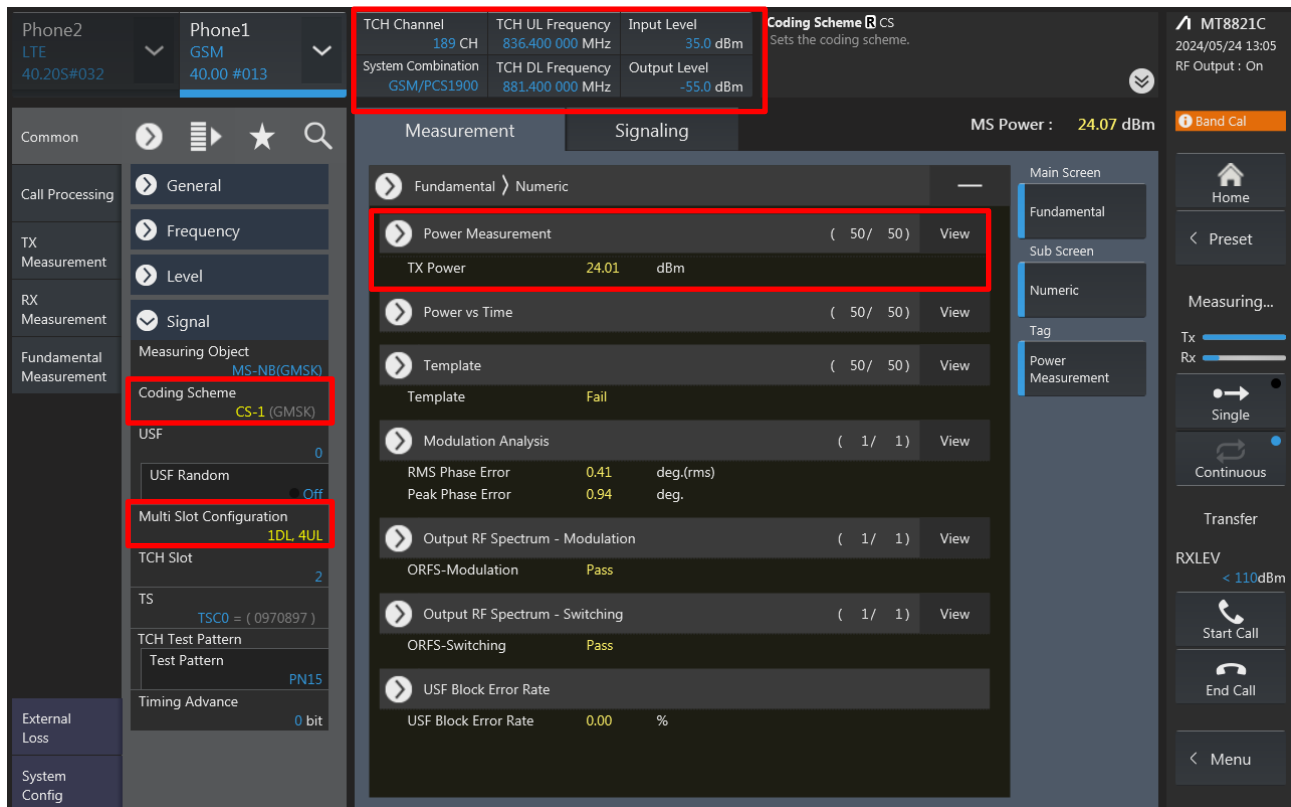


Power measurement connection diagram:

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.

