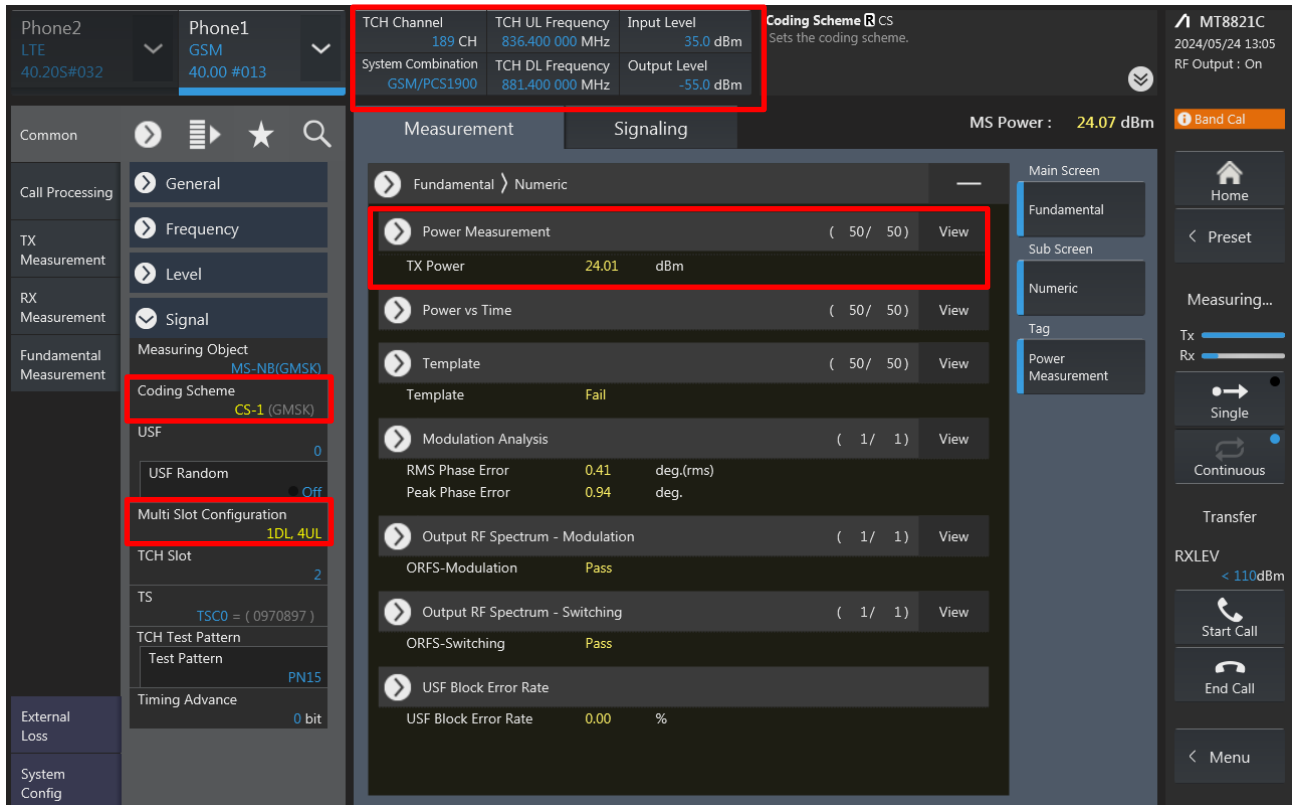


Power measurement connection diagram:

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.

