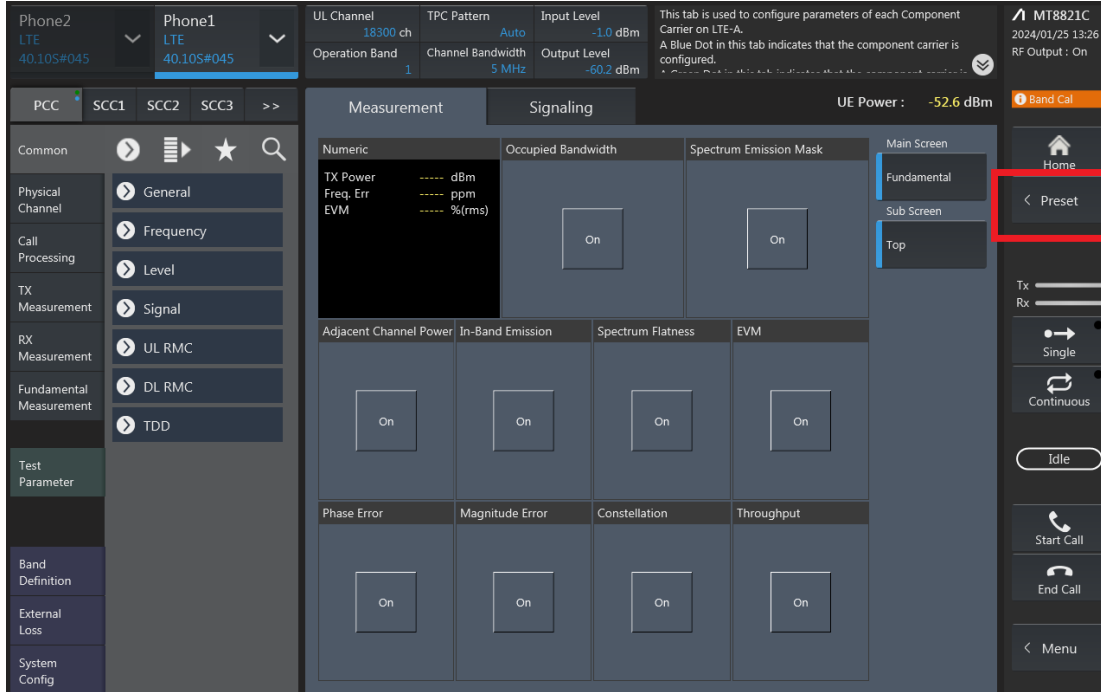
Start Call

End Call

Menu

LTE Uplink and Downlink Carrier Aggregation configurations:

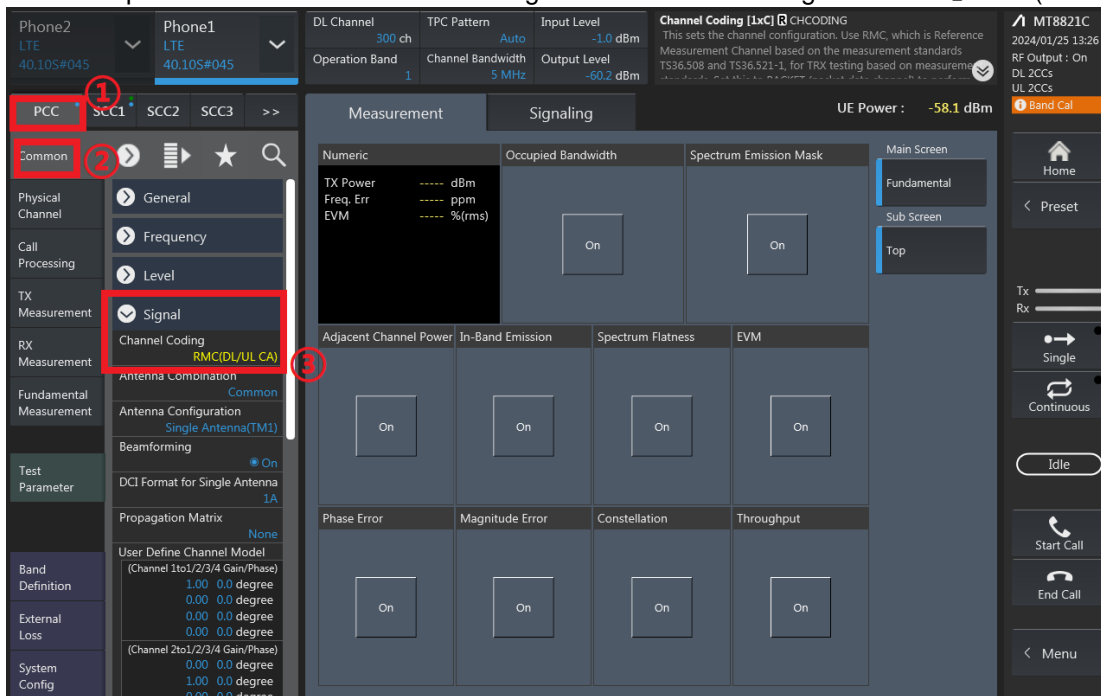
1. Change the Scenario in the Configuration of Phone1 LTE Signaling and Preset.



