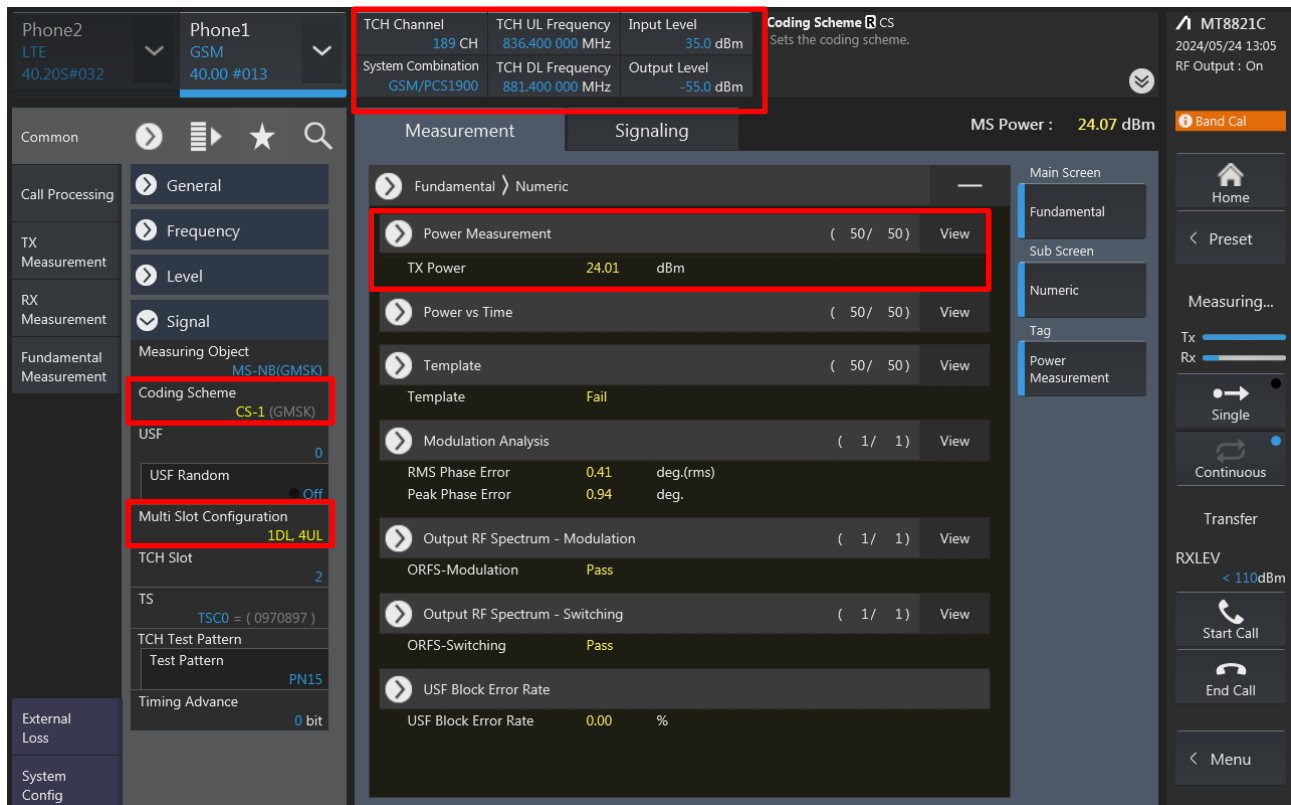


Power measurement connection diagram:

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.

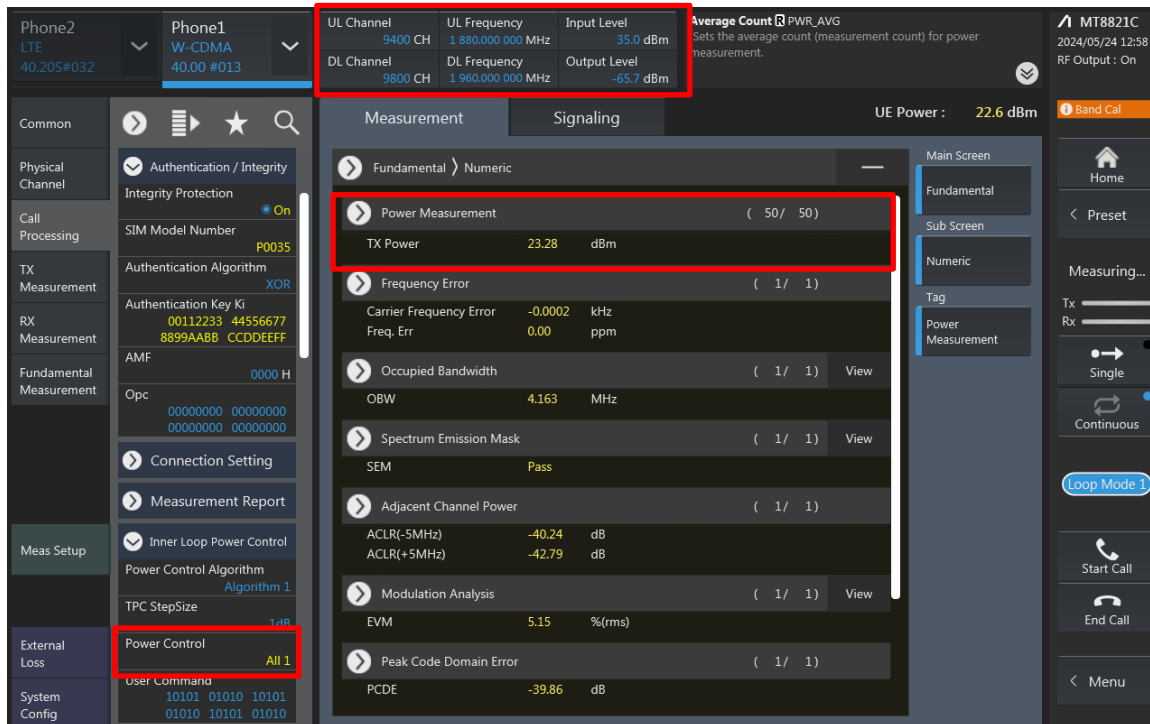
<GSM>



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 Coding Scheme is CS. The TCH DL Frequency is 881.400 000 MHz, and Output Level is -55.0 dBm.
- Left Sidebar:** Contains navigation options like Common, Call Processing, TX Measurement, RX Measurement, Fundamental Measurement, and External Loss.
- Main Area:**
 - Measurement Tab:** Shows the Power Measurement section with a red box highlighting the TX Power value of 24.01 dBm. Other sections include Power vs Time, Template, Modulation Analysis, Output RF Spectrum - Modulation, Output RF Spectrum - Switching, and USF Block Error Rate.
 - Signaling Tab:** Shows the Template section with a red box highlighting the Template value of Fail.
- Right Sidebar:** Contains navigation options like Main Screen, Fundamental, Sub Screen, Numeric, Tag, and Power Measurement. It also shows the MT8821C device status and RF Output: On.

