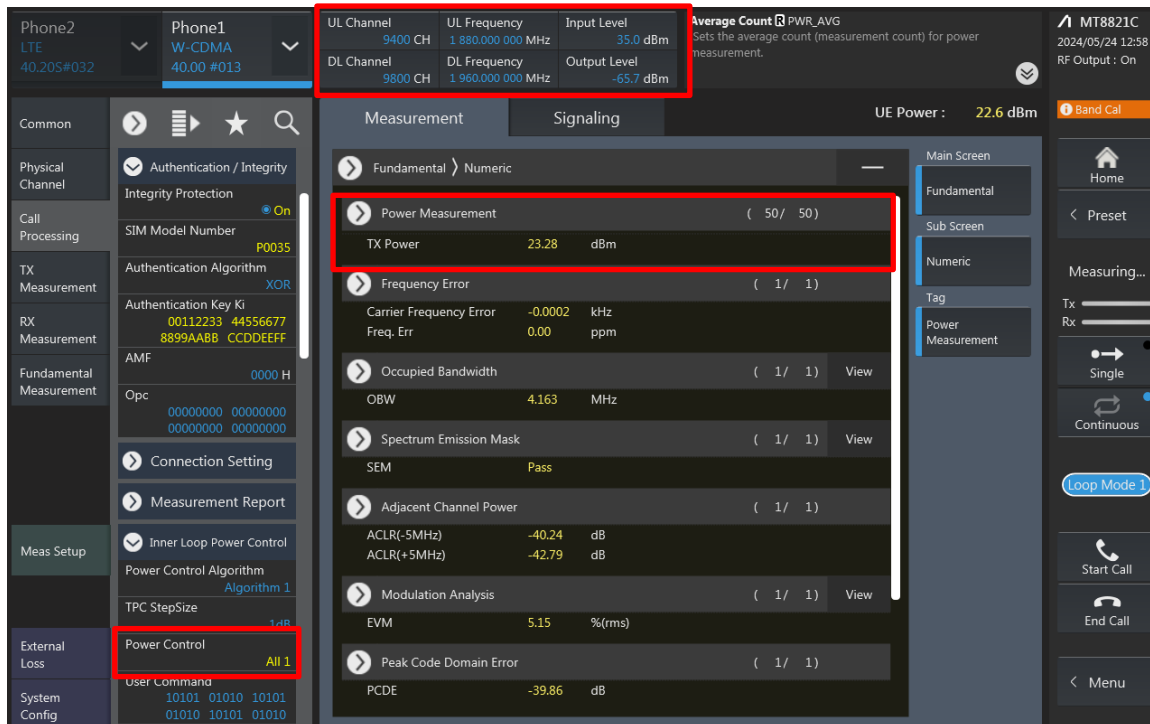


Power measurement connection diagram:

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 2G/3G/LTE/5G FR1/UL and DL CA.

<WCDMA>



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

- Top Bar:** Shows Phone2 (LTE, 40.205#032) and Phone1 (W-CDMA, 40.00 #013). It also displays 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). The Average Count (PWR_AVG) is shown as 50/50.
- Left Panel:** Contains various measurement and setup options: Common, Physical Channel, Call Processing, TX Measurement, RX Measurement, Fundamental Measurement, Meas Setup, External Loss, and System Config.
- Main Panel:** Displays the Measurement results for WCDMA. The 'Power Measurement' section is highlighted with a red box, showing TX Power (23.28 dBm). Other measurements include Frequency Error (Carrier Frequency Error: -0.0002 kHz, Freq. Err: 0.00 ppm), Occupied Bandwidth (OBW: 4.163 MHz), Spectrum Emission Mask (SEM: Pass), Adjacent Channel Power (ACLR(-5MHz): -40.24 dB, ACLR(+5MHz): -42.79 dB), Modulation Analysis (EVM: 5.15 %(rms)), and Peak Code Domain Error (PCDE: -39.86 dB).
- Right Panel:** Shows the UE Power (22.6 dBm) and a 'Band Cal' button. It also includes a 'Measuring...' section with 'Tx' and 'Rx' power levels, and a 'Loop Mode 1' button.

<LTE>

Phone2
LTE
40.20S#021

Phone1
LTE
40.20S#021

UL Channel
21100 ch
Operation Band
7

TPC Pattern
All +3dB
Channel Bandwidth
20 MHz

Input Level
30.0 dBm
Output Level
-67.0 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

