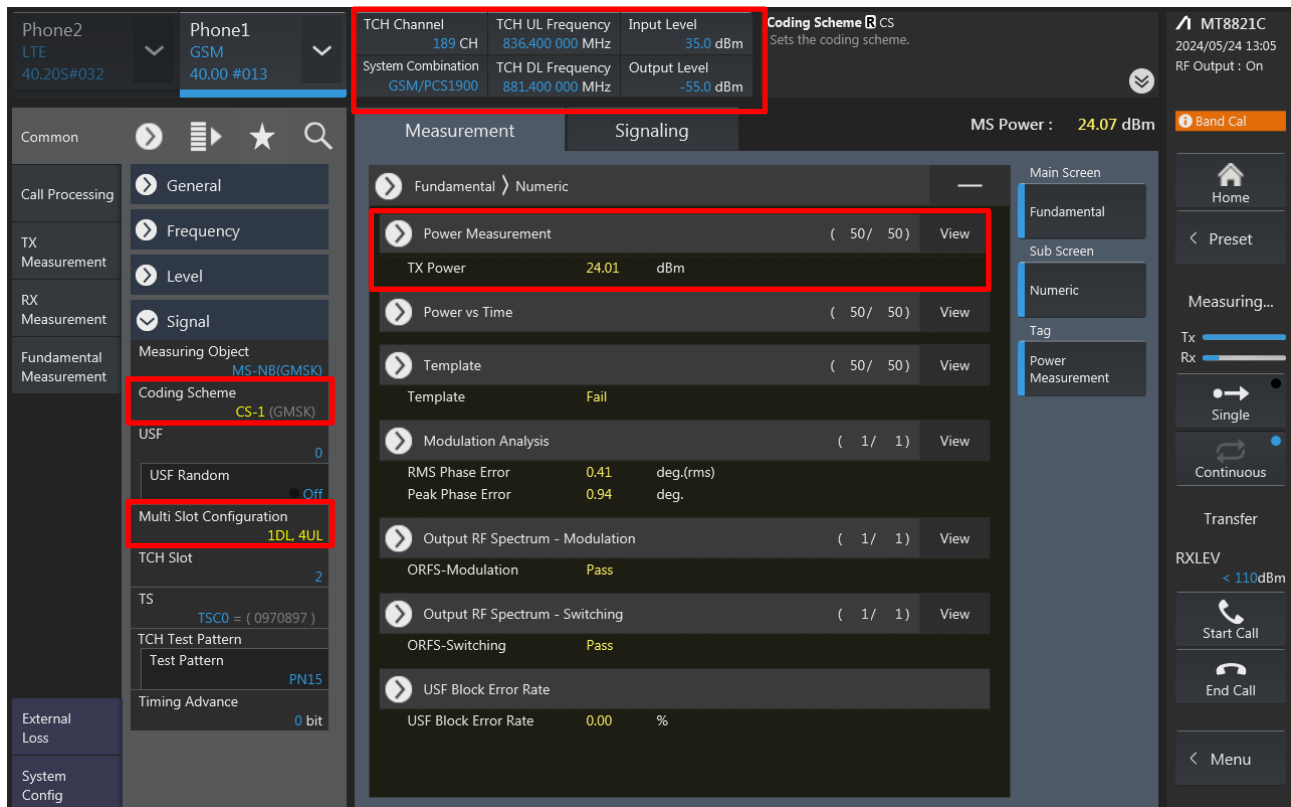


Power measurement connection diagram:

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.