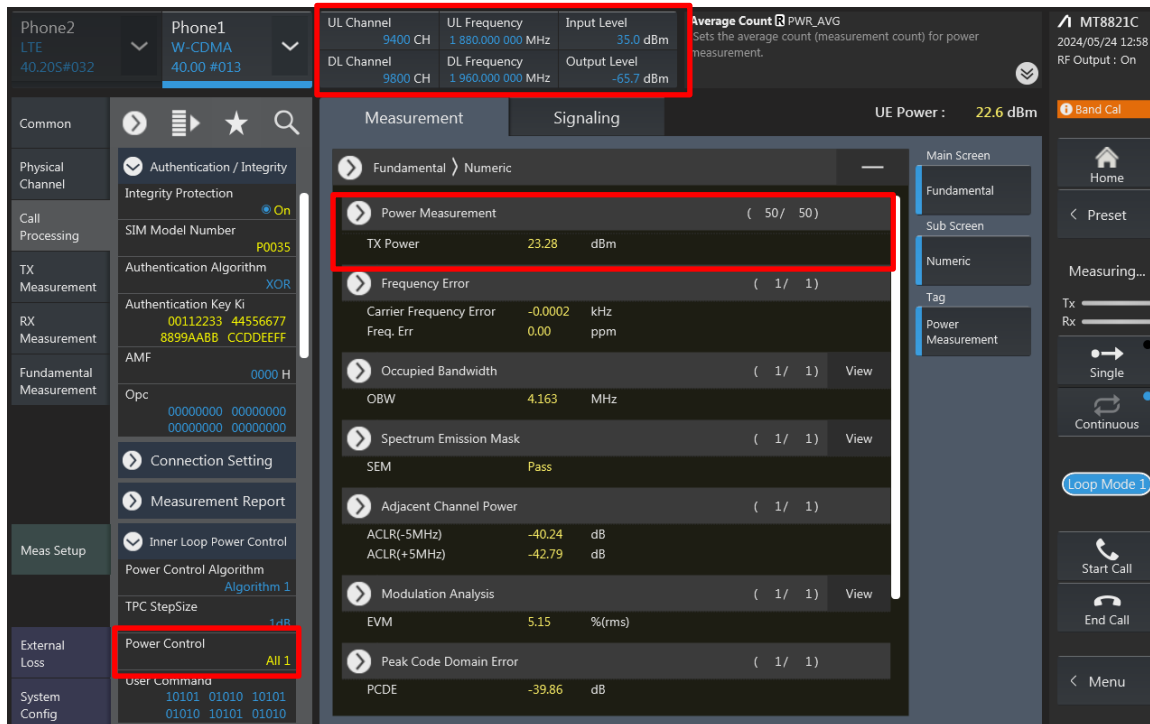
<GSM>



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

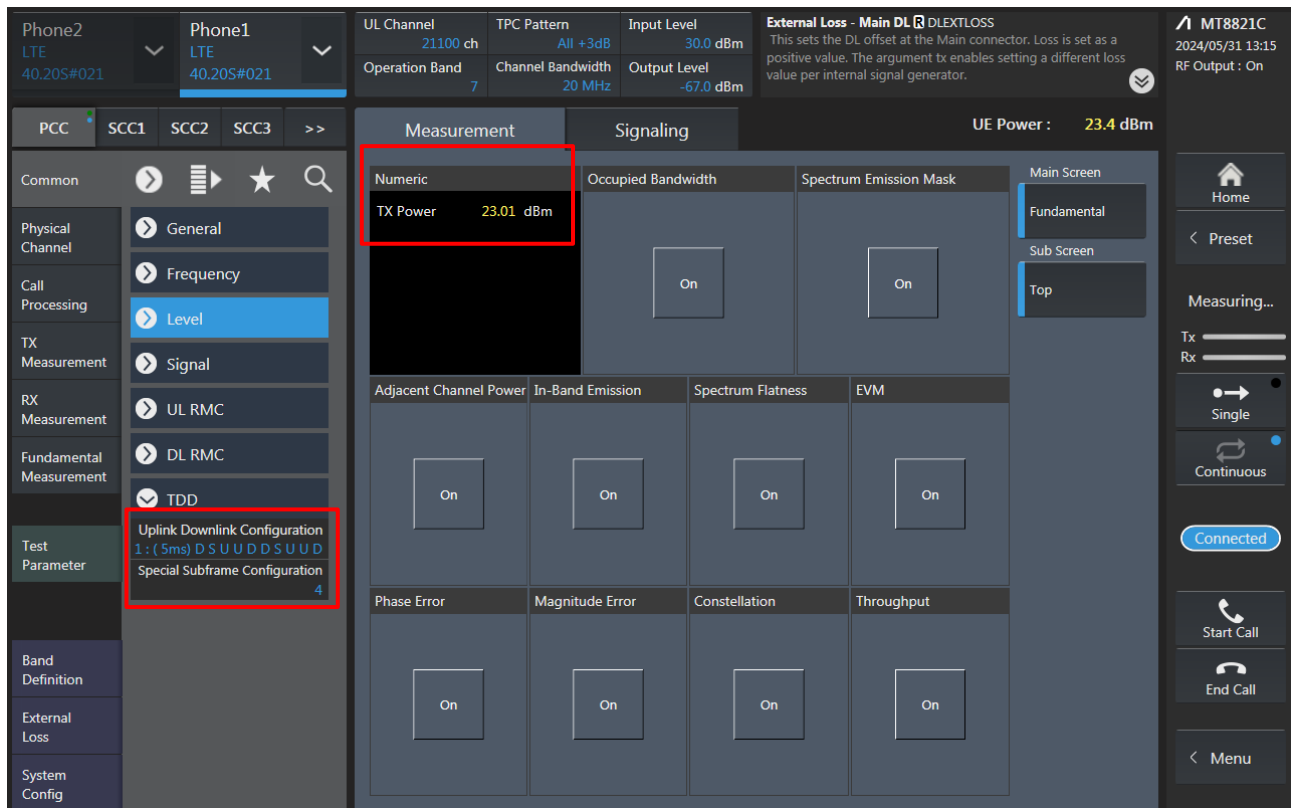
- Top Bar:** Shows Phone2 (LTE, 40.205#032) and Phone1 (GSM, 40.00 #013). The TCH Channel is 189 CH, TCH UL Frequency is 836.400 000 MHz, Input Level is 35.0 dBm, and TCH DL Frequency is 881.400 000 MHz. The Coding Scheme is CS.
- Left Sidebar:** Contains navigation options like Common, Call Processing, TX Measurement, RX Measurement, Fundamental Measurement, and External Loss. The 'Fundamental Measurement' section is expanded, showing 'Coding Scheme' (CS-1 (GMSK)) and 'Multi Slot Configuration' (1DL, 4UL).
- Main Area:** Displays 'Measurement' and 'Signaling' tabs. The 'Measurement' tab is active, showing 'Fundamental' and 'Numeric' views. The 'Power Measurement' section is highlighted, showing 'TX Power' as 24.01 dBm. Other measurements include 'Power vs Time', 'Template', 'Modulation Analysis', 'Output RF Spectrum - Modulation', 'Output RF Spectrum - Switching', and 'USF Block Error Rate'.
- Right Sidebar:** Shows 'MT8821C' with a timestamp of 2024/05/24 13:05 and 'RF Output : On'. It also includes a 'Band Cal' button and a 'Main Screen' section with 'Fundamental', 'Sub Screen', 'Numeric', and 'Tag' options.

<WCDMA>



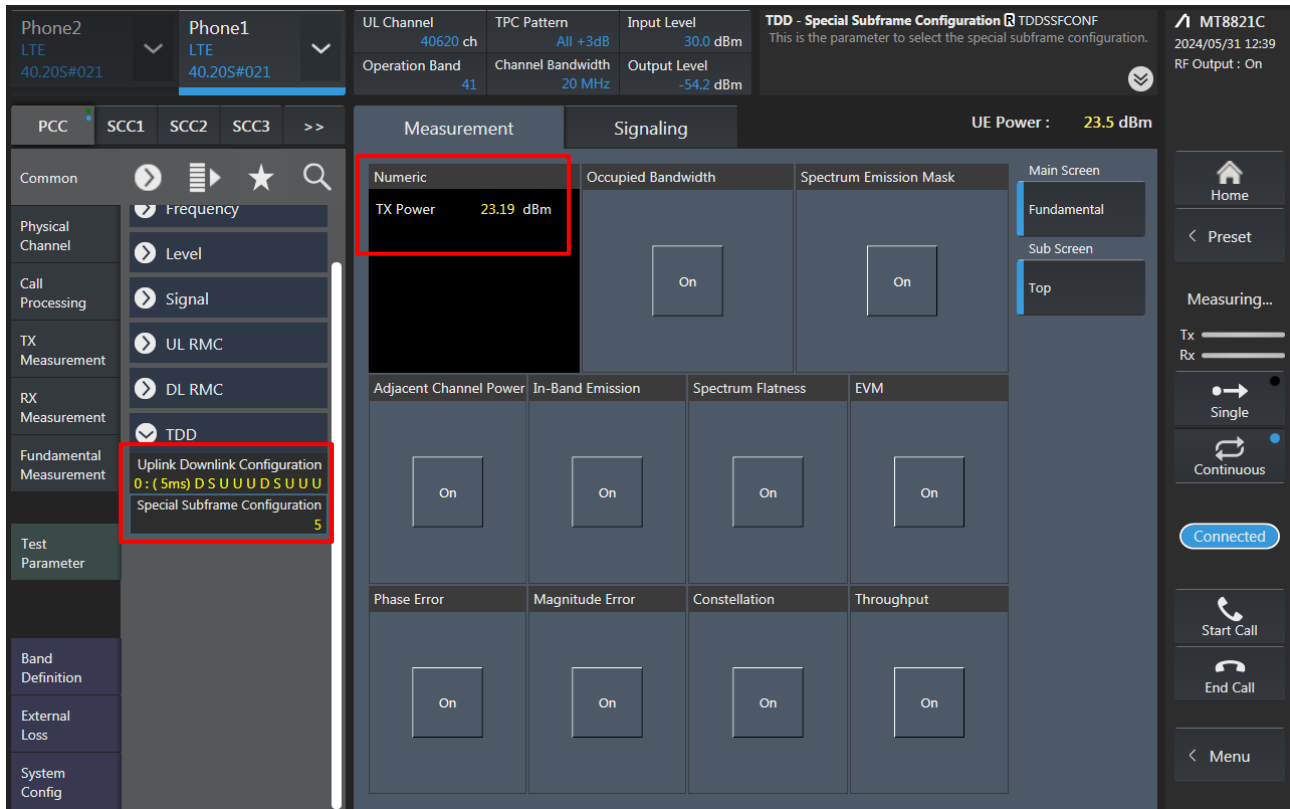
The screenshot displays the WCDMA measurement interface. The top section shows the configuration for Phone1 (W-CDMA, 40.00 #013) and Phone2 (LTE, 40.20S#032). The main measurement area is divided into two tabs: Measurement and Signaling. The Measurement tab is active, showing various metrics such as TX Power (23.28 dBm), Frequency Error (-0.0002 kHz), Occupied Bandwidth (4.163 MHz), Spectrum Emission Mask (Pass), Adjacent Channel Power (ACLR(-5MHz) -40.24 dB, ACLR(+5MHz) -42.79 dB), Modulation Analysis (EVM 5.15 %), and Peak Code Domain Error (PCDE -39.86 dB). The Signaling tab is also visible, showing the Average Count (PWR_AVG) and UE Power (22.6 dBm). The bottom section contains various settings and controls, including Authentication/Integrity, Connection Setting, Measurement Report, Inner Loop Power Control, and Power Control (All 1).

<LTE>



The screenshot displays the LTE measurement interface. The top section shows the configuration for Phone1 (LTE, 40.20S#021) and Phone2 (LTE, 40.20S#021). The main measurement area is divided into two tabs: Measurement and Signaling. The Measurement tab is active, showing various metrics such as 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 Signaling tab is also visible, showing the External Loss - Main DL (DLEXTLOSS) and UE Power (23.4 dBm). The bottom section contains various settings and controls, including 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), Band Definition, External Loss, and System Config.

