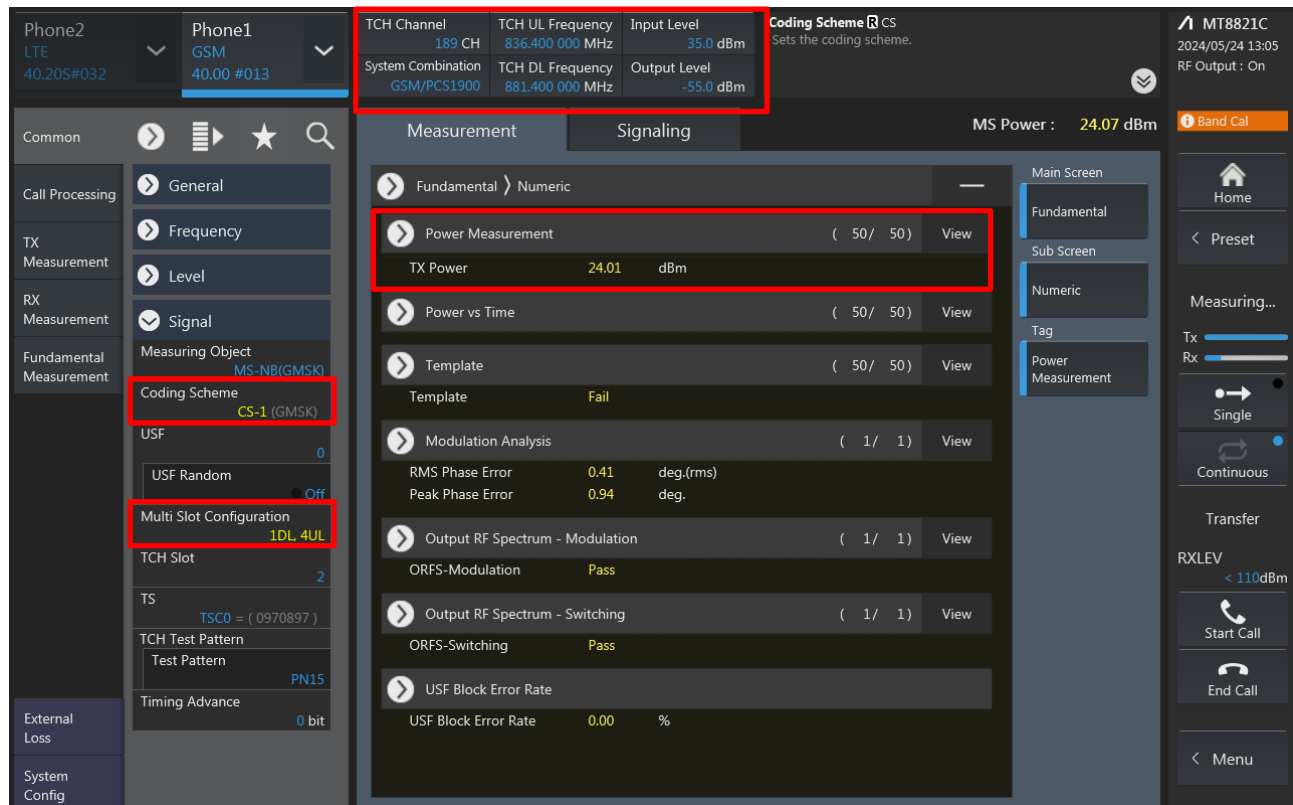


Power measurement connection diagram:

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.

