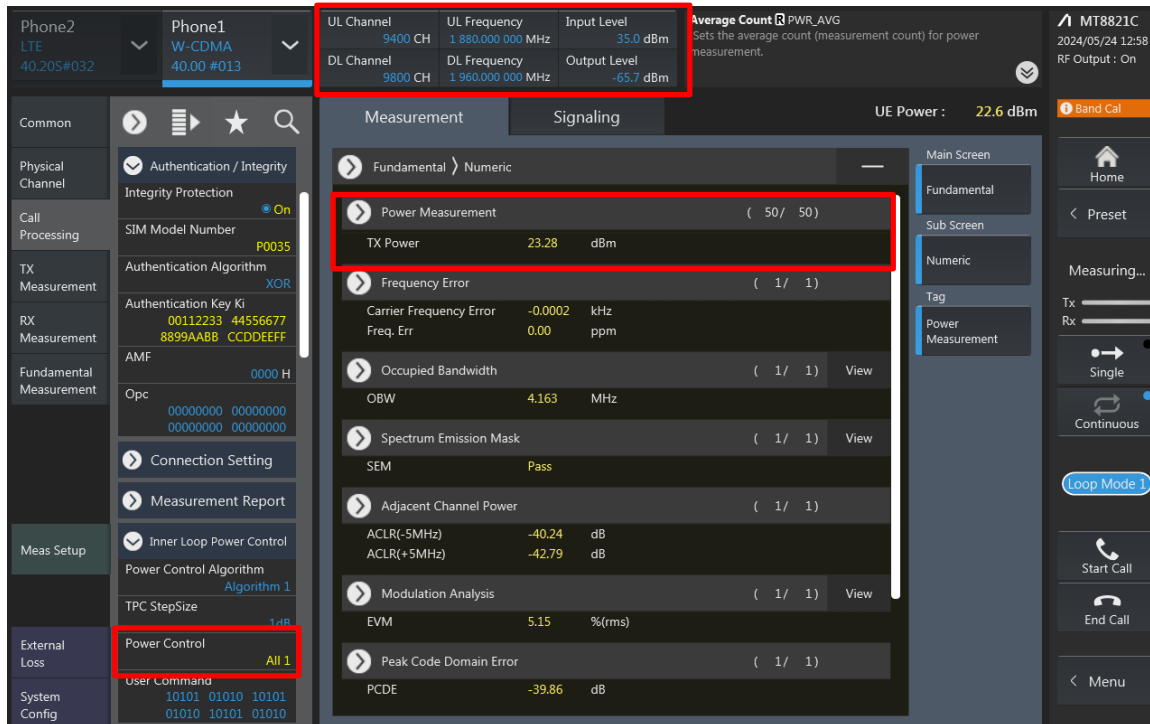


Power measurement connection diagram:

The power measurement for 3G/LTE/5G FR1 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 3G/LTE/5G FR1 and DL CA.