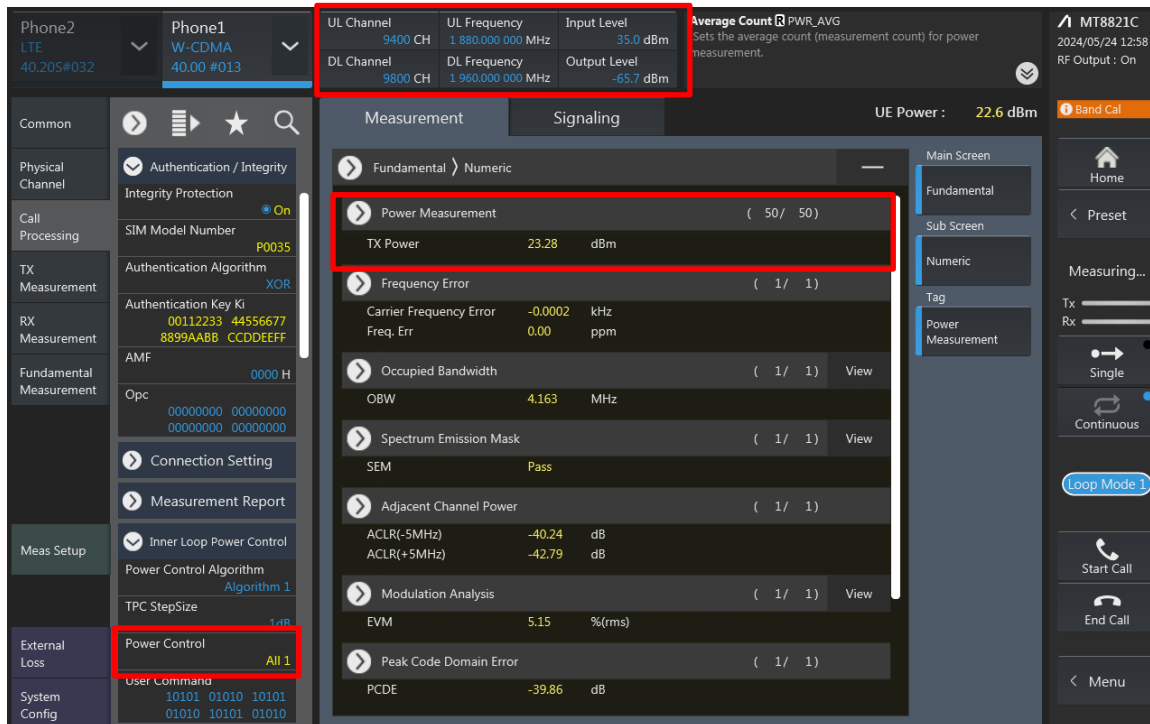
<GSM>



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

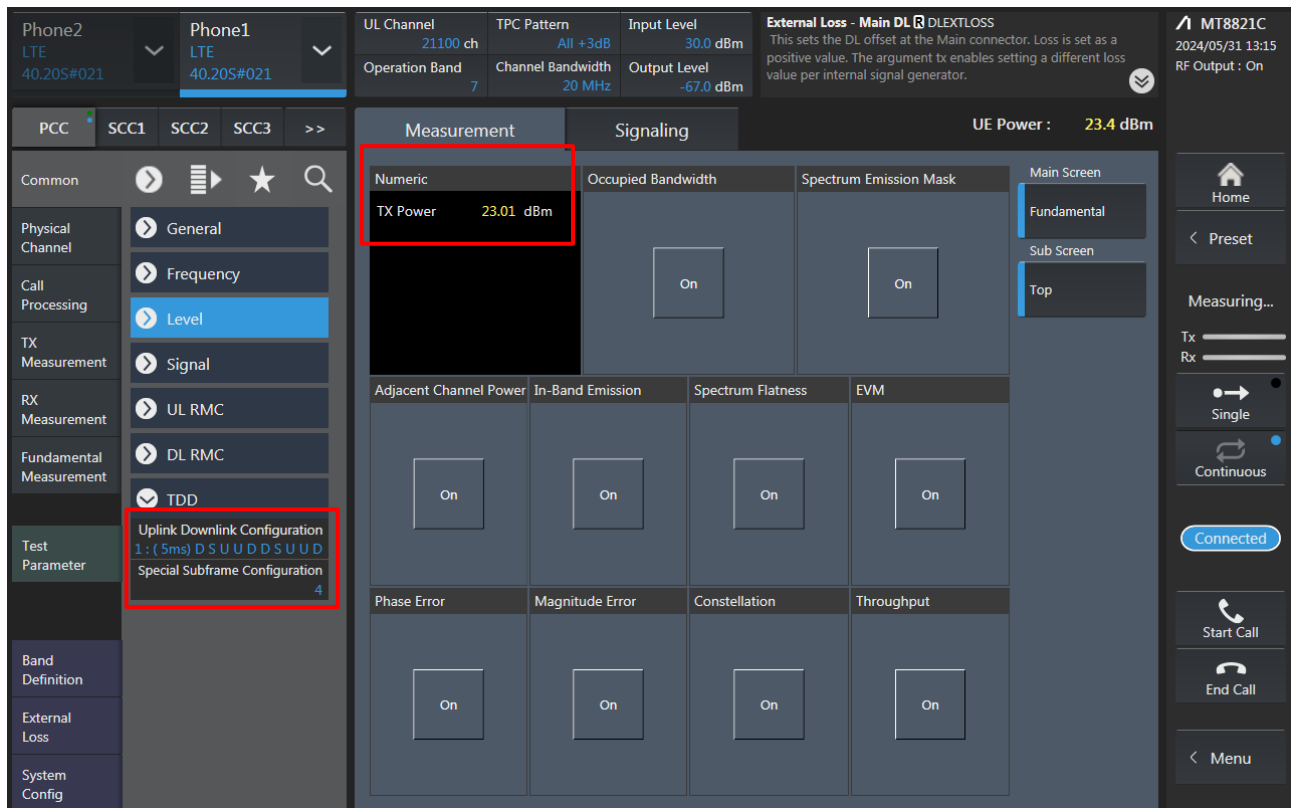
- Top Bar:** Shows Phone2 (LTE, 40.205#032) and Phone1 (GSM, 40.00 #013). It also displays TCH Channel (189 CH), TCH UL Frequency (836.400 000 MHz), Input Level (35.0 dBm), TCH DL Frequency (881.400 000 MHz), and Output Level (-55.0 dBm). The Coding Scheme is set to CS.
- Left Sidebar:** Contains navigation options like Common, Call Processing, TX Measurement, RX Measurement, Fundamental Measurement, and External Loss. The 'Fundamental Measurement' section is expanded, showing options for General, Frequency, Level, Signal, and Measuring Object (MS-NB(GMSK)).
- Main Area:** Displays the 'Measurement' tab with a 'Fundamental' sub-tab. The 'Power Measurement' section shows TX Power at 24.01 dBm. Other sections include 'Power vs Time', 'Template' (Fail), 'Modulation Analysis' (RMS Phase Error: 0.41 deg.(rms), Peak Phase Error: 0.94 deg.), 'Output RF Spectrum - Modulation' (ORFS-Modulation: Pass), 'Output RF Spectrum - Switching' (ORFS-Switching: Pass), and 'USF Block Error Rate' (USF Block Error Rate: 0.00 %).
- Right Sidebar:** Shows the 'Main Screen' with options for Fundamental, Sub Screen, Numeric, and Tag. It also displays the 'MS Power' as 24.07 dBm and the 'Band Cal' status as 'On'.