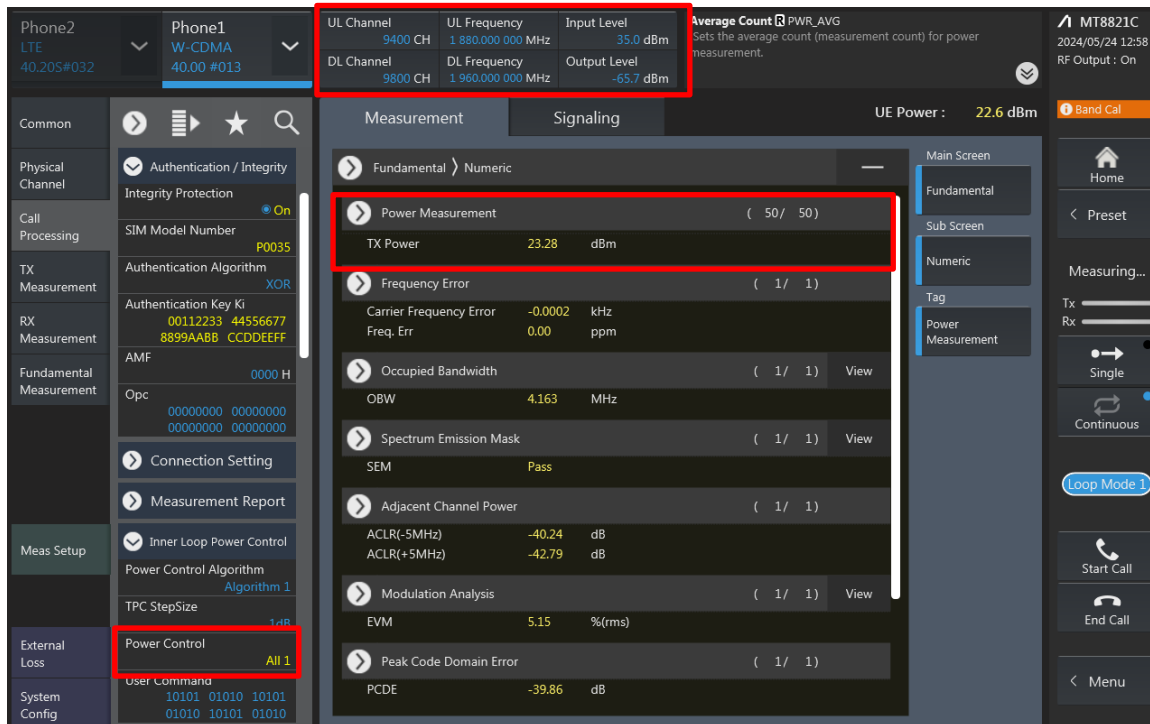
<GSM>



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

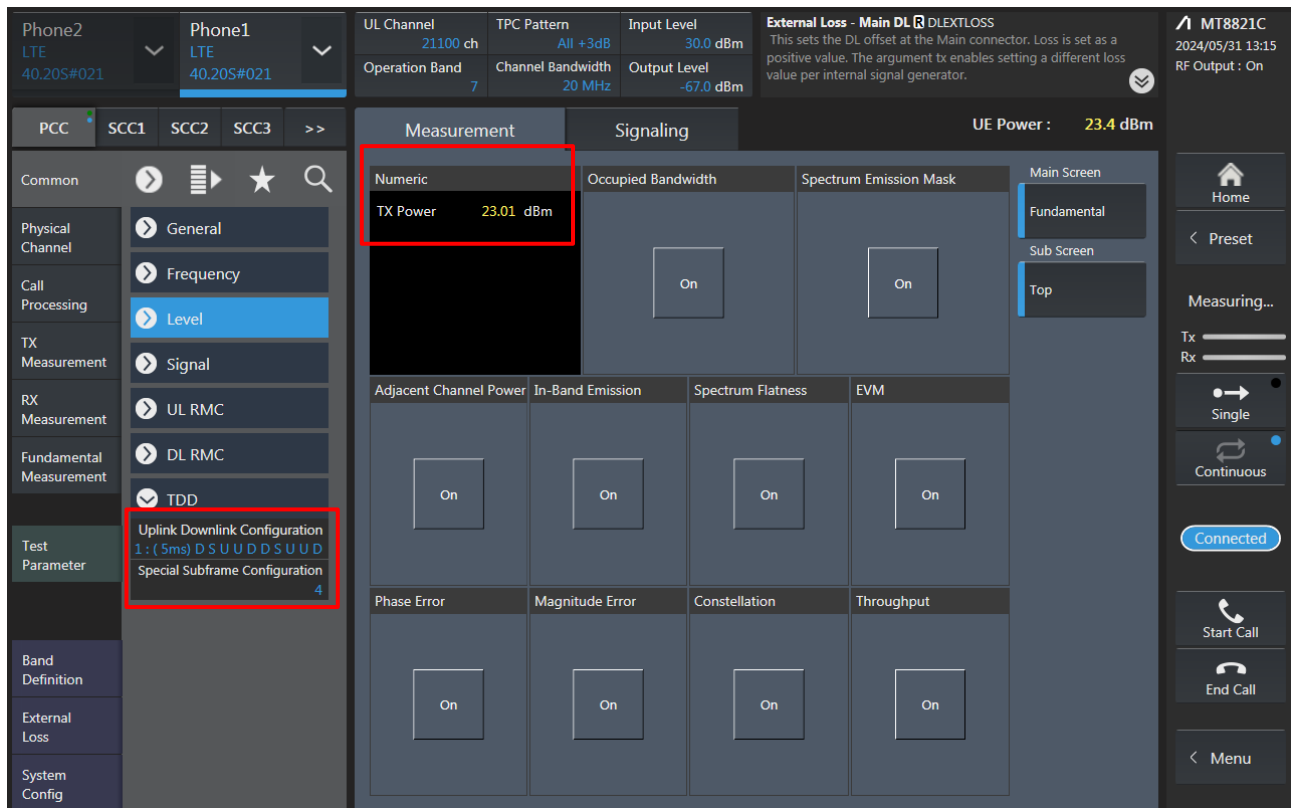
- Top Bar:** Shows Phone2 (LTE, 40.205#032) and Phone1 (GSM, 40.00 #013). The TCH Channel is 189 CH, TCH UL Frequency is 836.400 000 MHz, Input Level is 35.0 dBm, and TCH DL Frequency is 881.400 000 MHz. The Coding Scheme is CS.
- Left Sidebar:** Contains navigation options like Call Processing, TX Measurement, RX Measurement, Fundamental Measurement, and External Loss.
- Main Area:**
 - Measurement Tab:** Displays various measurement results. The 'Power Measurement' section shows TX Power as 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 signaling information.
- Right Sidebar:** Includes a 'Main Screen' section with 'Fundamental' and 'Sub Screen' options, and a 'Tag' section with 'Power Measurement'.

<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 a list of metrics. A red box highlights the 'Power Measurement' section, which includes 'TX Power' at 23.28 dBm. Another red box highlights the 'UL Channel' and 'DL Channel' information at the top, showing 'UL Channel 9400 CH' and 'DL Channel 9800 CH'. The 'UE Power' is 22.6 dBm. The right sidebar shows 'MT8821C' and 'RF Output : On'.

<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 a grid of metrics. A red box highlights the 'TX Power' at 23.01 dBm. Another red box highlights the 'Uplink Downlink Configuration' section, showing '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 right sidebar shows 'MT8821C' and 'RF Output : On'.

The screenshot displays the MT8821C software interface for TDD - Special Subframe Configuration. The top status bar shows the device name 'MT8821C', the date '2024/05/31 12:39', and the RF Output status 'On'. The main interface is divided into several sections:

- Navigation Menu (Left):** Includes options for PCC, SCC1, SCC2, SCC3, and Common. The 'Common' section is currently selected, showing a list of measurement and signaling parameters.
- Measurement Section (Top Left):** Displays various parameters including UL Channel (40620 ch), TPC Pattern (All +3dB), Input Level (30.0 dBm), Operation Band (41), Channel Bandwidth (20 MHz), and Output Level (-54.2 dBm).
- TDD - Special Subframe Configuration (Red Box):** This section is highlighted and shows the 'Uplink Downlink Configuration' as '0 : (5ms) D S U U U D S U U U' and the 'Special Subframe Configuration' as '5'.
- Measurement Section (Bottom Left):** This section is also highlighted and shows the 'TX Power' as '23.19 dBm'.
- Signaling Section (Top Right):** Displays 'Occupied Bandwidth' and 'Spectrum Emission Mask'.
- UE Power (Top Right):** Shows the 'UE Power' as '23.5 dBm'.
- Main Screen (Right):** Includes options for 'Fundamental', 'Sub Screen', and 'Top'.
- Bottom Right:** Shows a 'Connected' status and buttons for 'Start Call' and 'End Call'.