<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 TDD - Special Subframe Configuration TDDSSFCNF This is the parameter to select the special subframe configuration. MT8821C 2024/05/31 12:39 RF Output : On

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

UE Power : 23.5 dBm

Measurement Signaling

Numeric TX Power 23.19 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

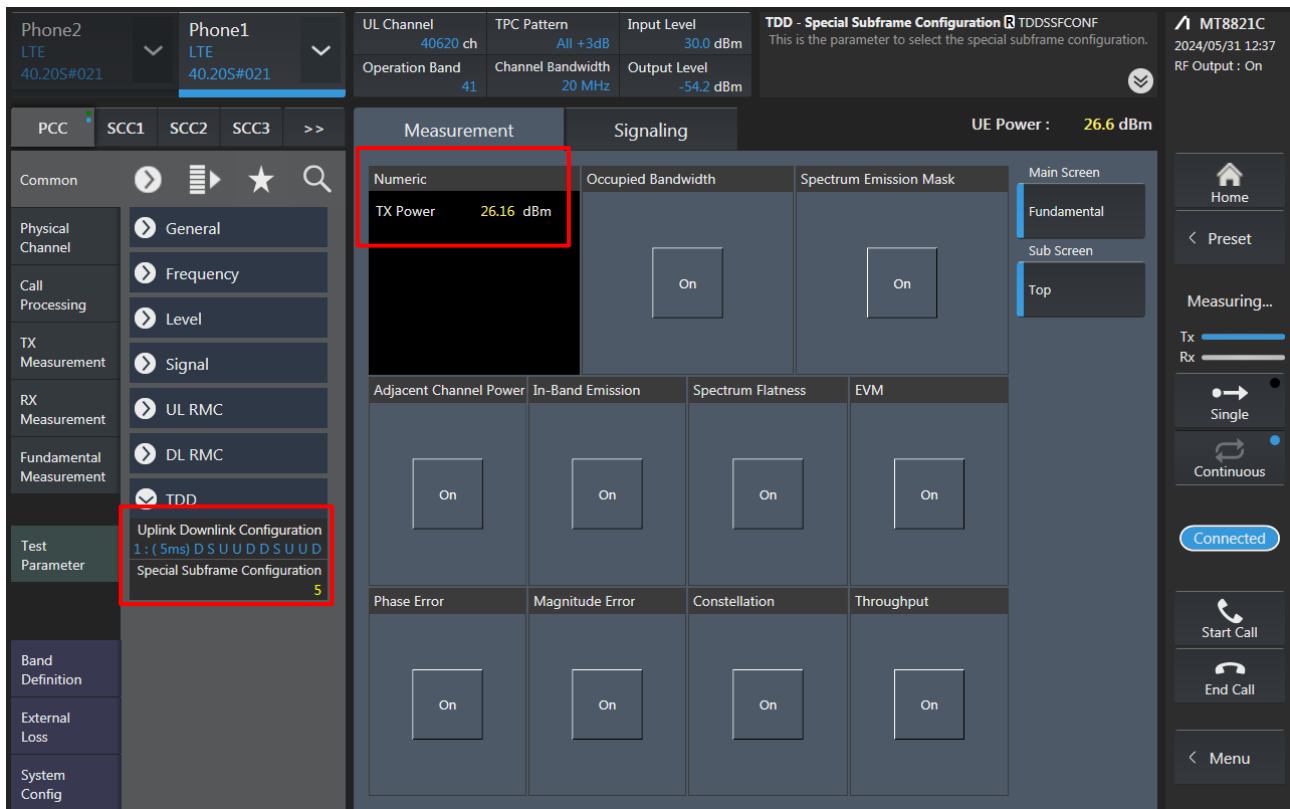
Common Frequency Level Signal UL RMC DL RMC TDD Uplink Downlink Configuration 0 : (5ms) D S U U D S U U U Special Subframe Configuration 5

Physical Channel Call Processing TX Measurement RX Measurement Fundamental Measurement Test Parameter Band Definition External Loss System Config

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 TDD - Special Subframe Configuration TDDSSFCNF This is the parameter to select the special subframe configuration. MT8821C 2024/05/31 12:37 RF Output : On

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

UE Power : 26.6 dBm

Measurement Signaling

Numeric TX Power 26.16 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

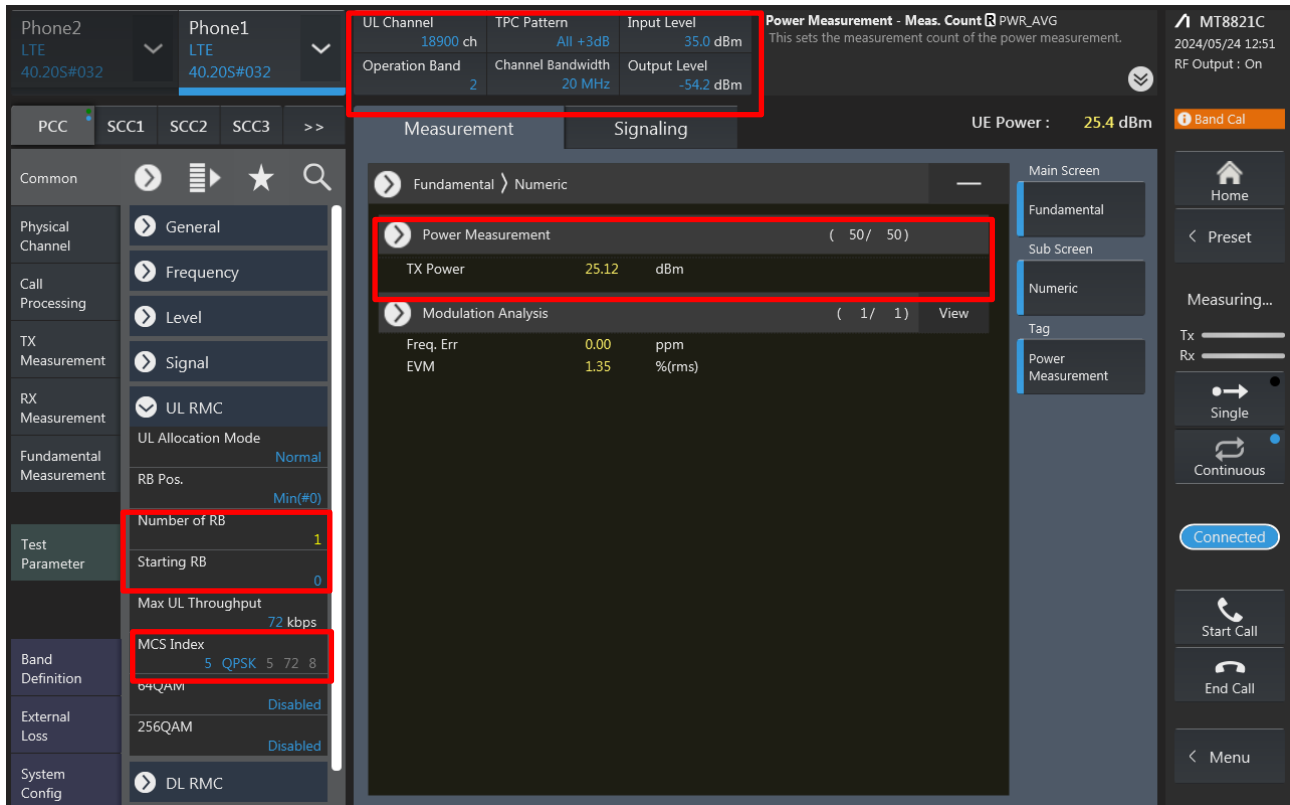
On On On On

Common 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

Physical Channel Call Processing TX Measurement RX Measurement Fundamental Measurement Test Parameter Band Definition External Loss System Config

Main Screen Fundamental Sub Screen Top

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

PCC SCC1 SCC2 SCC3 >>

Measurement Signaling

UE Power : 25.4 dBm

Band Cal

Home

Preset

Measuring...

