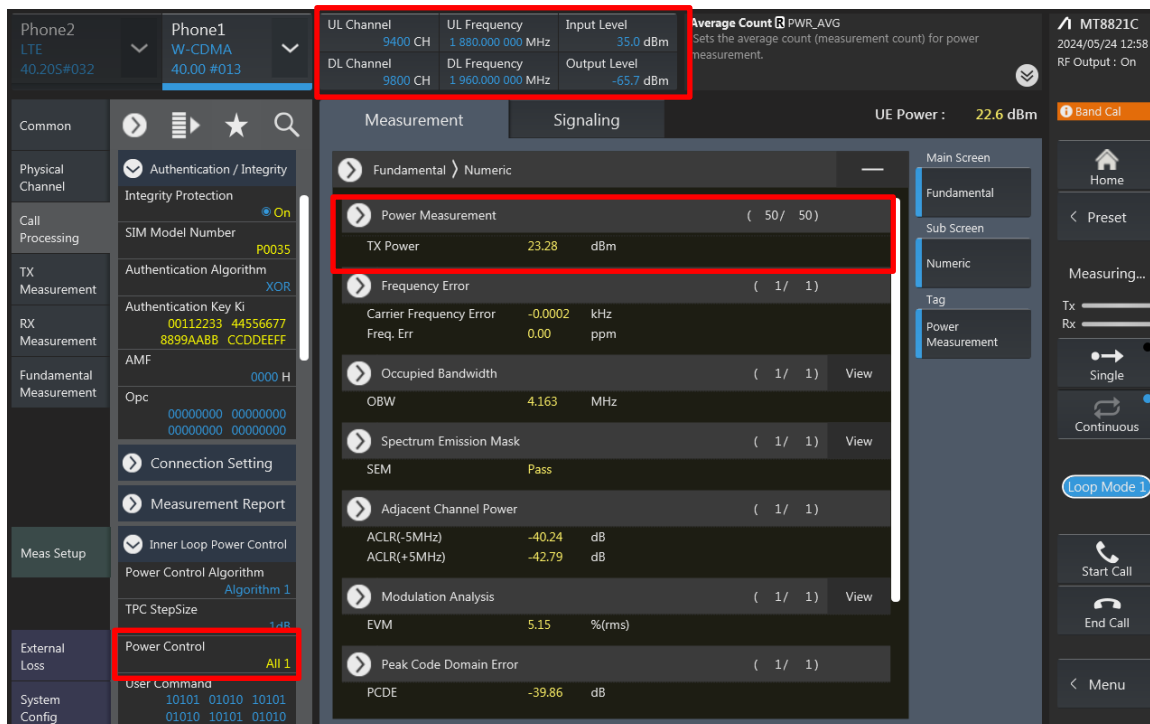


Power measurement connection diagram:

The power measurement for 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 3G/LTE/5G FR1/UL and DL CA.

<WCDMA>



The screenshot displays the SPORTON LAB. software interface for WCDMA power measurement. The top status bar shows device information: Phone2 (LTE, 40.205#032) and Phone1 (W-CDMA, 40.00 #013). The main display area is divided into several sections:

- Top Status Bar:** Shows 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), and Output Level (-65.7 dBm). It also displays Average Count (PWR_AVG) and UE Power (22.6 dBm).
- Measurement Section:** Contains a list of measurement parameters and their values:
 - 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)
- Power Control Section:** Shows the Power Control status as 'All 1'.

<LTE>

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

UL Channel 21100 ch TPC Pattern All +3dB Input Level 30.0 dBm External Loss - Main DL DLEXTLOSS 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. MT8821C 2024/05/31 13:15 RF Output : On

Operation Band 7 Channel Bandwidth 20 MHz Output Level -67.0 dBm

PCC SCC1 SCC2 SCC3 >>

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 DL RMC TDD Uplink Downlink Configuration 1: (5ms) D S U U D D S U U D Special Subframe Configuration 4