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

Power Measurement - Count PWR_AVG

MT8000A
2024/05/24 14:11
Ref. Int

UE Power : 26.0 dBm

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

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
- Aggregation Level 4
- DL RMC
- Uplink Tx Switching

Measurement

Numeric

Tx Power	25.88 dBm
OBW	18.787 MHz
ACLR(-)	-53.74 dB
ACLR(+)	-55.90 dB

Occupied Bandwidth

OBW 18.787 MHz

Adjacent Channel Power

In-Band Emission

Spectrum Emission Mask

Spectrum Flatness

EVM

Phase Error

Magnitude Error

Constellation

Main Screen

- Fundamental
- Sub Screen
- Top

Home

Preset

Measuring...

Tx

Rx

Single

Continuous

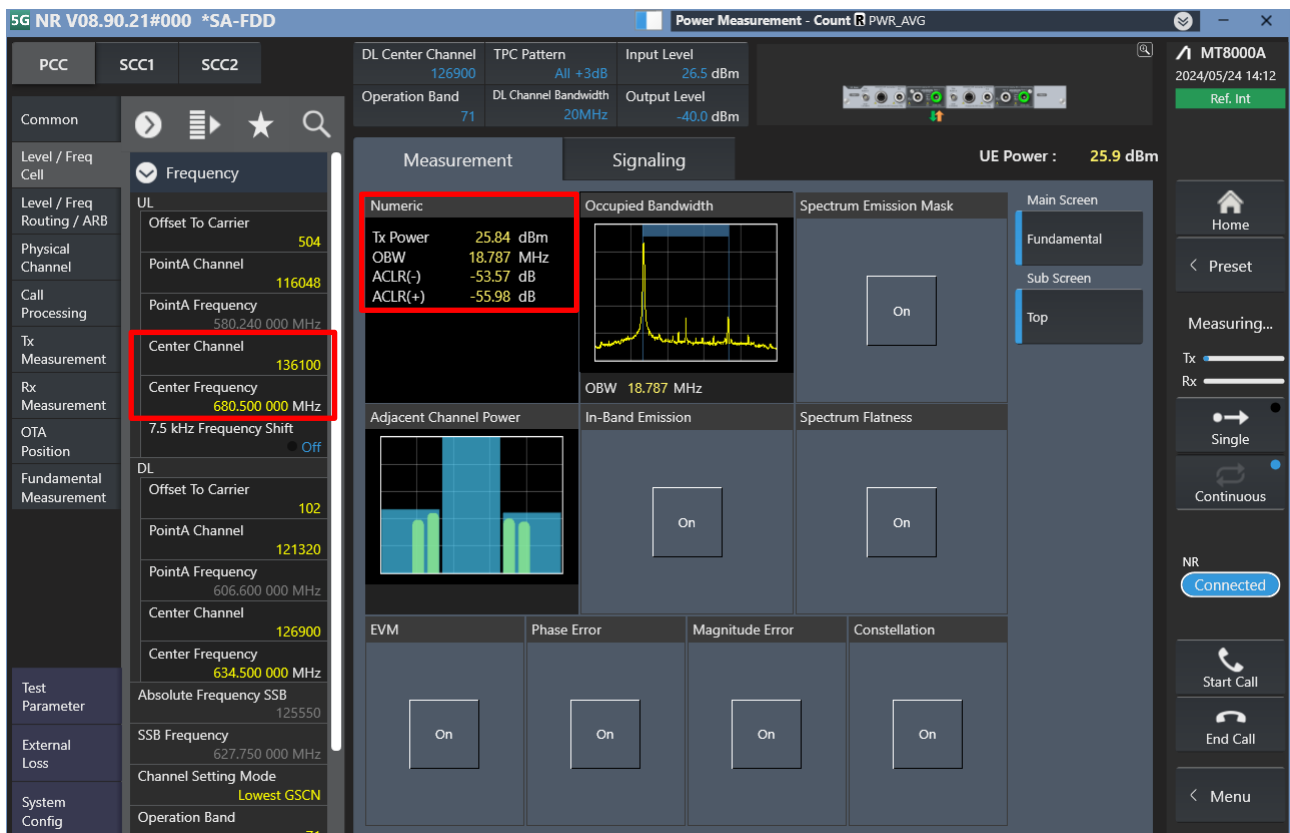
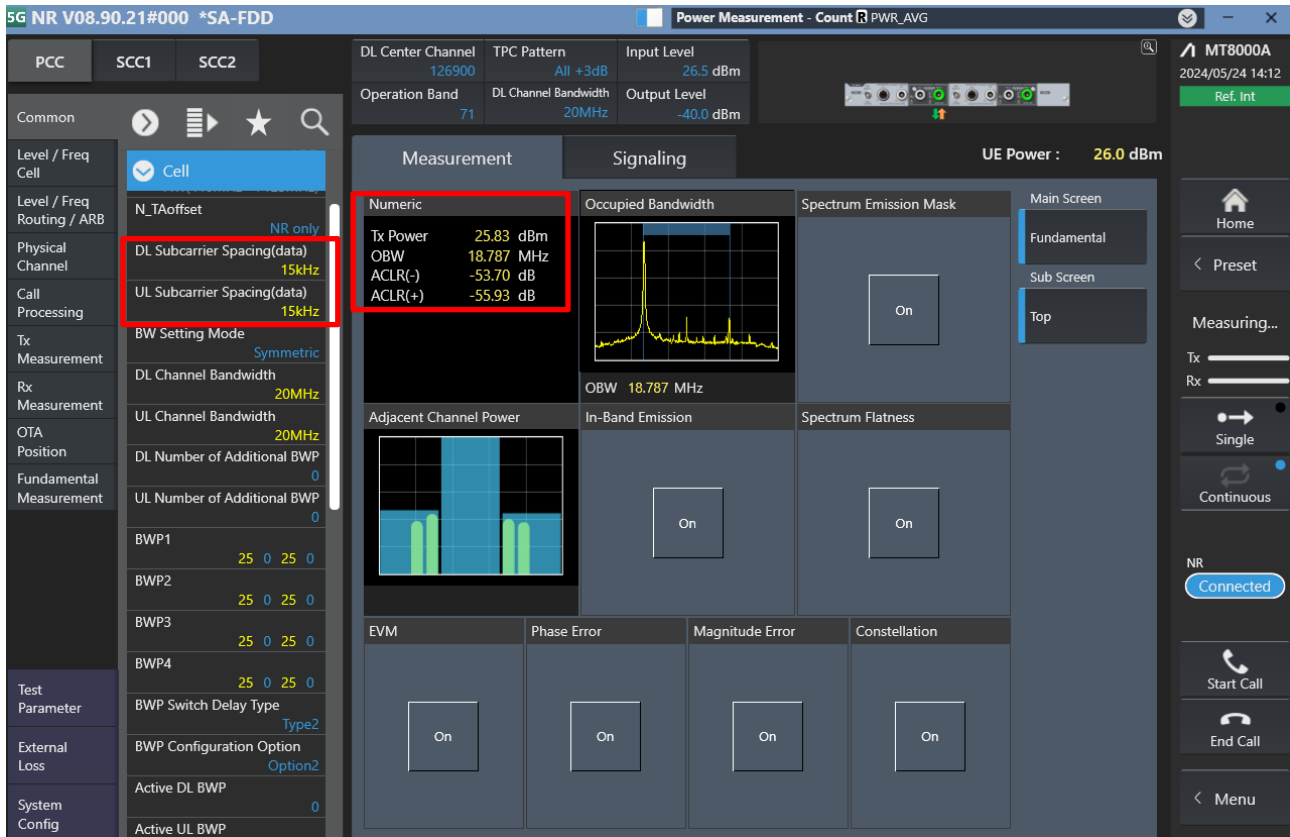
NR