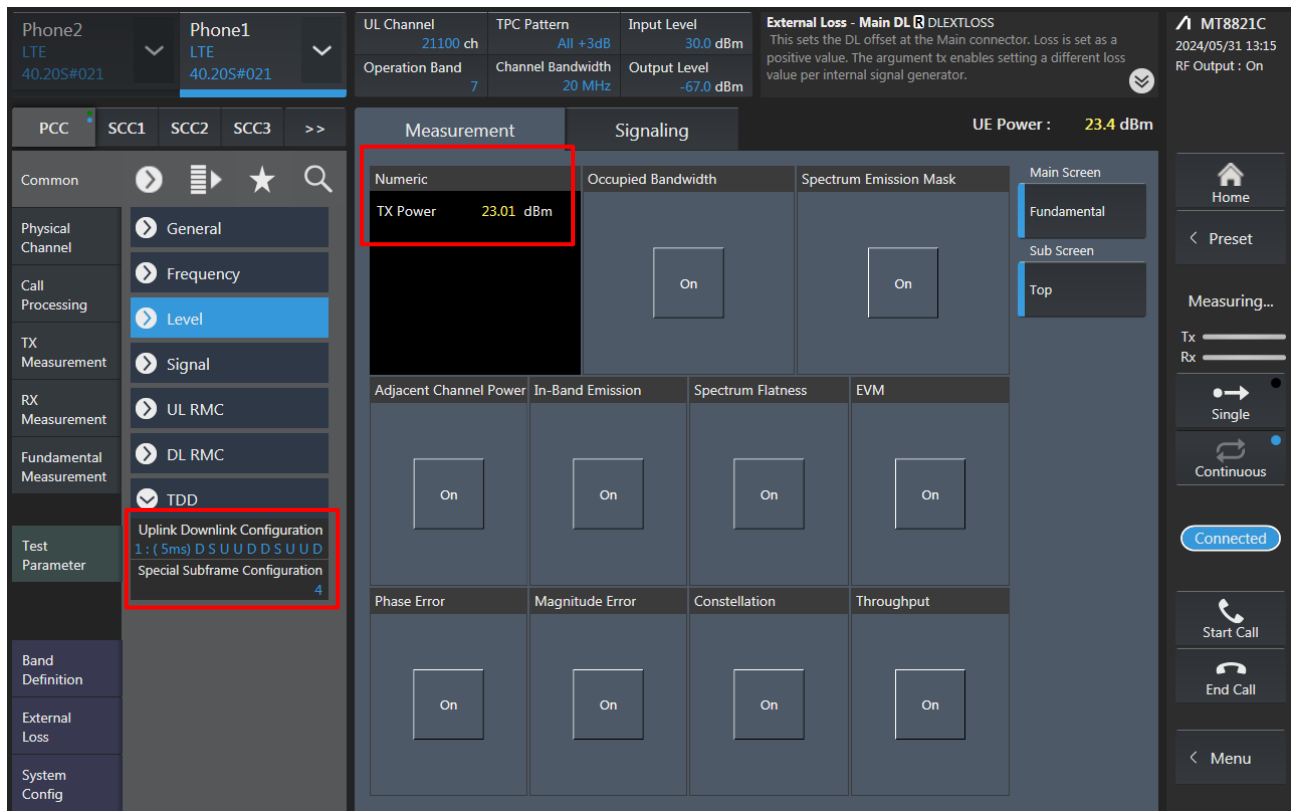
<WCDMA>



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

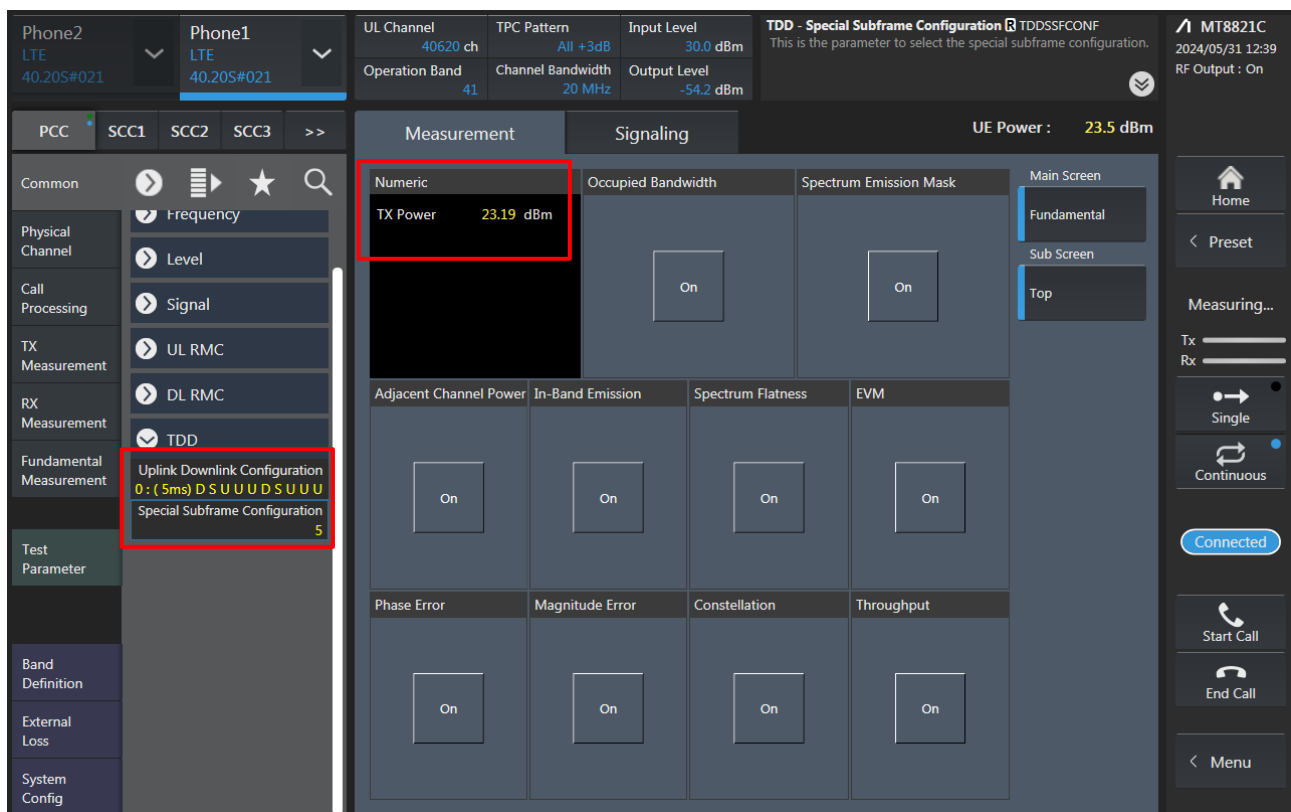
- Top Bar:** Shows Phone2 (LTE 40.205#032) and Phone1 (W-CDMA 40.00 #013). A red box highlights the channel and frequency information: UL Channel 9400 CH, UL Frequency 1 880.000 000 MHz, Input Level 35.0 dBm, DL Channel 9800 CH, DL Frequency 1 960.000 000 MHz, and Output Level -65.7 dBm. The Average Count is set to PWR_AVG.
- Left Panel:** Contains various measurement and setup options. The 'Power Control' option under 'External Loss' is highlighted with a red box.
- Main Panel:** Displays the 'Measurement' results. A red box highlights the 'Power Measurement' section, showing TX Power at 23.28 dBm. Other measurements include Frequency Error, Occupied Bandwidth (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 %), and Peak Code Domain Error (PCDE: -39.86 dB).
- Right Panel:** Shows the 'Main Screen' and 'Sub Screen' tabs. The 'Main Screen' is selected, and the 'Power Measurement' tag is active. The 'Measuring...' status is shown, and the 'Loop Mode 1' button is highlighted.

<LTE>



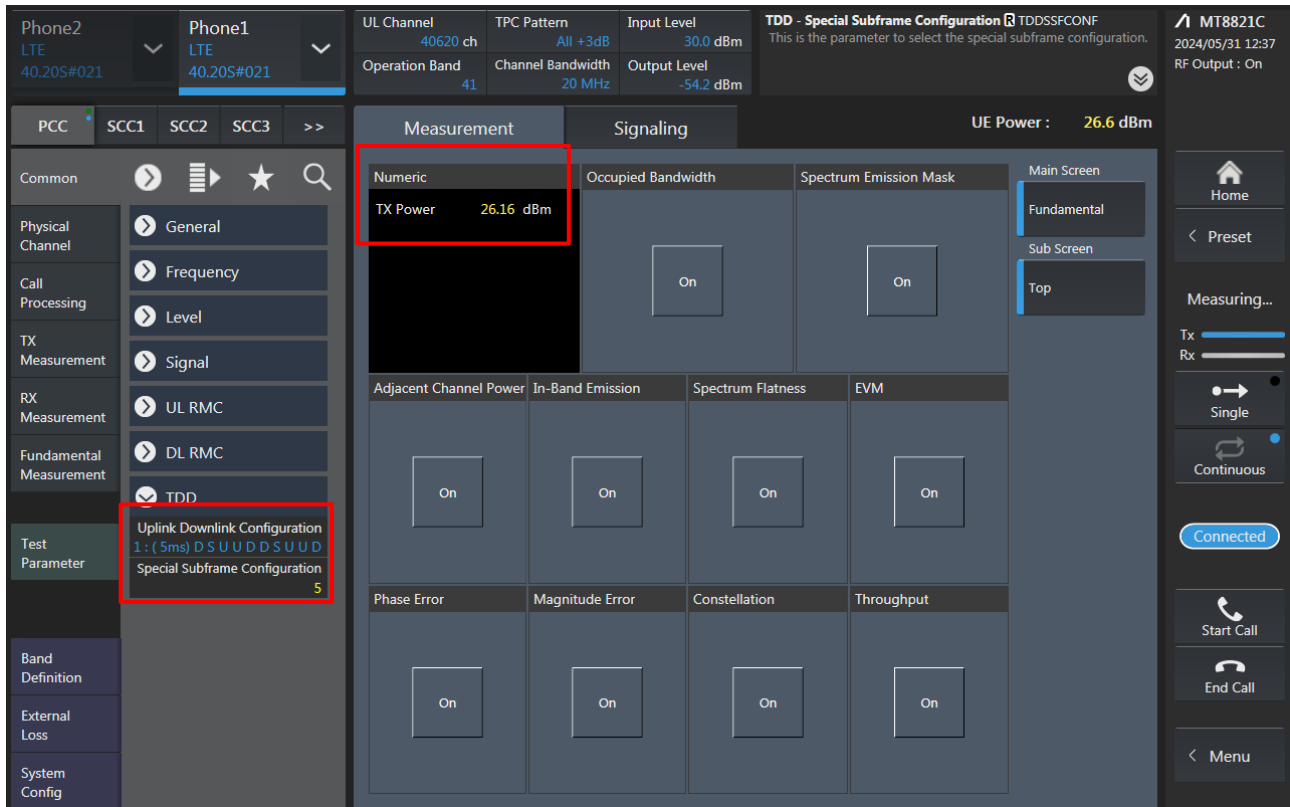