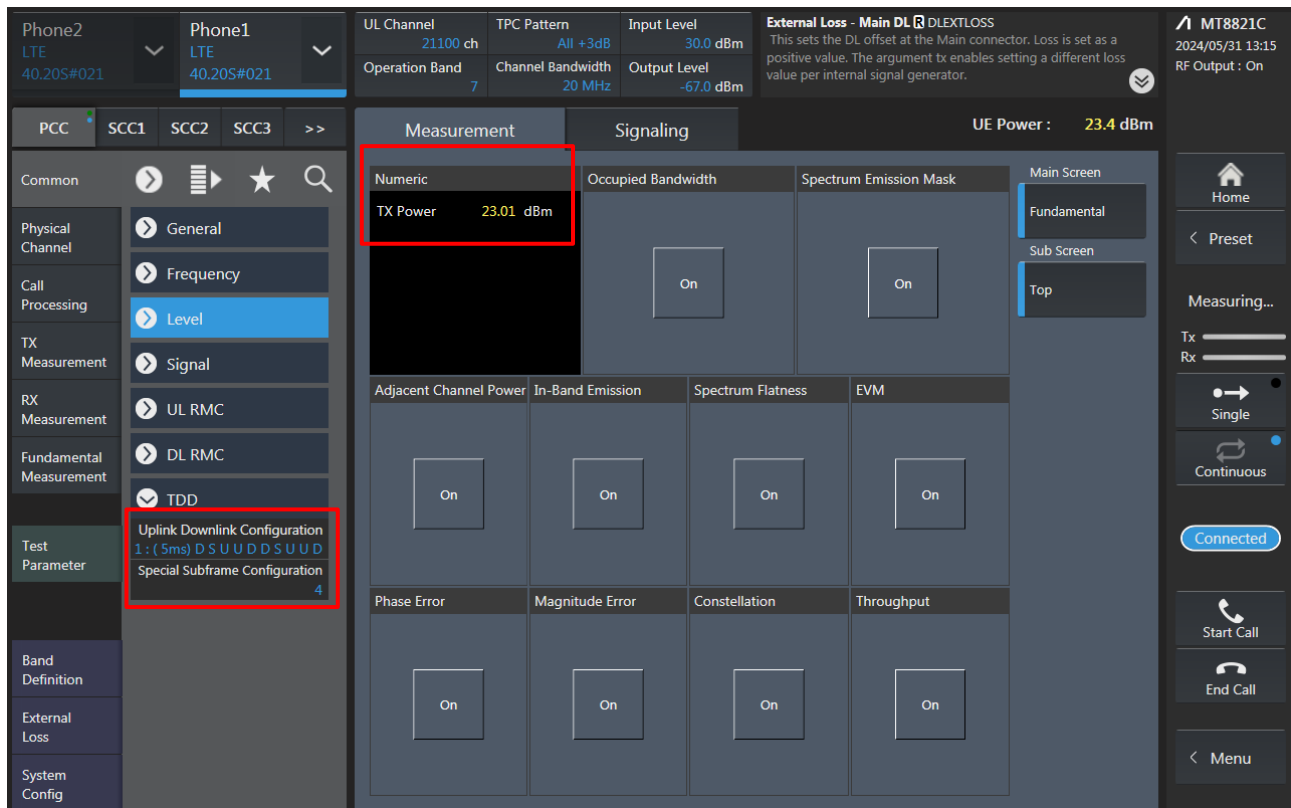
<WCDMA>



The WCDMA measurement interface shows the following configuration and results:

- Phone2:** LTE 40.20S#032
- Phone1:** W-CDMA 40.00 #013
- UL Channel:** 9400 CH
- DL Channel:** 9800 CH
- UL Frequency:** 1 880.000 000 MHz
- DL Frequency:** 1 960.000 000 MHz
- Input Level:** 35.0 dBm
- Output Level:** -65.7 dBm
- Average Count:** PWR_AVG (Sets the average count (measurement count) for power measurement.)
- UE Power:** 22.6 dBm
- Measurement Results:**
 - Power Measurement:** TX Power 23.28 dBm
 - 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)
 - Peak Code Domain Error:** PCDE -39.86 dB
- Meas Setup:**
 - Authentication / Integrity: Integrity Protection On
 - SIM Model Number: P0035
 - Authentication Algorithm: XOR
 - Authentication Key Ki: 00112233 44556677 8899AABB CCDDDEFF
 - AMF: 0000 H
 - Op: 00000000 00000000 00000000 00000000
 - Connection Setting: Measurement Report
 - Inner Loop Power Control: Power Control Algorithm Algorithm 1
 - TPC StepSize: 1 step
 - Power Control: All 1
 - User Command: 10101 01010 10101 01010 10101 01010

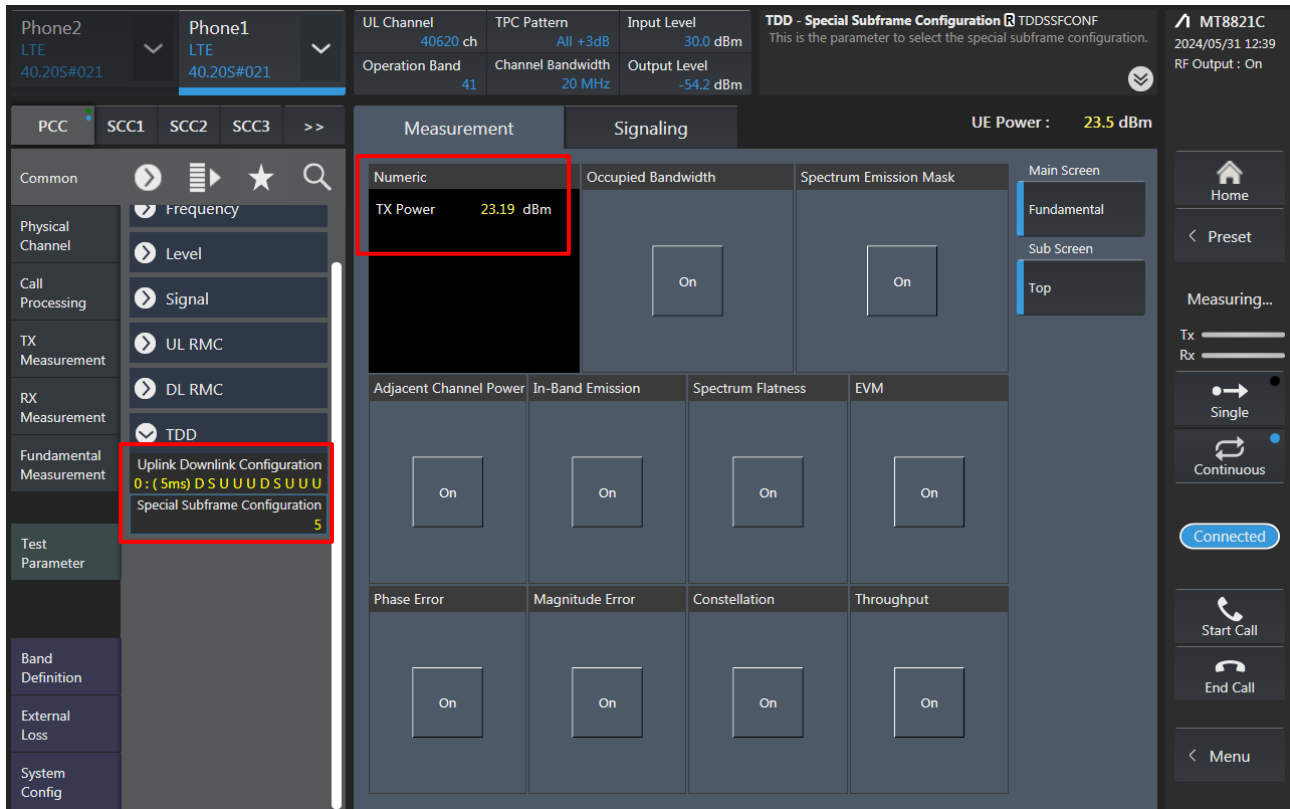
<LTE>



The LTE measurement interface shows the following configuration and results:

- 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.)
- UE Power:** 23.4 dBm
- Measurement Results:**
 - 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
- Test Parameter:**
 - Uplink Downlink Configuration 1: (5ms) D S U U D D S U U D
 - Special Subframe Configuration 4

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

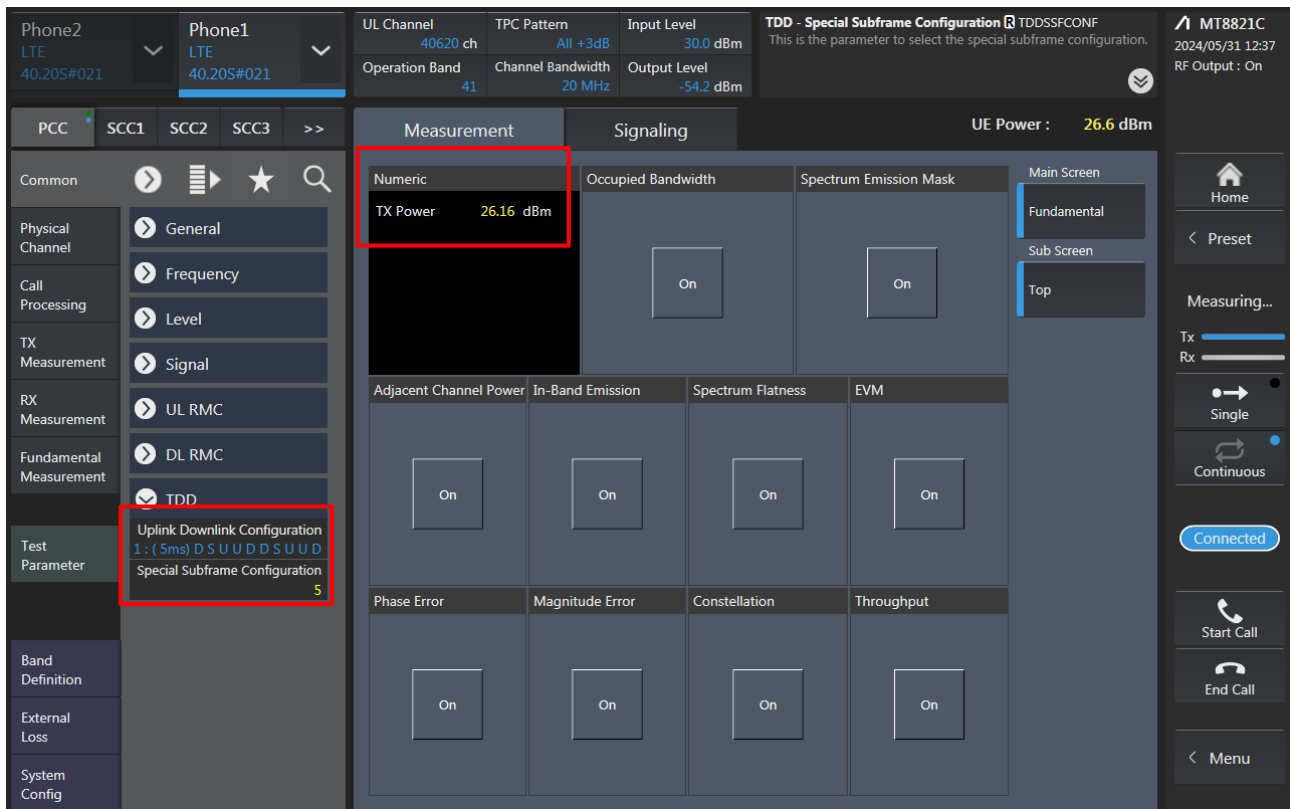
Frequency Level Signal UL RMC DL RMC TDD

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

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

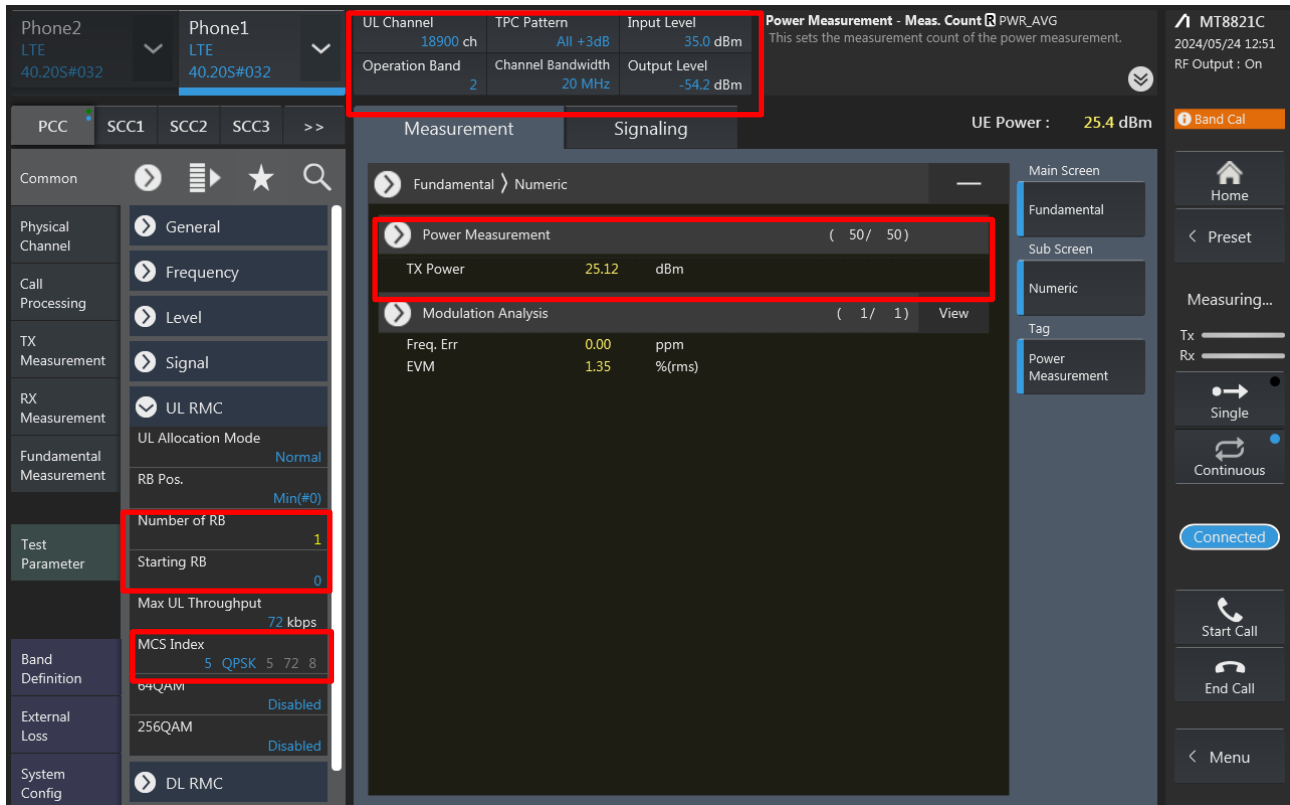
Common Physical Channel Call Processing TX Measurement RX Measurement Fundamental Measurement Test Parameter Band Definition External Loss System Config