Tx

Rx

Single

Continuous

Connected

Start Call

End Call

Menu

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

UL Allocation Mode Normal

RB Pos. Min(#0)

Number of RB 1

Starting RB 0

Max UL Throughput 72 kbps

MCS Index 5 QPSK 5 72 8

DL RMC

Power Measurement

(50 / 50)

TX Power 25.12 dBm

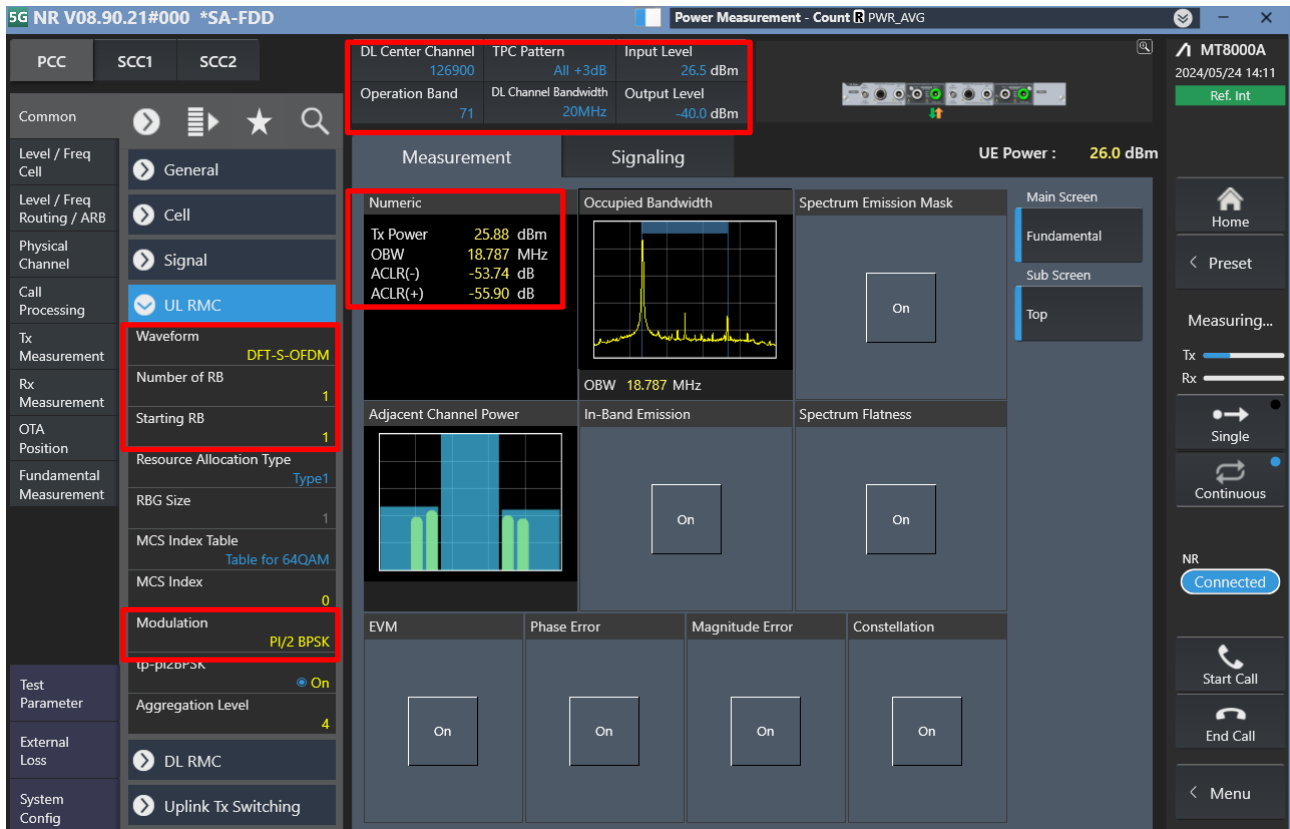
Modulation Analysis

(1 / 1) View

Freq. Err 0.00 ppm

EVM 1.35 % (rms)

<5G NR FR1>



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

Power Measurement - Count PWR_AVG

MT8800A

2024/05/24 14:11

Ref. Int

PCC SCC1 SCC2

Measurement Signaling

UE Power : 26.0 dBm

Home

Preset

Measuring...

Tx

Rx

Single

Continuous

Connected

Start Call

End Call

Menu

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

General

Cell

Signal

UL RMC

Waveform DFT-S-OFDM

Number of RB 1

Starting RB 1

Resource Allocation Type Type1

RBG Size 1

MCS Index Table Table for 64QAM

MCS Index 0

Modulation Pi/2 BPSK

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

Power Measurement

(26.0 / 26.0)

