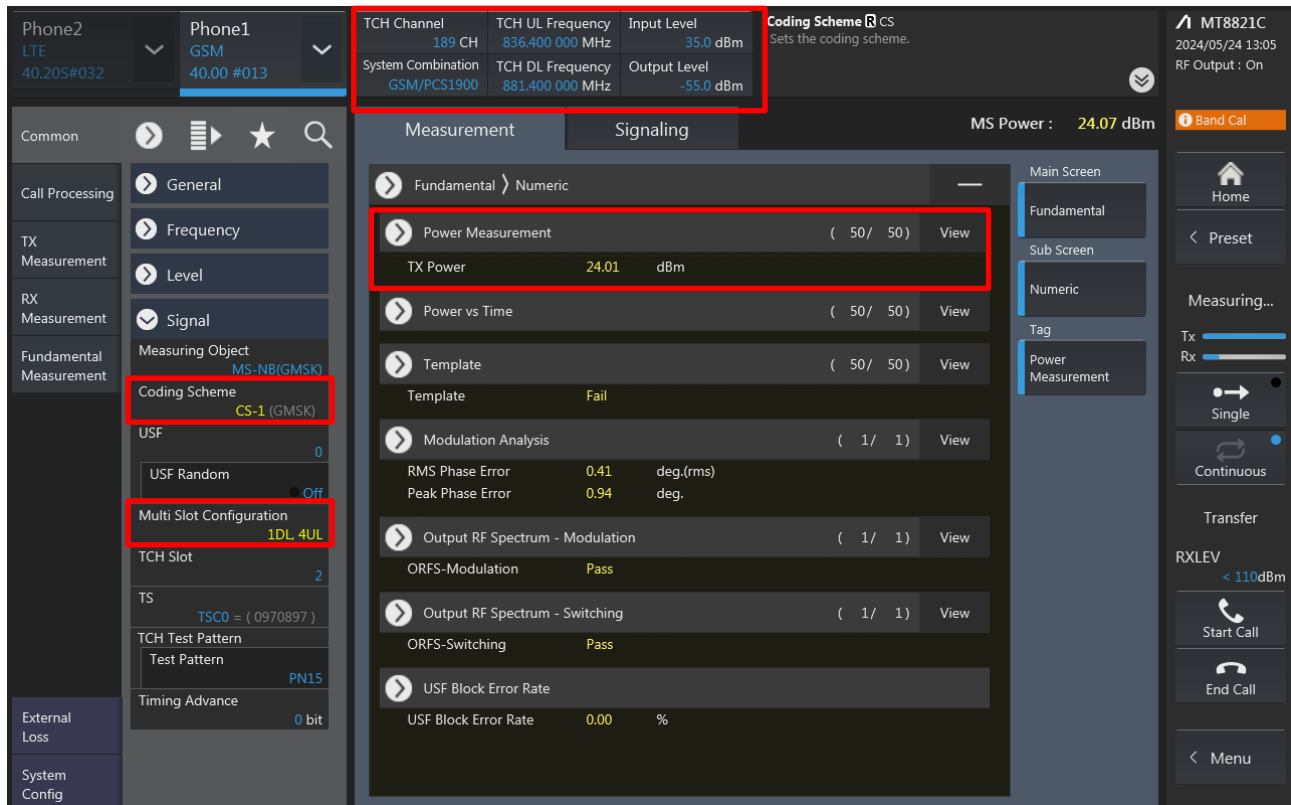


Power measurement connection diagram:

The power measurement for 2G/3G/LTE /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 /UL and DL CA.