Connected

Start Call

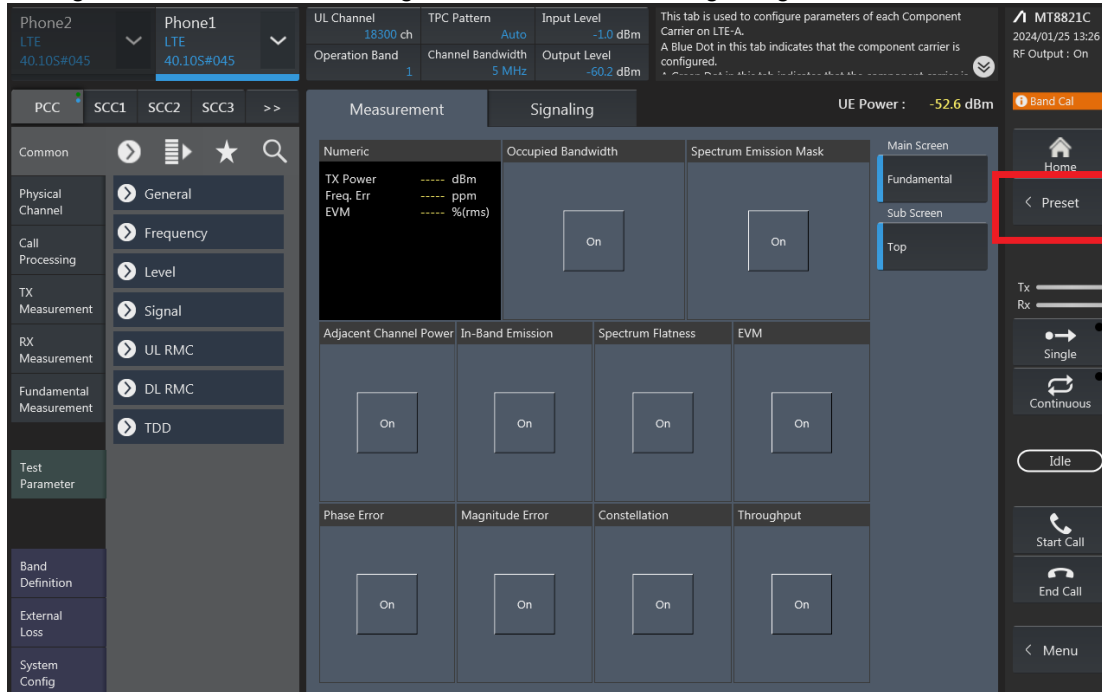
End Call

Menu



LTE Uplink and Downlink Carrier Aggregation configurations:

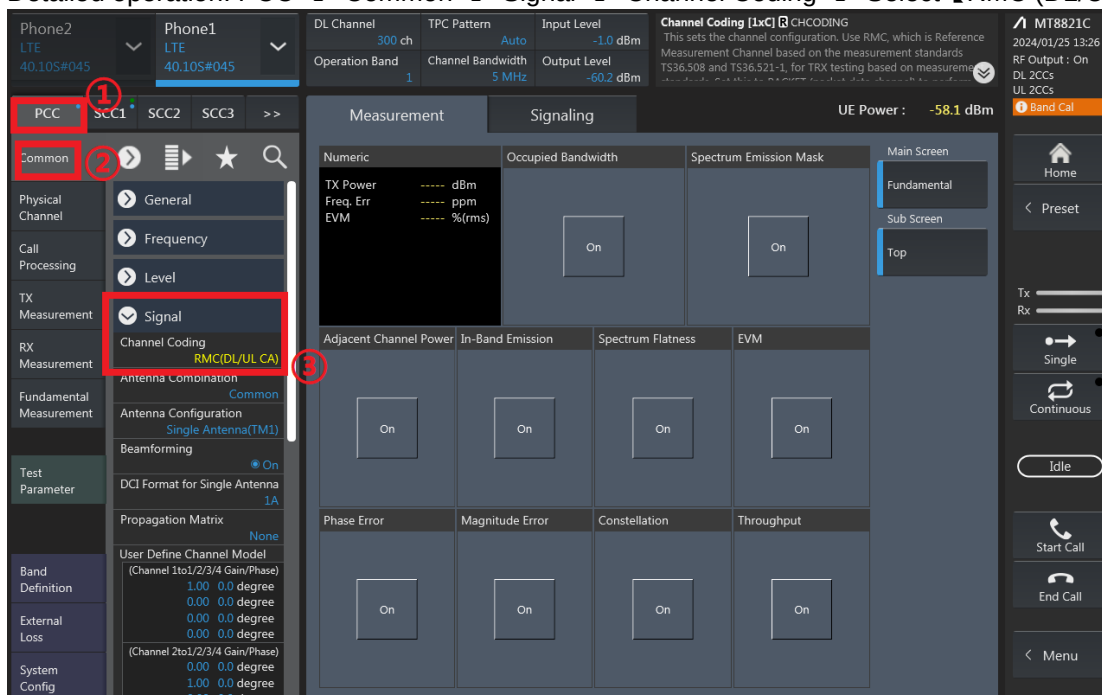
1. Change the Scenario in the Configuration of Phone1 LTE Signaling and Preset.



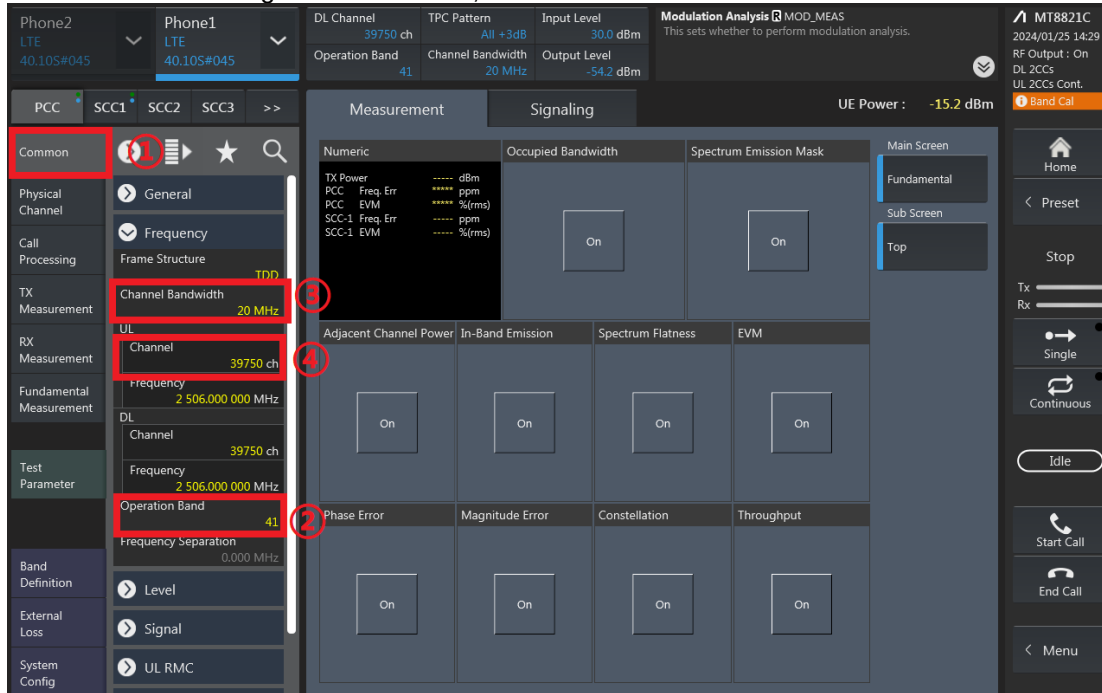
2. If Select "RMC (DL/UL CA)" for Uplink Carrier Aggregation;
If Select "RMC (DL CA)" for Downlink Carrier Aggregation.

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

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 PPM PCC EVM % (rms) SCC-1 Freq. Err. PPM SCC-1 EVM % (rms)