Tx Power 25.88 dBm

OBW 18.787 MHz

ACLR(-) -53.74 dB

ACLR(+) -55.90 dB

Occupied Bandwidth

OBW 18.787 MHz

Spectrum Emission Mask

On

Adjacent Channel Power

In-Band Emission

Spectrum Flatness

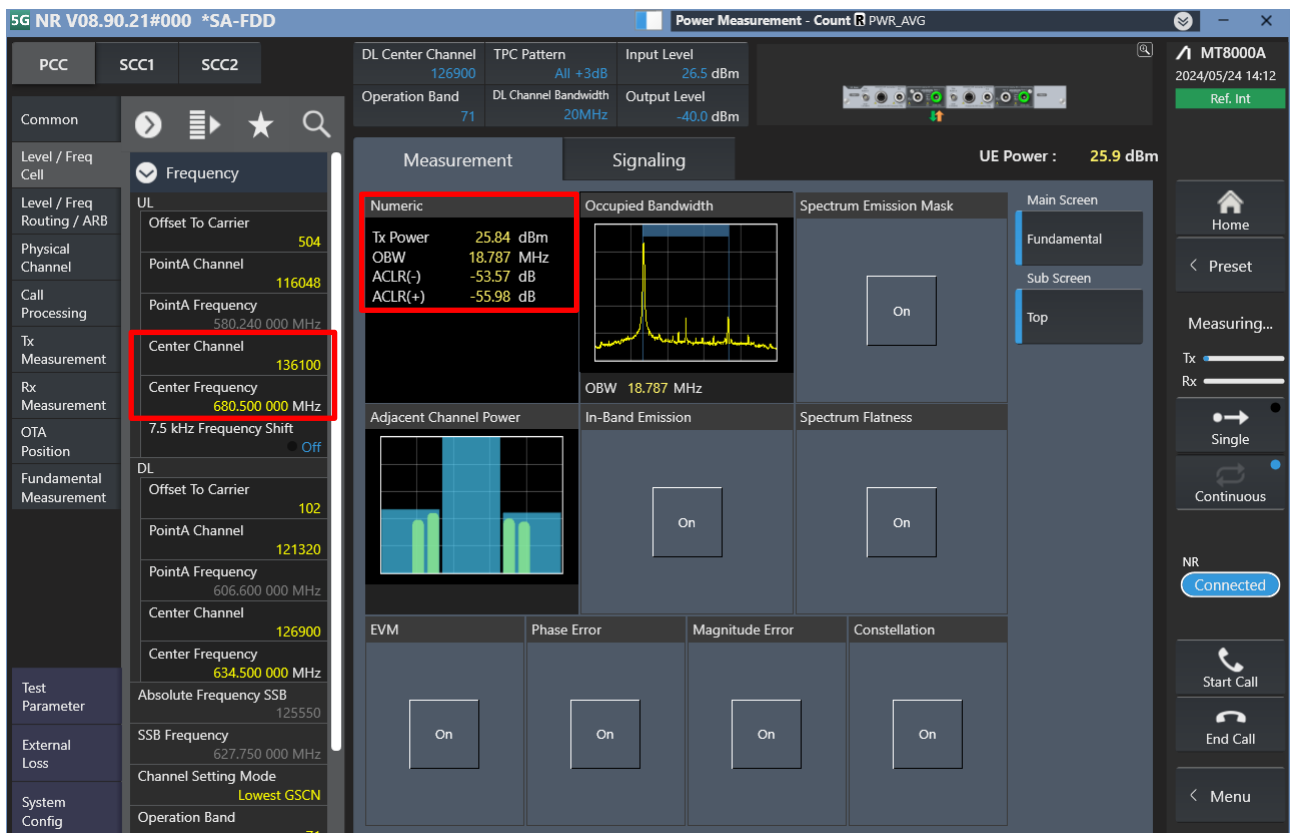
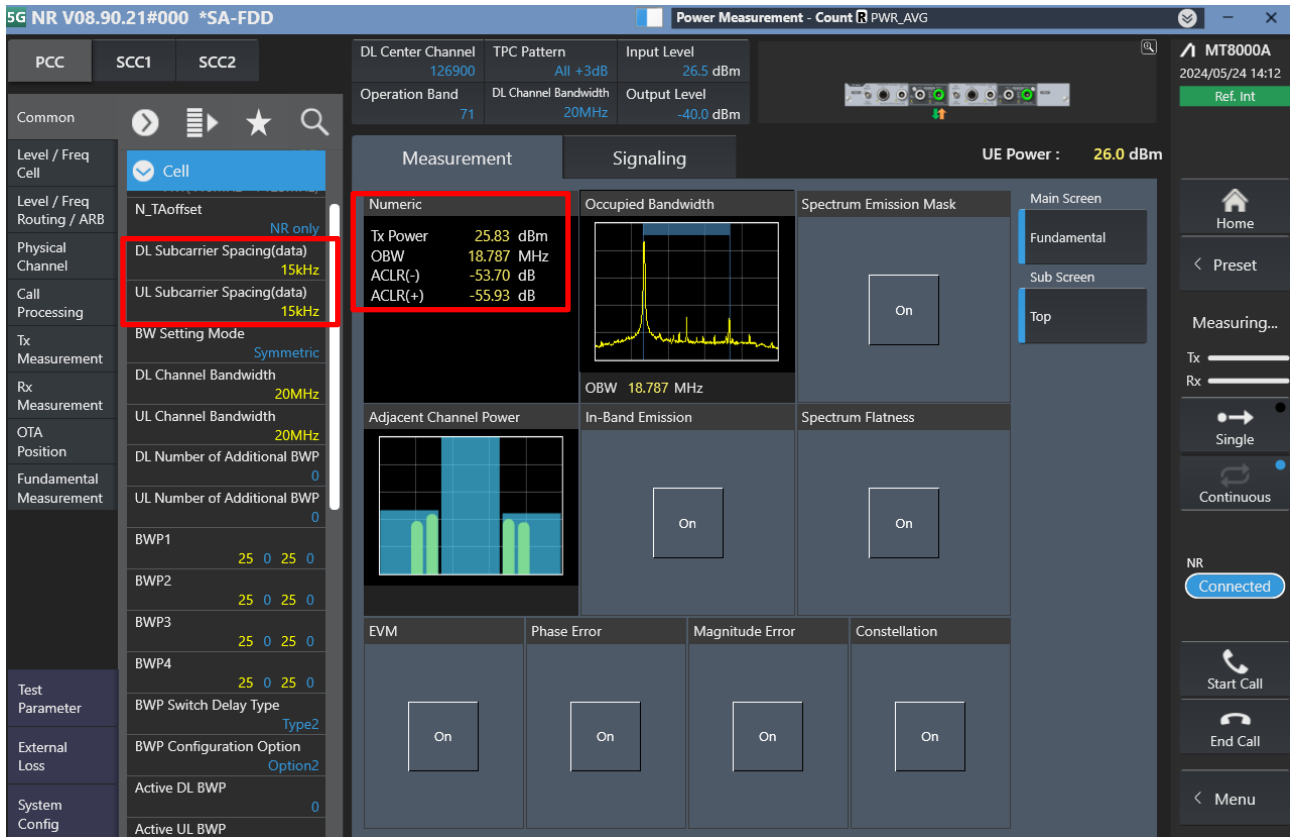
On

EVM

Phase Error

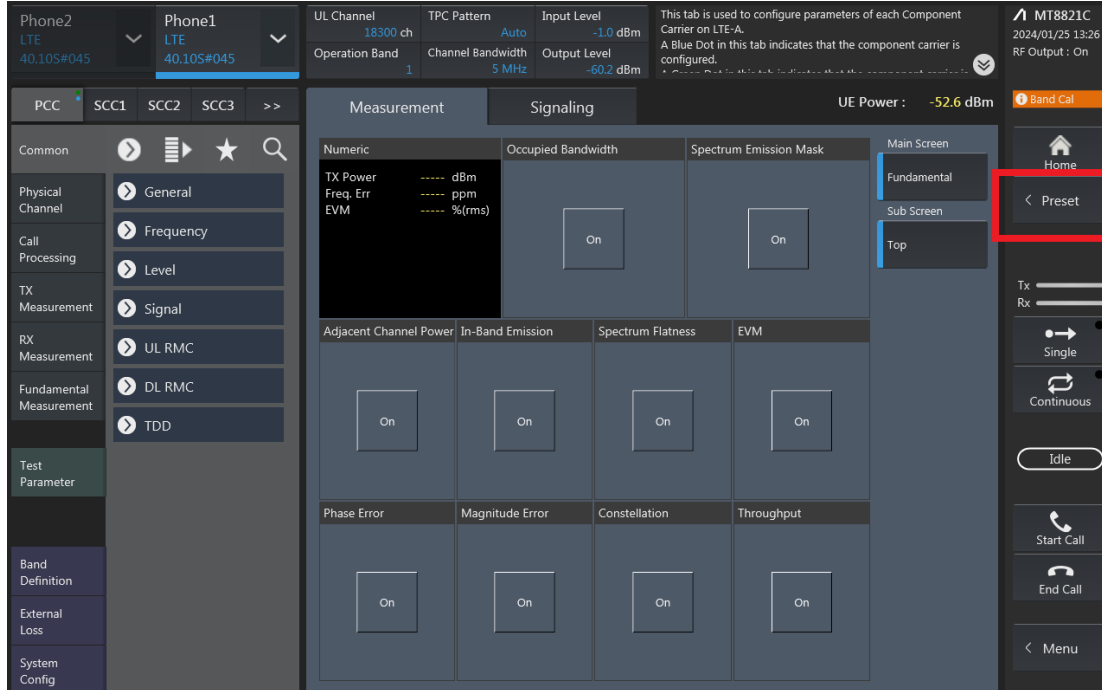
Magnitude Error

Constellation



LTE Uplink and Downlink Carrier Aggregation configurations:

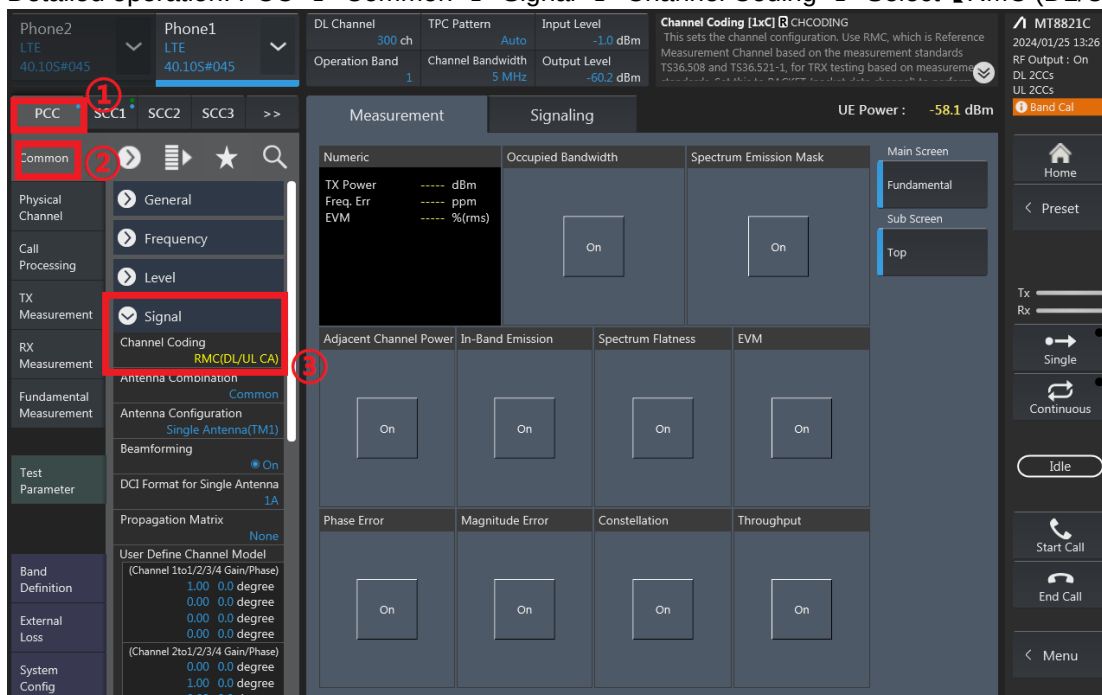
1. Change the Scenario in the Configuration of Phone1 LTE Signaling and Preset.