Measurement Signaling

Numeric TX Power 23.01 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

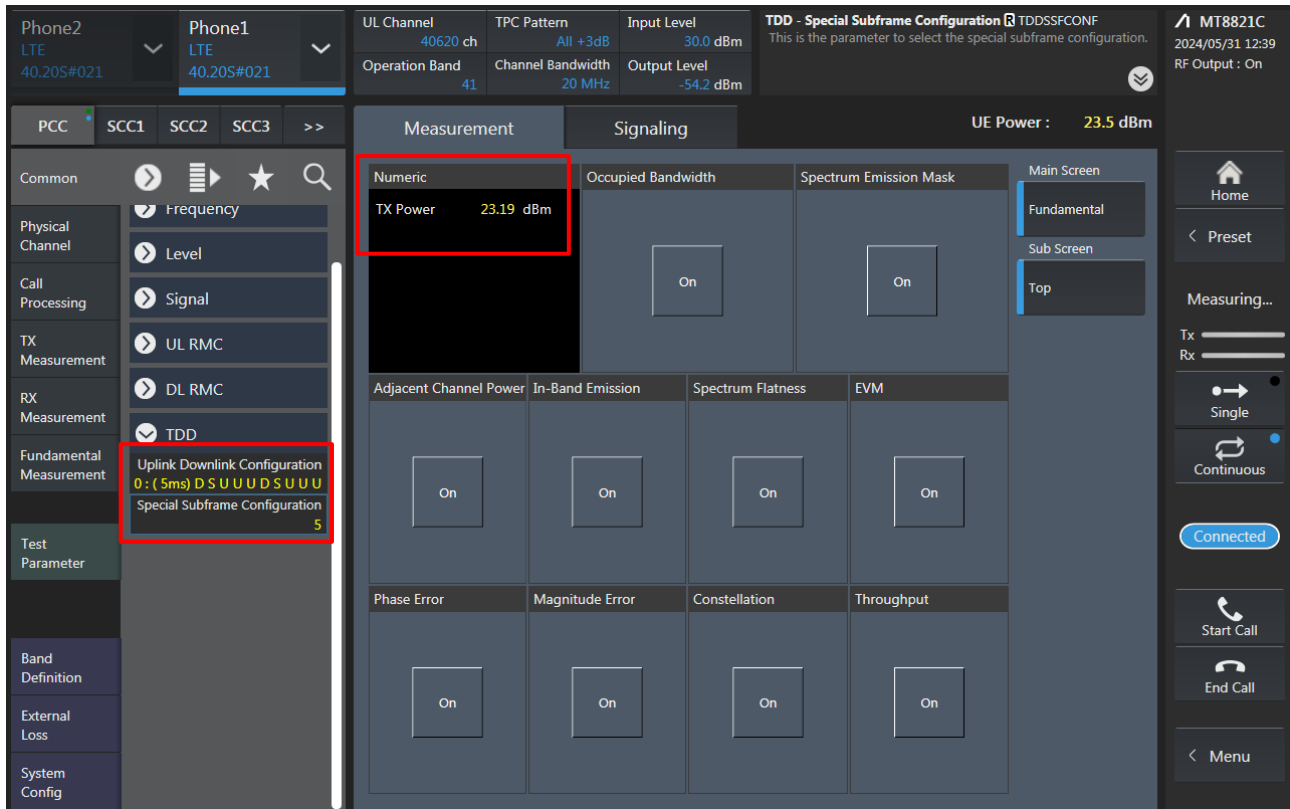
On On On On

UE Power : 23.4 dBm

Main Screen Fundamental Sub Screen Top

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

<LTE TDD Power class 3>



Phone2
LTE
40.20S#021

Phone1
LTE
40.20S#021

UL Channel 40620 ch
Operation Band 41

TPC Pattern All +3dB
Channel Bandwidth 20 MHz

Input Level 30.0 dBm