General Frequency Level Signal UL RMC DL RMC TDD

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

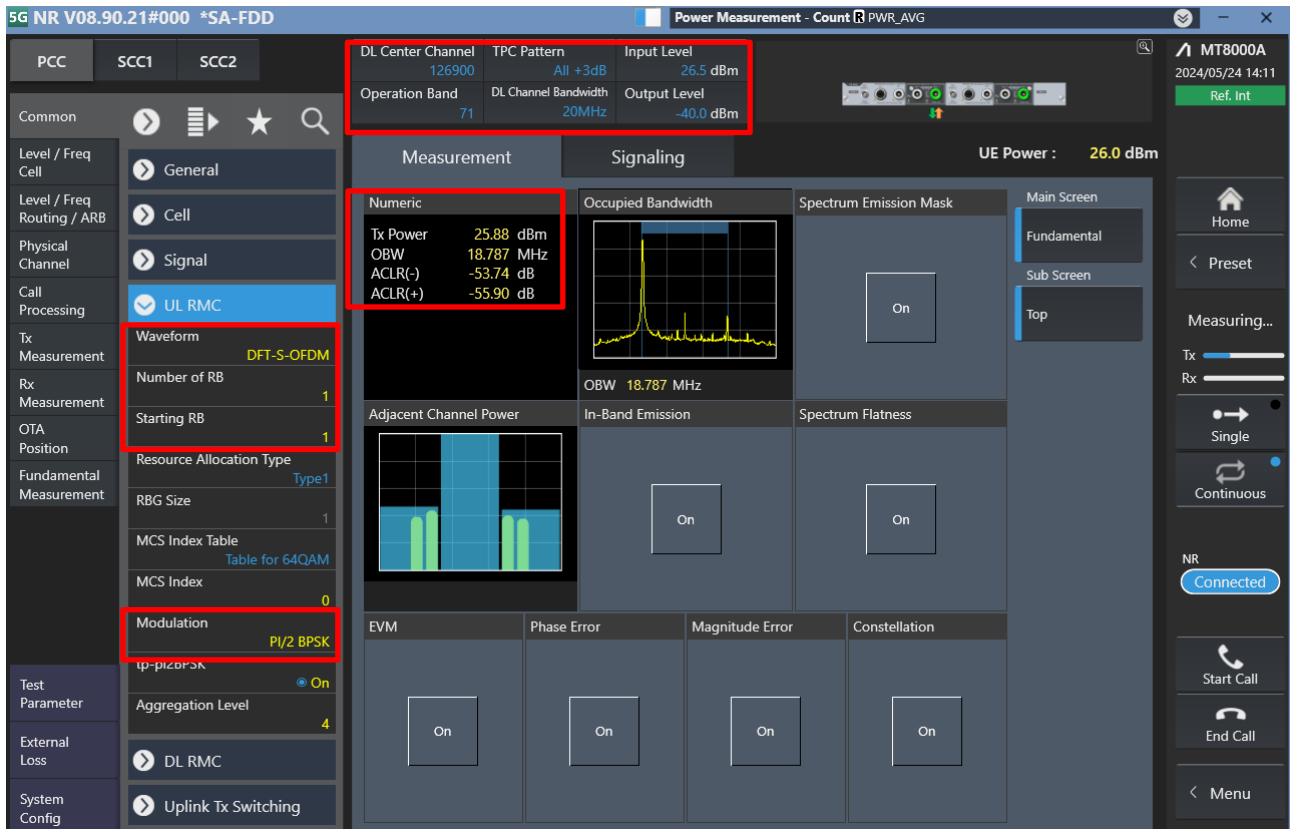
Main Screen Fundamental Sub Screen Top

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

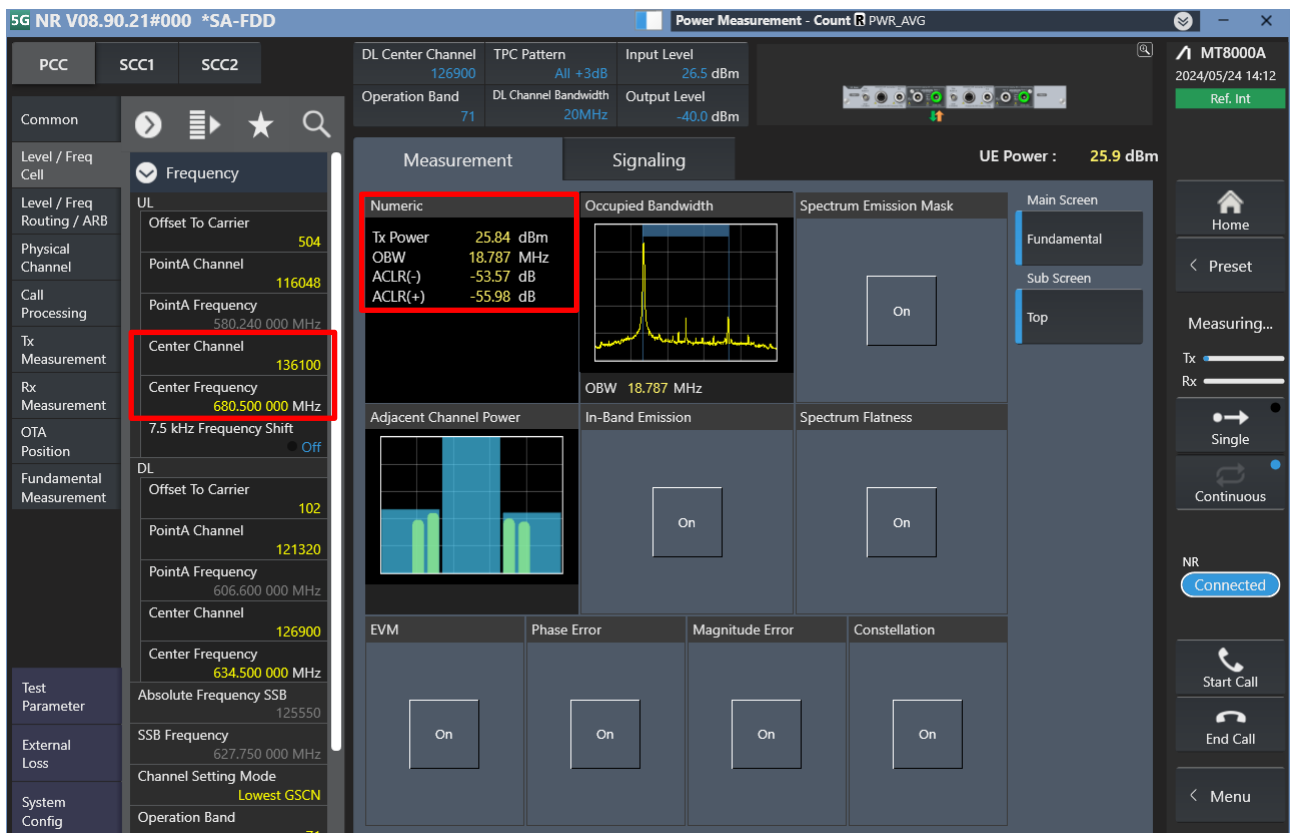
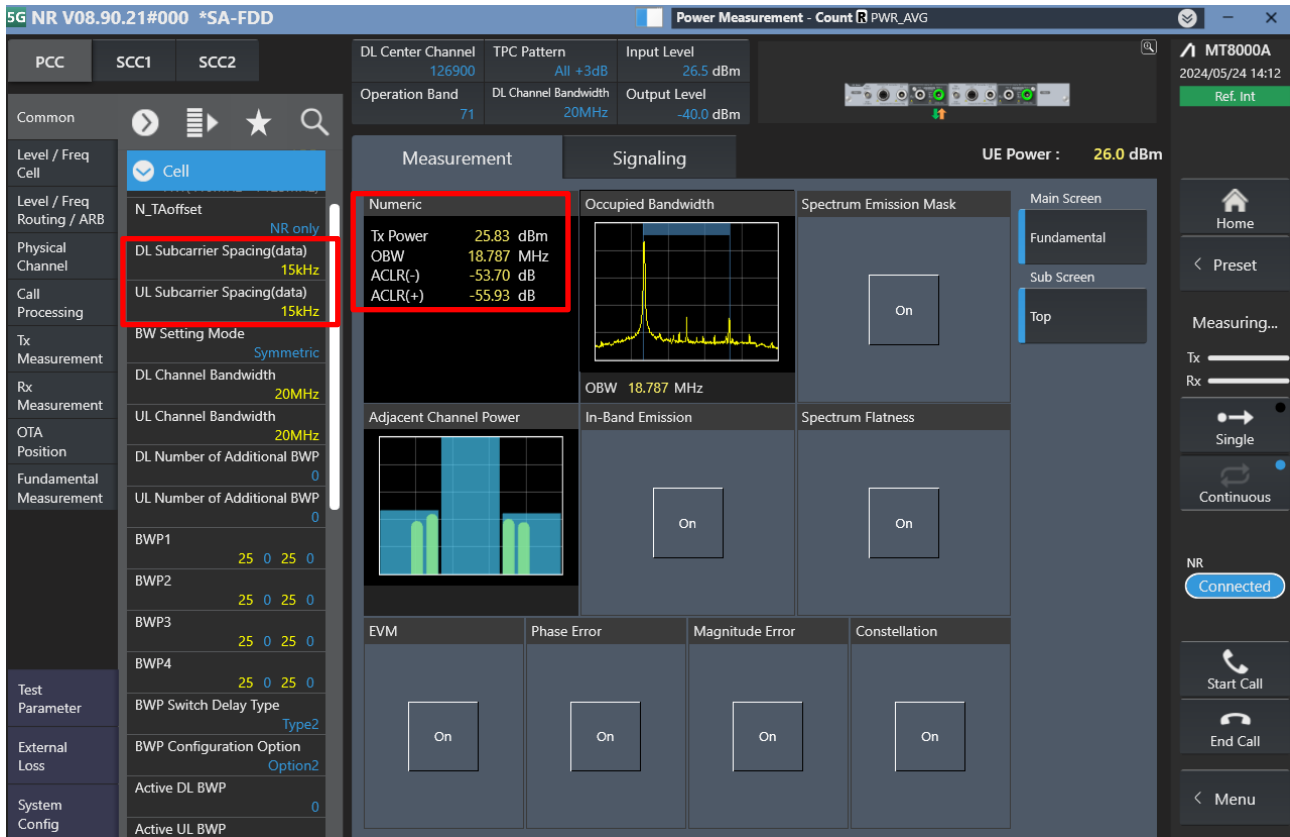


The screenshot displays the SPORTON LAB. software interface for LTE testing. The top bar shows 'Phone2' and 'Phone1' both set to 'LTE 40.20S#032'. The 'Measurement' tab is active, showing 'Fundamental' and 'Numeric' views. The 'Power Measurement' section is highlighted, showing 'TX Power' at 25.12 dBm. The 'Modulation Analysis' section shows 'Freq. Err' at 0.00 ppm and 'EVM' at 1.35 % (rms). The 'Test Parameter' section on the left shows 'Number of RB' at 1, 'Starting RB' at 0, and 'MCS Index' at 5 QPSK. The 'UE Power' is 