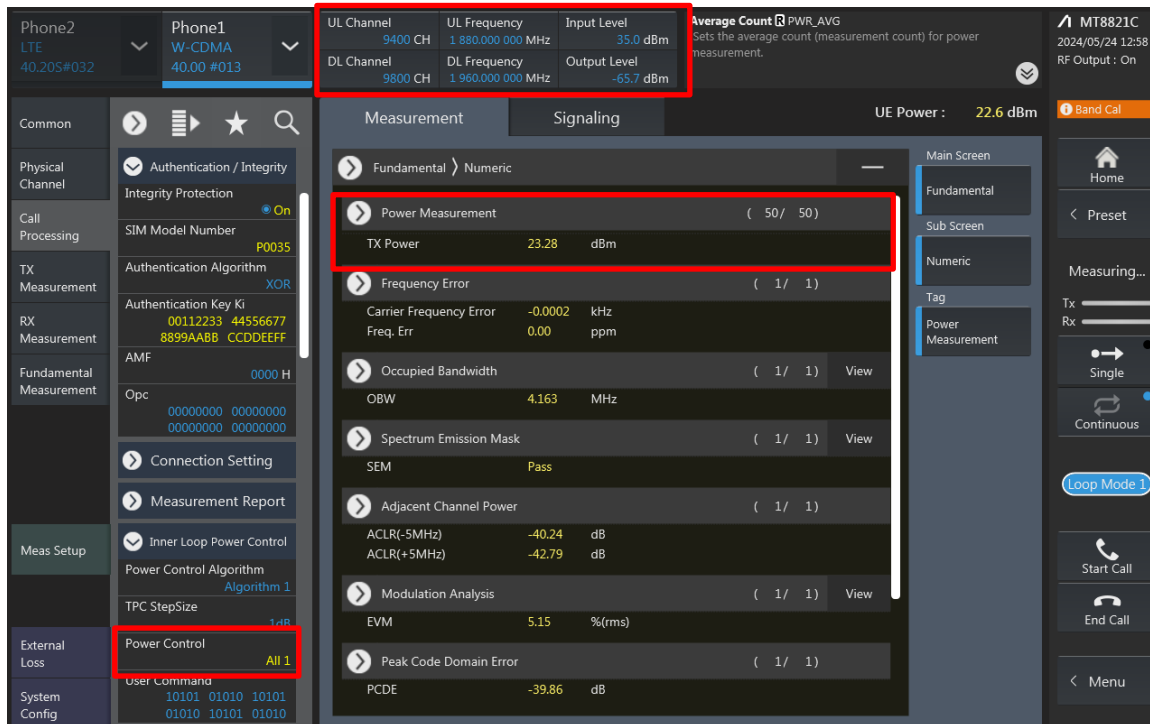
<GSM>



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

- Phone Information:** Phone2 (LTE, 40.205#032) and Phone1 (GSM, 40.00 #013).
- Measurement Configuration:**
 - 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
- Measurement Results:**
 - TX Power: 24.01 dBm
 - Power vs Time: (50/ 50) View
 - Template: Fail
 - Modulation Analysis: (1/ 1) View
 - RMS Phase Error: 0.41 deg.(rms)
 - Peak Phase Error: 0.94 deg.
 - Output RF Spectrum - Modulation: (1/ 1) View
 - ORFS-Modulation: Pass
 - Output RF Spectrum - Switching: (1/ 1) View
 - ORFS-Switching: Pass
 - USF Block Error Rate: 0.00 %
- Side Panel:**
 - Call Processing: General, Frequency, Level, Signal
 - TX Measurement: Level
 - RX Measurement: Signal
 - Fundamental Measurement: Measuring Object (MS-NB(GMSK)), Coding Scheme (CS-1 (GMSK)), USF (0), USF Random (Off), Multi Slot Configuration (1DL, 4UL), TCH Slot (2), TS (TSC0 = (0970897)), TCH Test Pattern (Test Pattern, PN15), Timing Advance (0 bit)
 - External Loss
 - System Config
- Right Panel:**
 - MT8821C
 - 2024/05/24 13:05
 - RF Output : On
 - Band Cal
 - Home
 - Preset
 - Measuring...
 - Tx/Rx level indicators
 - Single/Continuous measurement modes
 - Transfer
 - RXLEV < 110dBm
 - Start Call/End Call buttons
 - Menu

<WCDMA>



Phone2: LTE 40.20S#032, Phone1: W-CDMA 40.00 #013

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

Average Count: PWR_AVG, Sets the average count (measurement count) for power measurement.

MT8821C, 2024/05/24 12:58, RF Output: On

UE Power: 22.6 dBm

Measurement: Fundamental > Numeric

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

Connection Setting: Authentication / Integrity, Integrity Protection On, SIM Model Number P0035, Authentication Algorithm XOR, Authentication Key Ki 00112233 44556677 8899AABB CCDDDEFF, AMF 0000 H, Opc 00000000 00000000 00000000 00000000