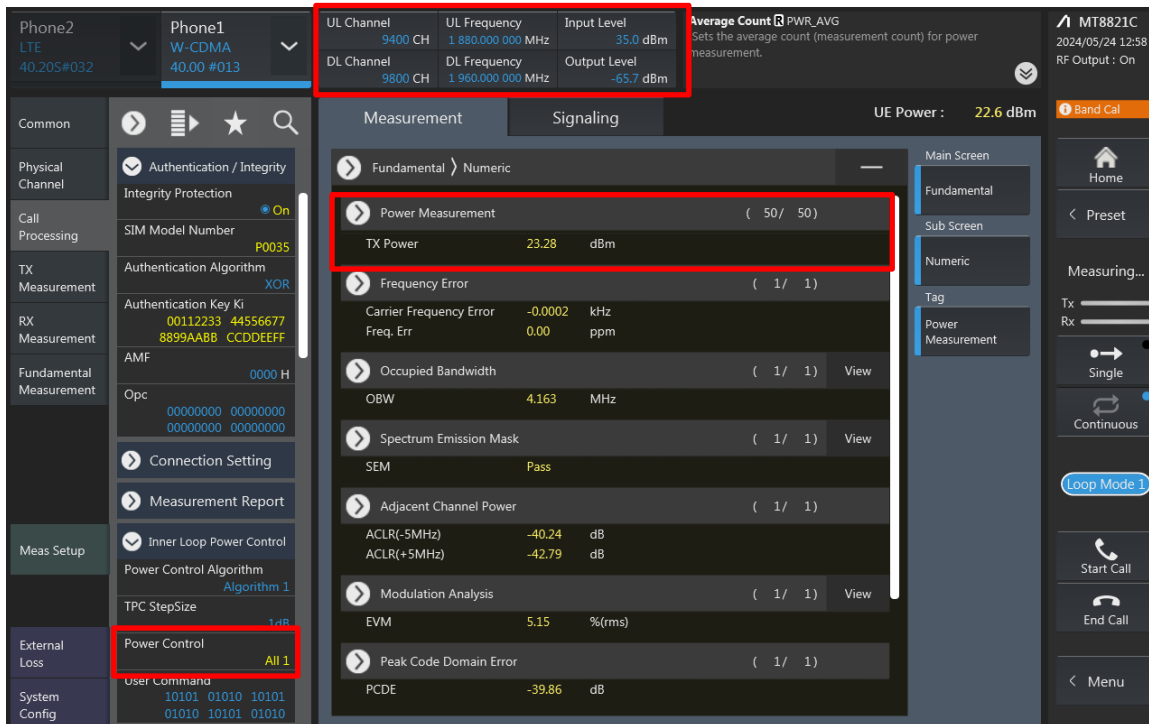
<GSM>



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

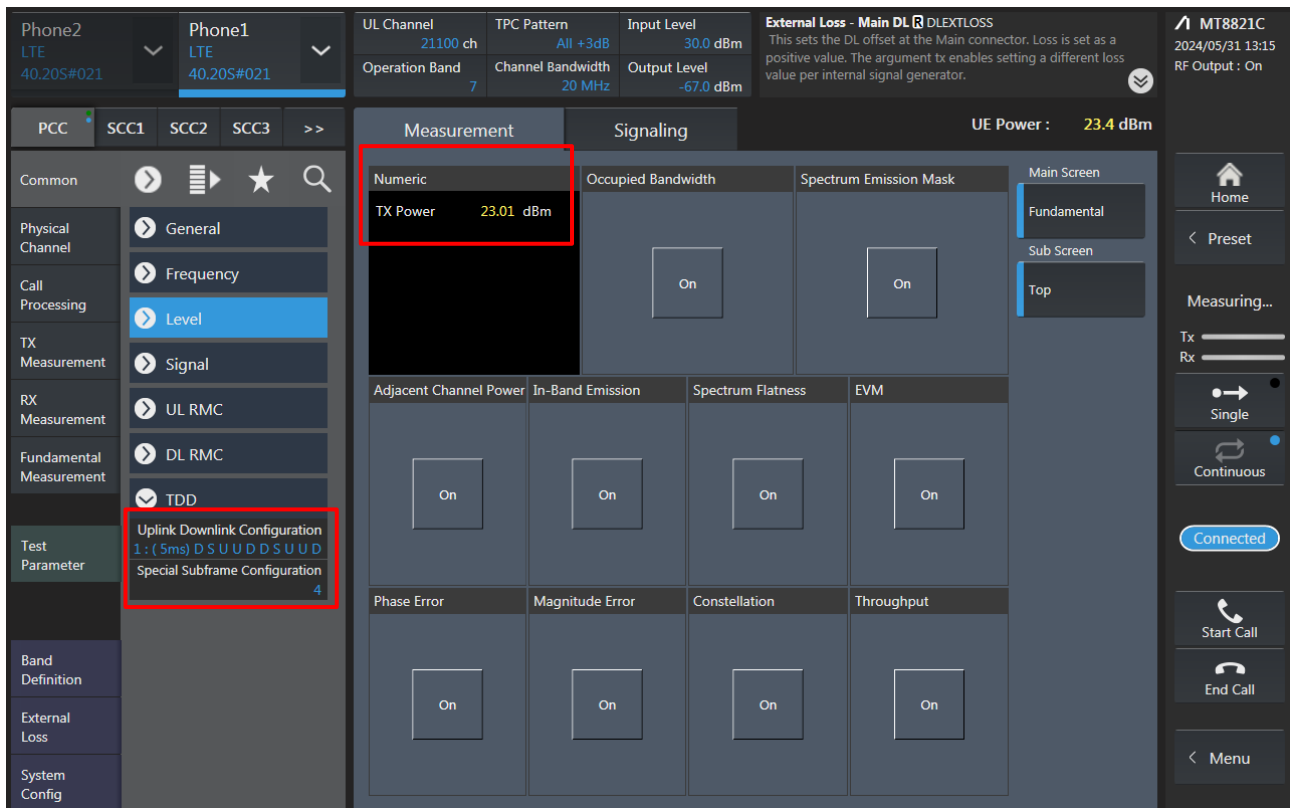
- Top Bar:** Shows Phone2 (LTE, 40.205#032) and Phone1 (GSM, 40.00 #013). The TCH Channel is 189 CH, TCH UL Frequency is 836.400 000 MHz, Input Level is 35.0 dBm, and TCH DL Frequency is 881.400 000 MHz. The Coding Scheme is CS.
- Left Sidebar:** Contains navigation options like Common, Call Processing, 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>



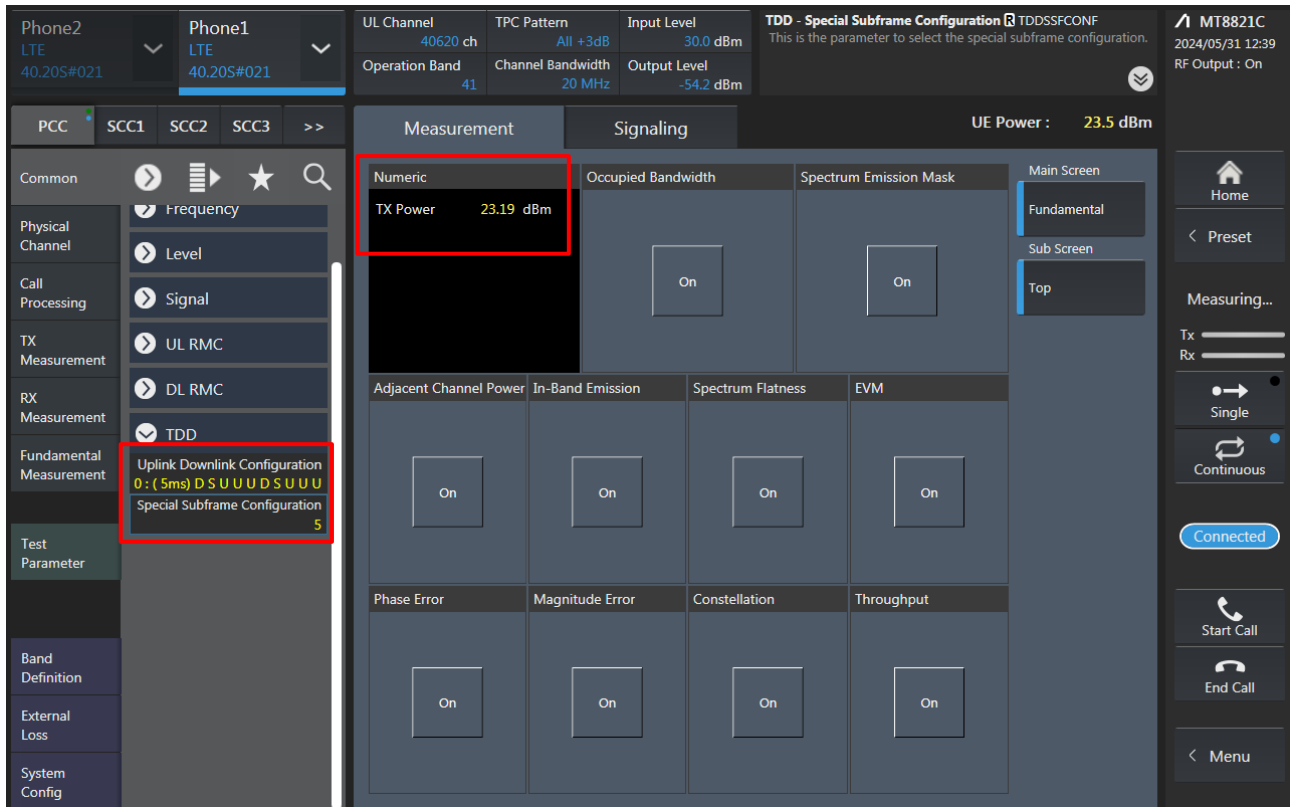
The screenshot shows the WCDMA measurement interface. The top bar displays 'Phone2 LTE 40.20S#032' and 'Phone1 W-CDMA 40.00 #013'. The 'Measurement' tab is active, showing 'Fundamental' and 'Numeric' views. The 'Power Measurement' section is highlighted with a red box, showing 'TX Power' as 23.28 dBm. The 'Occupied Bandwidth' section shows 'OBW' as 4.163 MHz. The 'Adjacent Channel Power' section shows 'ACLR(-5MHz)' as -40.24 dB and 'ACLR(+5MHz)' as -42.79 dB. The 'Modulation Analysis' section shows 'EVM' as 5.15 % (rms). The 'Peak Code Domain Error' section shows 'PCDE' as -39.86 dB. The 'UE Power' is 22.6 dBm. The 'Band Cal' button is visible on the right. The 'Meas Setup' section on the left shows 'Power Control' set to 'All 1'.