Occupied Bandwidth

Spectrum Emission Mask

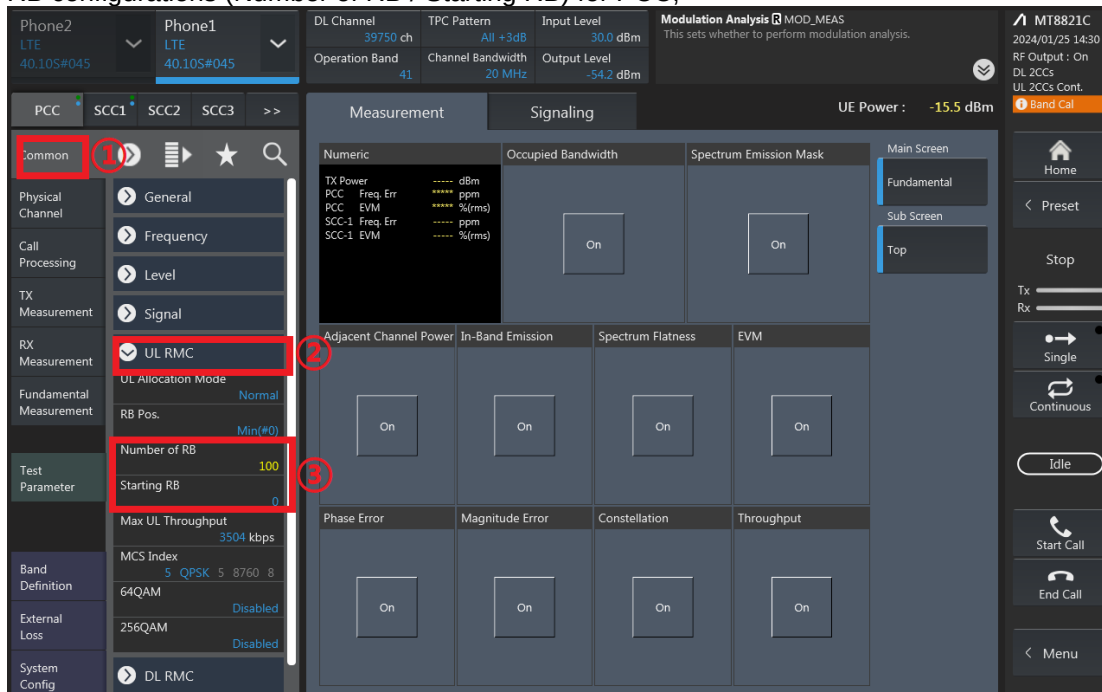
Main Screen Fundamental Sub Screen Top

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 DL RMC

Numeric

TX Power PCC Freq. Err. dBm PPM PCC EVM % (rms) SCC-1 Freq. Err. PPM SCC-1 EVM % (rms)

Occupied Bandwidth

Spectrum Emission Mask

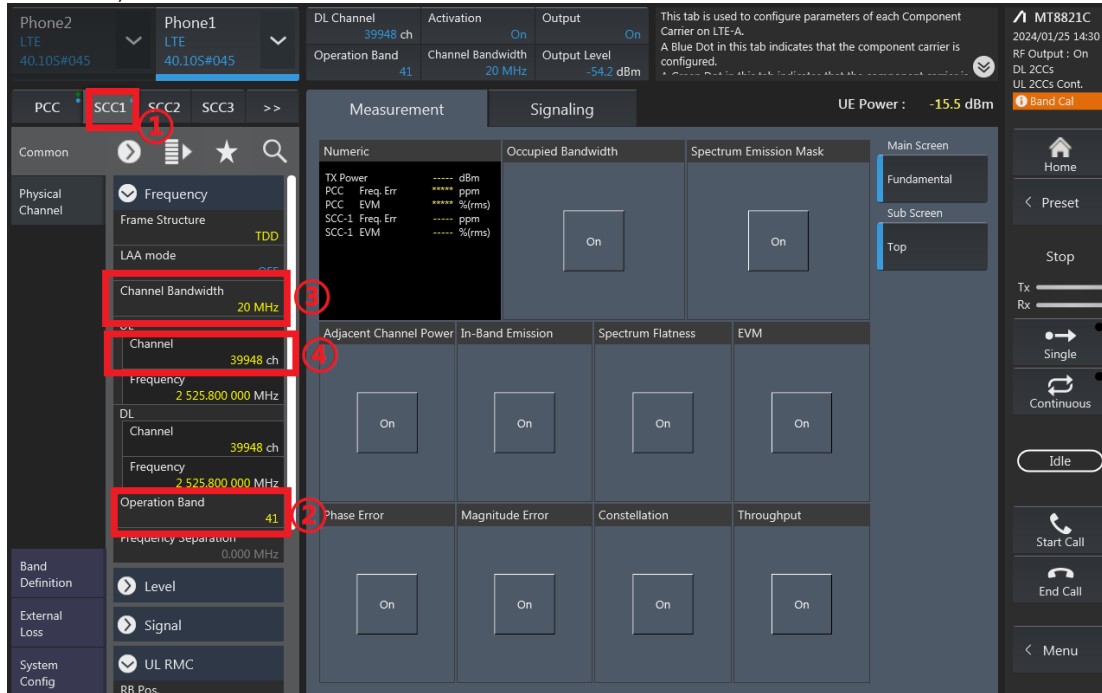
Main Screen Fundamental Sub Screen Top

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

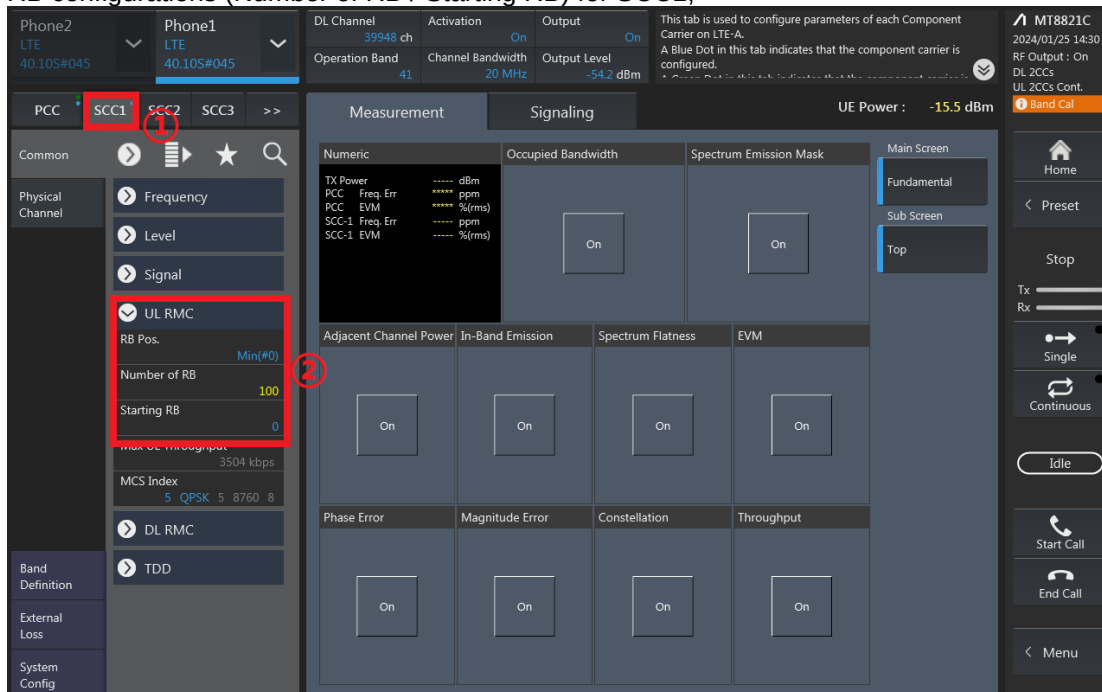
Adjacent Channel Power In-Band Emission Spectrum Flatness EVM