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)】



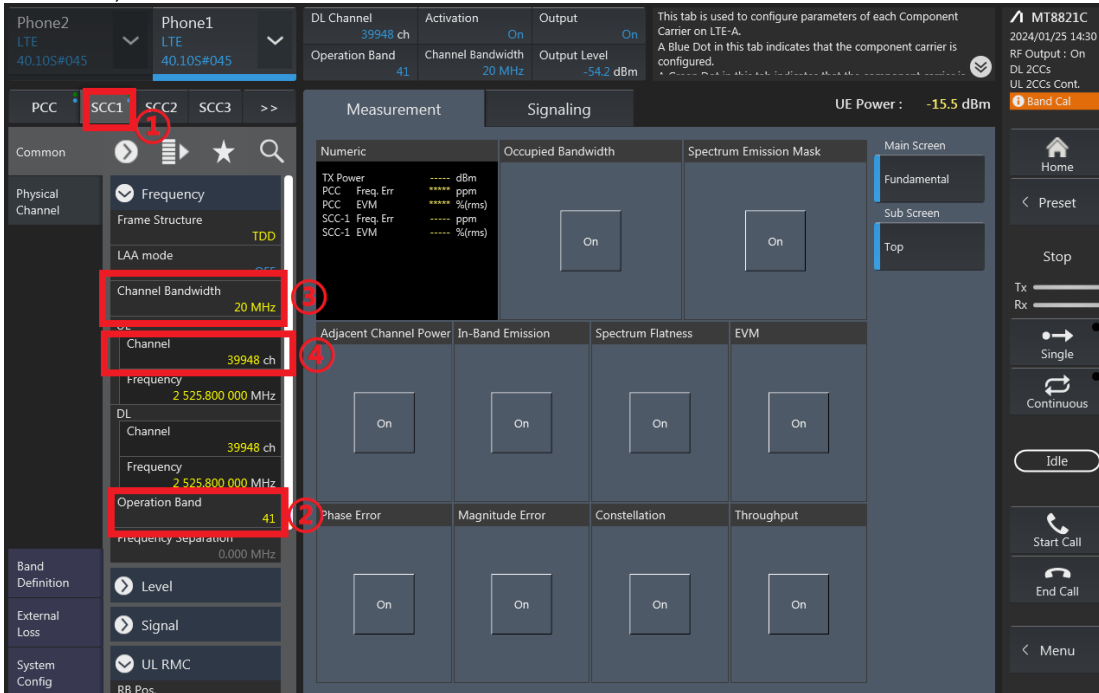
3. PCC parameter Settings: on the screen, and then select the PCC tab and Set operating band, BW, channel and RB configurations for PCC;

The screenshot shows the PCC parameter configuration screen. The left sidebar has 'Common' selected. The main area displays various measurement and signaling parameters. Red boxes and numbers highlight specific settings: 1. 'Channel Bandwidth' set to 20 MHz; 2. 'Operation Band' set to 41; 3. 'Channel' set to 39750 ch; 4. 'Frequency' set to 2 506.000 000 MHz. The top status bar shows 'Phone1 LTE 40.10S#045' and 'DL Channel 39750 ch'. The right side shows 'UE Power: -15.2 dBm' and 'Modulation Analysis' options.