<LTE>



The screenshot shows the LTE measurement interface. The top bar displays 'Phone2 LTE 40.20S#021' and 'Phone1 LTE 40.20S#021'. The 'Measurement' tab is active, showing 'Numeric' and 'Occupied Bandwidth' views. The 'Power Measurement' section is highlighted with a red box, showing 'TX Power' as 23.01 dBm. The 'Occupied Bandwidth' section shows 'OBW' as 20 MHz. The 'Adjacent Channel Power' section shows 'ACLR(-5MHz)' as -40.24 dB and 'ACLR(+5MHz)' as -42.79 dB. The 'Modulation Analysis' section shows 'EVM' as 5.15 % (rms). The 'Peak Code Domain Error' section shows 'PCDE' as -39.86 dB. The 'UE Power' is 23.4 dBm. The 'Band Cal' button is visible on the right. The 'Meas Setup' section on the left shows 'Uplink Downlink Configuration' set to '1: (5ms) D S U U D D S U U D' and 'Special Subframe Configuration' set to '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

Operation Band 41

Channel Bandwidth 20 MHz

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

UE Power : 23.5 dBm

Measurement

Numeric

TX Power 23.19 dBm

Occupied Bandwidth

Spectrum Emission Mask

Main Screen

Fundamental

Sub Screen

Top

Adjacent Channel Power

In-Band Emission

Spectrum Flatness

EVM

Phase Error

Magnitude Error

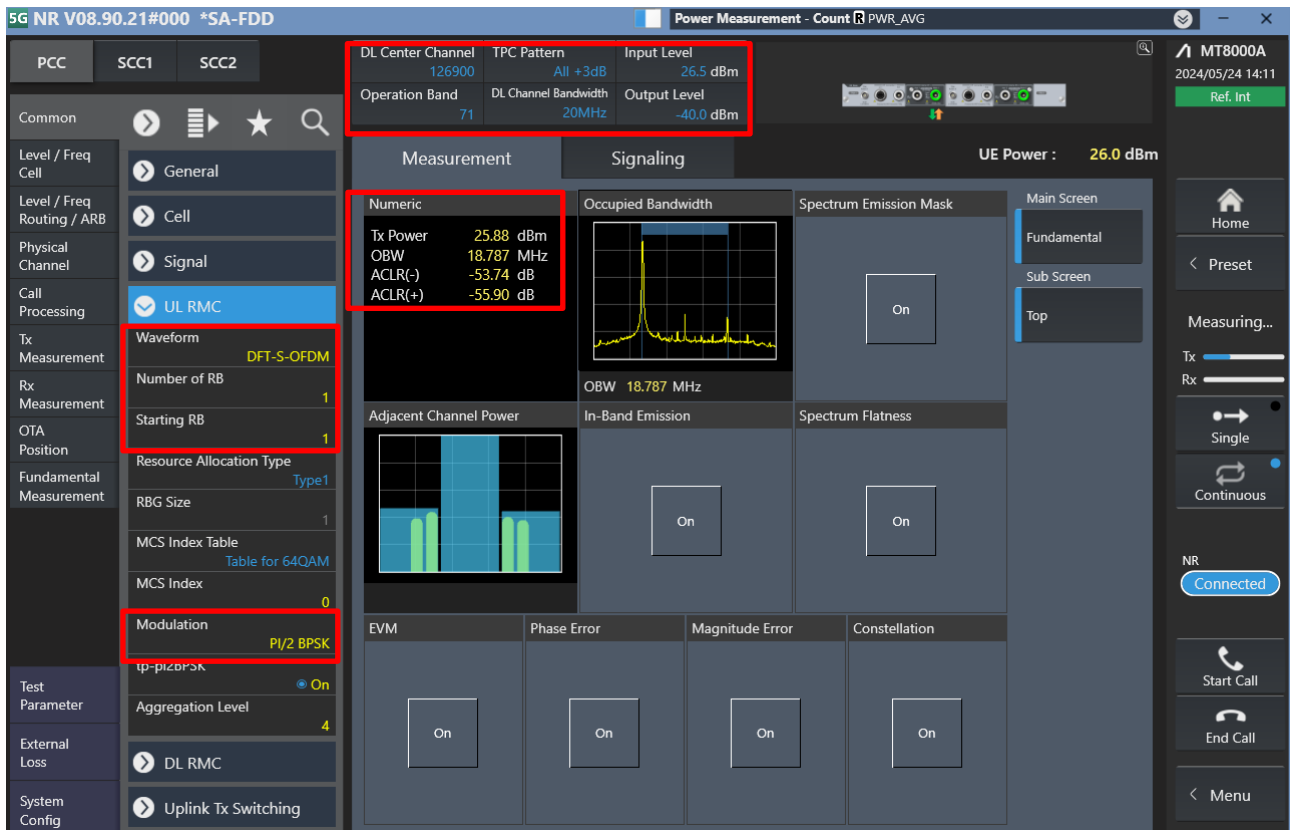
Constellation

Throughput

Uplink Downlink Configuration 0:(5ms)DSUUUSUUU

Special Subframe Configuration 5

<5G NR FR1>



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

Power Measurement - Count PWR_AVG

MT88000A

2024/05/24 14:11

Ref. Int

UE Power : 26.0 dBm

Measurement

Numeric

Tx Power 25.88 dBm

OBW 18.787 MHz

ACLR(-) -53.74 dB

ACLR(+) -55.90 dB

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

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

Waveform DFT-S-OFDM

Number of RB 1

Starting RB 1

Resource Allocation Type Type1

RBG Size 1

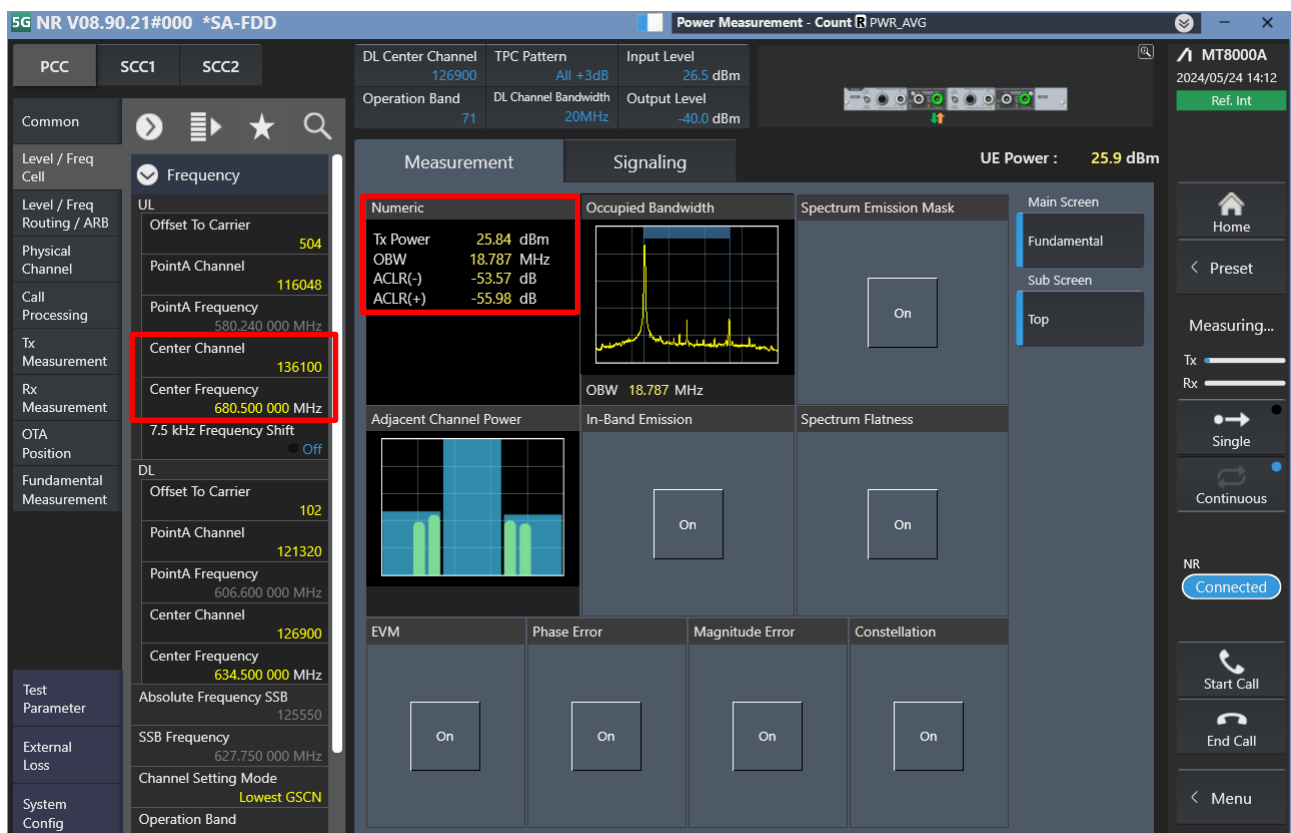
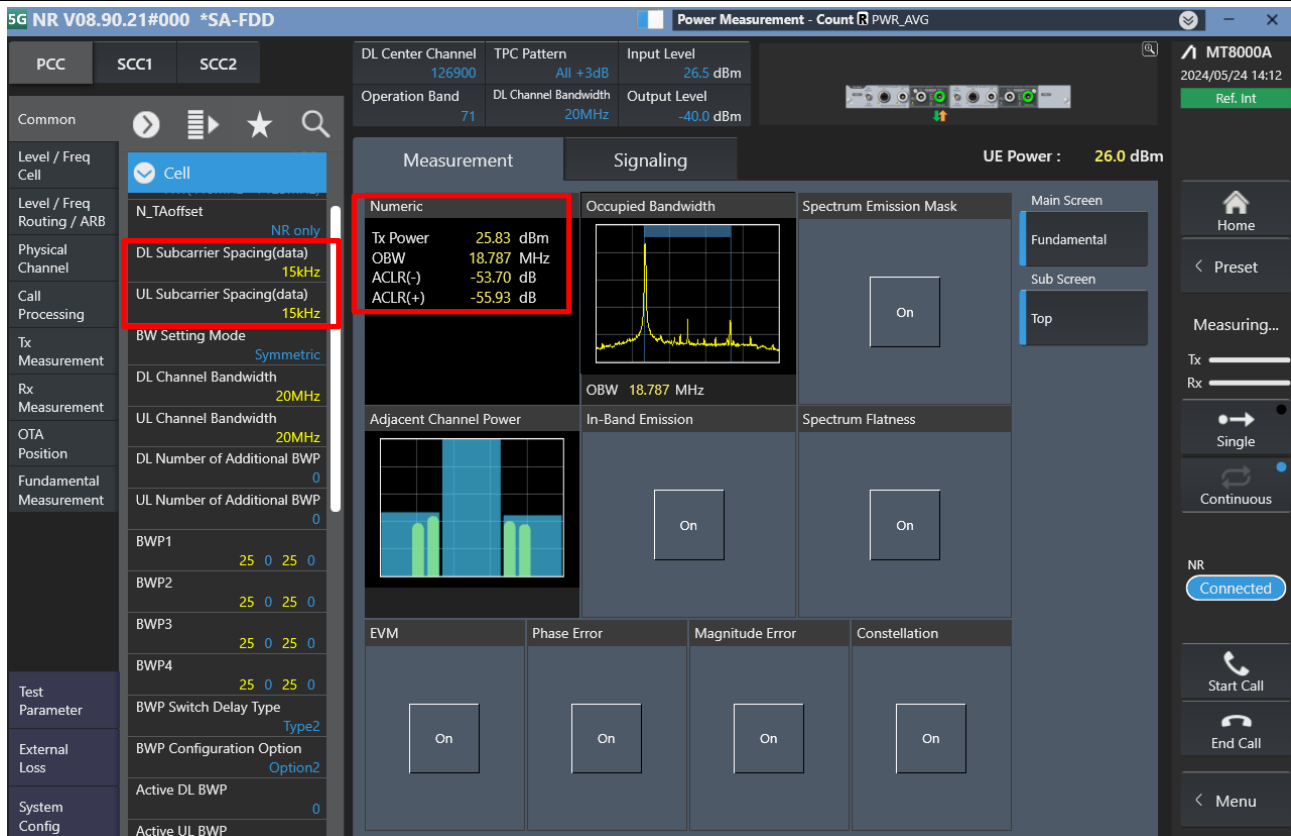
MCS Index Table Table for 64QAM

MCS Index 0

Modulation PI/2 BPSK

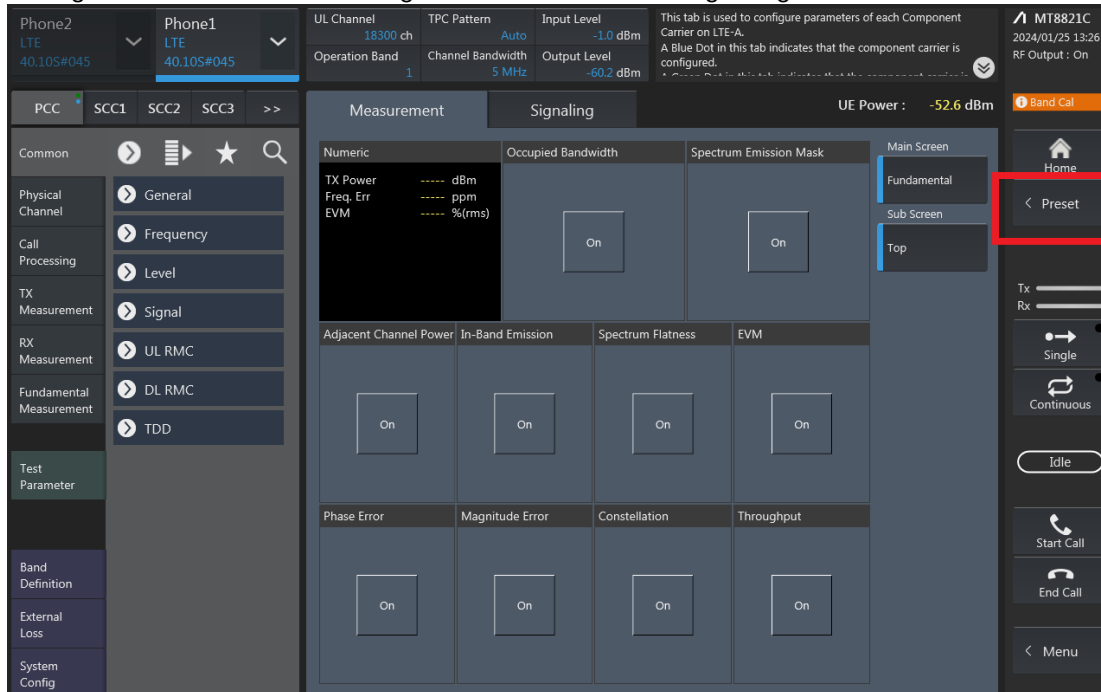
Aggregation Level 4

Uplink Tx Switching



LTE Uplink and Downlink Carrier Aggregation configurations:

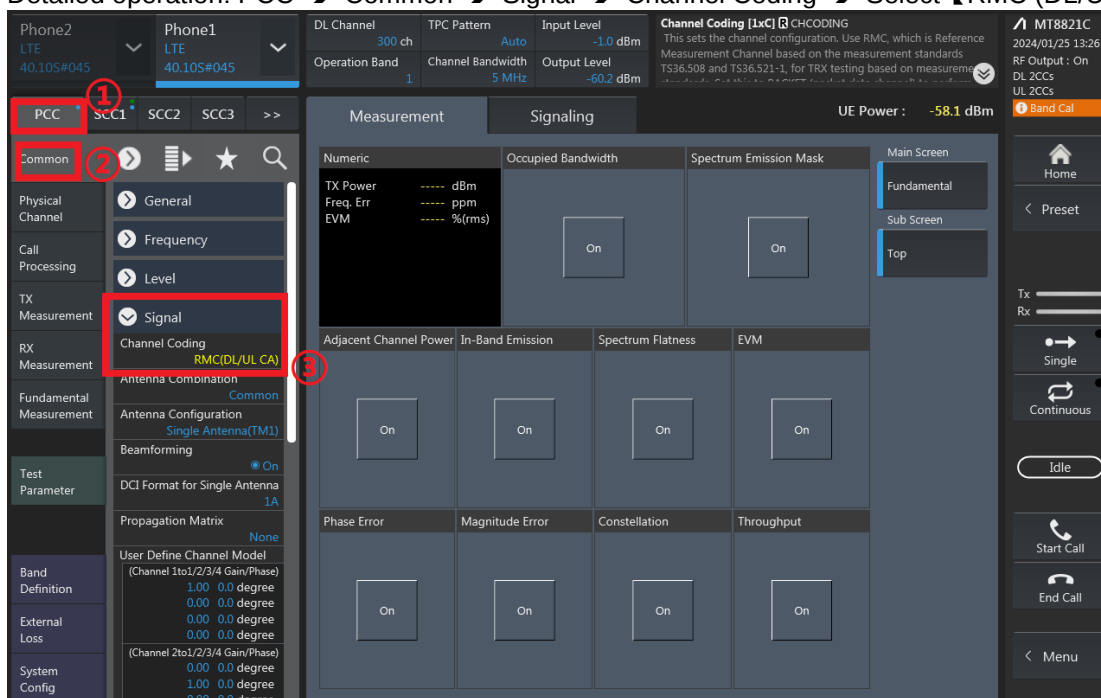
1. Change the Scenario in the Configuration of Phone1 LTE Signaling and Preset.



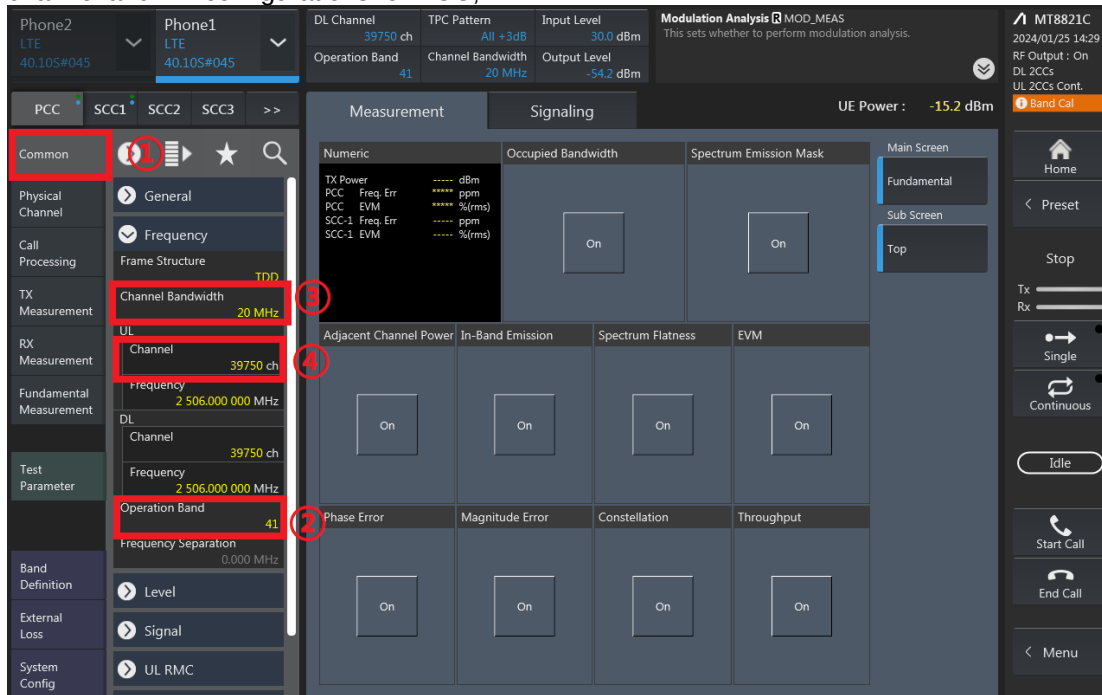
2. If Select "RMC (DL/UL CA)" for Uplink Carrier Aggregation;
If Select "RMC (DL CA)" for Downlink Carrier Aggregation.

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

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 Frame Structure TDD Channel Bandwidth 20 MHz Channel 39750 ch Frequency 2 506.000 000 MHz DL Channel 39750 ch Frequency 2 506.000 000 MHz Operation Band 41 Frequency Separation 0.000 MHz Level Signal UL RMC

Measurement Signaling UE Power: -15.2 dBm

Numeric Occupied Bandwidth Spectrum Emission Mask

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

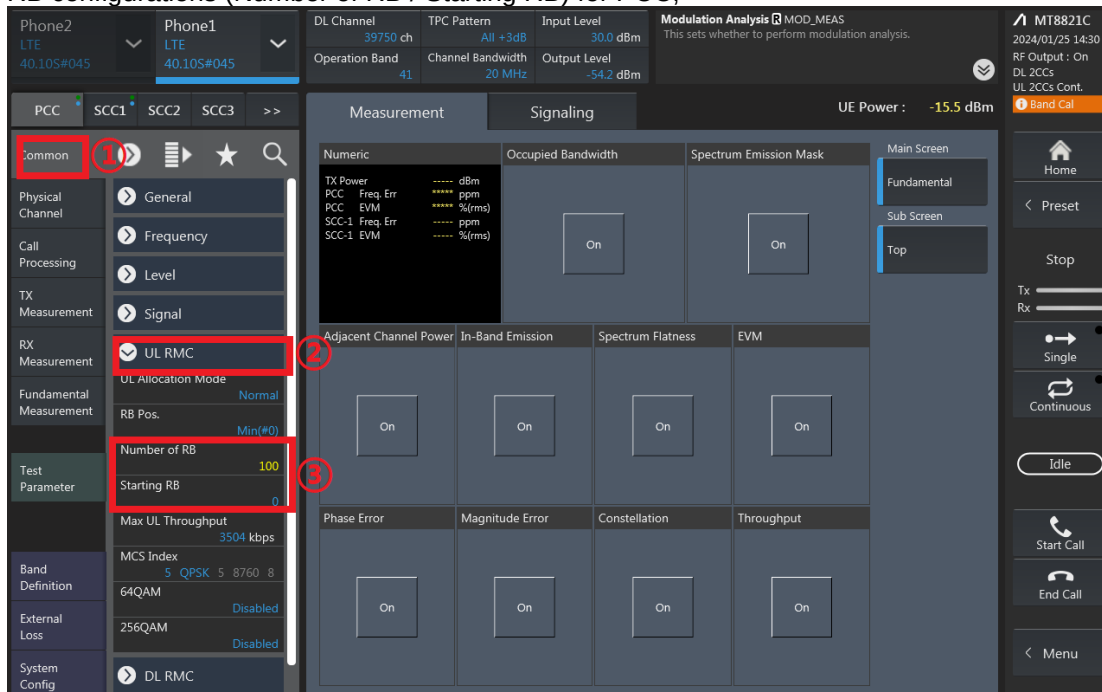
Adjacent Channel Power In-Band Emission Spectrum Flatness EVM

Phase Error Magnitude Error Constellation Throughput

Main Screen Fundamental Sub Screen Top

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

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

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 Frame Structure TDD Channel Bandwidth 20 MHz Channel 39750 ch Frequency 2 506.000 000 MHz DL Channel 39750 ch Frequency 2 506.000 000 MHz Operation Band 41 Frequency Separation 0.000 MHz Level Signal UL RMC