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

PCC SCC1 SCC2 SCC3 >>

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

Measurement
Numeric
TX Power 23.19 dBm

Signaling
Occupied Bandwidth
Spectrum Emission Mask
On
On

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

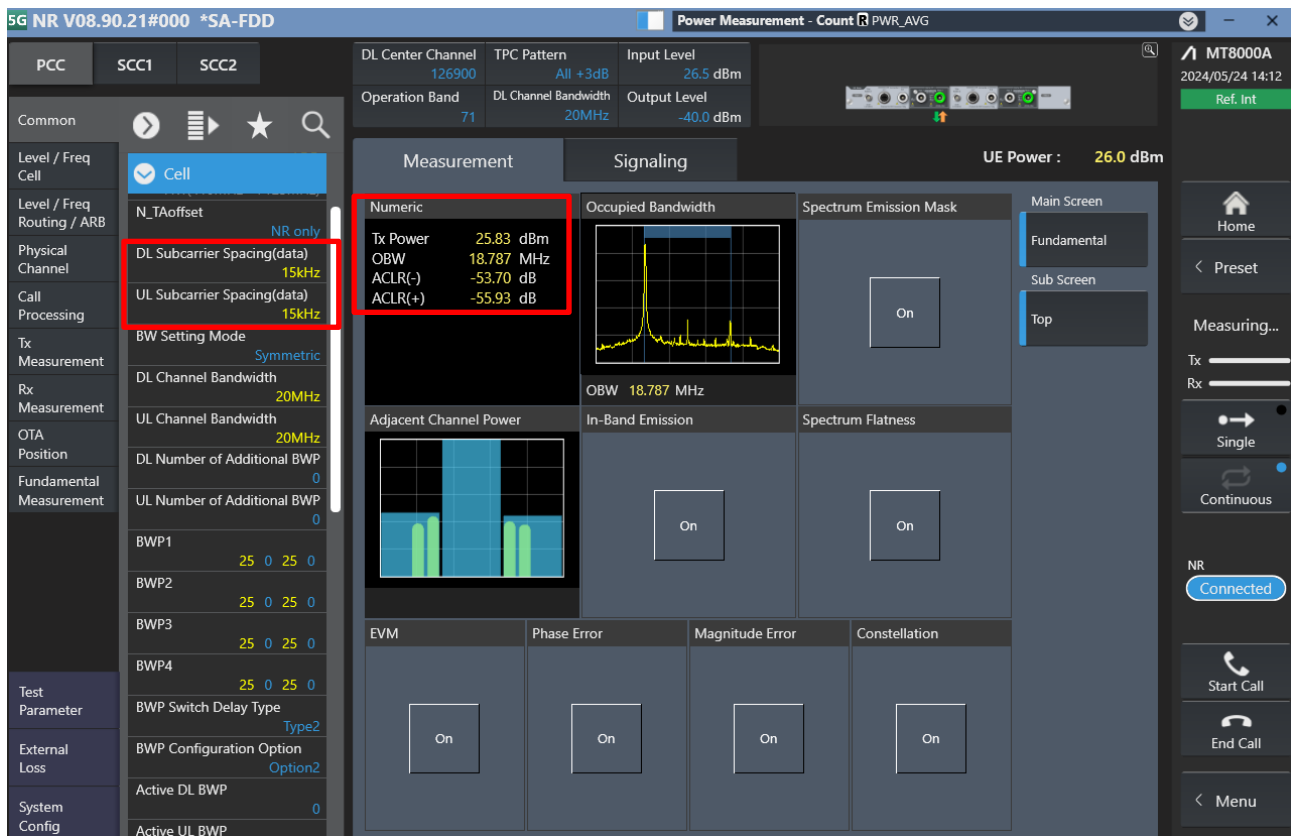
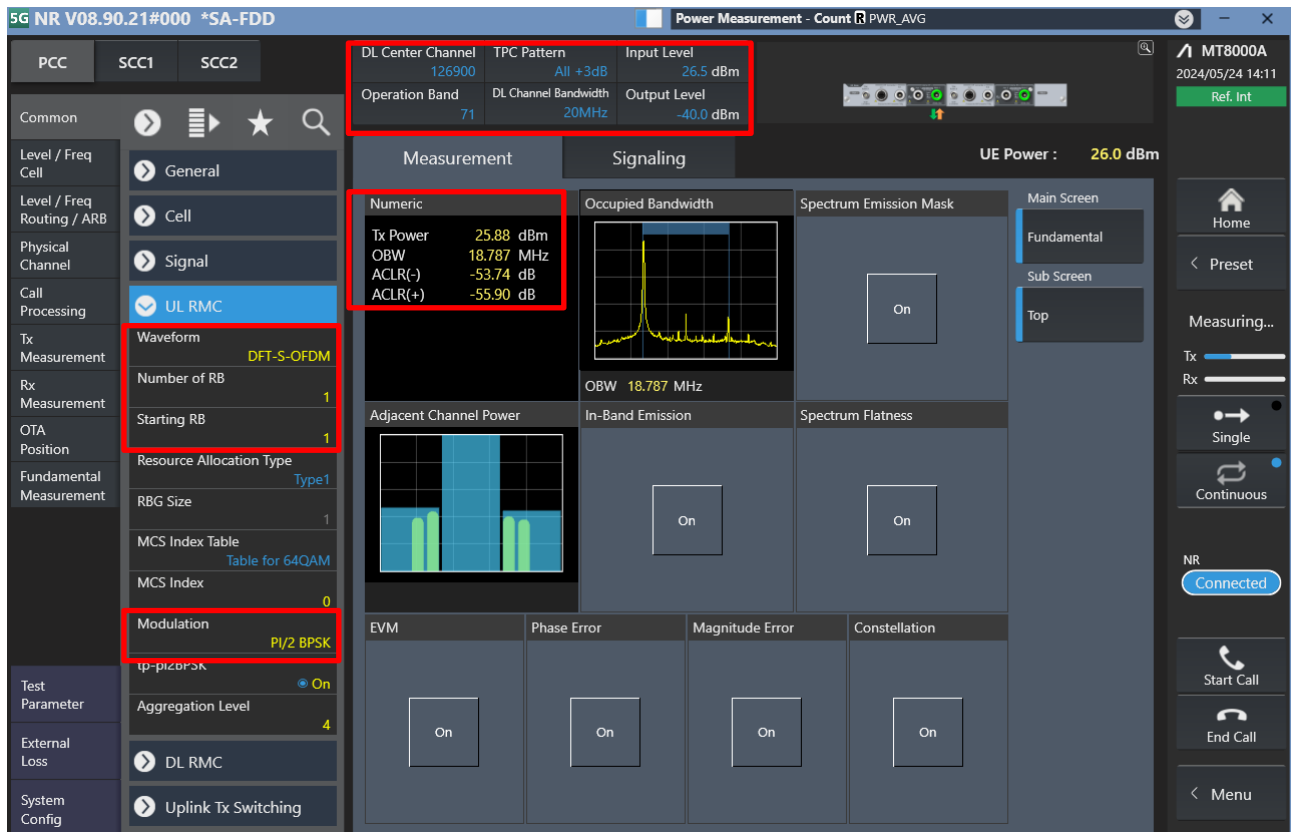
Phase Error
Magnitude Error
Constellation
Throughput
On
On
On
On