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

Adjacent Channel Power

In-Band Emission

Spectrum Flatness

EVM

Phase Error

Magnitude Error

Constellation

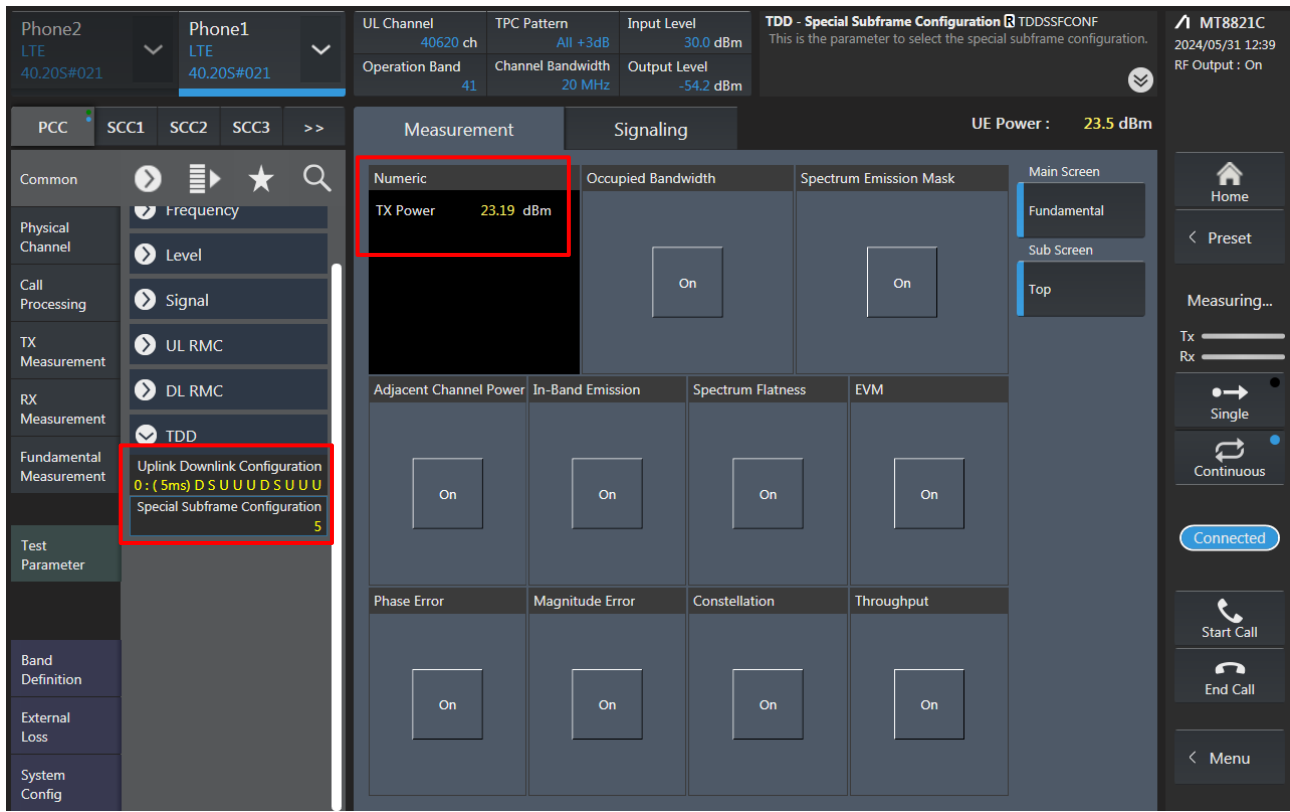
Throughput

Main Screen
Fundamental
Sub Screen
Top

UE Power : 23.4 dBm

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

Measurement
Signaling

UE Power : 23.5 dBm

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

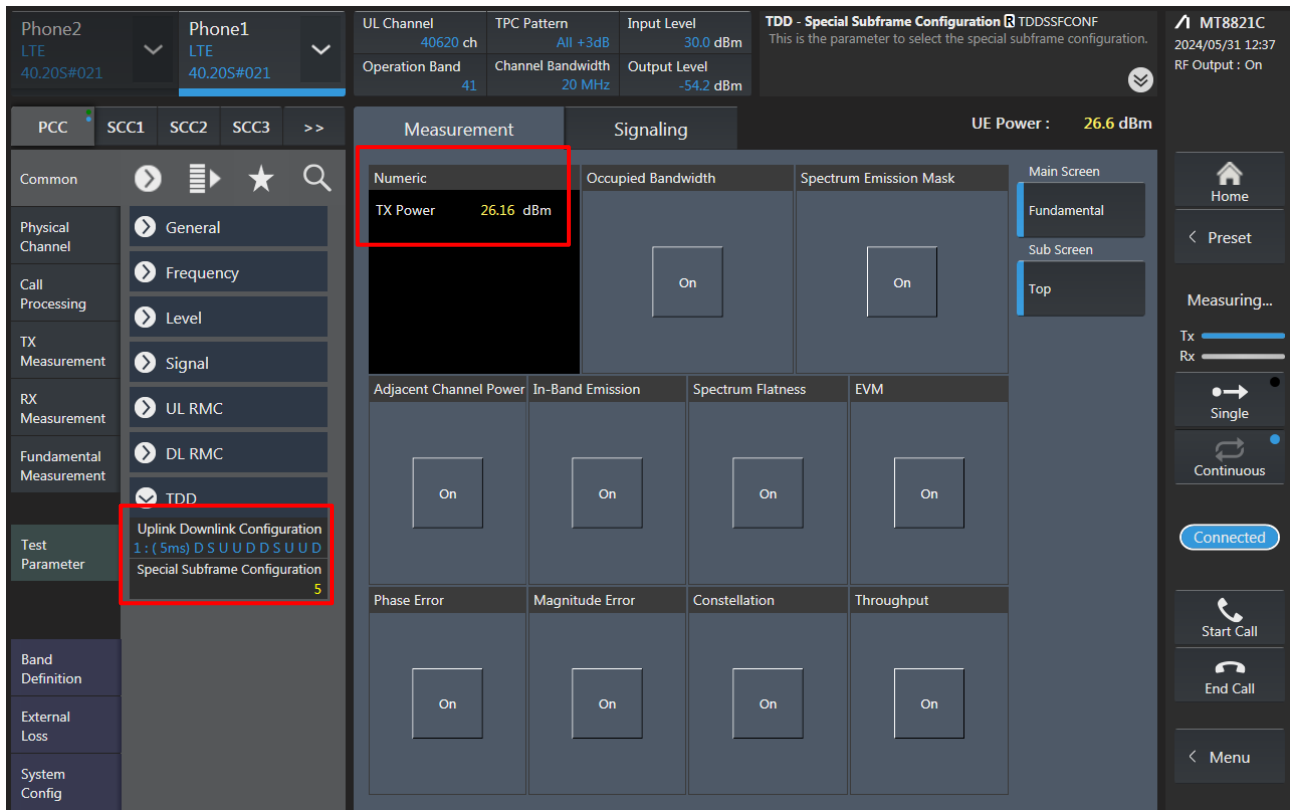
Constellation
On

Throughput
On

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

Operation Band 41

Channel Bandwidth 20 MHz

Output Level -54.2 dBm

TDD - Special Subframe Configuration TDDSSFCONF

This is the parameter to select the special subframe configuration.