The screenshot shows the LTE measurement interface. The top bar displays 'Phone2' and 'Phone1' both set to 'LTE 40.20S#021'. The 'Measurement' tab is active, showing 'TX Power' at 23.01 dBm. The 'Signaling' tab shows 'Occupied Bandwidth' and 'Spectrum Emission Mask' both set to 'On'. The 'Main Screen' shows 'Fundamental' and 'Sub Screen' set to 'Top'. The 'Test Parameter' section shows 'Uplink Downlink Configuration 1: (5ms) D S U U D D S U U D' and 'Special Subframe Configuration 4'. The 'UE Power' is 23.4 dBm. The 'External Loss - Main DL' is 0 dB. The 'MT8821C' status is '2024/05/31 13:15 RF Output : On'.

<LTE TDD Power class 3>



The screenshot shows the LTE TDD Power class 3 measurement interface. The top bar displays 'Phone2' and 'Phone1' both set to 'LTE 40.20S#021'. The 'Measurement' tab is active, showing 'TX Power' at 23.19 dBm. The 'Signaling' tab shows 'Occupied Bandwidth' and 'Spectrum Emission Mask' both set to 'On'. The 'Main Screen' shows 'Fundamental' and 'Sub Screen' set to 'Top'. The 'Test Parameter' section shows 'Uplink Downlink Configuration 0: (5ms) D S U U U D S U U U' and 'Special Subframe Configuration 5'. The 'UE Power' is 23.5 dBm. The 'TDD - Special Subframe Configuration' is 0. The 'MT8821C' status is '2024/05/31 13:39 RF Output : On'.