25.4 dBm. The 'Main Screen' on the right shows 'Fundamental' and 'Numeric' views, with 'Power Measurement' selected. The 'Connected' status is indicated at the bottom right.

<5G NR FR1>

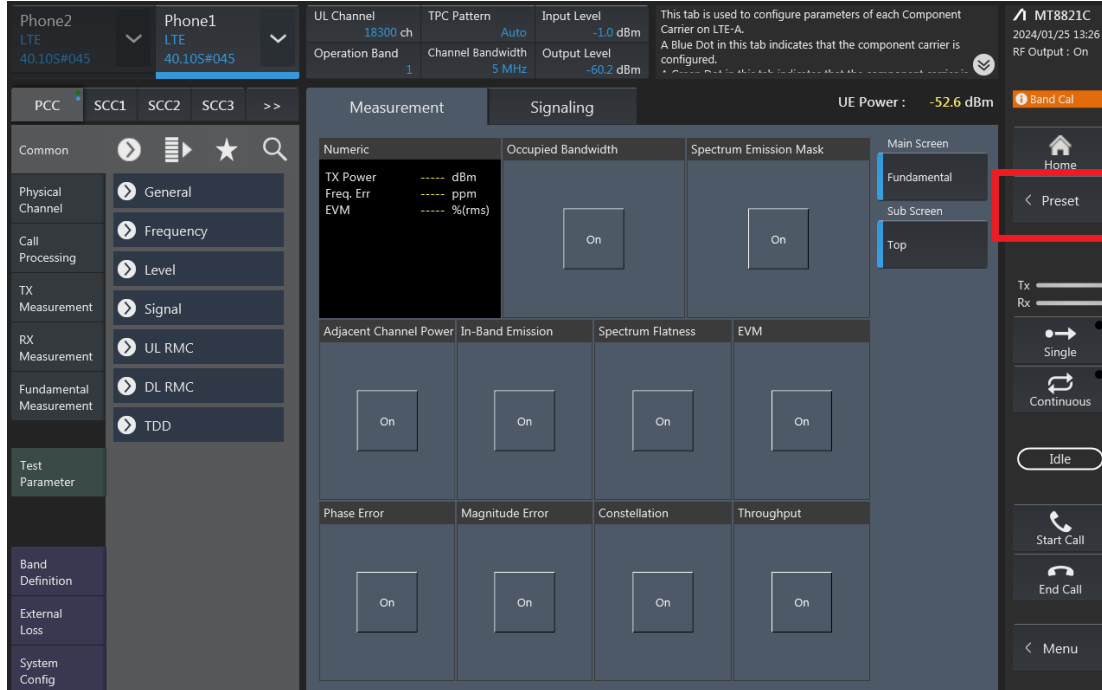


The screenshot displays the SPORTON LAB. software interface for 5G NR FR1 testing. The top bar shows '5G NR V08.90.21#000 *SA-FDD'. The 'Measurement' tab is active, showing 'Fundamental' and 'Numeric' views. The 'Power Measurement' section is highlighted, showing 'Tx Power' at 25.88 dBm, 'OBW' at 18.787 MHz, 'ACLR(-)' at -53.74 dB, and 'ACLR(+)' at -55.90 dB. The 'Modulation' section shows 'DFT-S-OFDM' and 'Pl/2 BPSK'. The 'UE Power' is 26.0 dBm. The 'Main Screen' on the right shows 'Fundamental' and 'Top' views, with 'Power Measurement' selected. The 'Connected' status is indicated at the bottom right.