MT8821C

2024/05/31 12:37

RF Output : On

UE Power : 26.6 dBm

Measurement

Numeric

TX Power 26.16 dBm

Occupied Bandwidth

Spectrum Emission Mask

Main Screen

Fundamental

Sub Screen

Top

Physical Channel

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 5

Test Parameter

Band Definition

External Loss

System Config

Adjacent Channel Power

In-Band Emission

Spectrum Flatness

EVM

Phase Error

Magnitude Error

Constellation

Throughput

Home

Preset

Measuring...

Tx

Rx

Single

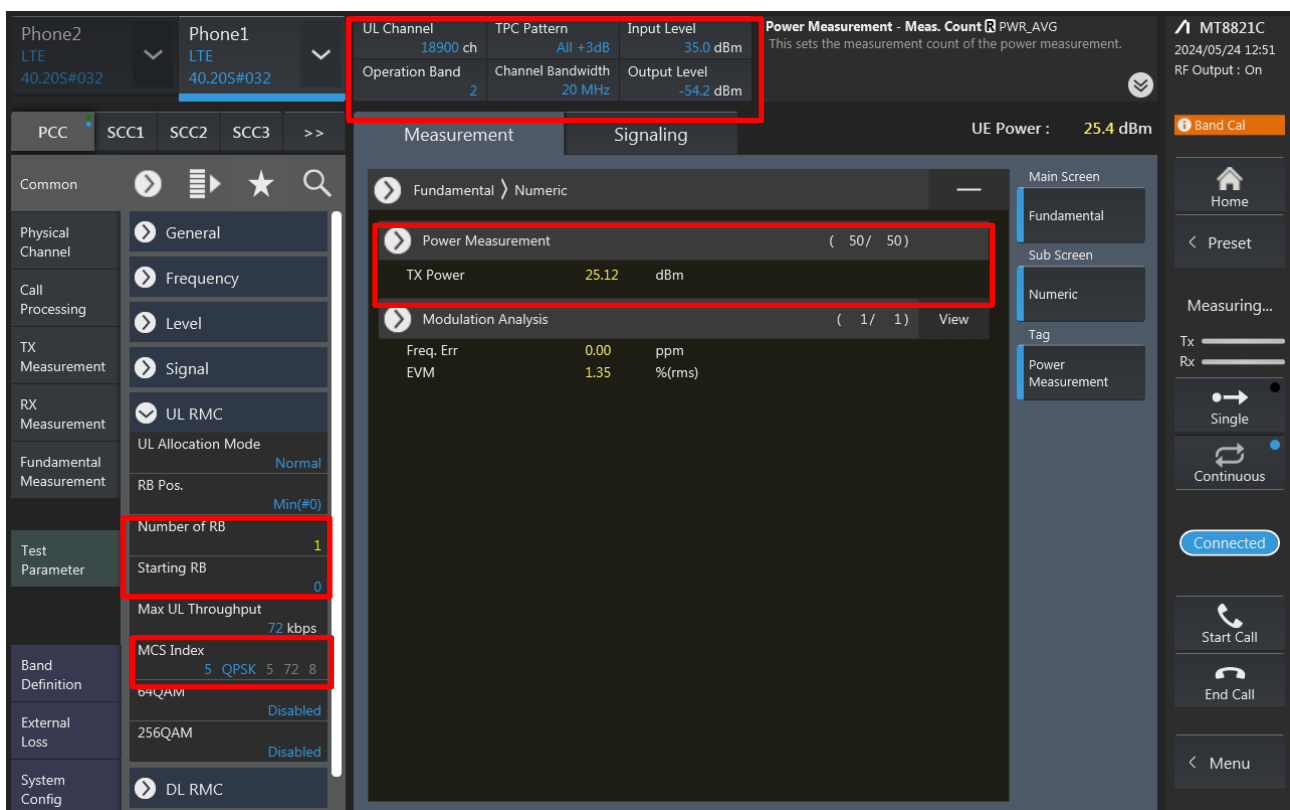
Continuous

Connected

Start Call

End Call

Menu



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

Signaling

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

Max UL Throughput 72 kbps

MCS Index 5 QPSK 5 72 8

Band Definition

External Loss

System Config

Home

Preset

Measuring...