<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 TDDSSCONF

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

Adjacent Channel Power

In-Band Emission

Spectrum Flatness

EVM

Phase Error

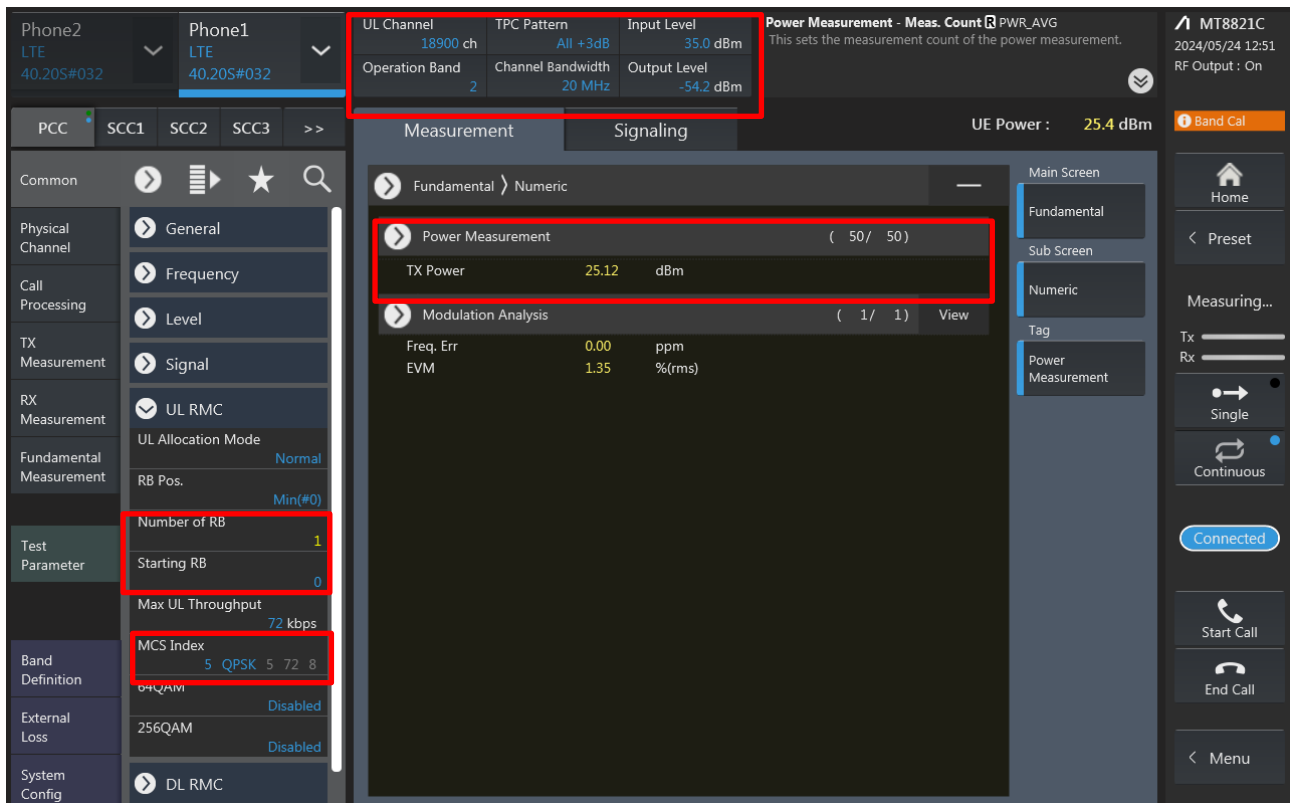
Magnitude Error

Constellation

Throughput

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

Special Subframe Configuration 5



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

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)

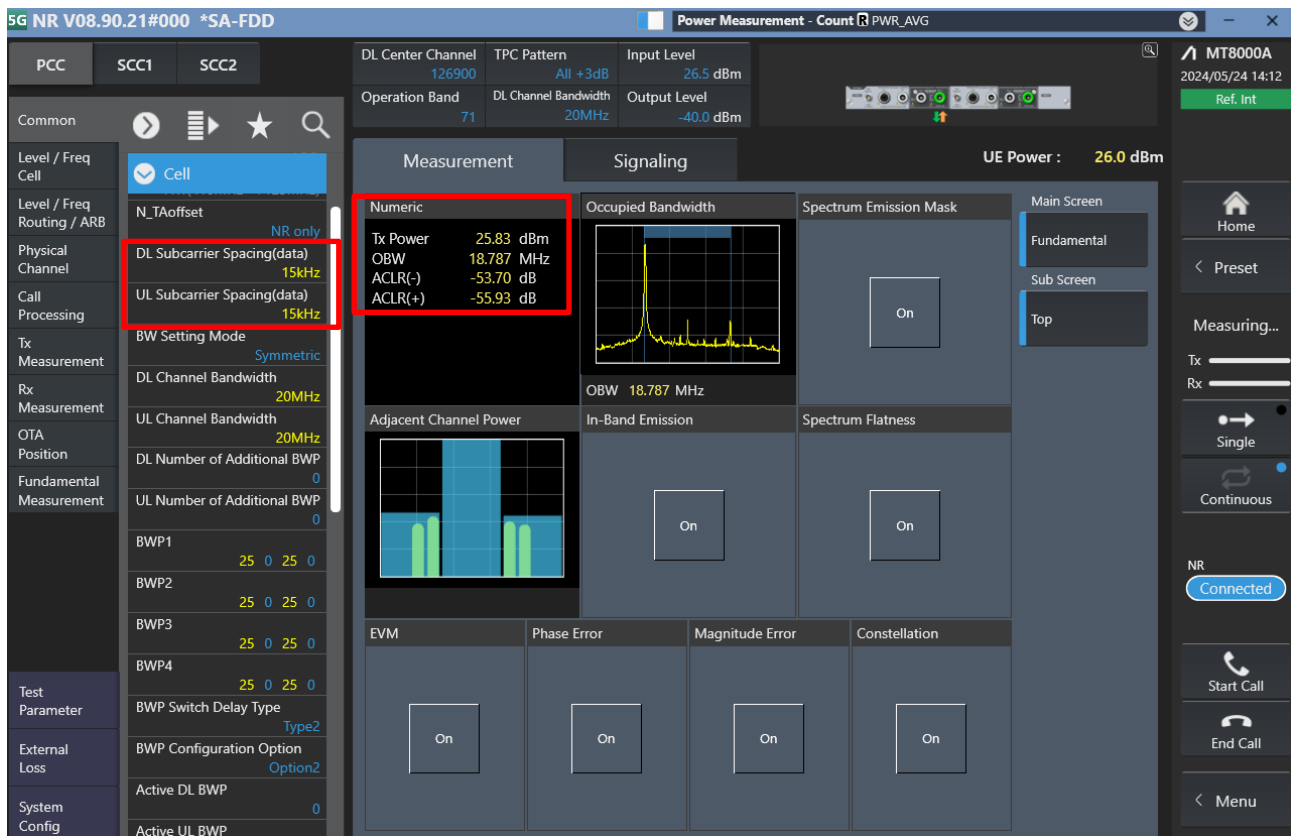
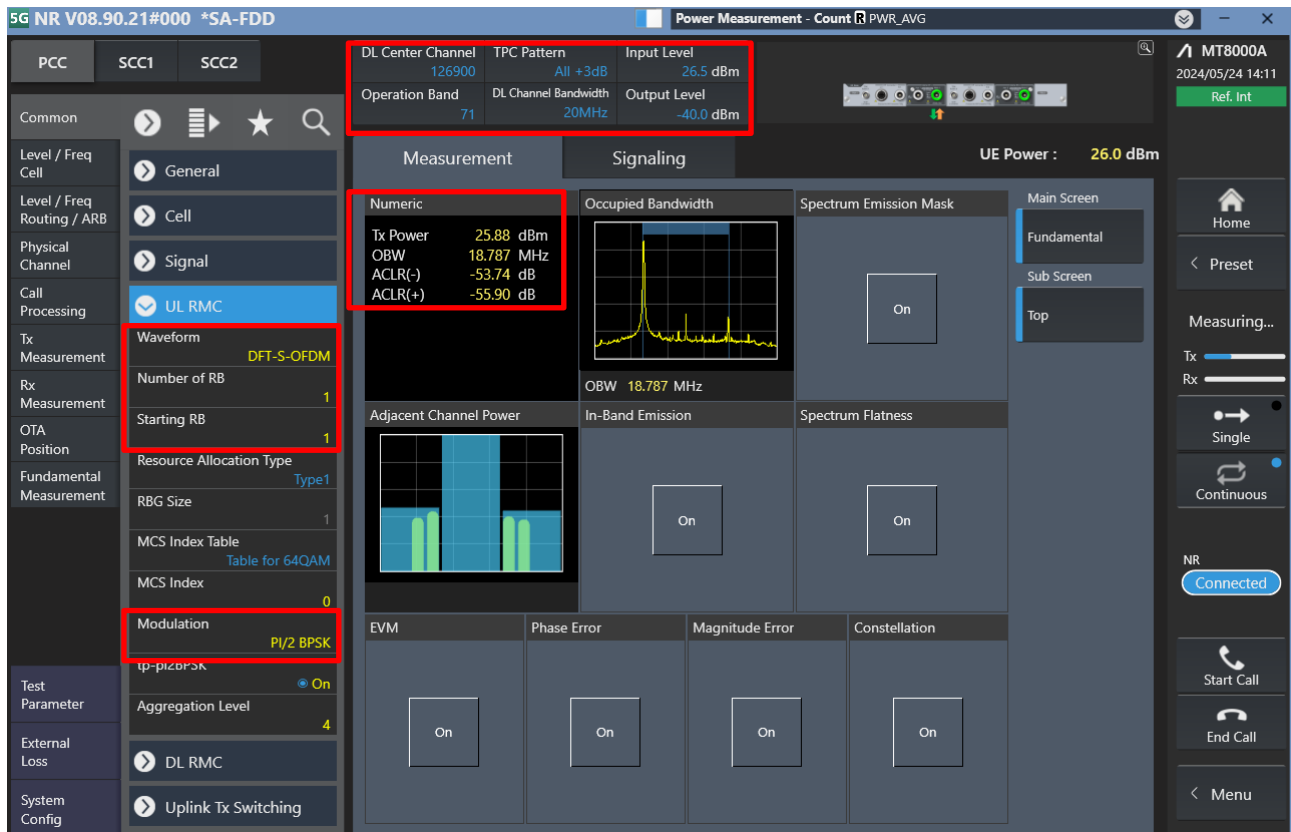
Number of RB 1