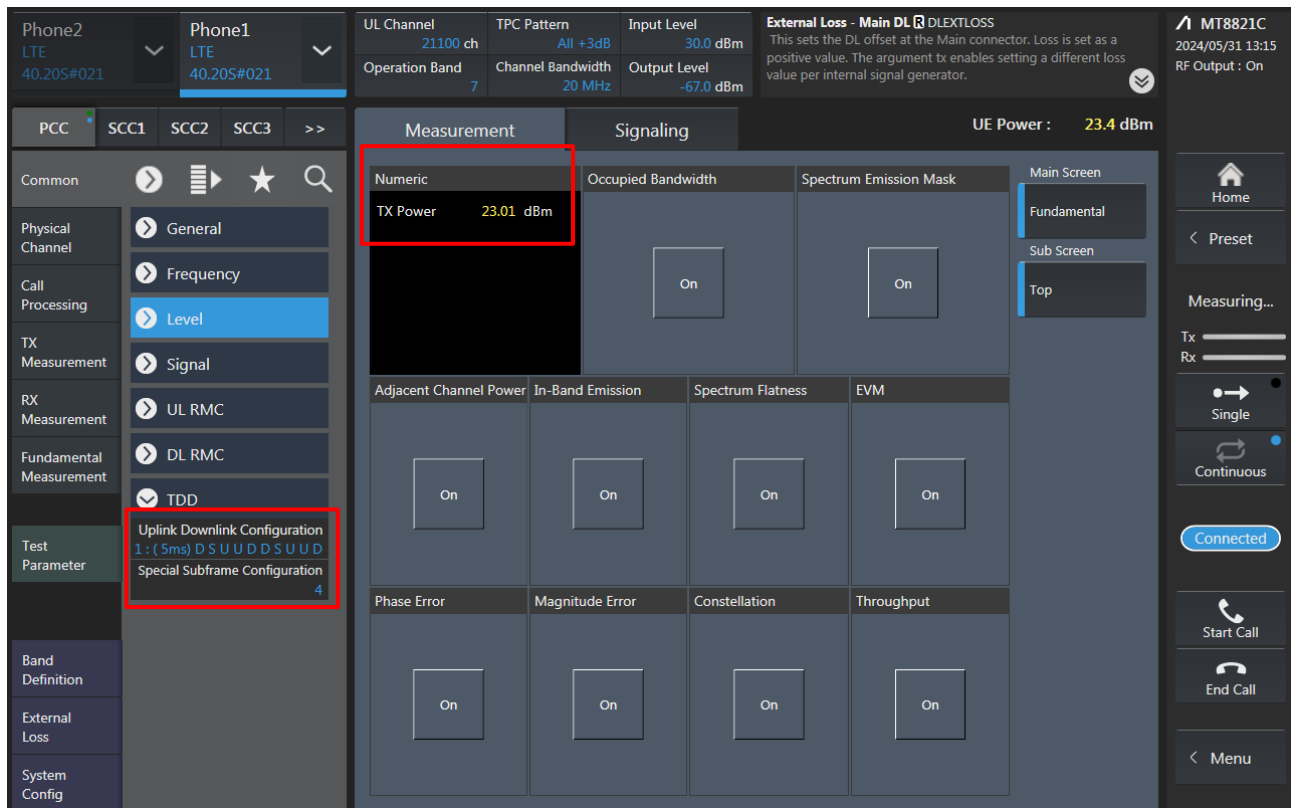
Measurement Report: Connection Setting, Measurement Report

Meas Setup: Inner Loop Power Control, Power Control Algorithm Algorithm 1, TPC StepSize 1

External Loss: Power Control All 1

User Command: 10101 01010 10101 01010 10101 01010

<LTE>



Phone2: LTE 40.20S#021, Phone1: LTE 40.20S#021

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

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

UE Power: 23.4 dBm

Measurement: 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

Uplink Downlink Configuration 1: (5ms) D S U U D D S U U D, Special Subframe Configuration 4

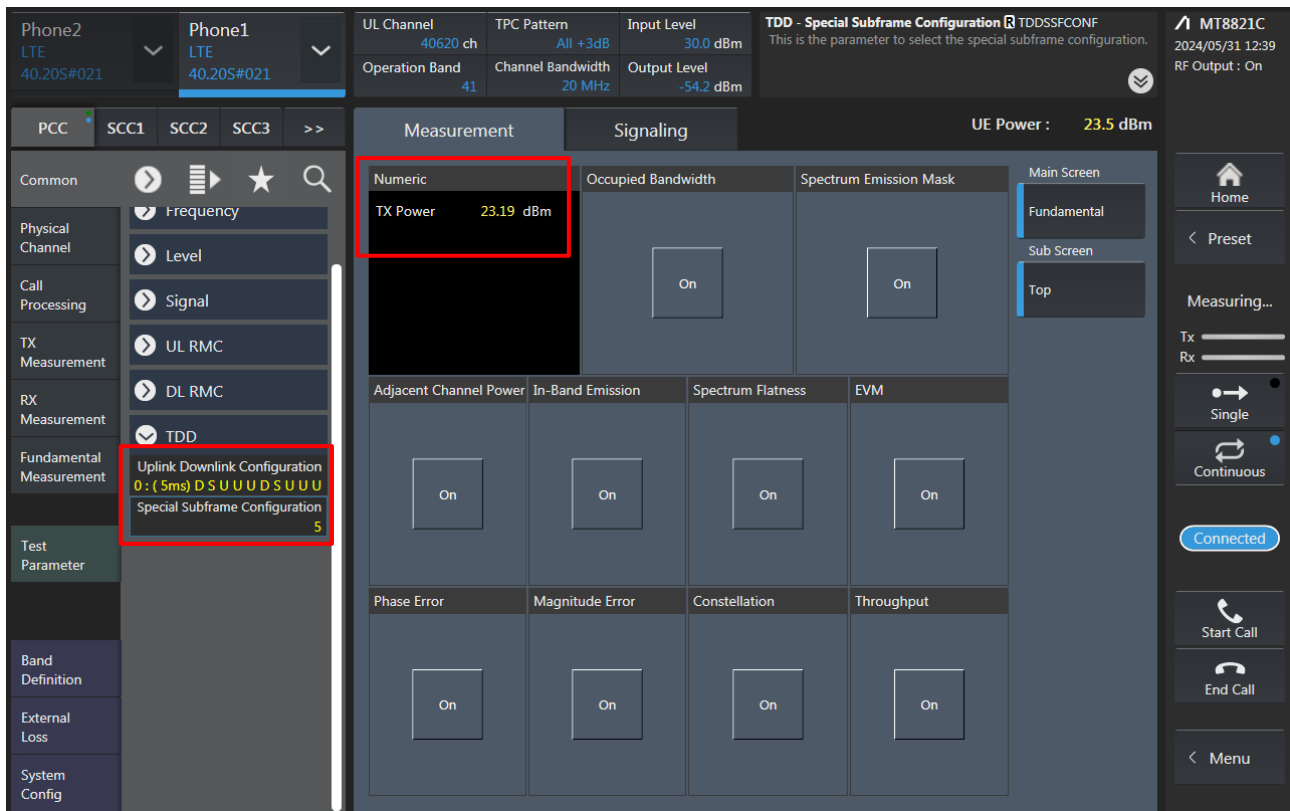
Test Parameter: Uplink Downlink Configuration 1: (5ms) D S U U D D S U U D, Special Subframe Configuration 4