Tx

Rx

Single

Continuous

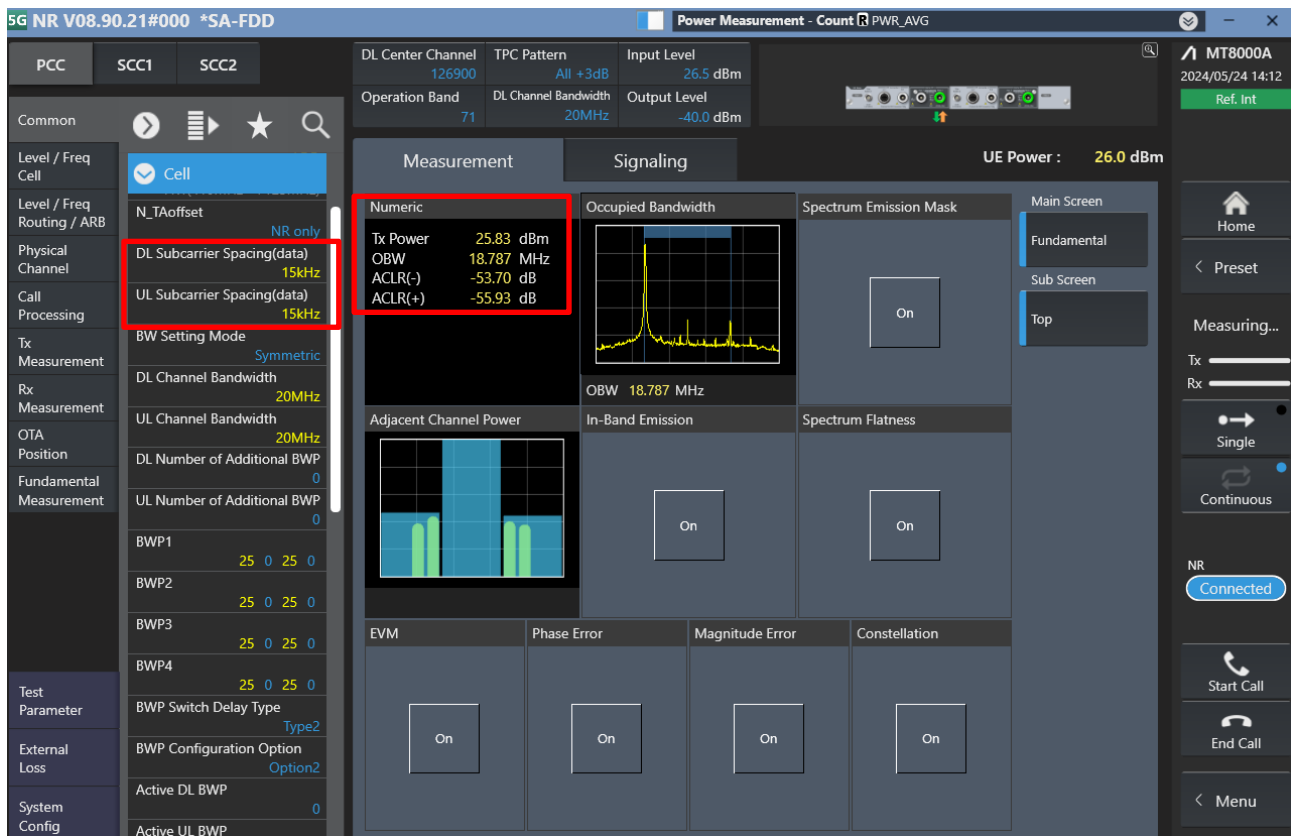
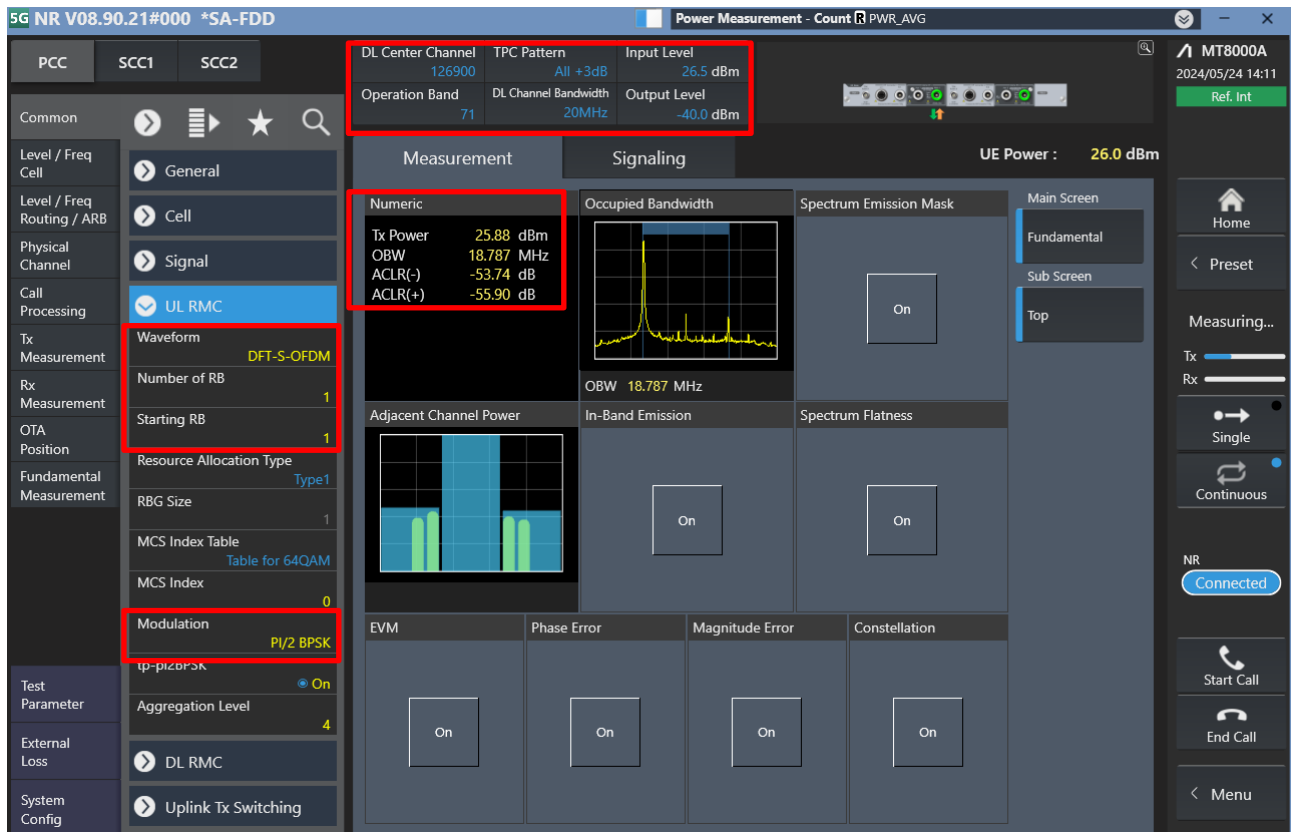
Connected