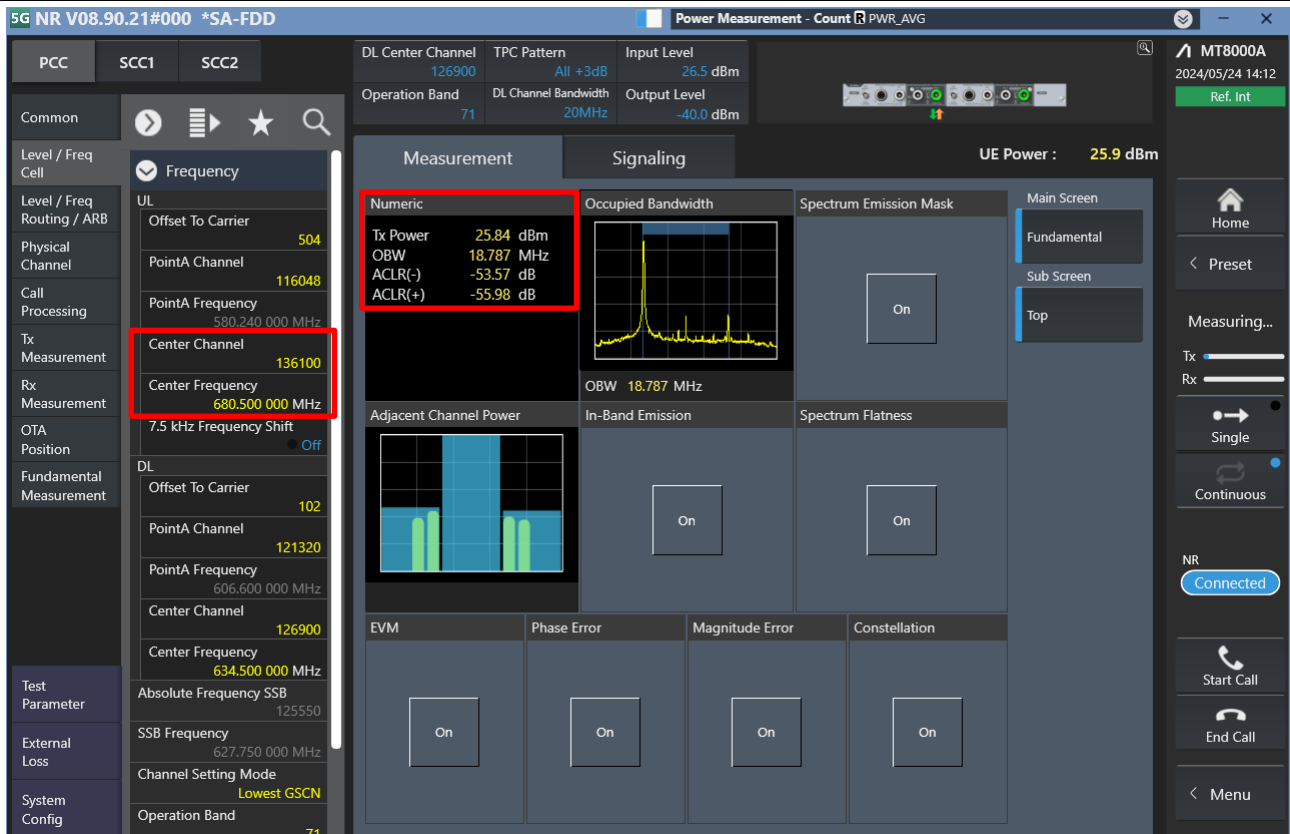
Starting RB 0

Max UL Throughput 72 kbps

MCS Index 5 QPSK 5 72 8

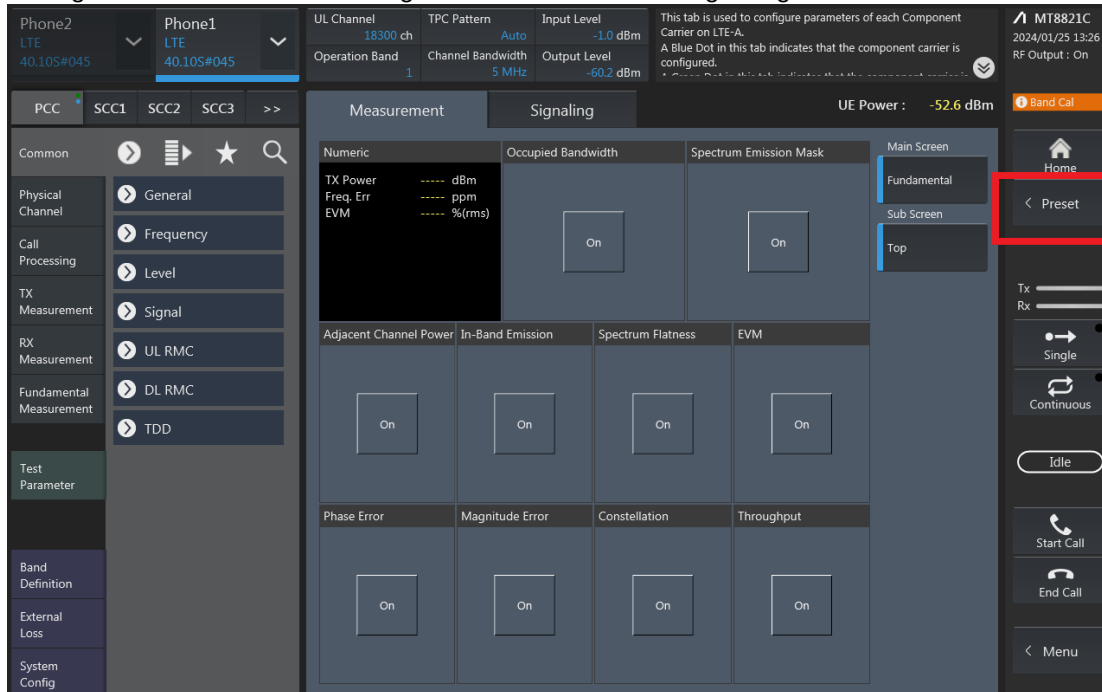
<5G NR FR1>





LTE Downlink Carrier Aggregation configurations:

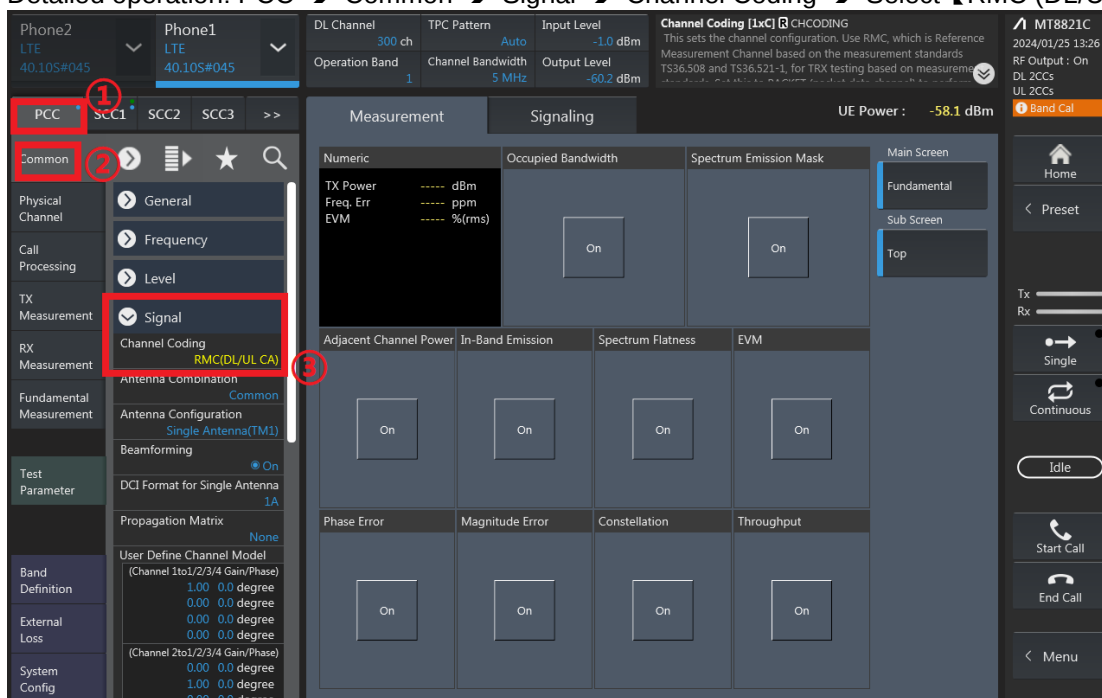
1. Change the Scenario in the Configuration of Phone1 LTE Signaling and Preset.



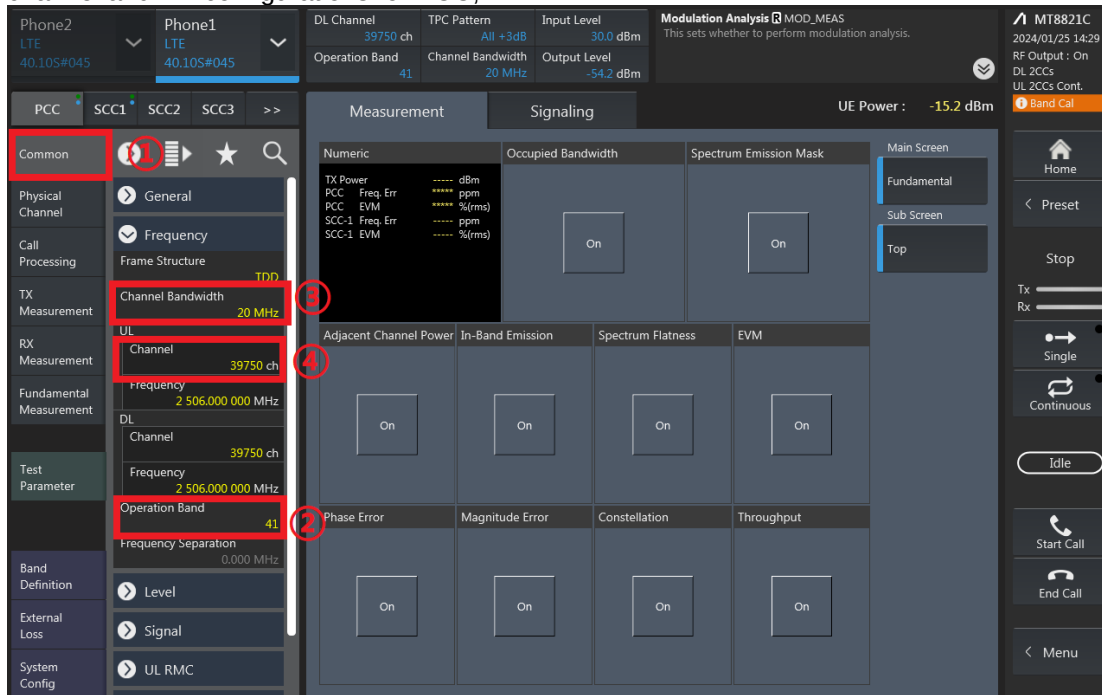
2. If Select "RMC (DL/UL CA)" for Uplink Carrier Aggregation;
If Select "RMC (DL CA)" for Downlink Carrier Aggregation.