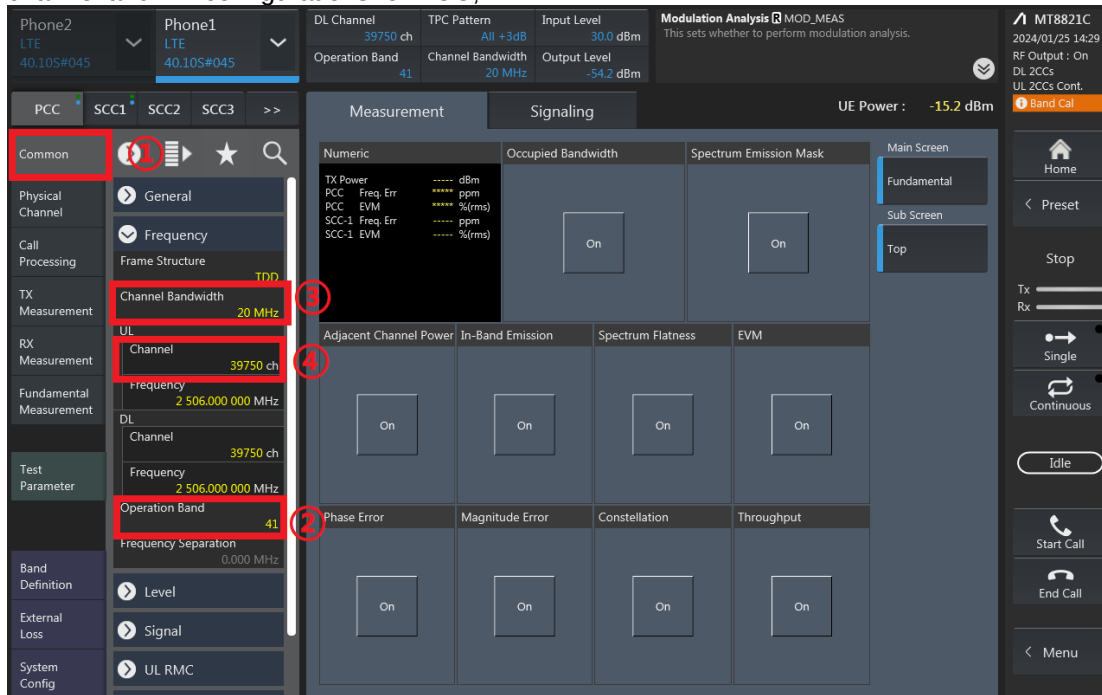
2. If Select "RMC (DL/UL CA)" for Uplink Carrier Aggregation;
If Select "RMC (DL CA)" for Downlink Carrier Aggregation.

For example, Uplink Carrier Aggregation:

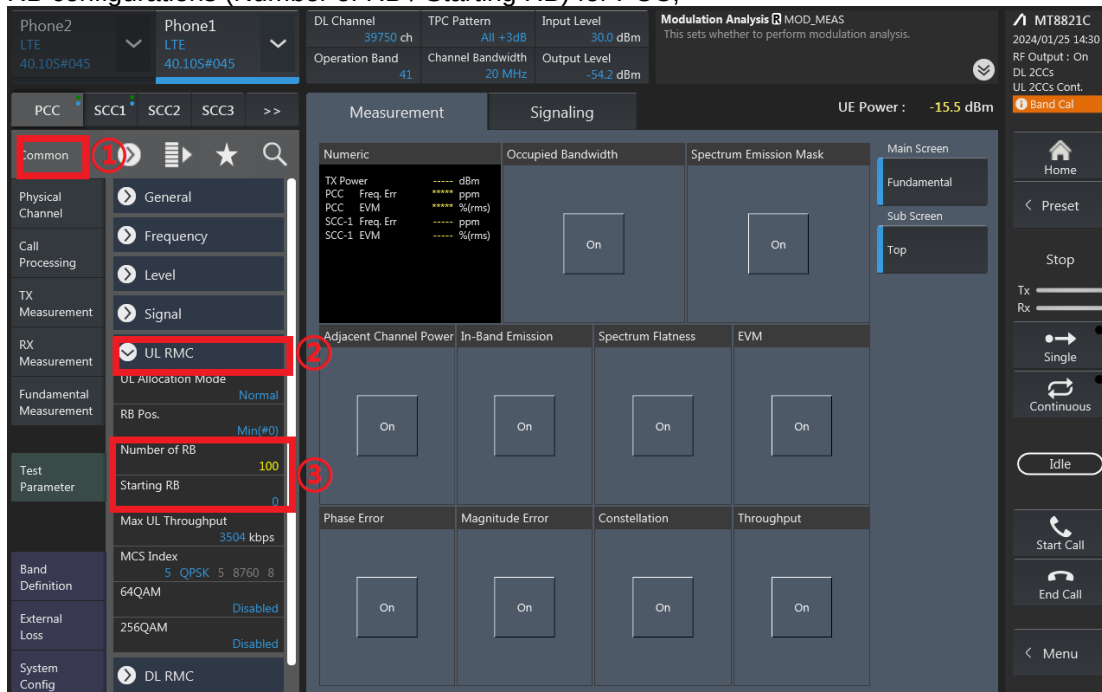
Detailed operation: PCC → Common → Signal → Channel Coding → Select 【RMC (DL/UL CA)】



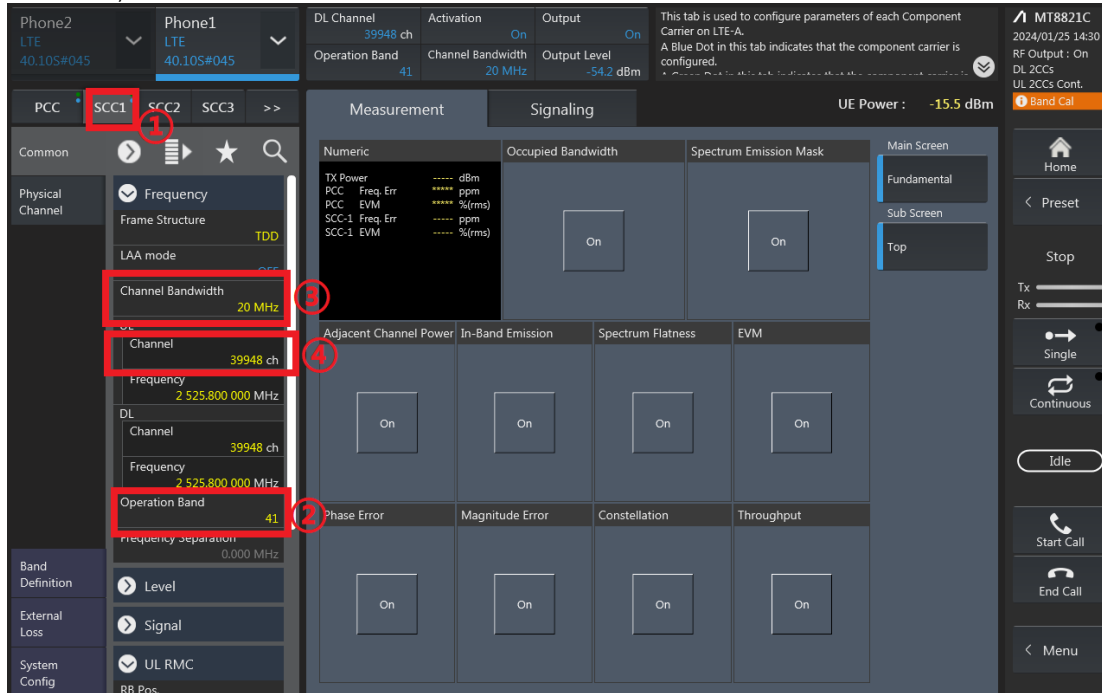
3. PCC parameter Settings: on the screen, and then select the PCC tab and Set operating band, BW, channel and RB configurations for PCC;