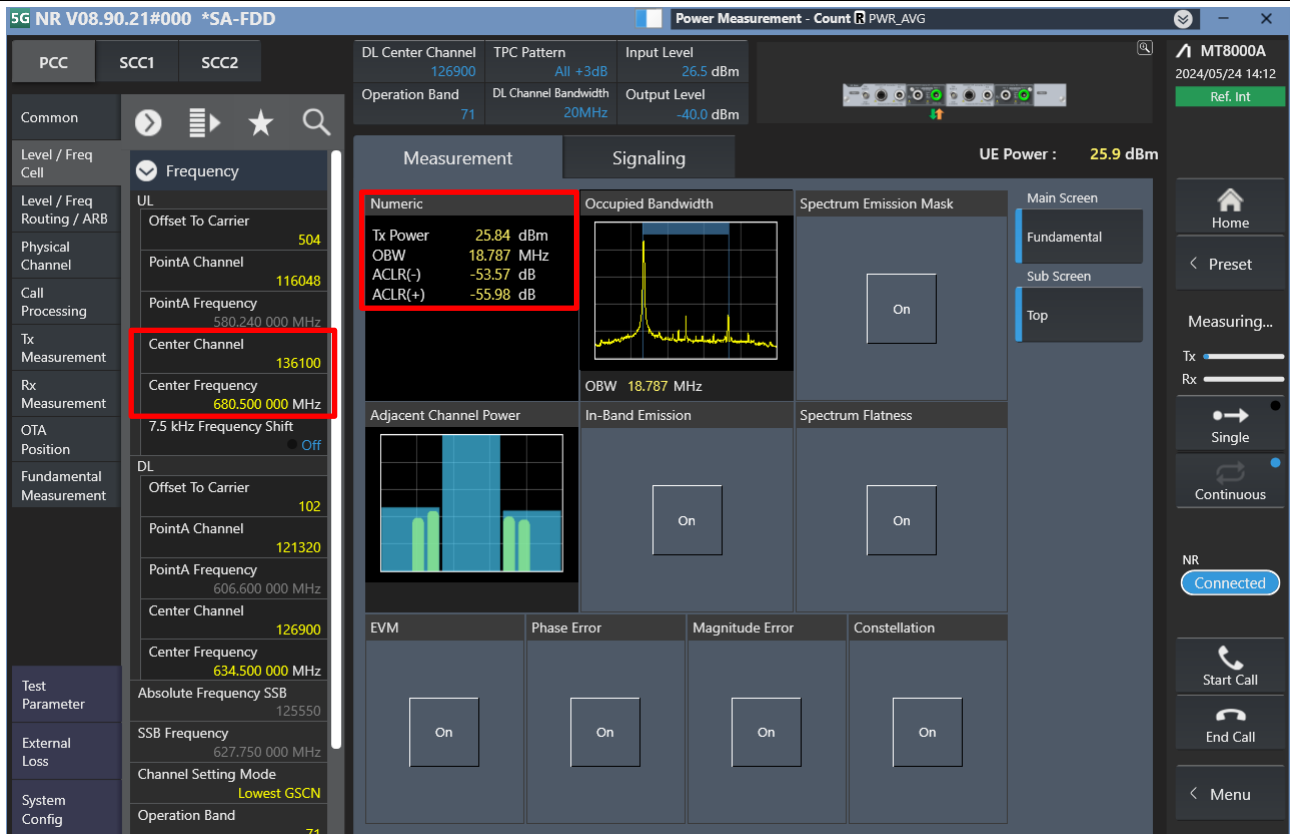
Start Call

End Call

Menu

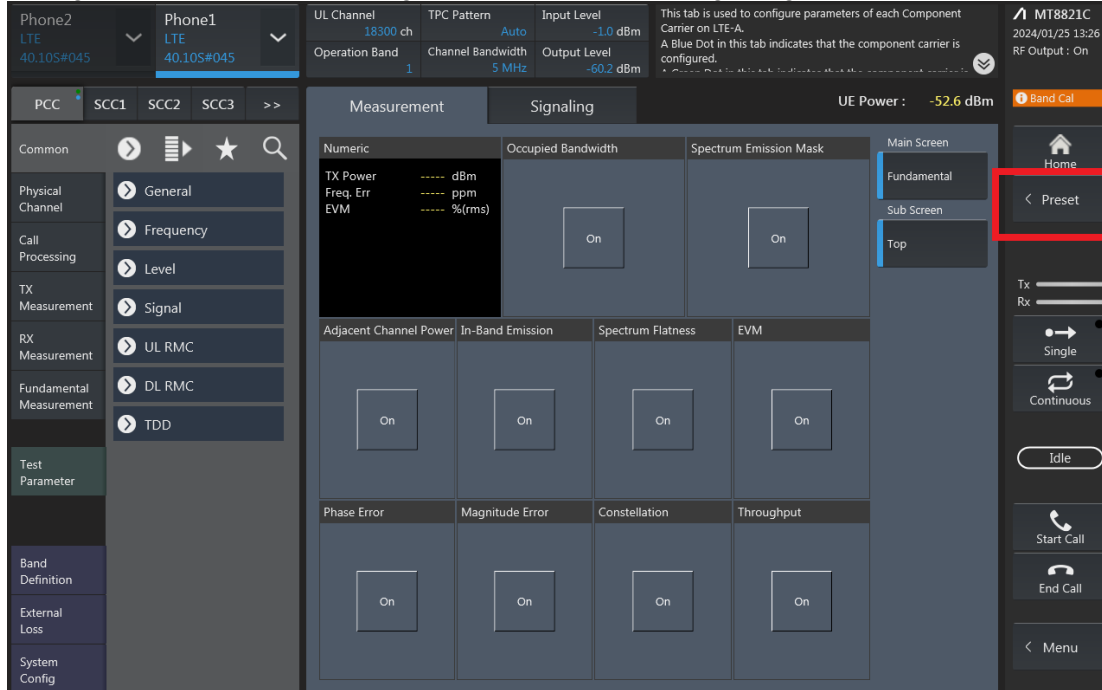
<5G NR FR1>





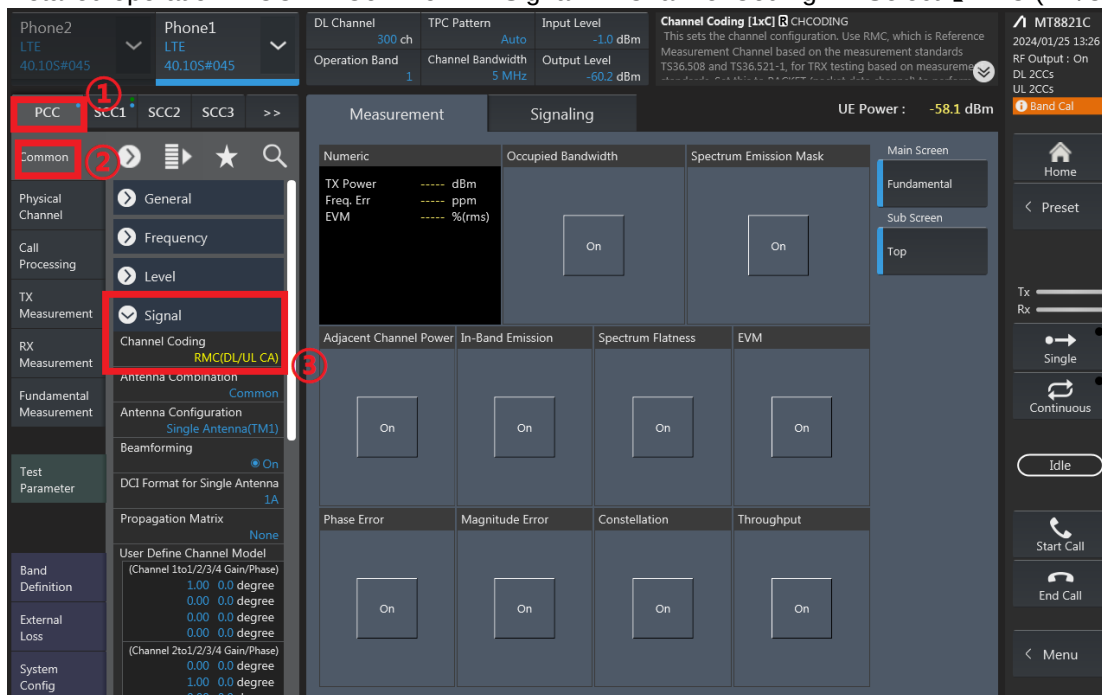
LTE Uplink and Downlink Carrier Aggregation configurations:

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

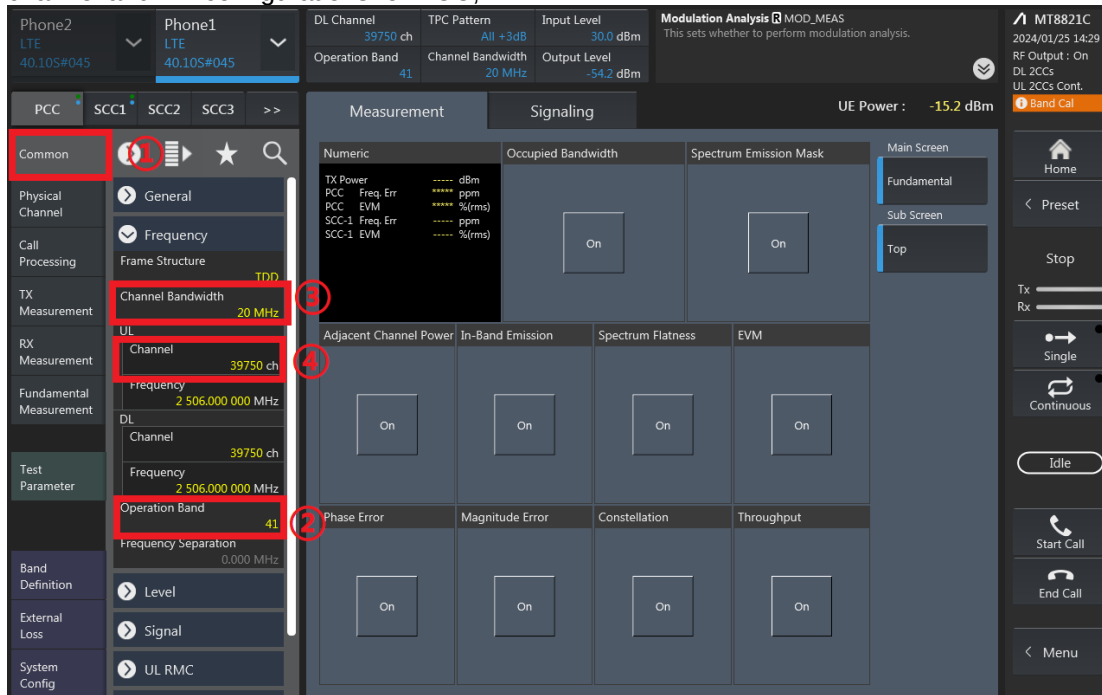


2. If Select "RMC (DL/UL CA)" for Uplink Carrier Aggregation;
If Select "RMC (DL CA)" for Downlink Carrier Aggregation.
For example, Uplink Carrier Aggregation:

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 PPM PCC EVM Freq. Err. % (rms) SCC-1 Freq. Err. PPM SCC-1 EVM Freq. Err. % (rms)