LTE Uplink and Downlink Carrier Aggregation configurations:

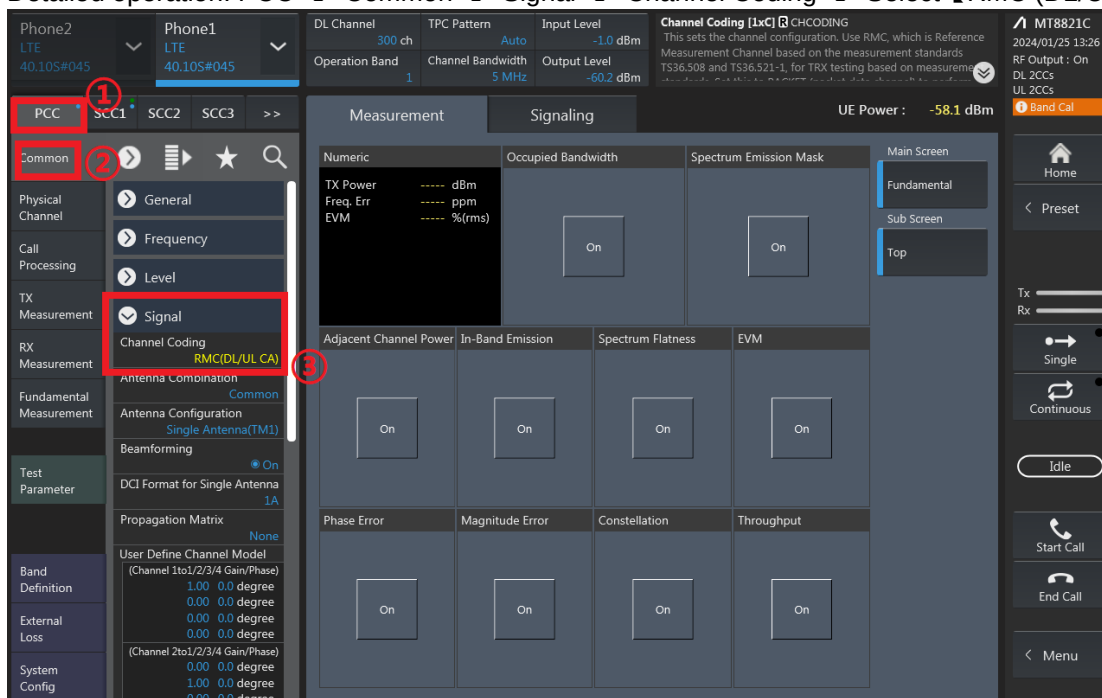
1. Change the Scenario in the Configuration of Phone1 LTE Signaling and Preset.



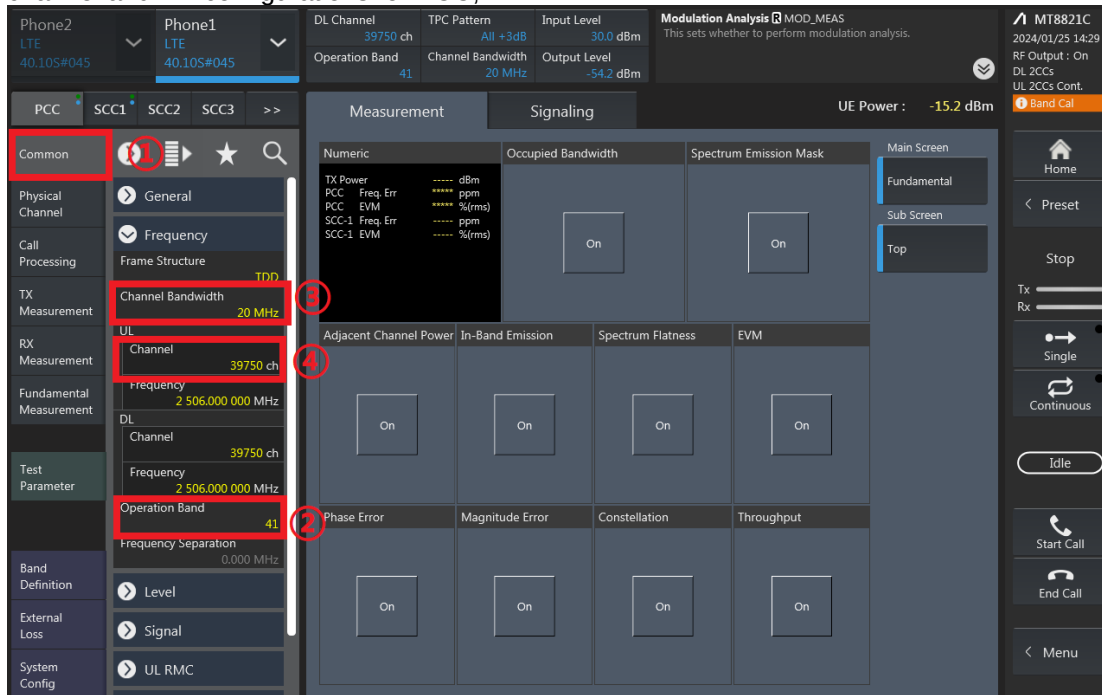
2. If Select "RMC (DL/UL CA)" for Uplink Carrier Aggregation;
If Select "RMC (DL CA)" for Downlink Carrier Aggregation.