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 PCC EVM ppm SCC-1 Freq. Err. ppm SCC-1 EVM ppm

Occupied Bandwidth

Spectrum Emission Mask

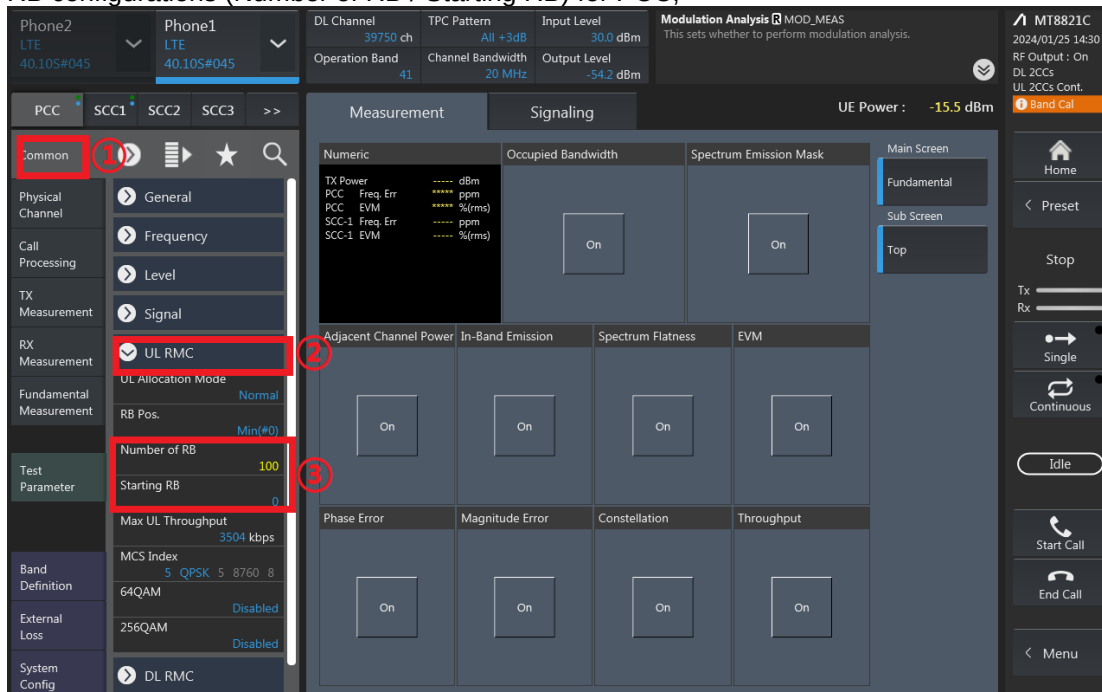
Main Screen Fundamental Sub Screen Top

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

External Loss

System Config DL RMC

Numeric

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

Occupied Bandwidth

Spectrum Emission Mask

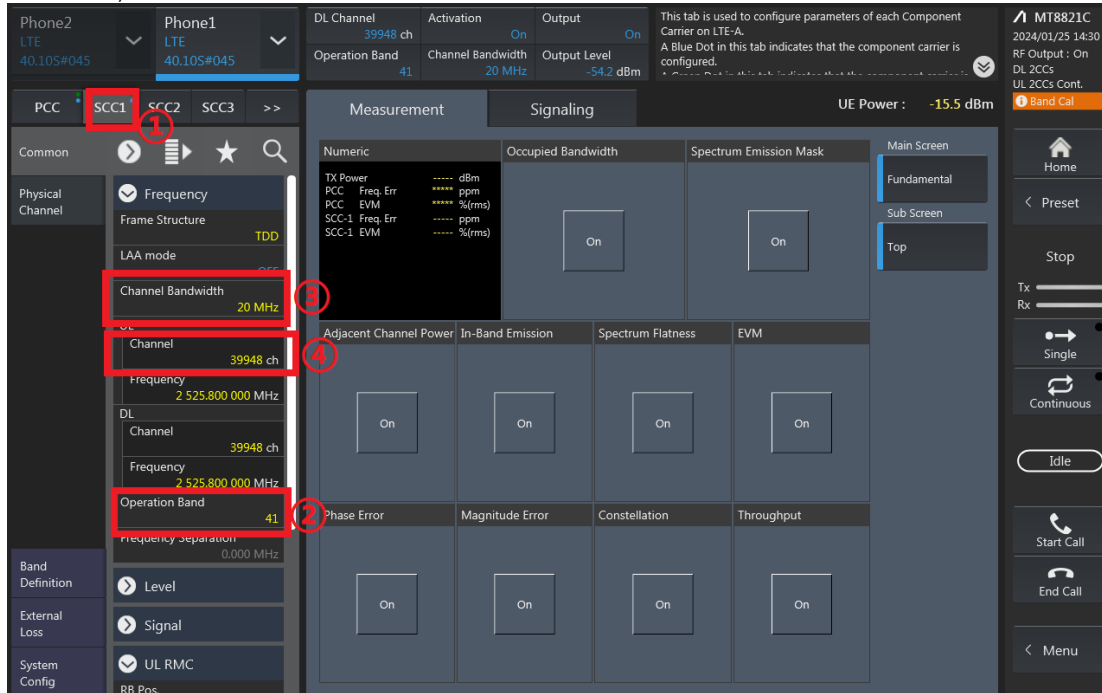
Main Screen Fundamental Sub Screen Top

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

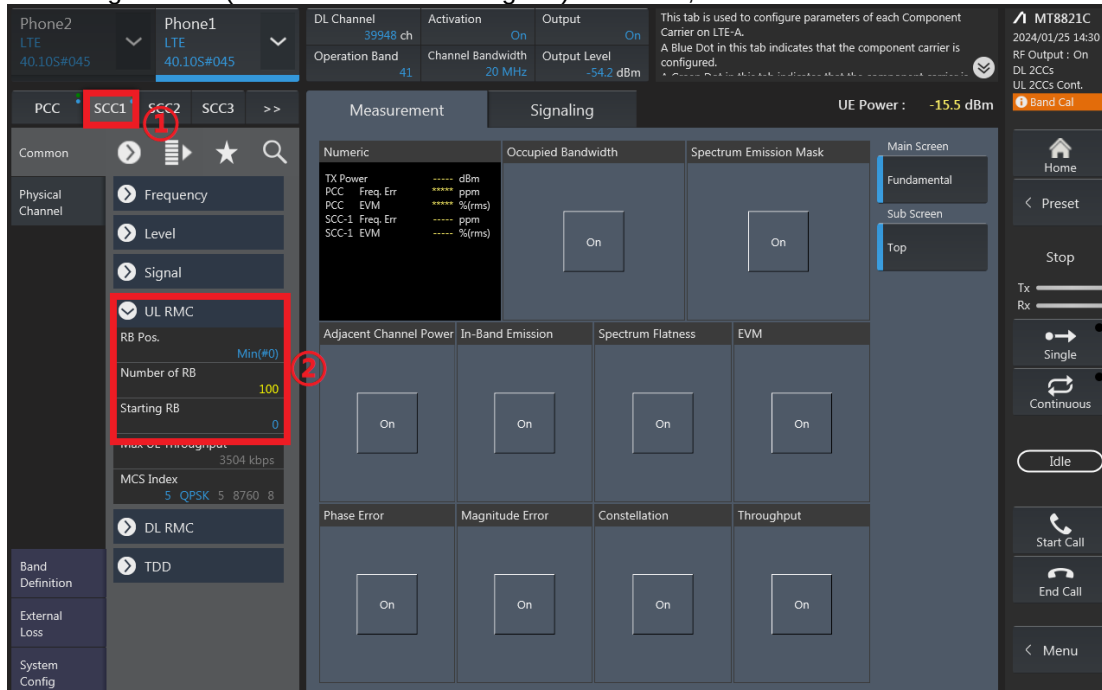
Adjacent Channel Power In-Band Emission Spectrum Flatness EVM