Band Definition: On

External Loss: On

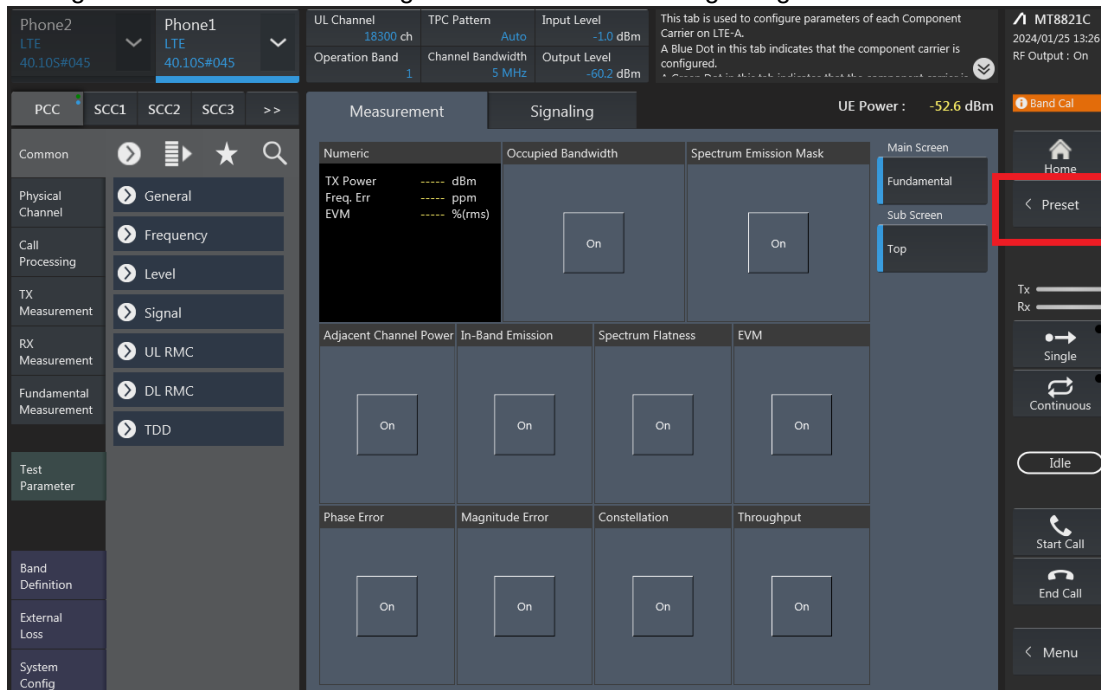
System Config: On

<LTE TDD Power class 3>



LTE Uplink and Downlink Carrier Aggregation configurations:

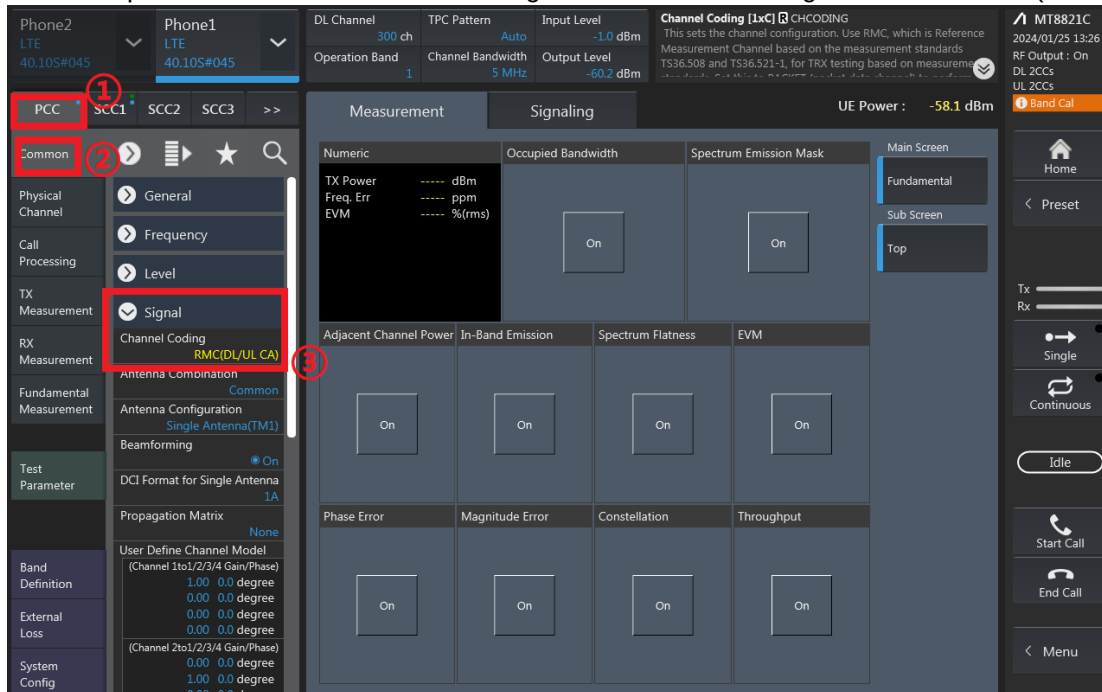
1. Change the Scenario in the Configuration of Phone1 LTE Signaling and Preset.



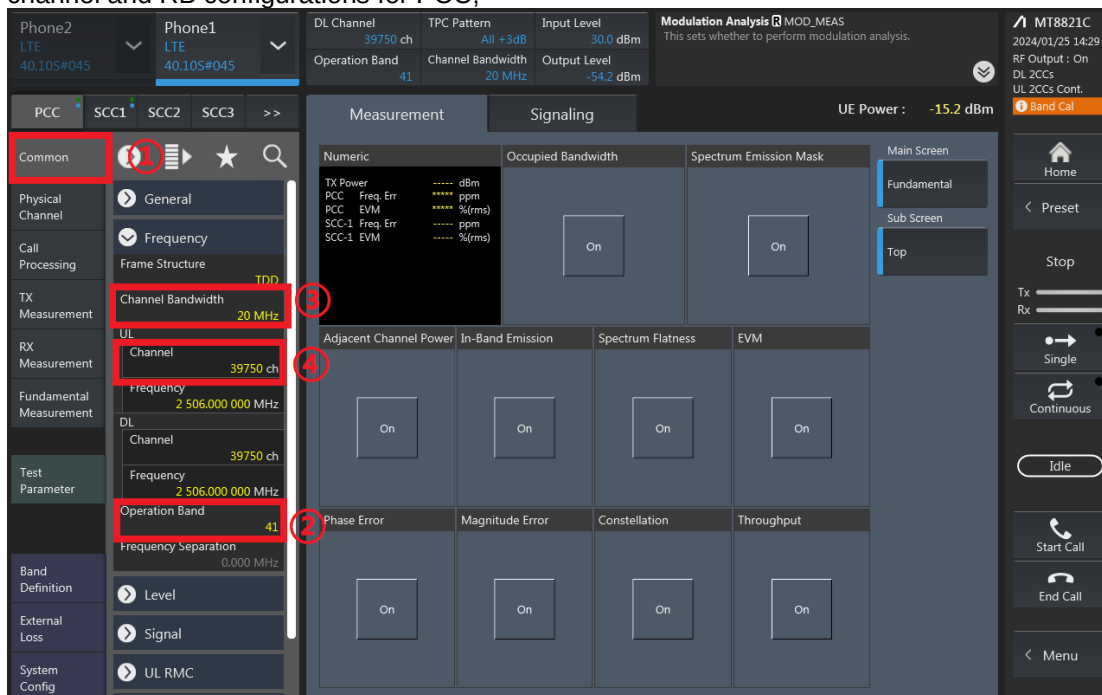
- If Select “RMC (DL/UL CA)” for Uplink Carrier Aggregation;
If Select “RMC (DL CA)” for Downlink Carrier Aggregation.