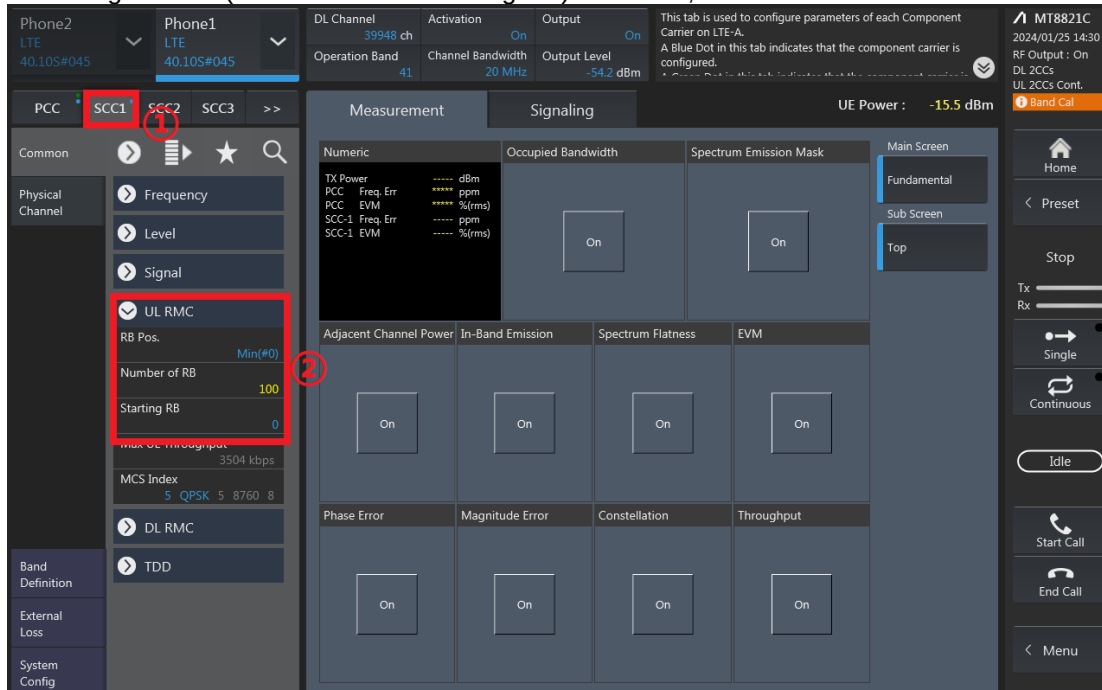
RB configurations (Number of RB / Starting RB) for PCC;



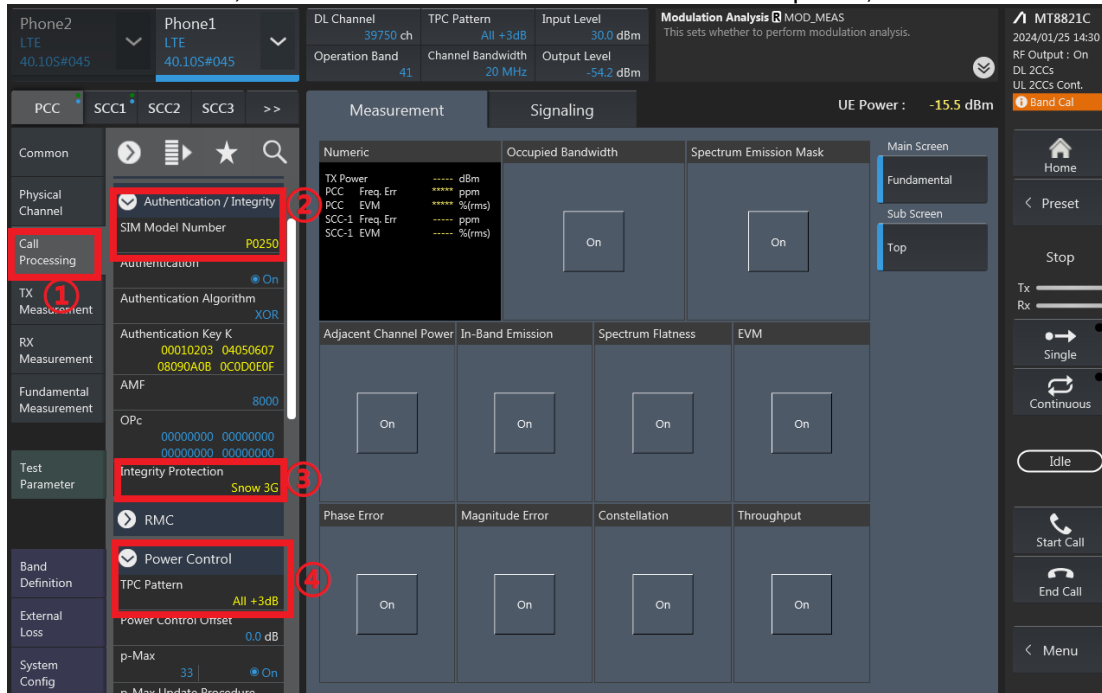
4. SCC parameter Settings: Select the SCC1 tab, Set operating band, BW, channel, and RB configurations for SCC1;



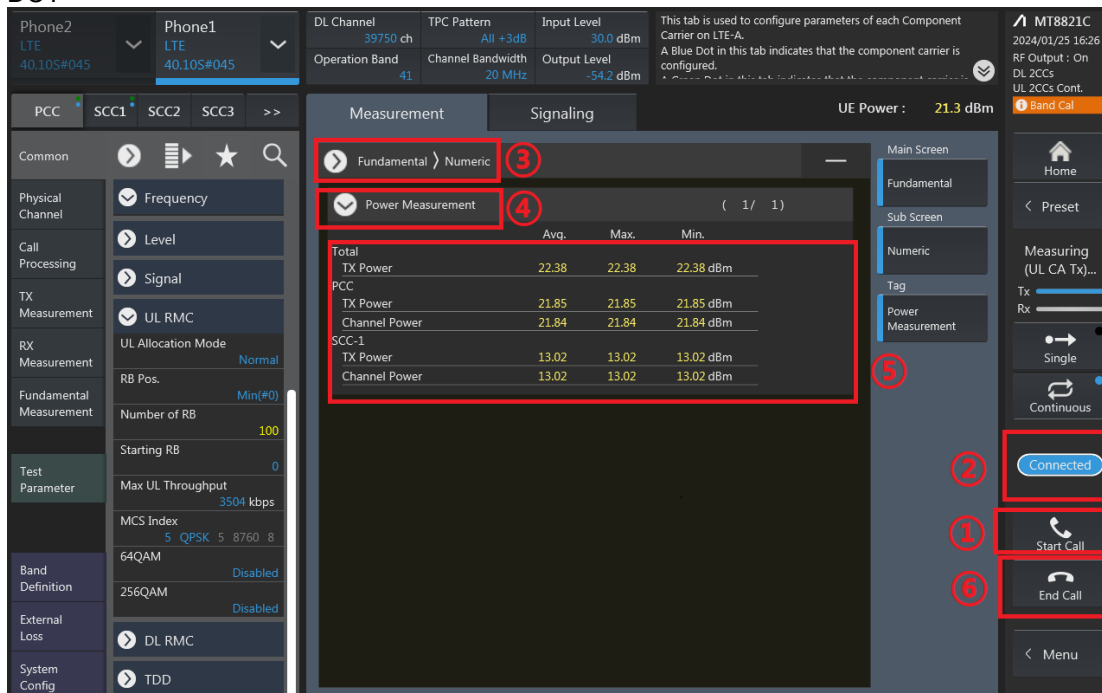
RB configurations (Number of RB / Starting RB) for SCC1;



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 inter-band ULCA test method is similar to intra-band ULCA, and DLCA test method is similar to intra-band ULCA too.