Phase Error Magnitude Error Constellation Throughput

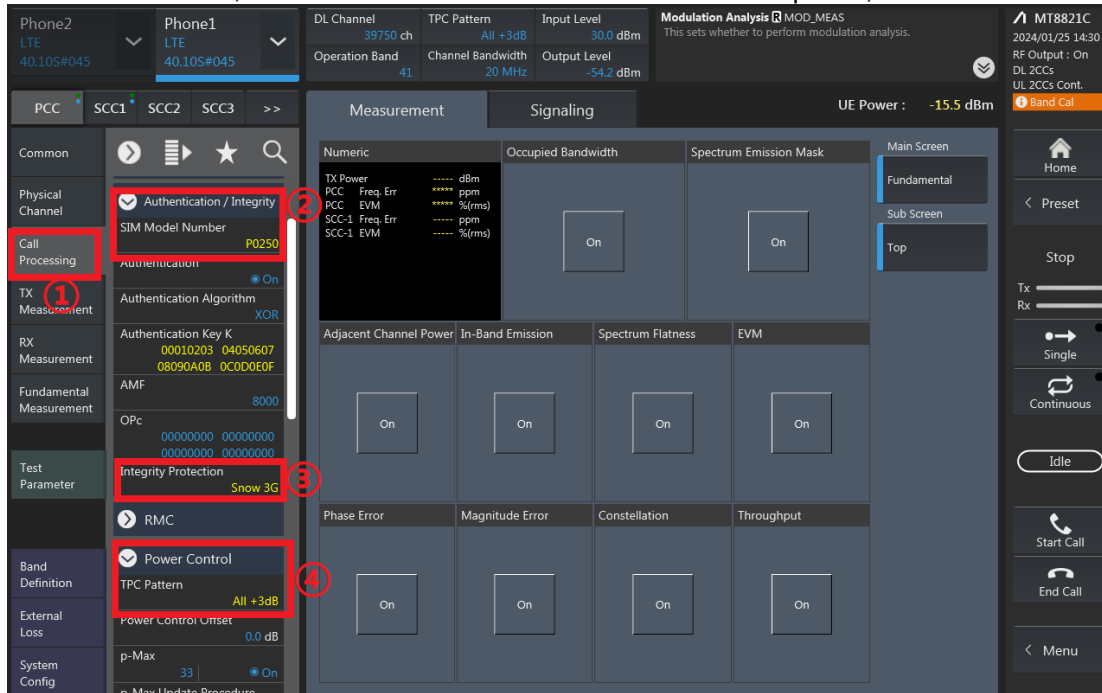
4. SCC parameter Settings: Select the SCC1 tab, Set operating band, BW, channel, and RB configurations for SCC1;



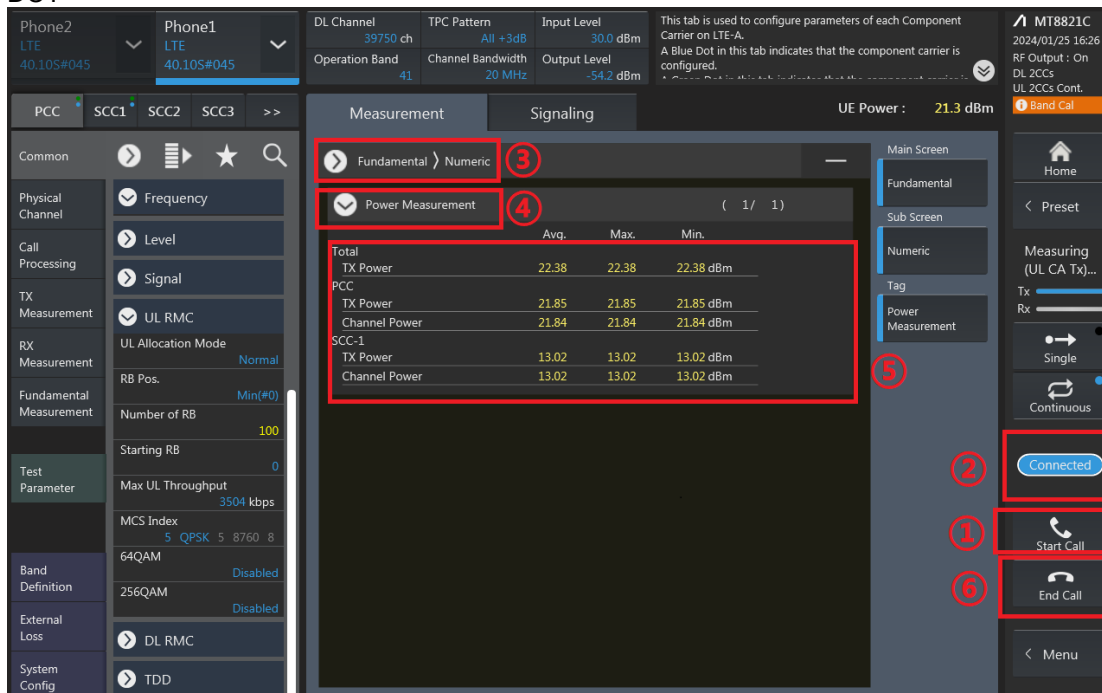
RB configurations (Number of RB / Starting RB) for SCC1;



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



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

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

LTE bandS	Modulation	BW (MHz)	Ch.	Freq. (MHz)	RB offset	LTE Rel 8Tx.power (dBm)	DL 4x4 MIMO Tx.power (dBm)	Delta
LTE Band 42	QPSK	20M	42190	3460	1/0	22.98	22.87	0.11
LTE Band 43	QPSK	20M	44590	3650	1/0	22.72	22.67	0.05
LTE Band 38	QPSK	20M	38000	2595	1/0	23.15	23.07	0.08
LTE Band 7	QPSK	20M	21100	2535	1/0	22.21	22.17	0.04
LTE Band 41	QPSK	20M	40620	2593	1/0	23.14	23.11	0.03
LTE Band 48	QPSK	20M	55830	3609	1/0	22.72	22.67	0.05