For example, Uplink Carrier Aggregation:

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



- 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;



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. MT8821C 2024/01/25 14:30 RF Output : On DL 2CCs UL 2CCs Cont. Band Cal

PCC SCC1 SCC2 SCC3 >> UE Power : -15.5 dBm

Common 1

Physical Channel General Frequency Level Signal

Call Processing

TX Measurement

RX Measurement 2

Fundamental Measurement

Test Parameter

Band Definition

External Loss

System Config

UL RMC 3

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 Disabled

256QAM Disabled

DL RMC

Measurement Signaling

Numeric Occupied Bandwidth Spectrum Emission Mask

TX Power PCC Freq. Err PCC EVM SCC-1 Freq. Err SCC-1 EVM

Adjacent Channel Power In-Band Emission Spectrum Flatness EVM

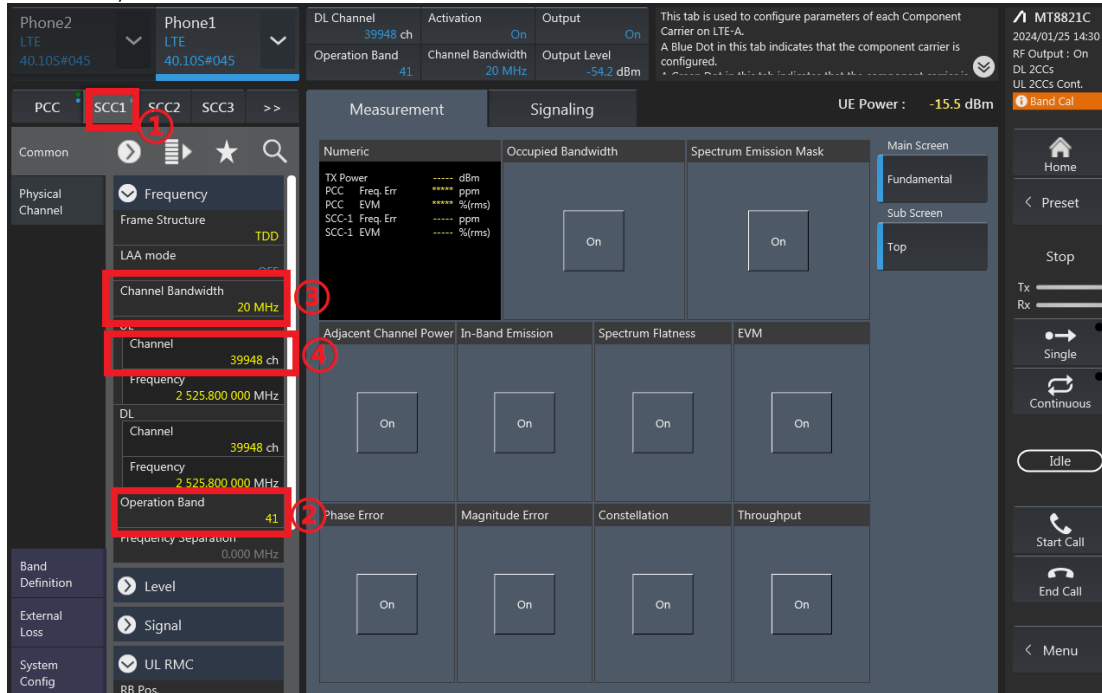
Phase Error Magnitude Error Constellation Throughput