Measurement Signaling UE Power: -15.5 dBm

Numeric Occupied Bandwidth Spectrum Emission Mask

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

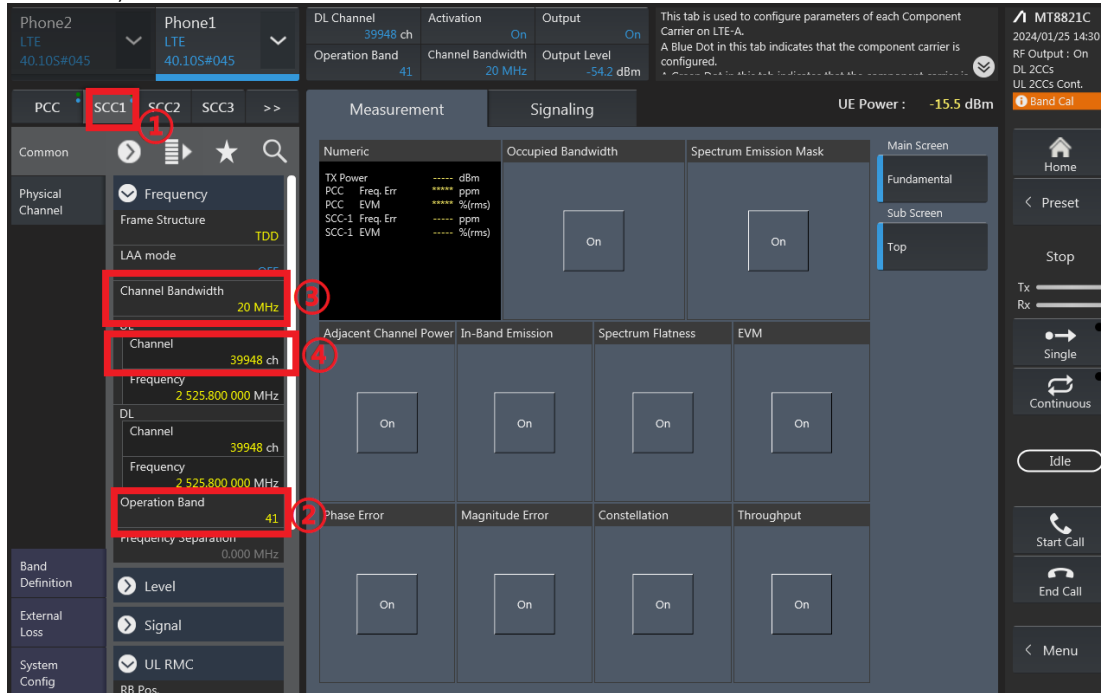
Adjacent Channel Power In-Band Emission Spectrum Flatness EVM

Phase Error Magnitude Error Constellation Throughput

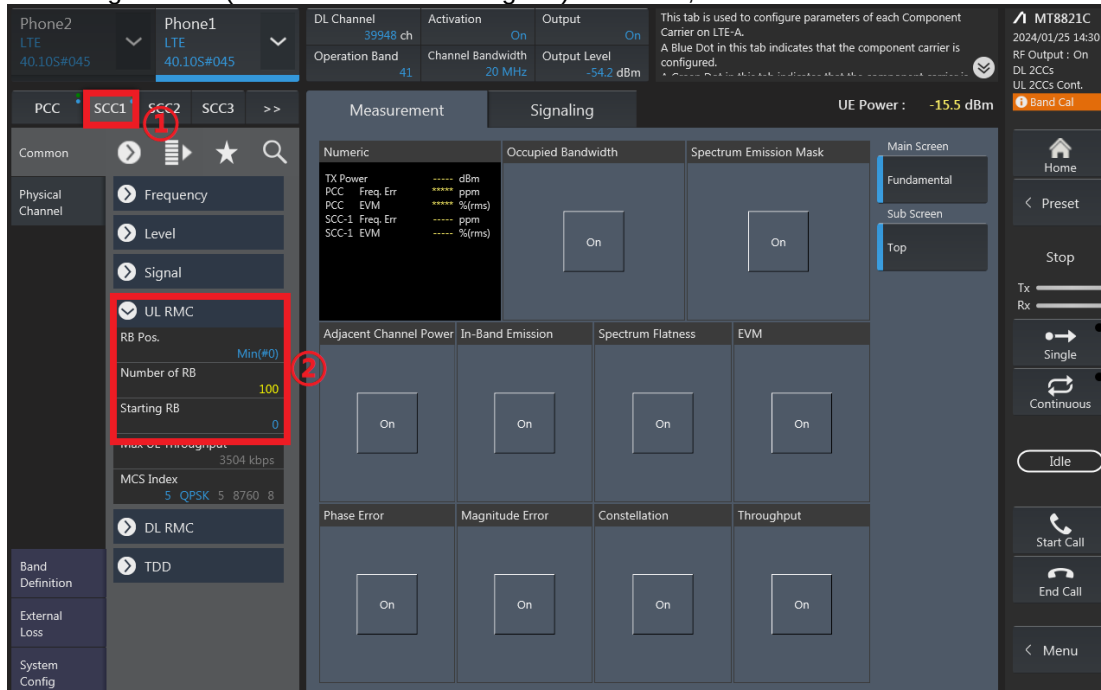
Main Screen Fundamental Sub Screen Top

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

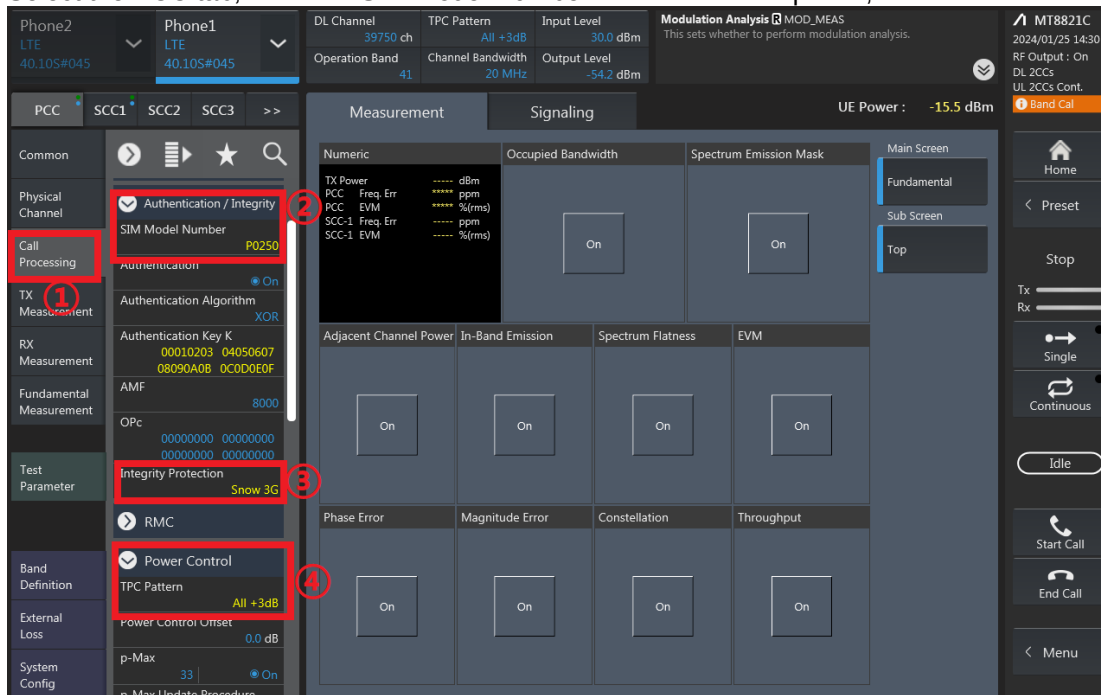
4. SCC parameter Settings: Select the SCC1 tab, Set operating band, BW, channel, and RB configurations for SCC1;