【CA_5B_Ant 8_Full Power】

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	23.98	25.10
20476	20575	QPSK	1	49	1	0	24.01	25.10
20600	20501	QPSK	1	0	1	49	23.91	25.10

【CA_5B_Ant 8_DSI 0】

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	23.98	25.10
20476	20575	QPSK	1	49	1	0	24.01	25.10
20600	20501	QPSK	1	0	1	49	23.91	25.10

【CA_5B_Ant 8_DSI 7】

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	19.61	21.00
20476	20575	QPSK	1	49	1	0	19.65	21.00
20600	20501	QPSK	1	0	1	49	19.59	21.00

【CA_7C_Ant 8_DSI 7】

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	13.71	14.90
21100	21298	QPSK	1	99	1	0	13.75	14.90
21350	21152	QPSK	1	0	1	99	13.65	14.90

【CA_38C_Ant 8_Full Power】

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	24.15	25.10
37901	38099	QPSK	1	99	1	0	24.23	25.10
38150	37952	QPSK	1	0	1	99	24.13	25.10

【CA_38C_Ant 8_DSI 0】

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	24.15	25.10
37901	38099	QPSK	1	99	1	0	24.23	25.10
38150	37952	QPSK	1	0	1	99	24.13	25.10

【CA_38C_Ant 8_DSI 7】

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	16.15	17.10
37901	38099	QPSK	1	99	1	0	16.25	17.10
38150	37952	QPSK	1	0	1	99	16.13	17.10

【CA_41C_Ant 8_Full Power】

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	24.05	25.10
40185	40383	QPSK	1	99	1	0	24.03	25.10
40620	40818	QPSK	1	99	1	0	24.25	25.10
41055	41253	QPSK	1	99	1	0	24.05	25.10
41490	41292	QPSK	1	0	1	99	24.03	25.10

【CA_41C_Ant 8_Full Power_HPUE】

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	26.09	27.00
40185	40383	QPSK	1	99	1	0	26.03	27.00
40620	40818	QPSK	1	99	1	0	26.15	27.00
41055	41253	QPSK	1	99	1	0	26.10	27.00
41490	41292	QPSK	1	0	1	99	26.05	27.00

【CA_41C_Ant 8_DSI 0】

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	24.05	25.10
40185	40383	QPSK	1	99	1	0	24.03	25.10
40620	40818	QPSK	1	99	1	0	24.25	25.10
41055	41253	QPSK	1	99	1	0	24.05	25.10
41490	41292	QPSK	1	0	1	99	24.03	25.10

【CA_41C_Ant 8_DSI 0_HPUE】

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	26.09	27.00
40185	40383	QPSK	1	99	1	0	26.03	27.00
40620	40818	QPSK	1	99	1	0	26.15	27.00
41055	41253	QPSK	1	99	1	0	26.10	27.00
41490	41292	QPSK	1	0	1	99	26.05	27.00

【CA_41C_Ant 8_DSI 7】

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	16.11	17.10
40185	40383	QPSK	1	99	1	0	16.13	17.10
40620	40818	QPSK	1	99	1	0	16.25	17.10
41055	41253	QPSK	1	99	1	0	16.15	17.10
41490	41292	QPSK	1	0	1	99	16.09	17.10

【CA_41C_Ant 8_DSI 7_HPUE】

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	18.03	18.70
40185	40383	QPSK	1	99	1	0	18.00	18.70
40620	40818	QPSK	1	99	1	0	18.15	18.70
41055	41253	QPSK	1	99	1	0	18.05	18.70
41490	41292	QPSK	1	0	1	99	18.03	18.70

【CA_66B_Ant 1_Full Power】

Combination 15MHz+5MHz (75RB+25RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB Offset	RB Size	RB Offset		
132072	132165	QPSK	1	74	1	0	23.35	25.10
132322	132415	QPSK	1	74	1	0	23.51	25.10
132572	132665	QPSK	1	0	1	24	23.45	25.10

【CA_66C_Ant 1_Full Power】

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		
132072	132270	QPSK	1	99	1	0	23.41	25.10
132322	132520	QPSK	1	99	1	0	23.45	25.10
132572	132374	QPSK	1	0	1	99	23.35	25.10

【CA_66B_Ant 1_DSI 0】

Combination 15MHz+5MHz (75RB+25RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB Offset	RB Size	RB Offset		
132072	132165	QPSK	1	74	1	0	23.35	25.10
132322	132415	QPSK	1	74	1	0	23.51	25.10
132572	132665	QPSK	1	0	1	24	23.45	25.10

【CA_66C_Ant 1_DSI 0】

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		
132072	132270	QPSK	1	99	1	0	23.41	25.10
132322	132520	QPSK	1	99	1	0	23.45	25.10
132572	132374	QPSK	1	0	1	99	23.35	25.10

【CA_66B_Ant 1_DSI 7】

Combination 15MHz+5MHz (75RB+25RB)								
PCC Channel	SCC Channel	Modulation	PCC		SCC		Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB Offset	RB Size	RB Offset		
132072	132165	QPSK	1	74	1	0	14.45	16.00
132322	132415	QPSK	1	74	1	0	14.51	16.00
132572	132665	QPSK	1	0	1	24	14.41	16.00

【CA_66C_Ant 1_DSI 7】

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		
132072	132270	QPSK	1	99	1	0	14.41	16.00
132322	132520	QPSK	1	99	1	0	14.45	16.00
132572	132374	QPSK	1	0	1	99	14.31	16.00

CA_48B Ant 8 Full Power&DSI0								
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		
55290	55389	QPSK	1	49	1	0	21.31	22.00
55940	56039	QPSK	1	49	1	0	21.04	22.00
56591	56690	QPSK	1	49	1	0	21.24	22.00
55290	55389	QPSK	1	49	1	0	21.22	22.00
55940	56039	QPSK	1	0	1	49	21.36	22.00

CA_48B Ant 8 DSI7								
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		
55290	55389	QPSK	1	49	1	0	13.31	14.70
55940	56039	QPSK	1	49	1	0	13.25	14.70
56591	56690	QPSK	1	49	1	0	13.45	14.70
55290	55389	QPSK	1	49	1	0	13.21	14.70
55940	56039	QPSK	1	0	1	49	13.23	14.70

CA_48C Ant 8 Full Power&DSI0								
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		
55340	55538	QPSK	1	99	1	0	20.02	22.00
55830	56028	QPSK	1	99	1	0	21.33	22.00
56442	56640	QPSK	1	0	1	99	14.92	16.00

CA_48C Ant 8 DSI7								
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		
55340	55538	QPSK	1	99	1	0	13.11	14.70
55830	56028	QPSK	1	99	1	0	13.21	14.70
56442	56640	QPSK	1	0	1	99	12.87	14.70

CA_7C Ant 8 Full Power&DSI0								
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	24.19	25.10
21100	21298	QPSK	1	99	1	0	24.06	25.10
21350	21152	QPSK	1	0	1	99	23.92	25.10

CA_7C Ant 8 DSI7								
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	13.71	14.90
21100	21298	QPSK	1	99	1	0	13.75	14.90
21350	21152	QPSK	1	0	1	99	13.65	14.90