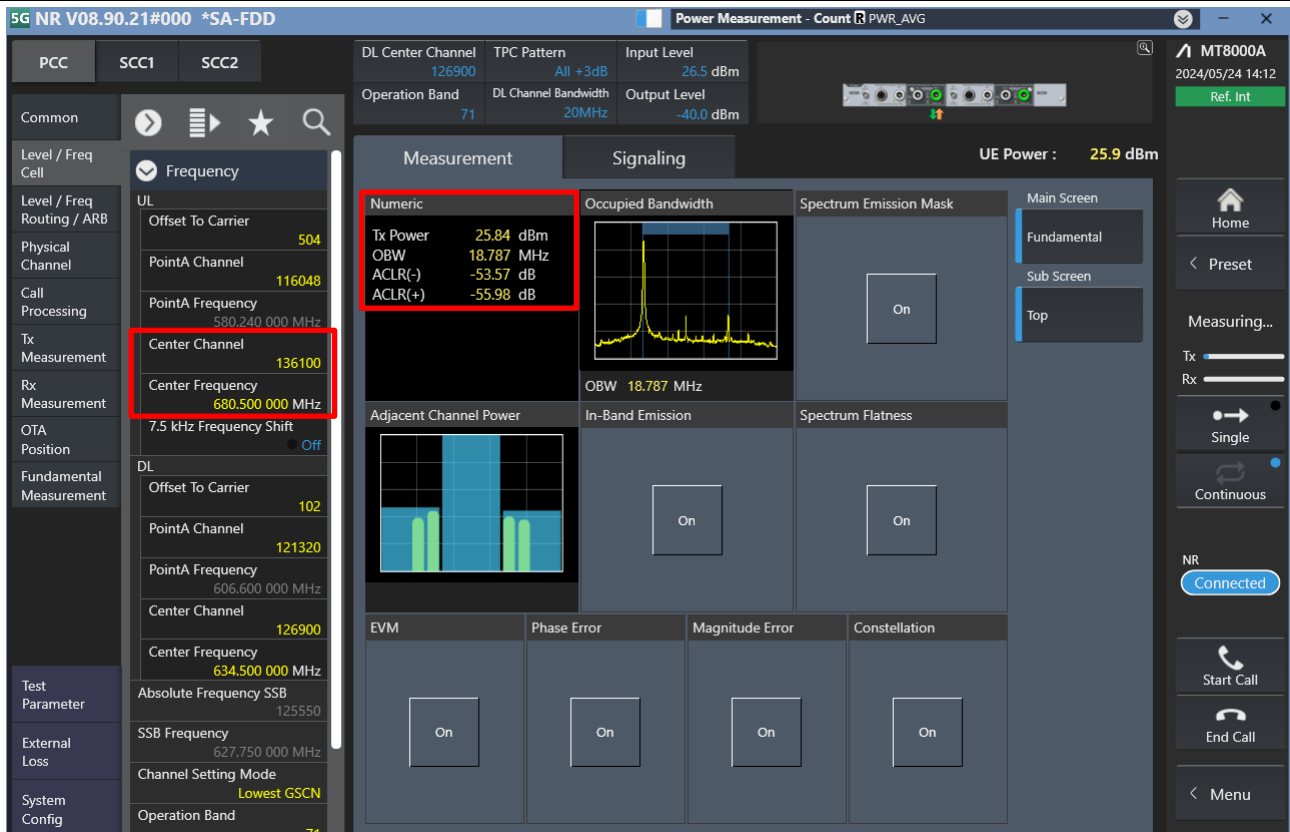
UE Power : 23.5 dBm

Main Screen
Fundamental
Sub Screen
Top

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

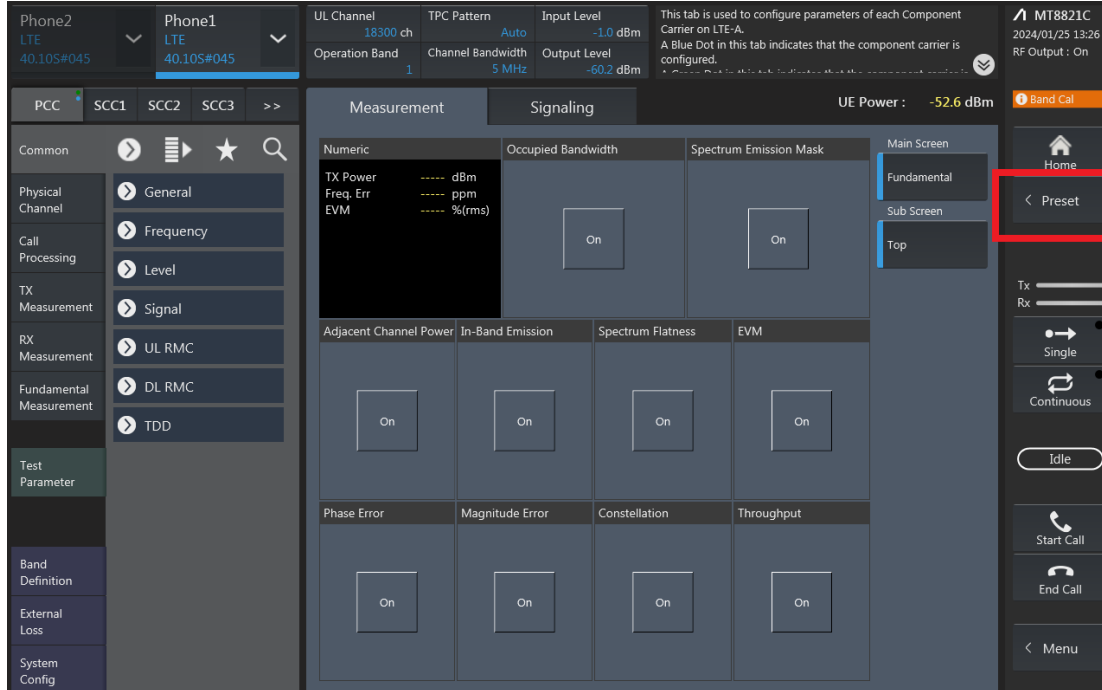
<5G NR FR1>





LTE Uplink and Downlink Carrier Aggregation configurations:

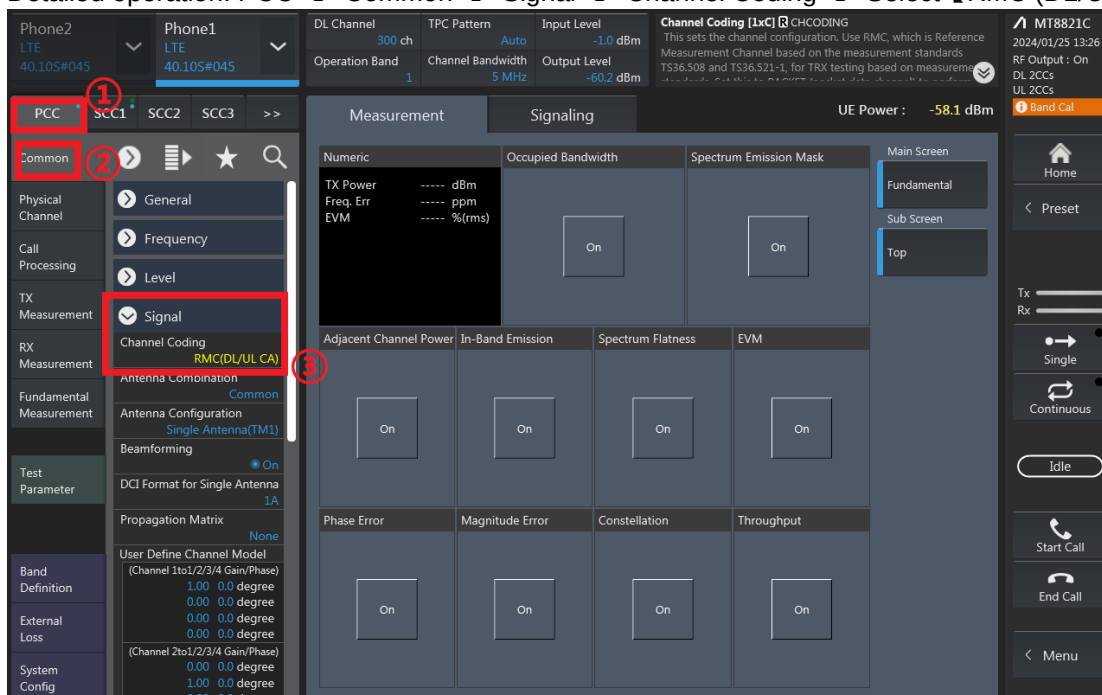
1. Change the Scenario in the Configuration of Phone1 LTE Signaling and Preset.



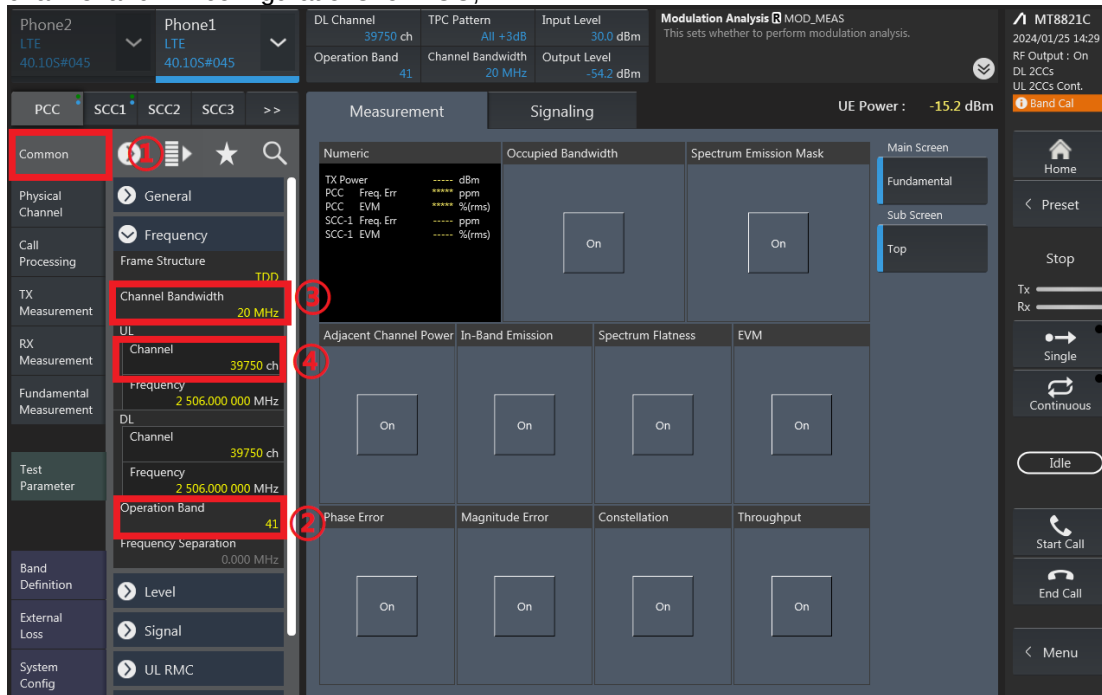
2. If Select "RMC (DL/UL CA)" for Uplink Carrier Aggregation;
If Select "RMC (DL CA)" for Downlink Carrier Aggregation.