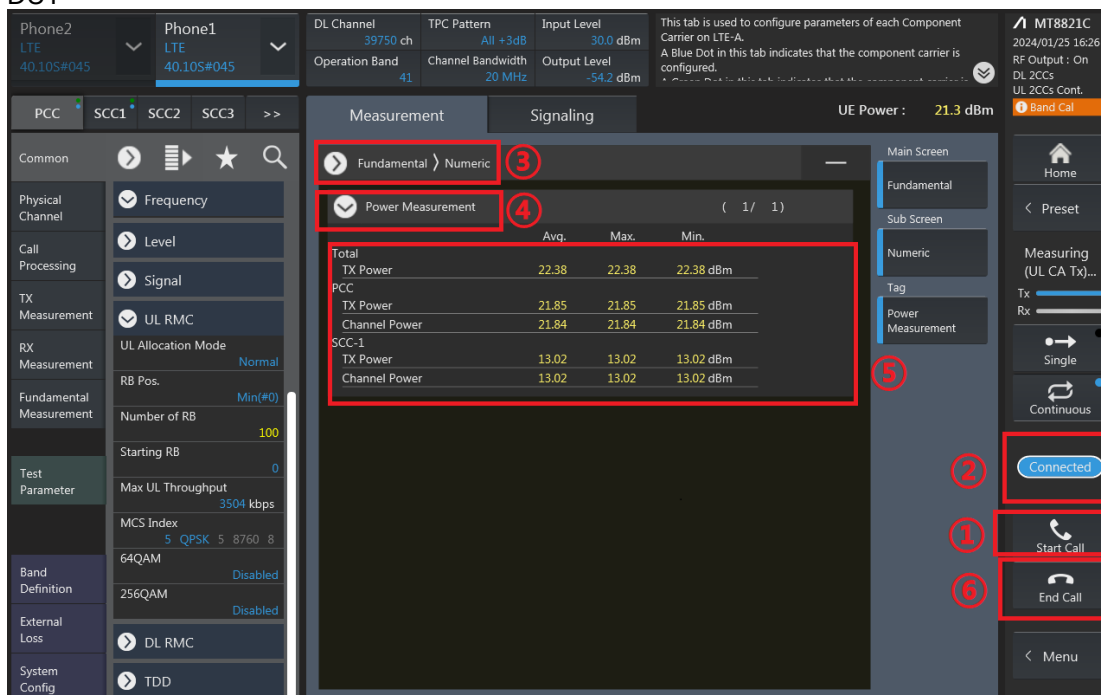
RB configurations (Number of RB / Starting RB) for SCC1;



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



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_7B_Ant 3											
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					
20825	20918	QPSK	1	0	0	0	1	0	Full Power	22.94	24.20
21076	21169	QPSK	1	0	0	0	1	0	Full Power	23.06	24.20
21327	21420	QPSK	1	0	0	0	1	0	Full Power	22.98	24.20
20825	20918	QPSK	1	0	0	0	1	0	ECI1	21.48	22.70
21076	21169	QPSK	1	0	0	0	1	0	ECI1	21.58	22.70
21327	21420	QPSK	1	0	0	0	1	0	ECI1	21.56	22.70
20825	20918	QPSK	1	0	0	0	1	0	ECI2	22.94	24.20
21076	21169	QPSK	1	0	0	0	1	0	ECI2	23.00	24.20
21327	21420	QPSK	1	0	0	0	1	0	ECI2	22.95	24.20
20825	20918	QPSK	1	0	0	0	1	0	ECI3	16.44	17.70
21076	21169	QPSK	1	0	0	0	1	0	ECI3	16.64	17.70
21327	21420	QPSK	1	0	0	0	1	0	ECI3	16.56	17.70
20825	20918	QPSK	1	0	0	0	1	0	ECI4	17.94	19.20
21076	21169	QPSK	1	0	0	0	1	0	ECI4	18.09	19.20
21327	21420	QPSK	1	0	0	0	1	0	ECI4	18.10	19.20

CA_7B_Ant 1											
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					
20825	20918	QPSK	1	0	0	0	1	0	Full Power	22.39	23.70
21076	21169	QPSK	1	0	0	0	1	0	Full Power	22.71	23.70
21327	21420	QPSK	1	0	0	0	1	0	Full Power	22.73	23.70
20825	20918	QPSK	1	0	0	0	1	0	ECI1	20.57	21.70
21076	21169	QPSK	1	0	0	0	1	0	ECI1	20.70	21.70
21327	21420	QPSK	1	0	0	0	1	0	ECI1	20.78	21.70
20825	20918	QPSK	1	0	0	0	1	0	ECI2	15.19	16.20
21076	21169	QPSK	1	0	0	0	1	0	ECI2	15.32	16.20
21327	21420	QPSK	1	0	0	0	1	0	ECI2	15.27	16.20
20825	20918	QPSK	1	0	0	0	1	0	ECI3	15.66	16.70
21076	21169	QPSK	1	0	0	0	1	0	ECI3	15.79	16.70
21327	21420	QPSK	1	0	0	0	1	0	ECI3	15.83	16.70
20825	20918	QPSK	1	0	0	0	1	0	ECI4	13.18	14.20
21076	21169	QPSK	1	0	0	0	1	0	ECI4	13.26	14.20
21327	21420	QPSK	1	0	0	0	1	0	ECI4	13.33	14.20

CA_7C_Ant 3											
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	0	0	1	0	Full Power	22.95	24.20
21100	21298	QPSK	1	0	0	0	1	0	Full Power	23.07	24.20
21350	21152	QPSK	1	0	0	0	1	0	Full Power	23.06	24.20
20850	21048	QPSK	1	0	0	0	1	0	EC11	21.56	22.70
21100	21298	QPSK	1	0	0	0	1	0	EC11	21.65	22.70
21350	21152	QPSK	1	0	0	0	1	0	EC11	21.63	22.70
20850	21048	QPSK	1	0	0	0	1	0	EC12	22.95	24.20
21100	21298	QPSK	1	0	0	0	1	0	EC12	23.07	24.20
21350	21152	QPSK	1	0	0	0	1	0	EC12	23.06	24.20
20850	21048	QPSK	1	0	0	0	1	0	EC13	16.56	17.70
21100	21298	QPSK	1	0	0	0	1	0	EC13	16.67	17.70
21350	21152	QPSK	1	0	0	0	1	0	EC13	16.63	17.70
20850	21048	QPSK	1	0	0	0	1	0	EC14	18.06	19.20
21100	21298	QPSK	1	0	0	0	1	0	EC14	18.16	19.20
21350	21152	QPSK	1	0	0	0	1	0	EC14	18.13	19.20

CA_7C_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					
20850	21048	QPSK	1	0	0	0	1	0	Full Power	22.43	23.70
21100	21298	QPSK	1	0	0	0	1	0	Full Power	22.82	23.70
21350	21152	QPSK	1	0	0	0	1	0	Full Power	22.77	23.70
20850	21048	QPSK	1	0	0	0	1	0	ECI1	20.70	21.70
21100	21298	QPSK	1	0	0	0	1	0	ECI1	20.83	21.70
21350	21152	QPSK	1	0	0	0	1	0	ECI1	20.81	21.70
20850	21048	QPSK	1	0	0	0	1	0	ECI2	15.22	16.20
21100	21298	QPSK	1	0	0	0	1	0	ECI2	15.35	16.20
21350	21152	QPSK	1	0	0	0	1	0	ECI2	15.33	16.20
20850	21048	QPSK	1	0	0	0	1	0	ECI3	15.72	16.70
21100	21298	QPSK	1	0	0	0	1	0	ECI3	15.88	16.70
21350	21152	QPSK	1	0	0	0	1	0	ECI3	15.85	16.70
20850	21048	QPSK	1	0	0	0	1	0	ECI4	13.26	14.20
21100	21298	QPSK	1	0	0	0	1	0	ECI4	13.38	14.20
21350	21152	QPSK	1	0	0	0	1	0	ECI4	13.35	14.20