Downlink CA Power

2CA DL																		
CA List	PCD								DL Antenna Configuration	SCC				Power				
	LTE	BW	BW	UL	UL#	UL	Tx Power (dBm)	Without CA (dBm)										
	Band	Ant	(MHz)	Freq (MHz)	Channel	Mod				RB	RB Offset							
CA_2A-2A	Band 2	Ant1	20M	1880	18800	QPSK	1	0	Band 2	5M	1987.5	1175	23.29	23.41				
CA_2A-4A	Band 2	Ant1	20M	1880	18800	QPSK	1	0	Band 4	20M	2132.5	2175	23.25	23.41				
	Band 4	Ant1	20M	1732.5	20175	QPSK	1	0	Band 2	20M	1960	900	23.12	23.33				
CA_2A-5A	Band 2	Ant1	20M	1880	18800	QPSK	1	0	Band 5	10M	881.5	2525	23.41	23.41				
	Band 5	Ant1	10M	836.5	20525	QPSK	1	0	Band 2	20M	1960	900	23.81	24.03				
CA_2A-7A	Band 2	Ant1	20M	1880	18800	QPSK	1	0	Band 7	20M	2655	3100	4xMMMO	23.19	23.33			
	Band 7	Ant2	20M	2535	21100	QPSK	1	0	4xMMMO	Band 2	20M	1960	900	22.09	22.21			
CA_2A-12A	Band 2	Ant1	20M	1880	18800	QPSK	1	0	Band 12	10M	737.5	5095		23.34	23.41			
	Band 12	Ant1	10M	707.5	23095	QPSK	1	0	Band 2	20M	1960	900	23.97	24.10				
CA_2A-13A	Band 2	Ant1	20M	1880	18800	QPSK	1	0	Band 13	10M	751	5230		23.22	23.41			
	Band 13	Ant1	10M	782	23230	QPSK	1	0	Band 2	20M	1960	900	24.05	24.11				
CA_2A-14A	Band 2	Ant1	20M	1880	18800	QPSK	1	0	Band 14	10M	763	5330		23.22	23.41			
	Band 14	Ant1	10M	793	23330	QPSK	1	0	Band 2	20M	1960	900	24.05	24.13				
CA_2A-66A	Band 2	Ant1	20M	1880	18800	QPSK	1	0	Band 66	20M	2155	66886		23.41	23.41			
	Band 66	Ant1	20M	1745	132322	QPSK	1	0	Band 2	20M	1960	900	23.27	23.38				
CA_2A-71A	Band 2	Ant1	20M	1880	18800	QPSK	1	0	Band 71	20M	683	68786		23.29	23.41			
	Band 71	Ant1	20M	683	133322	QPSK	1	0	Band 2	20M	1960	900	23.64	23.71				
CA_4A-4A	Band 4	Ant1	20M	1732.5	20175	QPSK	1	0	Band 4	5M	2152.5	2375		23.11	23.33			
	Band 4	Ant1	20M	1732.5	20175	QPSK	1	0	Band 5	10M	881.5	2525		23.15	23.33			
CA_4A-5A	Band 4	Ant1	20M	1732.5	20175	QPSK	1	0	Band 4	20M	2132.5	2175		23.64	24.03			
	Band 5	Ant1	10M	836.5	20525	QPSK	1	0	Band 7	20M	2655	3100	4xMMMO	23.14	23.33			
CA_4A-7A	Band 4	Ant1	20M	1732.5	20175	QPSK	1	0	Band 4	20M	2132.5	2175		22.06	22.21			
	Band 7	Ant2	20M	2535	21100	QPSK	1	0	4xMMMO	Band 4	20M	2132.5	2175		23.28	23.33		
CA_4A-12A	Band 4	Ant1	20M	1732.5	20175	QPSK	1	0	Band 12	10M	737.5	5095		23.28	23.33			
	Band 12	Ant1	10M	707.5	23095	QPSK	1	0	Band 4	20M	2132.5	2175		23.98	24.10			
CA_4A-13A	Band 4	Ant1	20M	1732.5	20175	QPSK	1	0	Band 13	10M	751	5230		23.24	23.33			
	Band 13	Ant1	10M	782	23230	QPSK	1	0	Band 4	20M	2132.5	2175		23.99	24.11			
CA_4A-48A	Band 4	Ant1	20M	1732.5	20175	QPSK	1	0	Band 48	20M	3609	56830	4xMMMO	23.11	23.33			
	Band 4	Ant1	20M	1732.5	20175	QPSK	1	0	Band 71	20M	683	68786		23.23	23.33			
CA_4A-71A	Band 71	Ant1	20M	683	133322	QPSK	1	0	Band 4	20M	2132.5	2175		23.62	23.71			
	Band 5	Ant1	10M	836.5	20525	QPSK	1	0	Band 5	5M	881.5	2625		23.95	24.03			
CA_5A-5A	Band 5	Ant1	10M	836.5	20525	QPSK	1	0	Band 7	20M	2655	3100	4xMMMO	23.94	24.03			
	Band 7	Ant2	20M	2535	21100	QPSK	1	0	4xMMMO	Band 5	10M	881.5	2525		22.10	22.21		
CA_5A-48A	Band 5	Ant1	10M	836.5	20525	QPSK	1	0	Band 48	20M	3609	56830	4xMMMO	23.85	24.03			
	Band 5	Ant1	10M	836.5	20525	QPSK	1	0	Band 66	20M	2155	66886		23.87	24.03			
CA_5A-66A	Band 66	Ant1	20M	1745	132322	QPSK	1	0	Band 5	10M	881.5	2525		23.20	23.36			
	Band 5	Ant1	10M	836.5	20525	QPSK	1	0	Band 5	5M	888.7	2597		23.82	24.03			
CA_7A-7A	Band 7	Ant2	20M	2535	21100	QPSK	1	0	4xMMMO	Band 7	5M	2687.5	3425	4xMMMO	22.14	22.21		
	Band 7	Ant2	20M	2535	21100	QPSK	1	0	4xMMMO	Band 12	10M	737.5	5095		22.16	22.21		
CA_7A-12A	Band 7	Ant1	20M	1732.5	20175	QPSK	1	0	4xMMMO	Band 7	20M	2655	3100	4xMMMO	23.94	24.10		
	Band 12	Ant1	10M	707.5	23095	QPSK	1	0	4xMMMO	Band 66	20M	2155	66886		22.02	22.21		
CA_7A-66A	Band 7	Ant2	20M	2535	21100	QPSK	1	0	4xMMMO	Band 66	20M	2155	66886		23.19	23.35		
	Band 66	Ant1	20M	1745	132322	QPSK	1	0	4xMMMO	Band 7	20M	2154.8	3296	4xMMMO	22.06	22.21		
CA_7C	Band 7	Ant2	20M	2535	21100	QPSK	1	0	4xMMMO	Band 7	20M	2154.8	3296		23.06	23.21		
	Band 12	Ant1	10M	707.5	23095	QPSK	1	0		Band 66	20M	2155	66886		24.09	24.10		
CA_12A-66A	Band 66	Ant1	20M	1745	132322	QPSK	1	0		Band 12	10M	737.5	5095		23.21	23.38		
	Band 12	Ant1	10M	707.5	23095	QPSK	1	0		Band 12	5M	743.5	5155		24.02	24.10		
CA_13A-48A	Band 13	Ant1	10M	782	23230	QPSK	1	0		Band 48	20M	3609	56830	4xMMMO	24.04	24.11		
	Band 13	Ant1	10M	782	23230	QPSK	1	0		Band 66	20M	2155	66886		23.94	24.11		
CA_13A-66A	Band 66	Ant1	20M	1745	132322	QPSK	1	0		Band 13	10M	751	5230		23.13	23.35		
	Band 14	Ant1	10M	793	23330	QPSK	1	0		Band 66	20M	2155	66886		23.96	24.13		
CA_14A-66A	Band 66	Ant1	20M	1745	132322	QPSK	1	0		Band 14	10M	763	5330		23.20	23.35		
	CA_41A-41A	Band 41	Ant2	20M	2593	40620	QPSK	1	0	4xMMMO	Band 41	5M	2687.5	41965	4xMMMO	22.90	23.14	
CA_41A-48A	Band 41	Ant2	20M	2593	40620	QPSK	1	0	4xMMMO	Band 41	20M	2012.8	40810	4xMMMO	22.91	23.14		
	CA_48A-48A	Band 48	Ant6	20M	3609	56830	QPSK	1	0	4xMMMO	Band 48	5M	3697.5	56715	4xMMMO	22.91	22.72	
CA_48C	Band 48	Ant6	20M	3609	56830	QPSK	1	0	4xMMMO	Band 48	20M	3628.8	56028	4xMMMO	22.67	22.72		
	Band 71	Ant1	20M	683	133322	QPSK	1	0		Band 48	20M	3609	56830	4xMMMO	23.65	23.71		
CA_48A-71A	Band 66	Ant1	20M	1745	132322	QPSK	1	0		Band 66	5M	2197.5	67311		23.14	23.35		
	Band 71	Ant1	20M	683	133322	QPSK	1	0		Band 71	20M	683	68786		23.35	23.35		
CA_66A-71A	Band 66	Ant1	20M	1745	132322	QPSK	1	0		Band 66	20M	2155	66886		23.56	23.71		
	Band 66	Ant1	15M	1745	132322	QPSK	1	0		Band 66	5M	2164.3	69979		23.29	23.35		
CA_66C	Band 66	Ant1	20M	1745	132322	QPSK	1	0		Band 66	20M	2164.8	69994		23.32	23.35		
	CA_2C	Band 2	Ant1	20M	1880	18800	QPSK	1	0	Band 2	20M	1979.8	1098		23.22	23.38		
CA_2A-48A	Band 2	Ant1	20M	1880	18800	QPSK	1	0		Band 48	20M	3609	56830	4xMMMO	23.24	23.29		
	CA_48A-66A	Band 66	Ant1	20M	1745	132322	QPSK	1	0	4xMMMO	Band 48	20M	3609	56830		23.13	23.38	