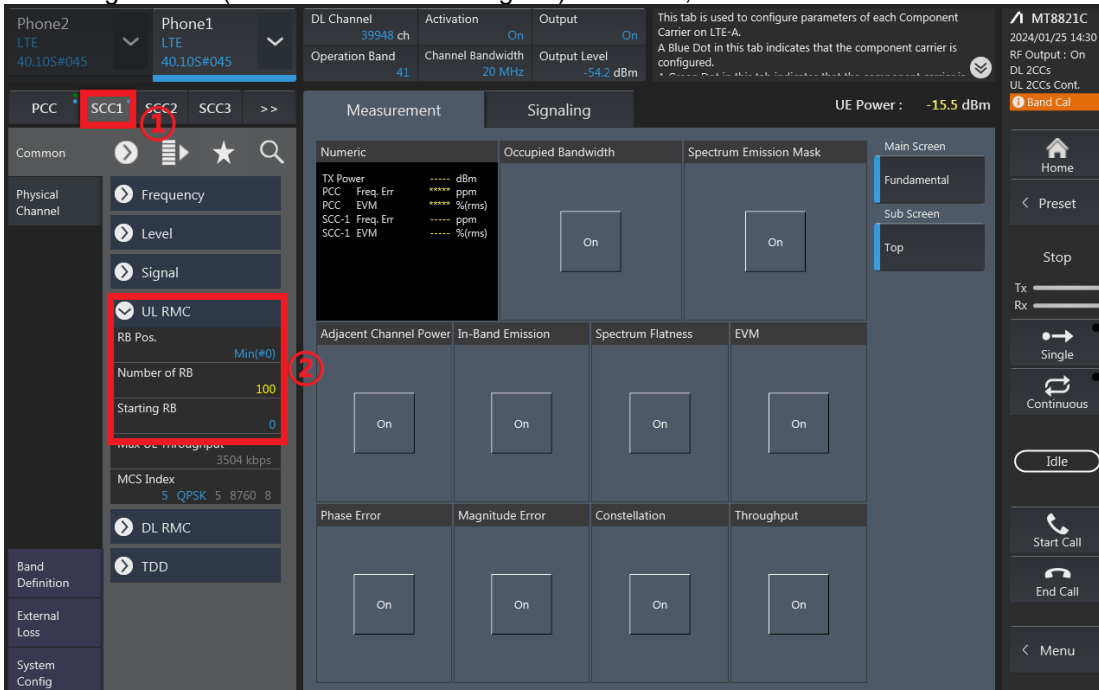
RB configurations (Number of RB / Starting RB) for PCC;

The screenshot shows the RB configurations screen. The left sidebar has 'UL RMC' selected. The main area displays RB configuration parameters. Red boxes and numbers highlight specific settings: 1. 'UL RMC' selected; 2. 'Number of RB' set to 100; 3. 'Starting RB' set to 0. The top status bar shows 'Phone1 LTE 40.10S#045' and 'DL Channel 39750 ch'. The right side shows 'UE Power: -15.5 dBm' and 'Modulation Analysis' options.

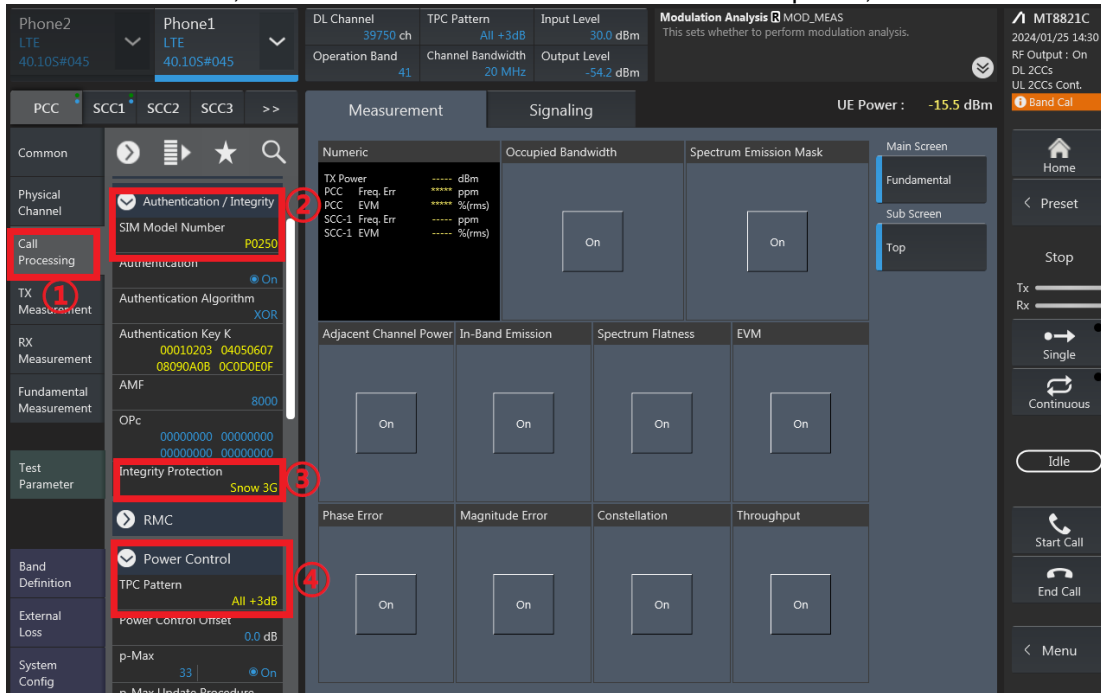
4. SCC parameter Settings: Select the SCC1 tab, Set operating band, BW, channel, and RB configurations for SCC1;