CA_38C_Ant 3											
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	0	0	1	0	Full Power	23.65	24.50
37901	38099	QPSK	1	0	0	0	1	0	Full Power	23.77	24.50
38150	37952	QPSK	1	0	0	0	1	0	Full Power	23.73	24.50
37850	38048	QPSK	1	0	0	0	1	0	ECI1	23.65	24.50
37901	38099	QPSK	1	0	0	0	1	0	ECI1	23.77	24.50
38150	37952	QPSK	1	0	0	0	1	0	ECI1	23.73	24.50
37850	38048	QPSK	1	0	0	0	1	0	ECI2	23.65	24.50
37901	38099	QPSK	1	0	0	0	1	0	ECI2	23.77	24.50
38150	37952	QPSK	1	0	0	0	1	0	ECI2	23.73	24.50
37850	38048	QPSK	1	0	0	0	1	0	ECI3	18.77	19.50
37901	38099	QPSK	1	0	0	0	1	0	ECI3	18.81	19.50
38150	37952	QPSK	1	0	0	0	1	0	ECI3	18.78	19.50
37850	38048	QPSK	1	0	0	0	1	0	ECI4	23.65	24.50
37901	38099	QPSK	1	0	0	0	1	0	ECI4	23.77	24.50
38150	37952	QPSK	1	0	0	0	1	0	ECI4	23.73	24.50

CA_38C_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					
37850	38048	QPSK	1	0	0	0	1	0	Full Power	22.98	24.00
37901	38099	QPSK	1	0	0	0	1	0	Full Power	23.10	24.00
38150	37952	QPSK	1	0	0	0	1	0	Full Power	23.01	24.00
37850	38048	QPSK	1	0	0	0	1	0	ECI1	22.98	24.00
37901	38099	QPSK	1	0	0	0	1	0	ECI1	23.10	24.00
38150	37952	QPSK	1	0	0	0	1	0	ECI1	23.01	24.00
37850	38048	QPSK	1	0	0	0	1	0	ECI2	19.12	20.00
37901	38099	QPSK	1	0	0	0	1	0	ECI2	19.16	20.00
38150	37952	QPSK	1	0	0	0	1	0	ECI2	19.13	20.00
37850	38048	QPSK	1	0	0	0	1	0	ECI3	18.10	19.00
37901	38099	QPSK	1	0	0	0	1	0	ECI3	18.16	19.00
38150	37952	QPSK	1	0	0	0	1	0	ECI3	18.11	19.00
37850	38048	QPSK	1	0	0	0	1	0	ECI4	15.10	16.00
37901	38099	QPSK	1	0	0	0	1	0	ECI4	15.18	16.00
38150	37952	QPSK	1	0	0	0	1	0	ECI4	15.13	16.00

CA_41C_Ant 3 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	0	0	1	0	Full Power	23.73	24.50
40185	40383	QPSK	1	0	0	0	1	0	Full Power	23.37	24.50
40620	40818	QPSK	1	0	0	0	1	0	Full Power	23.42	24.50
41055	41253	QPSK	1	0	0	0	1	0	Full Power	23.40	24.50
41490	41292	QPSK	1	0	0	0	1	0	Full Power	23.44	24.50
39750	39948	QPSK	1	0	0	0	1	0	ECI1	21.28	22.00
40185	40383	QPSK	1	0	0	0	1	0	ECI1	21.01	22.00
40620	40818	QPSK	1	0	0	0	1	0	ECI1	20.98	22.00
41055	41253	QPSK	1	0	0	0	1	0	ECI1	20.92	22.00
41490	41292	QPSK	1	0	0	0	1	0	ECI1	21.02	22.00
39750	39948	QPSK	1	0	0	0	1	0	ECI2	23.73	24.50
40185	40383	QPSK	1	0	0	0	1	0	ECI2	23.37	24.50
40620	40818	QPSK	1	0	0	0	1	0	ECI2	23.42	24.50
41055	41253	QPSK	1	0	0	0	1	0	ECI2	23.40	24.50
41490	41292	QPSK	1	0	0	0	1	0	ECI2	23.44	24.50
39750	39948	QPSK	1	0	0	0	1	0	ECI3	16.30	17.00
40185	40383	QPSK	1	0	0	0	1	0	ECI3	16.02	17.00
40620	40818	QPSK	1	0	0	0	1	0	ECI3	15.98	17.00
41055	41253	QPSK	1	0	0	0	1	0	ECI3	15.92	17.00
41490	41292	QPSK	1	0	0	0	1	0	ECI3	16.02	17.00
39750	39948	QPSK	1	0	0	0	1	0	ECI4	23.73	24.50
40185	40383	QPSK	1	0	0	0	1	0	ECI4	23.37	24.50
40620	40818	QPSK	1	0	0	0	1	0	ECI4	23.42	24.50
41055	41253	QPSK	1	0	0	0	1	0	ECI4	23.40	24.50
41490	41292	QPSK	1	0	0	0	1	0	ECI4	23.44	24.50

CA_41C_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					
39750	39948	QPSK	1	0	0	0	1	0	Full Power	23.11	24.00
40185	40383	QPSK	1	0	0	0	1	0	Full Power	23.09	24.00
40620	40818	QPSK	1	0	0	0	1	0	Full Power	23.03	24.00
41055	41253	QPSK	1	0	0	0	1	0	Full Power	23.05	24.00
41490	41292	QPSK	1	0	0	0	1	0	Full Power	23.07	24.00
39750	39948	QPSK	1	0	0	0	1	0	ECI1	20.65	21.50
40185	40383	QPSK	1	0	0	0	1	0	ECI1	20.63	21.50
40620	40818	QPSK	1	0	0	0	1	0	ECI1	20.55	21.50
41055	41253	QPSK	1	0	0	0	1	0	ECI1	20.56	21.50
41490	41292	QPSK	1	0	0	0	1	0	ECI1	20.62	21.50
39750	39948	QPSK	1	0	0	0	1	0	ECI2	17.65	18.50
40185	40383	QPSK	1	0	0	0	1	0	ECI2	17.61	18.50
40620	40818	QPSK	1	0	0	0	1	0	ECI2	17.55	18.50
41055	41253	QPSK	1	0	0	0	1	0	ECI2	17.56	18.50
41490	41292	QPSK	1	0	0	0	1	0	ECI2	17.62	18.50
39750	39948	QPSK	1	0	0	0	1	0	ECI3	15.65	16.50
40185	40383	QPSK	1	0	0	0	1	0	ECI3	15.61	16.50
40620	40818	QPSK	1	0	0	0	1	0	ECI3	15.56	16.50
41055	41253	QPSK	1	0	0	0	1	0	ECI3	15.55	16.50
41490	41292	QPSK	1	0	0	0	1	0	ECI3	15.63	16.50
39750	39948	QPSK	1	0	0	0	1	0	ECI4	14.16	15.00
40185	40383	QPSK	1	0	0	0	1	0	ECI4	14.11	15.00
40620	40818	QPSK	1	0	0	0	1	0	ECI4	14.06	15.00
41055	41253	QPSK	1	0	0	0	1	0	ECI4	14.03	15.00
41490	41292	QPSK	1	0	0	0	1	0	ECI4	14.13	15.00