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

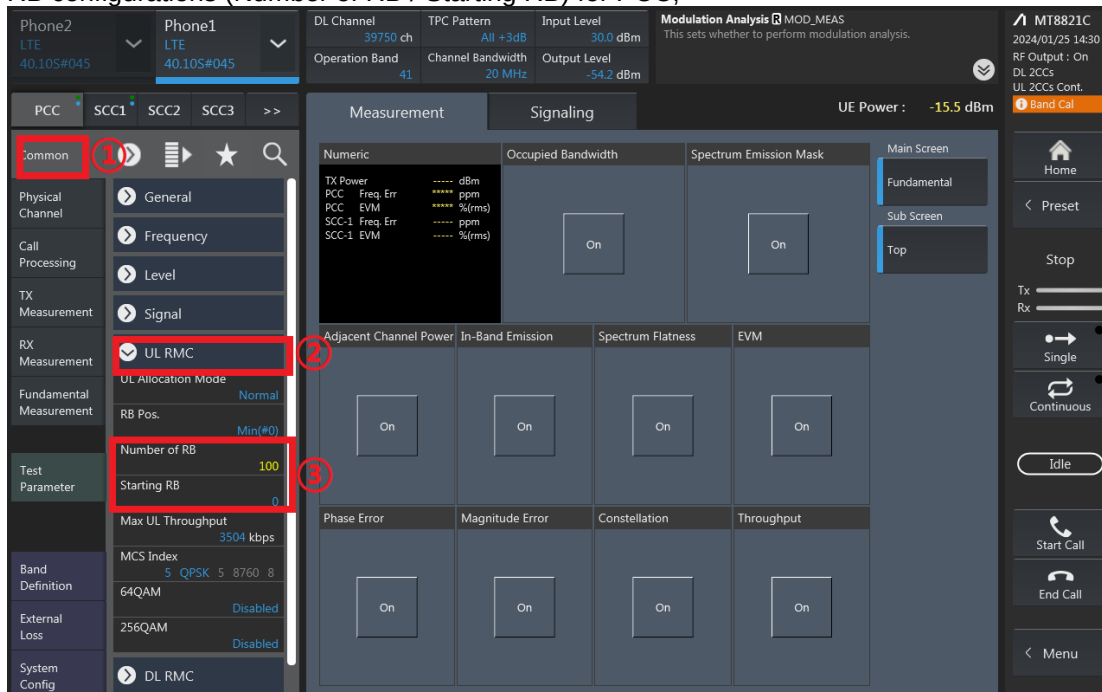
Main Screen Fundamental Sub Screen Top

Adjacent Channel Power In-Band Emission Spectrum Flatness EVM

Phase Error Magnitude Error Constellation Throughput

On On On On On On On On On On

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

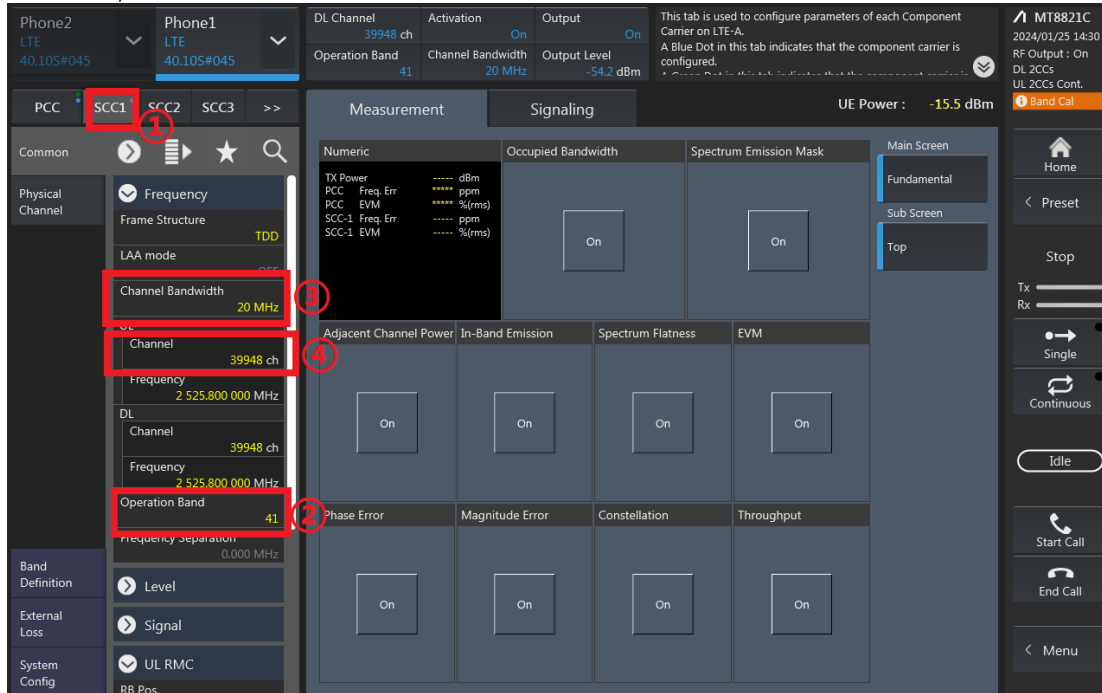