Occupied Bandwidth

Spectrum Emission Mask

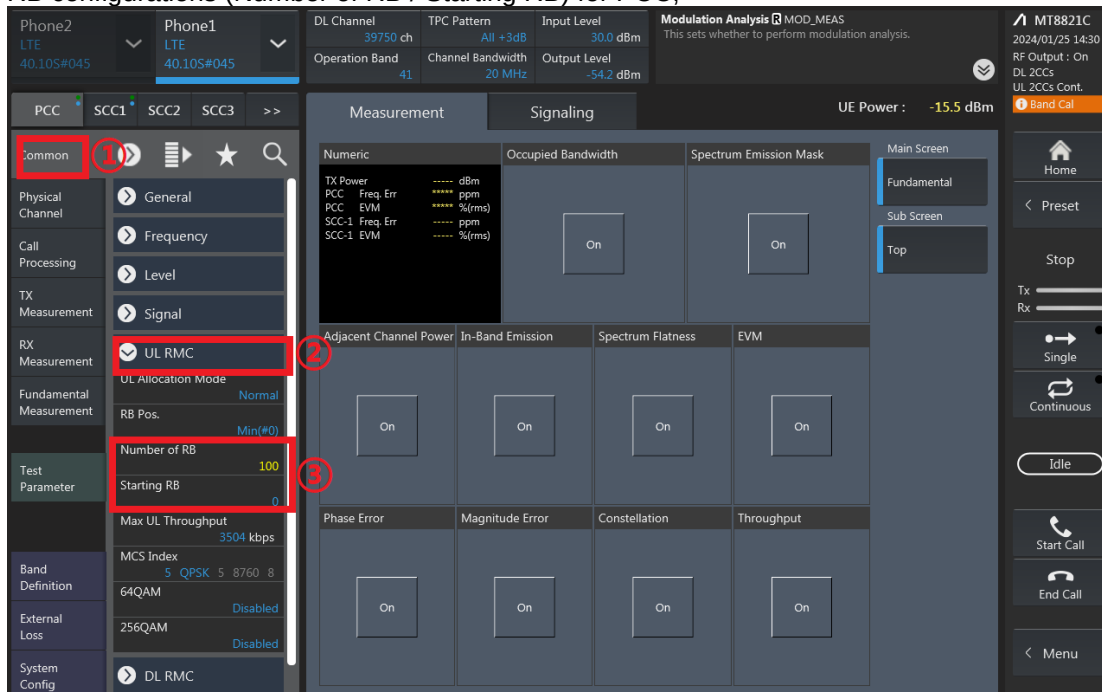
Main Screen Fundamental Sub Screen Top

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 PPM PCC EVM Freq. Err. % (rms) SCC-1 Freq. Err. PPM SCC-1 EVM Freq. Err. % (rms)

Occupied Bandwidth

Spectrum Emission Mask

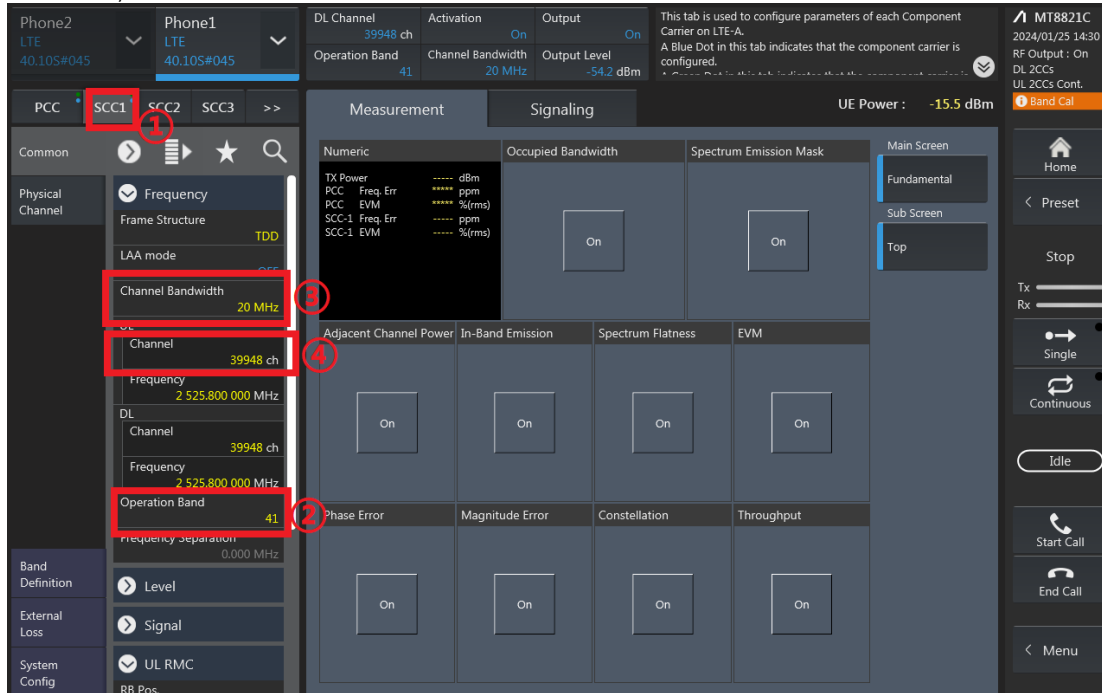
Main Screen Fundamental Sub Screen Top

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

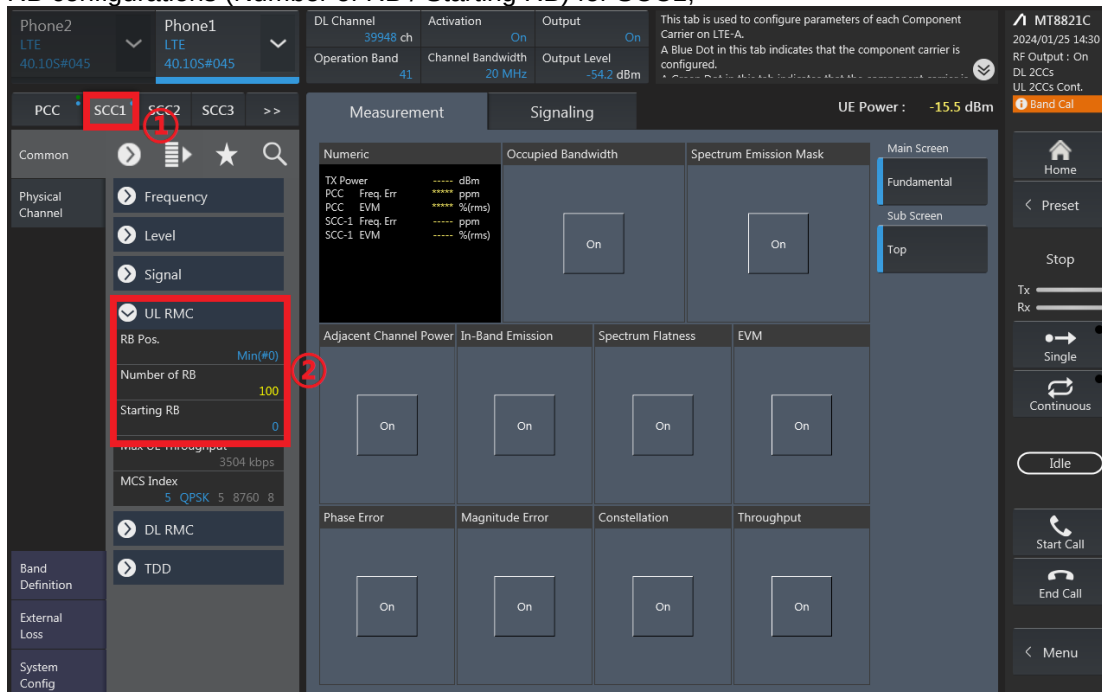
Adjacent Channel Power In-Band Emission Spectrum Flatness EVM