Phase Error Magnitude Error Constellation Throughput

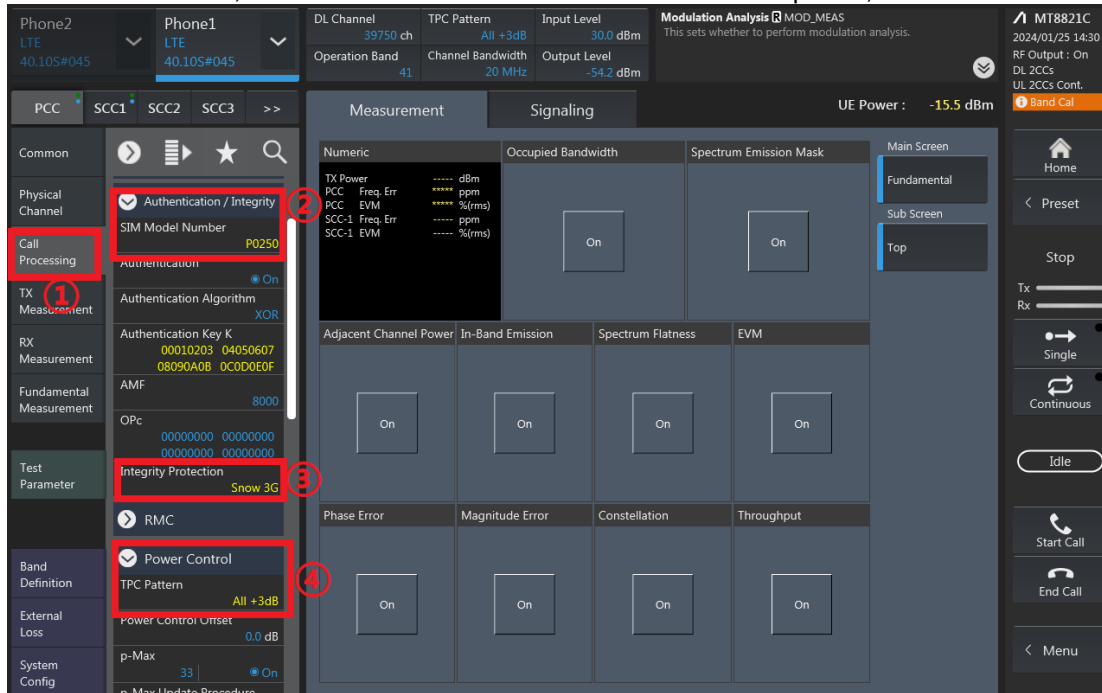
4. SCC parameter Settings: Select the SCC1 tab, Set operating band, BW, channel, and RB configurations for SCC1;



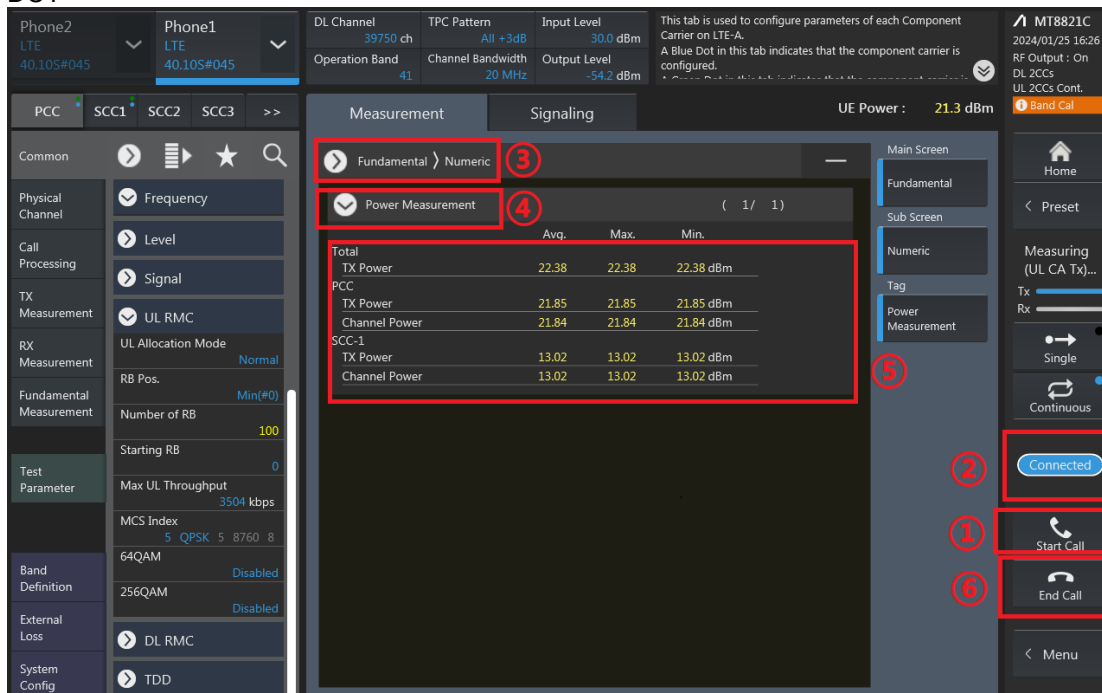
RB configurations (Number of RB / Starting RB) for SCC1;