Main Screen Fundamental Sub Screen Top

Adjacent Channel Power In-Band Emission Spectrum Flatness EVM

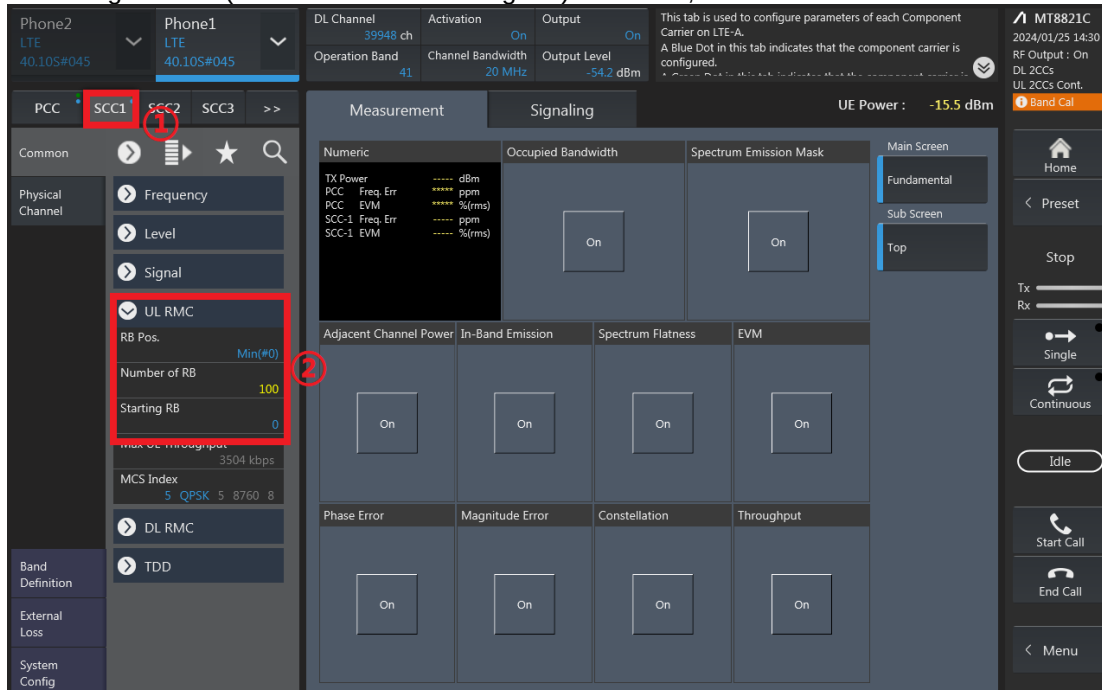
Phase Error Magnitude Error Constellation Throughput

On On On On On On On On On On

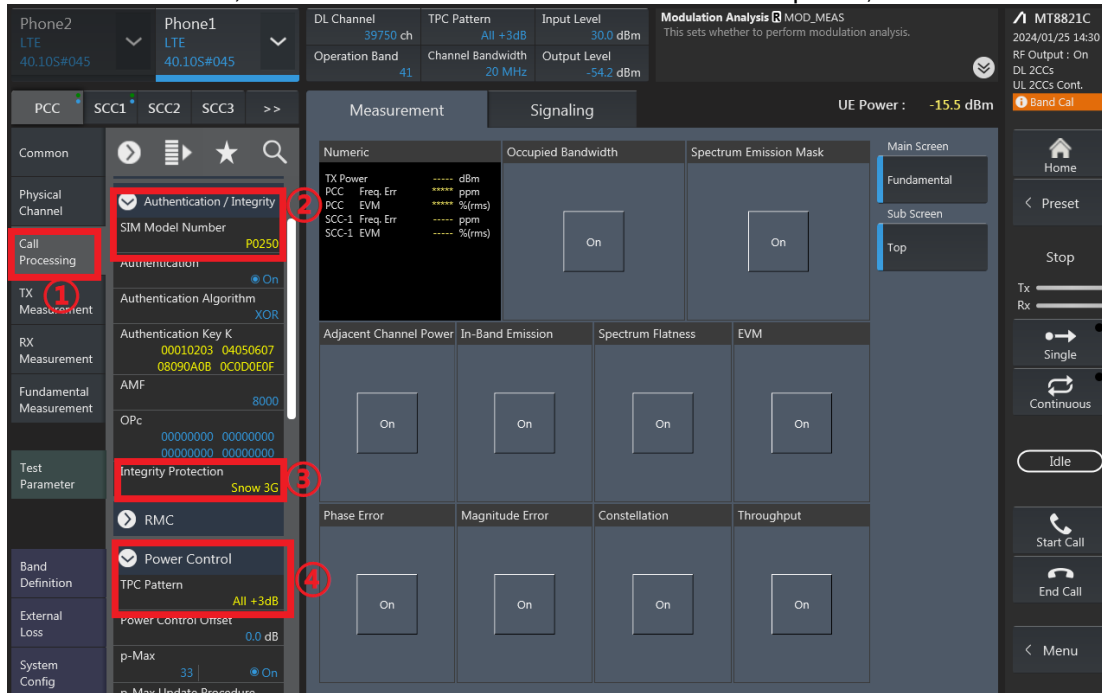
4. SCC parameter Settings: Select the SCC1 tab, Set operating band, BW, channel, and RB configurations for SCC1;