Phase Error Magnitude Error Constellation Throughput

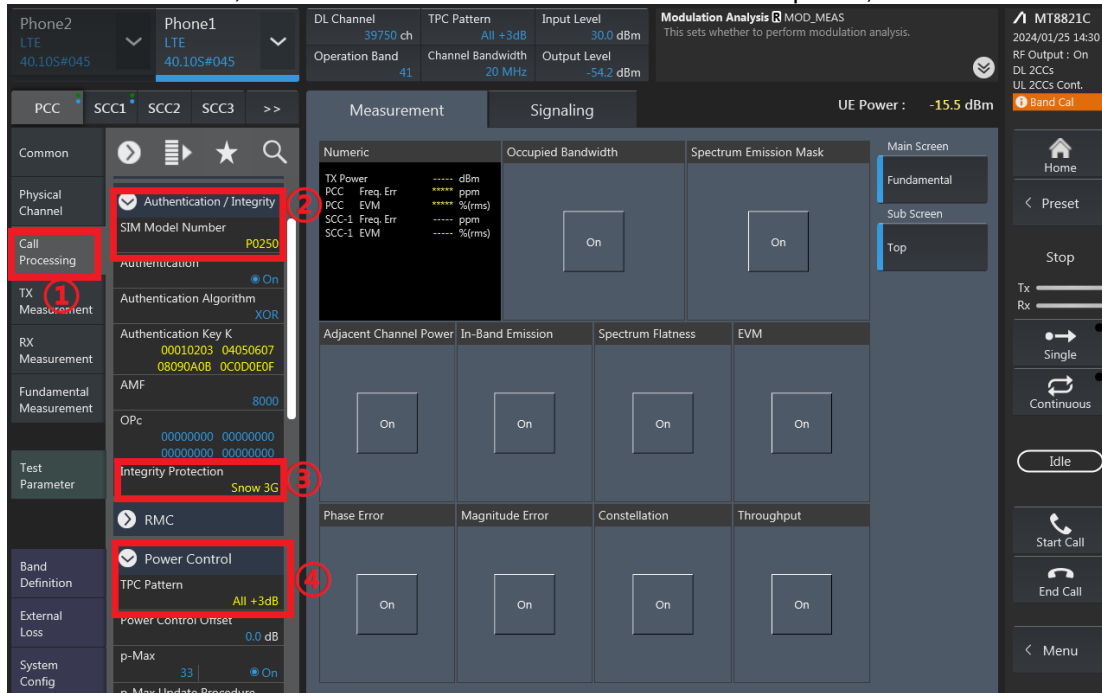
4. SCC parameter Settings: Select the SCC1 tab, Set operating band, BW, channel, and RB configurations for SCC1;



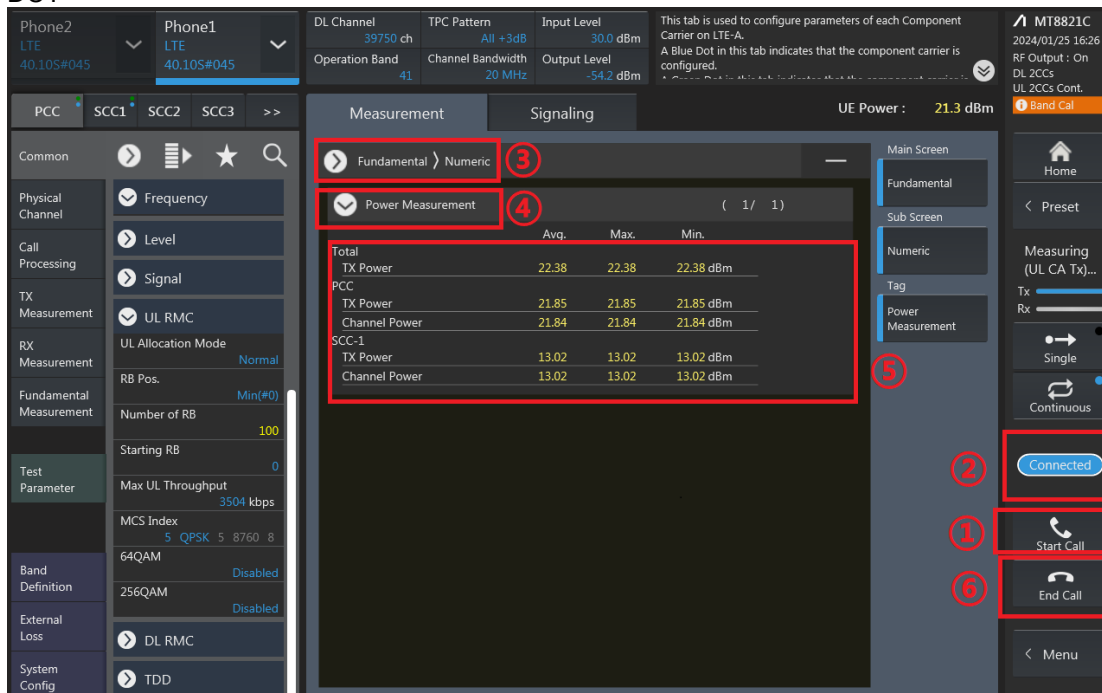
RB configurations (Number of RB / Starting RB) for SCC1;



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



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