For example, Uplink Carrier Aggregation:

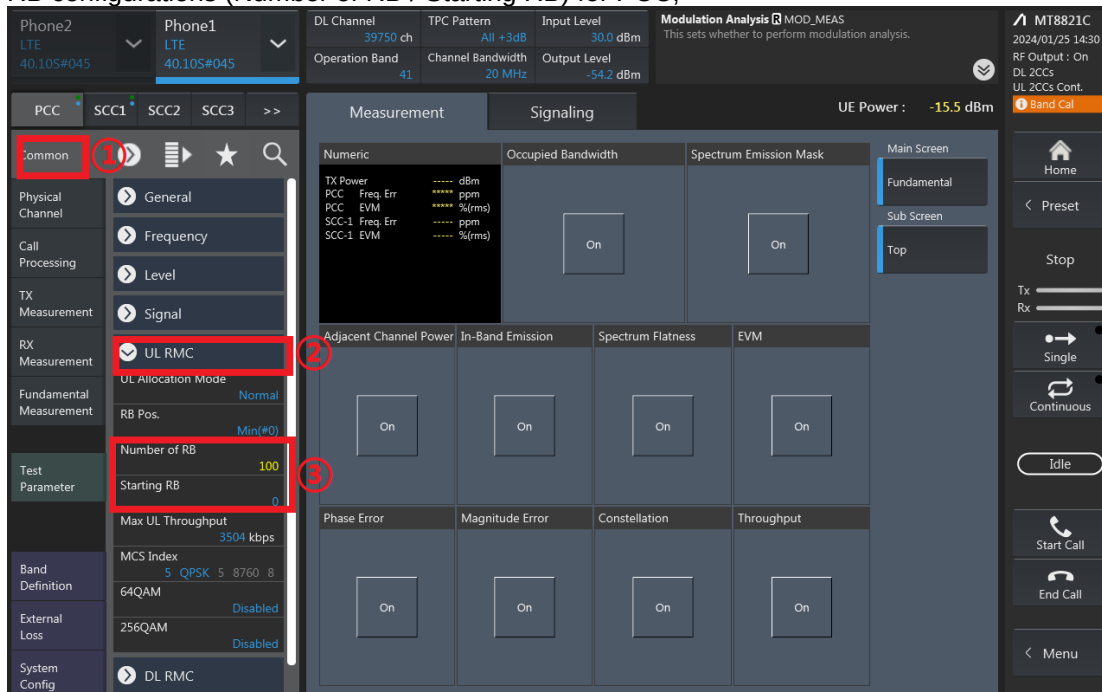
Detailed operation: PCC → Common → Signal → Channel Coding → Select 【RMC (DL/UL CA)】



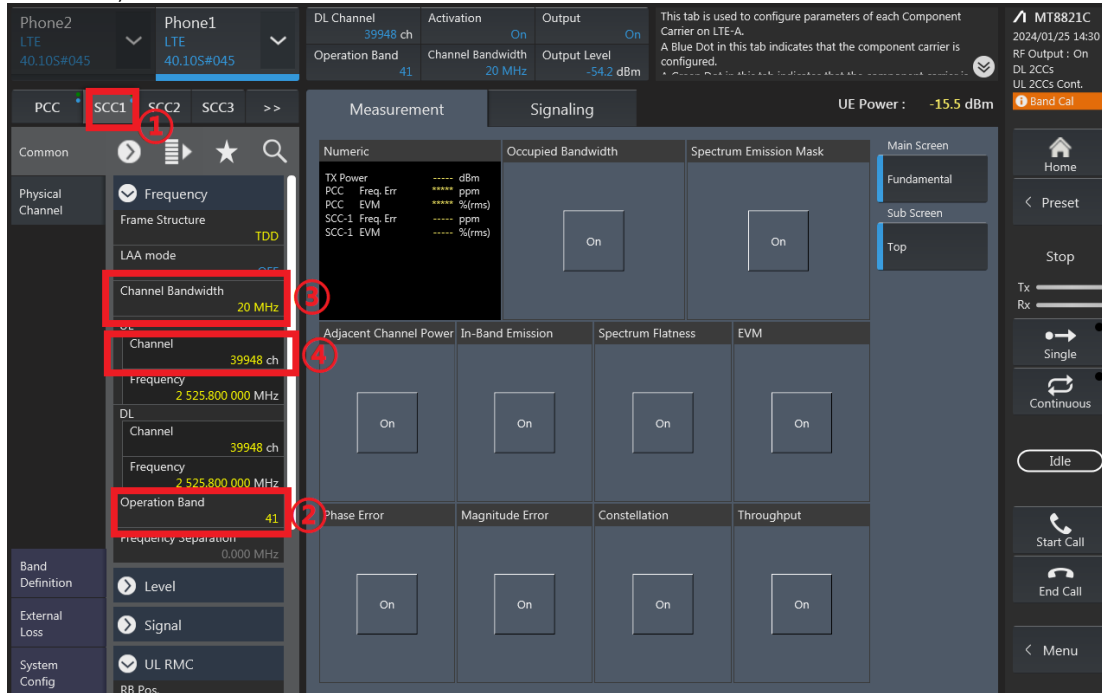
3. PCC parameter Settings: on the screen, and then select the PCC tab and Set operating band, BW, channel and RB configurations for PCC;



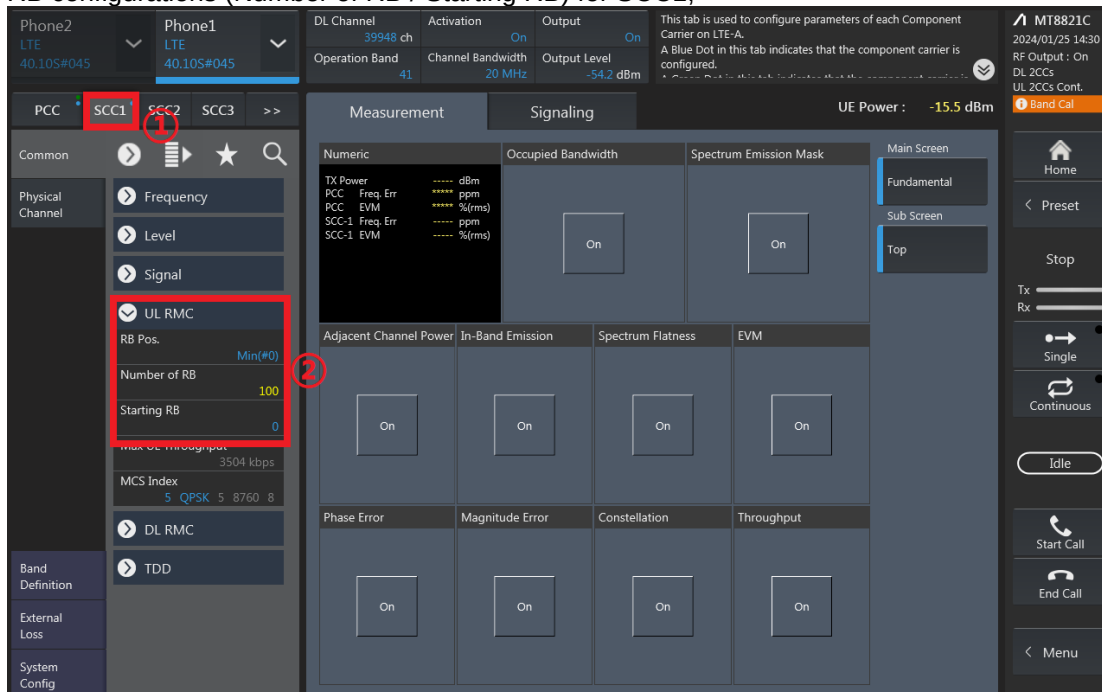
RB configurations (Number of RB / Starting RB) for PCC;