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



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

<Intra-Band Power Measurement>

【CA_2C_Ant 0_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		
18700	18898	QPSK	1	99	1	0	22.08	24.00
18900	19098	QPSK	1	99	1	0	22.15	24.00
19100	18902	QPSK	1	0	1	99	22.03	24.00

【CA_2C_Ant 0_ECI 2】

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		
18700	18898	QPSK	1	99	1	0	22.08	24.00
18900	19098	QPSK	1	99	1	0	22.15	24.00
19100	18902	QPSK	1	0	1	99	22.03	24.00

【CA_2C_Ant 0_ECI 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		
18700	18898	QPSK	1	99	1	0	16.65	18.20
18900	19098	QPSK	1	99	1	0	16.75	18.20
19100	18902	QPSK	1	0	1	99	16.63	18.20

【CA_2C_Ant 0_ECI 3】

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		
18700	18898	QPSK	1	99	1	0	18.01	19.50
18900	19098	QPSK	1	99	1	0	18.05	19.50
19100	18902	QPSK	1	0	1	99	18.03	19.50

【CA_2C_Ant 0_ECI 6】

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		
18700	18898	QPSK	1	99	1	0	21.11	22.10
18900	19098	QPSK	1	99	1	0	21.25	22.10
19100	18902	QPSK	1	0	1	99	21.13	22.10

【CA_2C_Ant 0_ECI 4】

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		
18700	18898	QPSK	1	99	1	0	22.08	24.00
18900	19098	QPSK	1	99	1	0	22.15	24.00
19100	18902	QPSK	1	0	1	99	22.03	24.00

【CA_7C_Ant 1_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	22.59	24.00



21100	21298	QPSK	1	99	1	0	22.65	24.00
21350	21152	QPSK	1	0	1	99	22.51	24.00

【CA_7C_Ant 1_ECI 2】

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	22.59	24.00
21100	21298	QPSK	1	99	1	0	22.65	24.00
21350	21152	QPSK	1	0	1	99	22.51	24.00

【CA_7C_Ant 1_ECI 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	19.45	21.00
21100	21298	QPSK	1	99	1	0	19.56	21.00
21350	21152	QPSK	1	0	1	99	19.41	21.00

【CA_7C_Ant 1_ECI 3】

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	19.45	21.00
21100	21298	QPSK	1	99	1	0	19.56	21.00
21350	21152	QPSK	1	0	1	99	19.41	21.00

【CA_7C_Ant 1_ECI 6】

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	20.81	22.30
21100	21298	QPSK	1	99	1	0	20.89	22.30
21350	21152	QPSK	1	0	1	99	20.83	22.30

【CA_7C_Ant 1_ECI 4】

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	22.59	24.00
21100	21298	QPSK	1	99	1	0	22.65	24.00
21350	21152	QPSK	1	0	1	99	22.51	24.00

【CA_42C_Ant 5_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		
42190	42388	QPSK	1	99	1	0	22.21	24.00
42590	42788	QPSK	1	99	1	0	22.25	24.00
42990	42792	QPSK	1	0	1	99	22.15	24.00

【CA_42C_Ant 5_ECI 2】

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		
42190	42388	QPSK	1	99	1	0	20.25	21.10
42590	42788	QPSK	1	99	1	0	20.35	21.10
42990	42792	QPSK	1	0	1	99	20.21	21.10

【CA_42C_Ant 5_ECI 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		
42190	42388	QPSK	1	99	1	0	15.25	17.20
42590	42788	QPSK	1	99	1	0	15.35	17.20
42990	42792	QPSK	1	0	1	99	15.21	17.20

【CA_42C_Ant 5_ECI 3】

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		
42190	42388	QPSK	1	99	1	0	16.76	18.70
42590	42788	QPSK	1	99	1	0	16.85	18.70
42990	42792	QPSK	1	0	1	99	16.73	18.70

【CA_42C_Ant 5_ECI 6】

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		
42190	42388	QPSK	1	99	1	0	21.25	22.70
42590	42788	QPSK	1	99	1	0	21.35	22.70
42990	42792	QPSK	1	0	1	99	21.21	22.70

【CA_42C_Ant 5_ECI 4】

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		
42190	42388	QPSK	1	99	1	0	22.21	24.00
42590	42788	QPSK	1	99	1	0	22.25	24.00
42990	42792	QPSK	1	0	1	99	22.15	24.00

【CA_66C_Ant 0_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		
132072	132270	QPSK	1	99	1	0	22.05	24.00
132322	132520	QPSK	1	99	1	0	22.11	24.00
132572	132374	QPSK	1	0	1	99	22.03	24.00

【CA_66C_Ant 0_ECI 2】

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	22.05	24.00
132322	132520	QPSK	1	99	1	0	22.11	24.00
132572	132374	QPSK	1	0	1	99	22.03	24.00

【CA_66C_Ant 0_ECI 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	16.81	17.70
132322	132520	QPSK	1	99	1	0	16.85	17.70
132572	132374	QPSK	1	0	1	99	16.83	17.70

【CA_66C_Ant 0_ECI 3】

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	18.01	19.70
132322	132520	QPSK	1	99	1	0	18.05	19.70
132572	132374	QPSK	1	0	1	99	18.03	19.70

【CA_66C_Ant 0_ECI 6】

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	21.03	21.80
132322	132520	QPSK	1	99	1	0	21.05	21.80
132572	132374	QPSK	1	0	1	99	21.02	21.80

【CA_66C_Ant 0_ECI 4】

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	22.05	24.00
132322	132520	QPSK	1	99	1	0	22.11	24.00
132572	132374	QPSK	1	0	1	99	22.03	24.00