On On On On On On On On On On

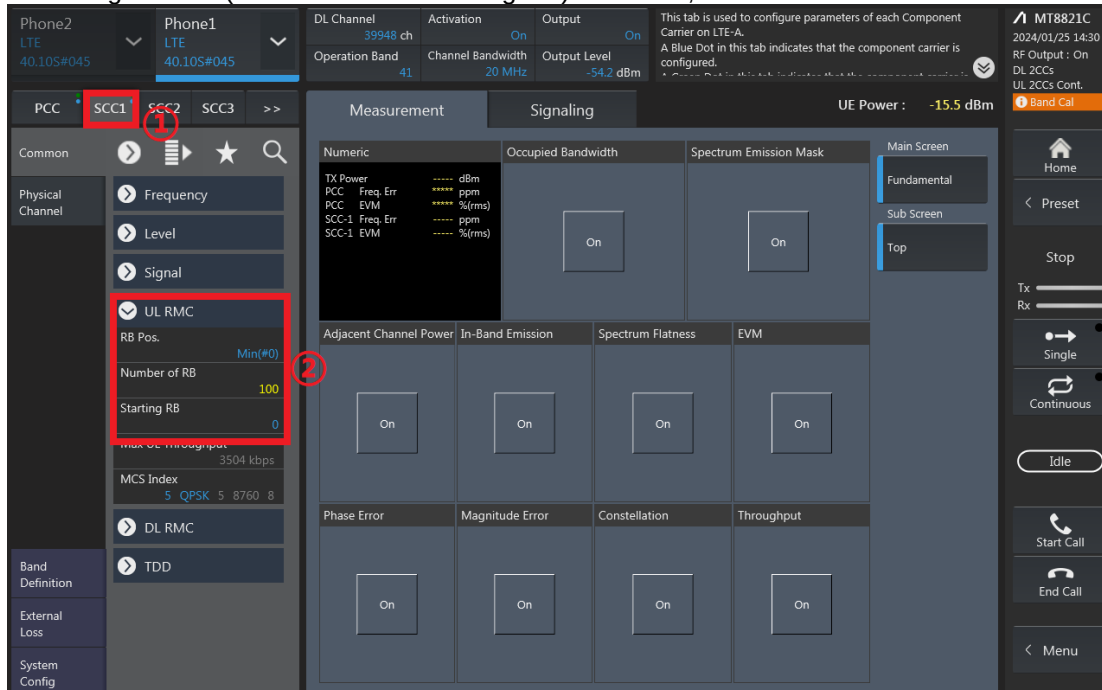
Main Screen Fundamental Sub Screen Top

Home Preset Stop Single Continuous Idle Start Call End Call Menu

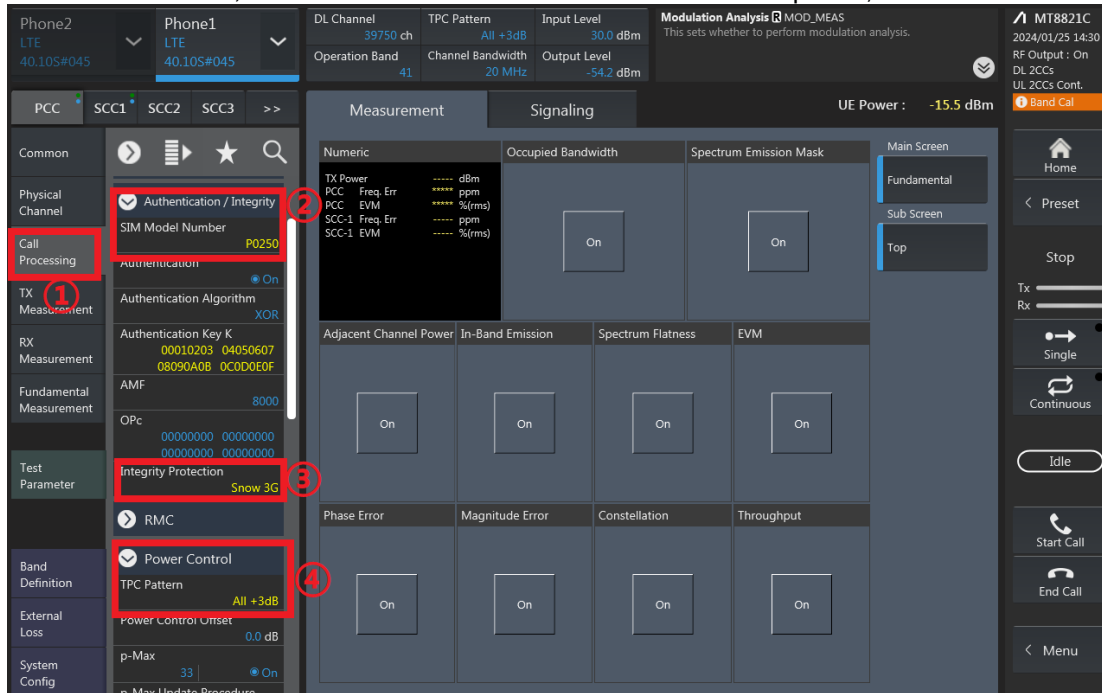
4. SCC parameter Settings: Select the SCC1 tab, Set operating band, BW, channel, and RB configurations for SCC1;