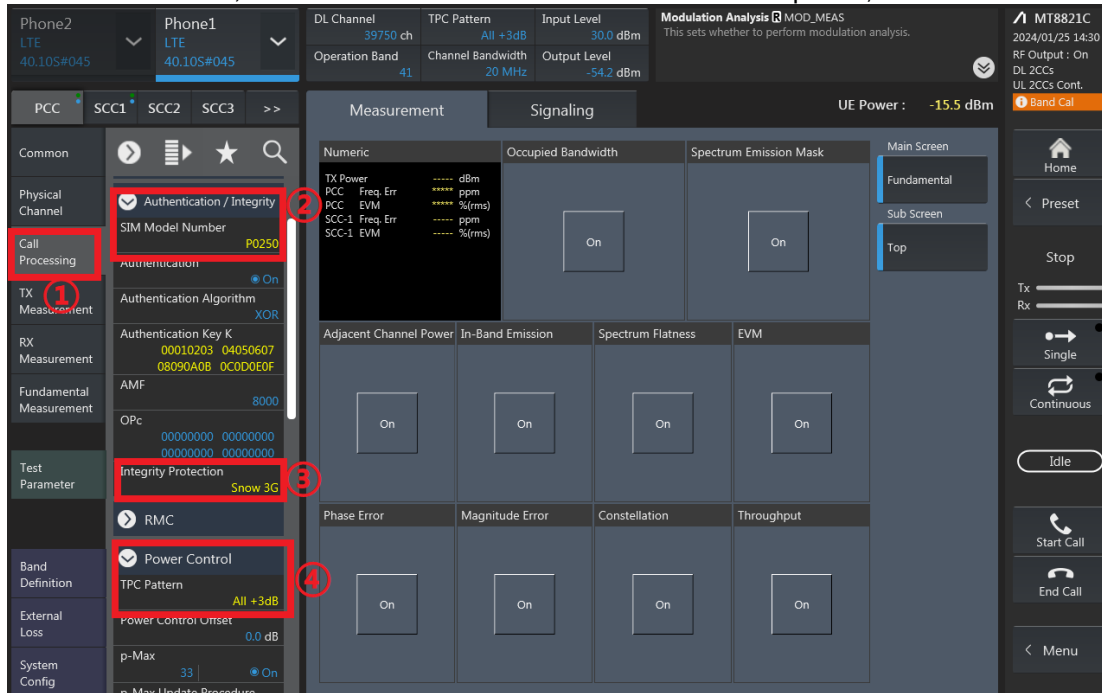
4. SCC parameter Settings: Select the SCC1 tab, Set operating band, BW, channel, and RB configurations for SCC1;



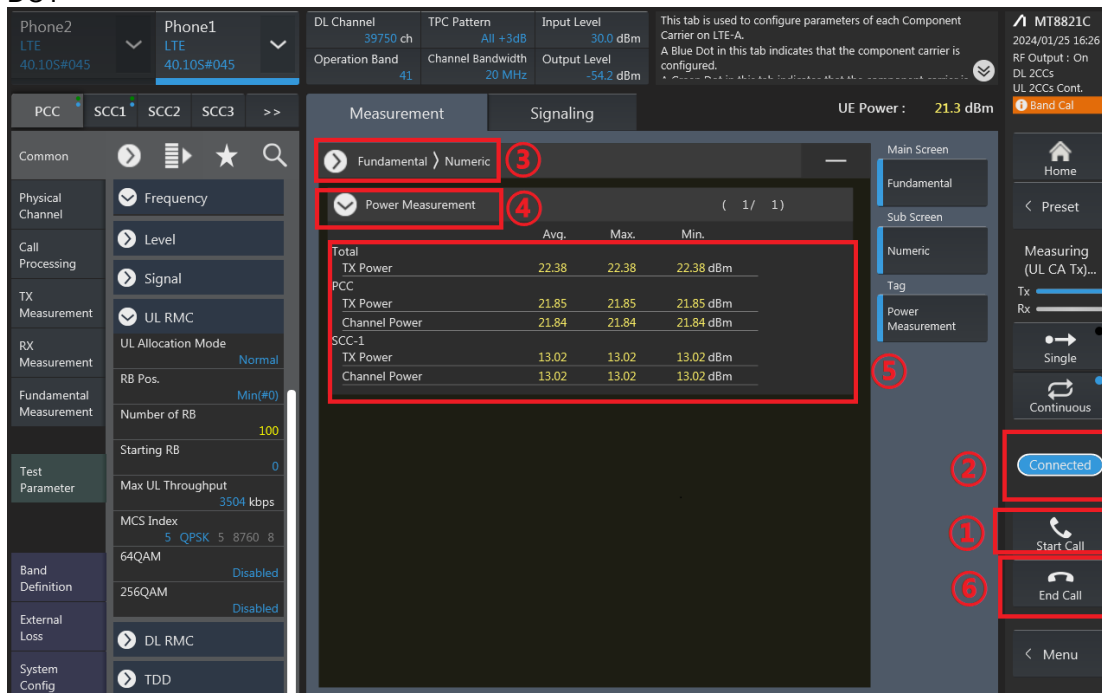
RB configurations (Number of RB / Starting RB) for SCC1;



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.



UL CA power

CA_2C_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					
18700	18898	QPSK	1	0	1	99	1	0	Full	22.31	23.50
18900	19098	QPSK	1	0	1	99	1	0	Full	22.36	23.50
19100	18902	QPSK	1	0	1	99	1	0	Full	22.32	23.50

CA_5B_Ant 0											
Combination 10MHz+10MHz (50RB+50RB)											
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					
20450	20549	QPSK	1	0	1	49	1	0	Full	21.75	23.00
20575	20476	QPSK	1	0	1	49	1	0	Full	21.62	23.00
20600	20501	QPSK	1	0	1	49	1	0	Full	21.65	23.00

CA_7C_Ant 2											
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					
20850	21048	QPSK	1	0	1	99	1	0	Full	22.33	23.50
21100	21298	QPSK	1	0	1	99	1	0	Full	22.63	23.50
21350	21152	QPSK	1	0	1	99	1	0	Full	22.51	23.50

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	1	99	1	0	Full	22.37	23.50
132322	132415	QPSK	1	0	1	99	1	0	Full	22.27	23.50
132597	132504	QPSK	1	0	1	99	1	0	Full	22.13	23.50

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	1	99	1	0	Full	22.37	23.50
132322	132520	QPSK	1	0	1	99	1	0	Full	22.40	23.50
132572	132374	QPSK	1	0	1	99	1	0	Full	22.27	23.50

CA_38C_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					
37850	38048	QPSK	1	0	1	99	1	0	Full	22.27	23.50
37901	38099	QPSK	1	0	1	99	1	0	Full	22.07	23.50
38150	37952	QPSK	1	0	1	99	1	0	Full	22.19	23.50

CA_41C_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					
39750	39948	QPSK	1	0	1	99	1	0	Full	22.35	23.5
40185	40383	QPSK	1	0	1	99	1	0	Full	22.38	23.5
40620	40818	QPSK	1	0	1	99	1	0	Full	22.29	23.5
41055	41253	QPSK	1	0	1	99	1	0	Full	22.07	23.5
41490	41292	QPSK	1	0	1	99	1	0	Full	22.04	23.5

CA_42C_Ant 2											
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					
43190	43388	QPSK	1	0	1	99	1	0	Full	21.50	23.00
43241	43439	QPSK	1	0	1	99	1	0	Full	21.59	23.00
43292	43490	QPSK	1	0	1	99	1	0	Full	21.52	23.00