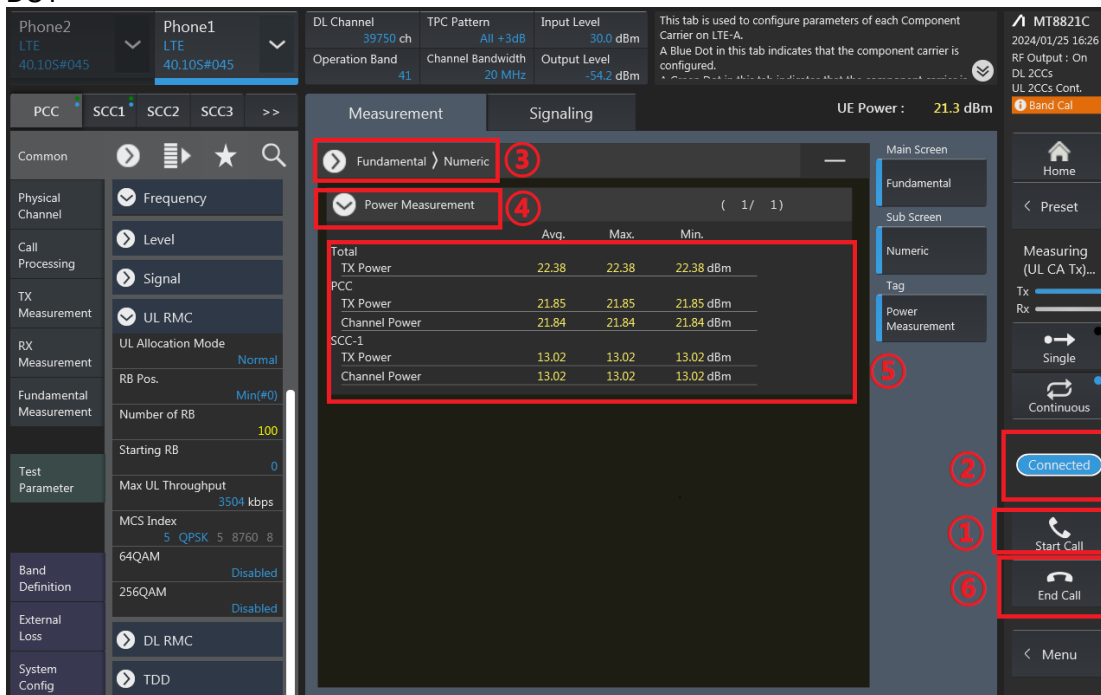
RB configurations (Number of RB / Starting RB) for SCC1;



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



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



Uplink CA Power

CA_5B Ant 0 Default								
Combination 10MHz+10MHz (50RB+50RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset		
20450	20549	QPSK	1	49	1	0	22.89	24.50
20476	20575	QPSK	1	49	1	0	22.94	24.50
20600	20501	QPSK	1	0	1	49	22.85	24.50

CA_7C Ant 4 Default								
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	23.12	24.50
21100	21298	QPSK	1	99	1	0	23.14	24.50
21350	21152	QPSK	1	0	1	99	23.05	24.50

CA_38C Ant 4 Default								
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	23.08	24.50
37901	38099	QPSK	1	99	1	0	23.25	24.50
38150	37952	QPSK	1	0	1	99	23.18	24.50

Uplink CA Power

CA_5B Ant 0 DS12								
Combination 10MHz+10MHz (50RB+50RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset		
20450	20549	QPSK	1	49	1	0	22.89	24.50
20476	20575	QPSK	1	49	1	0	22.94	24.50
20600	20501	QPSK	1	0	1	49	22.85	24.50

CA_7C Ant 4 DS12								
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	17.31	18.50
21100	21298	QPSK	1	99	1	0	17.39	18.50
21350	21152	QPSK	1	0	1	99	17.29	18.50

CA_38C Ant 4 DS12								
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	17.27	18.50
37901	38099	QPSK	1	99	1	0	17.41	18.50
38150	37952	QPSK	1	0	1	99	17.34	18.50

Uplink CA Power

CA_5B Ant 0 DSI0&1								
Combination 10MHz+10MHz (50RB+50RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset		
20450	20549	QPSK	1	49	1	0	22.89	24.50
20476	20575	QPSK	1	49	1	0	22.94	24.50
20600	20501	QPSK	1	0	1	49	22.85	24.50

CA_7C Ant 4 DSI0&1								
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	20.19	21.50
21100	21298	QPSK	1	99	1	0	20.22	21.50
21350	21152	QPSK	1	0	1	99	20.14	21.50

CA_38C Ant 4 DSI0&1								
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	23.08	24.50
37901	38099	QPSK	1	99	1	0	23.25	24.50
38150	37952	QPSK	1	0	1	99	23.18	24.50