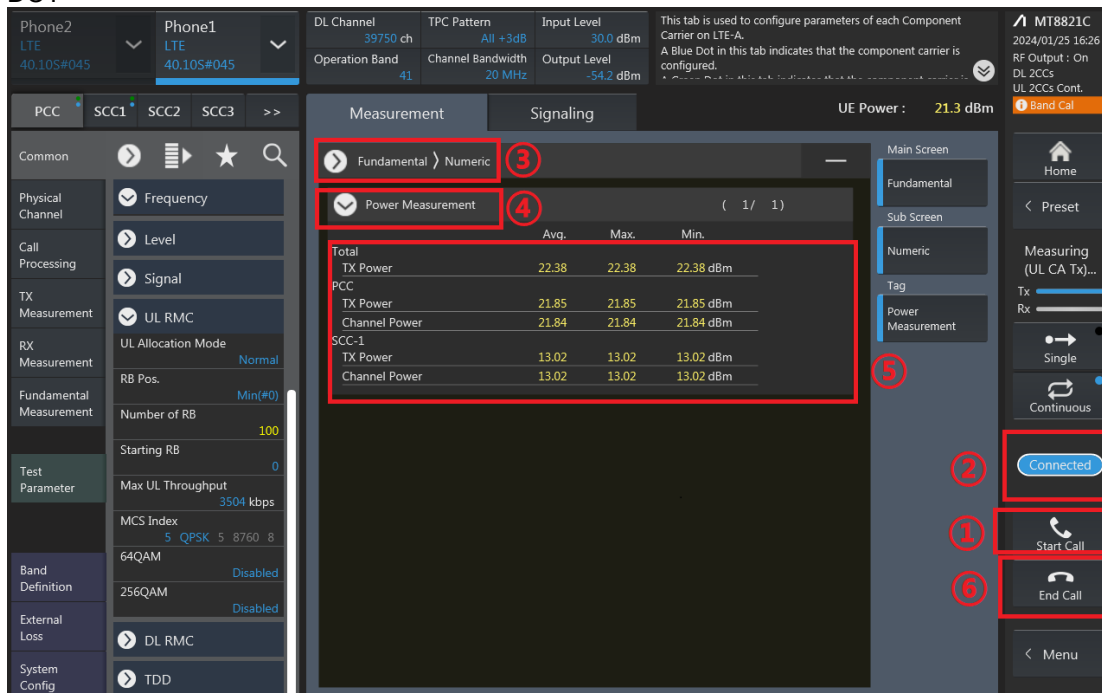
RB configurations (Number of RB / Starting RB) for SCC1;



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

CA_66B_Ant 0											
Combination 15MHz+5MHz (75RB+25RB)											
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Power Reduction	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset					
132047	132140	QPSK	1	0	0	0	1	0	DSI 0/Full	23.07	24.00
132322	132415	QPSK	1	0	0	0	1	0	DSI 0/Full	23.13	24.00
132597	132504	QPSK	1	0	0	0	1	0	DSI 0/Full	23.17	24.00
132047	132140	QPSK	1	0	0	0	1	0	DSI 1/6/8/9/12	21.62	22.50
132322	132415	QPSK	1	0	0	0	1	0	DSI 1/6/8/9/12	21.77	22.50
132597	132504	QPSK	1	0	0	0	1	0	DSI 1/6/8/9/12	21.71	22.50

CA_66C_Ant 0											
Combination 20MHz+20MHz (100RB+100RB)											
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Power Reduction	Measured Power (dbm)	Tune up Power (dbm)
			RB Size	RB offset	RB Size	RB offset					
132072	132270	QPSK	1	0	0	0	1	0	DSI 0/Full	23.19	24.00
132322	132520	QPSK	1	0	0	0	1	0	DSI 0/Full	23.26	24.00
132572	132374	QPSK	1	0	0	0	1	0	DSI 0/Full	23.16	24.00
132072	132270	QPSK	1	0	0	0	1	0	DSI 1/6/8/9/12	21.69	22.50
132322	132520	QPSK	1	0	0	0	1	0	DSI 1/6/8/9/12	21.78	22.50
132572	132374	QPSK	1	0	0	0	1	0	DSI 1/6/8/9/12	21.77	22.50

CA_48C For FCC_Ant 1											
Combination 20MHz+20MHz (100RB+100RB)											
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Power Reduction	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset					
55340	55638	QPSK	1	0	0	0	1	0	DSI 0Full	21.55	23.00
55830	56028	QPSK	1	0	0	0	1	0	DSI 0Full	21.47	23.00
56150	56348	QPSK	1	0	0	0	1	0	DSI 0Full	21.60	23.00
56640	56442	QPSK	1	0	0	0	1	0	DSI 0Full	21.48	23.00