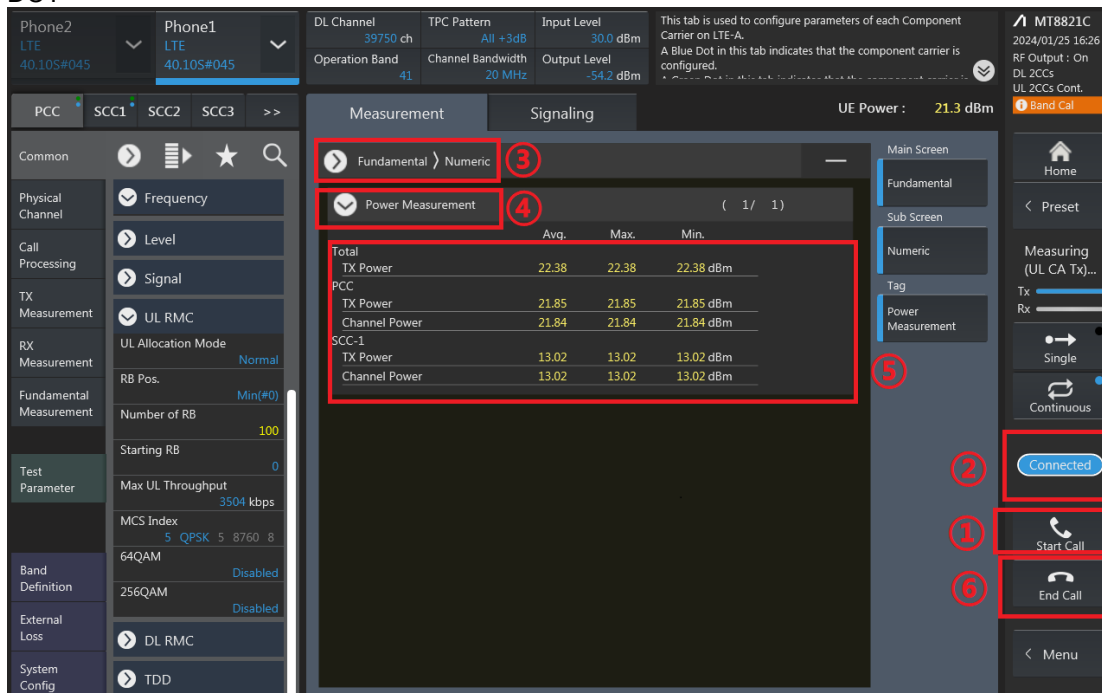
RB configurations (Number of RB / Starting RB) for SCC1;



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
PCC Channel Power	21.84	21.84	21.84 dBm
SCC-1 TX Power	13.02	13.02	13.02 dBm
SCC-1 Channel Power	13.02	13.02	13.02 dBm

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

Uplink CA Power

CA_7C Ant0 Default								
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	22.96	24.00
21100	21298	QPSK	1	99	1	0	23.03	24.00
21350	21152	QPSK	1	0	1	99	22.83	24.00

CA_38C Ant0 Default								
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	23.39	24.50
38000	38198	QPSK	1	99	1	0	23.55	24.50
38150	37952	QPSK	1	0	1	99	23.48	24.50

CA_41C Ant0 Default								
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		
39790	39988	QPSK	1	99	1	0	23.55	24.50
39750	39948	QPSK	1	99	1	0	23.67	24.50
40185	40383	QPSK	1	99	1	0	23.49	24.50
40620	40818	QPSK	1	99	1	0	23.67	24.50
41055	41253	QPSK	1	99	1	0	23.55	24.50
41490	41292	QPSK	1	0	1	99	23.58	24.50

Uplink CA Power

CA_7C Ant0 Sensor on								
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	15.01	16.00
21100	21298	QPSK	1	99	1	0	15.08	16.00
21350	21152	QPSK	1	0	1	99	14.67	16.00

CA_38C Ant0 Sensor on								
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	14.88	16.00
37901	38099	QPSK	1	99	1	0	15.16	16.00
38150	37952	QPSK	1	0	1	99	15.02	16.00

CA_41C Ant0 Sensor on								
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		
39790	39988	QPSK	1	99	1	0	15.08	16.00
39750	39948	QPSK	1	99	1	0	15.12	16.00
40185	40383	QPSK	1	99	1	0	15.15	16.00
40620	40818	QPSK	1	99	1	0	15.19	16.00
41055	41253	QPSK	1	99	1	0	15.12	16.00
41490	41292	QPSK	1	0	1	99	15	16.00

CA_7C Ant0 Receiver on								
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	16.42	17.50
21100	21298	QPSK	1	99	1	0	16.6	17.50
21350	21152	QPSK	1	0	1	99	16.46	17.50

CA_38C Ant0 Receiver on								
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	17.52	19.00
37901	38099	QPSK	1	99	1	0	17.55	19.00
38150	37952	QPSK	1	0	1	99	17.54	19.00

CA_41C Ant0 Receiver on								
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		
39790	39988	QPSK	1	99	1	0	17.51	19.00
39750	39948	QPSK	1	99	1	0	17.55	19.00
40185	40383	QPSK	1	99	1	0	17.54	19.00
40620	40818	QPSK	1	99	1	0	17.58	19.00
41055	41253	QPSK	1	99	1	0	17.51	19.00
41490	41292	QPSK	1	0	1	99	17.53	19.00