<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 a list of measurement parameters, including Authentication / Integrity, Call Processing, TX Measurement, RX Measurement, Fundamental Measurement, Connection Setting, Measurement Report, Inner Loop Power Control, Power Control Algorithm, TPC StepSize, Power Control, and User Command.

<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 a list of measurement parameters, including General, Frequency, Level, Signal, UL RMC, DL RMC, TDD, Uplink Downlink Configuration, Special Subframe Configuration, 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

PCC SCC1 SCC2 SCC3 >>

Common 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

Measurement Signaling

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

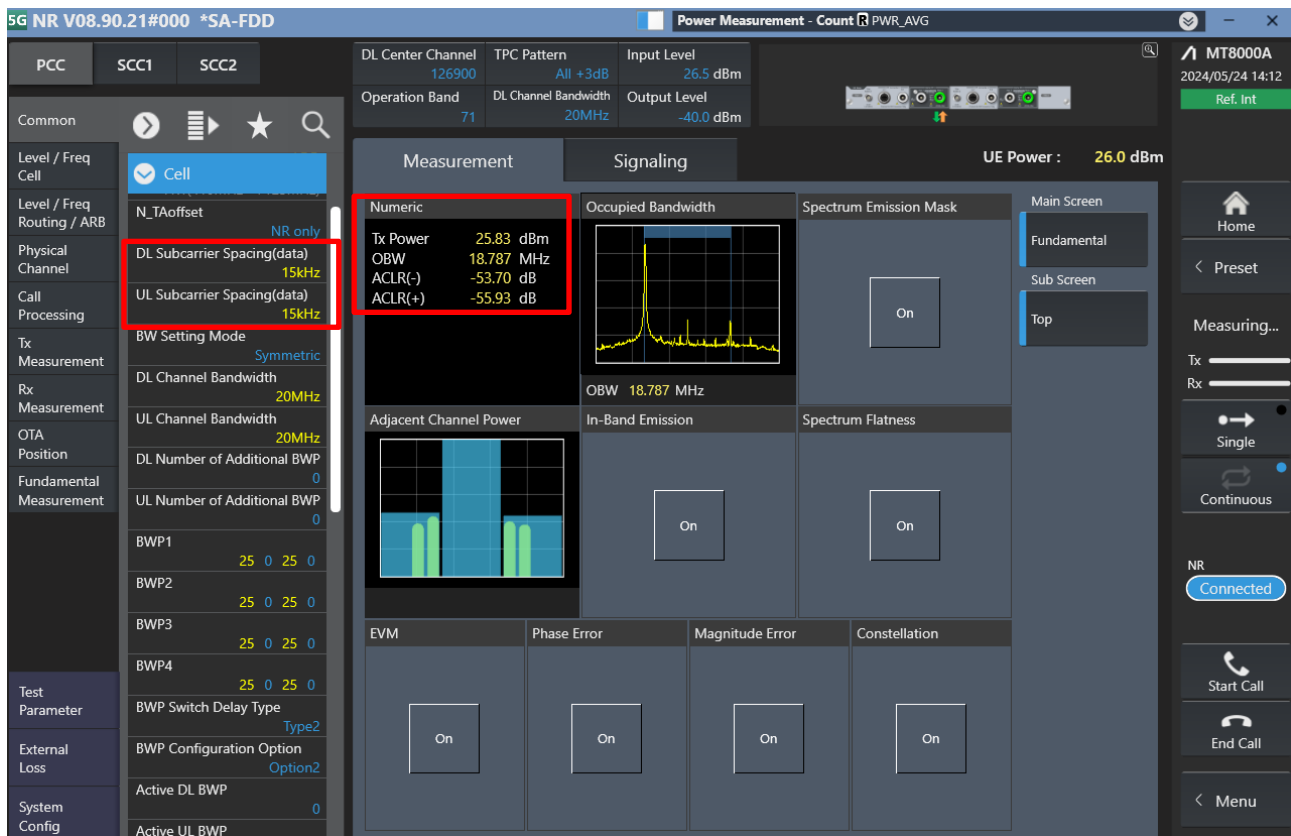
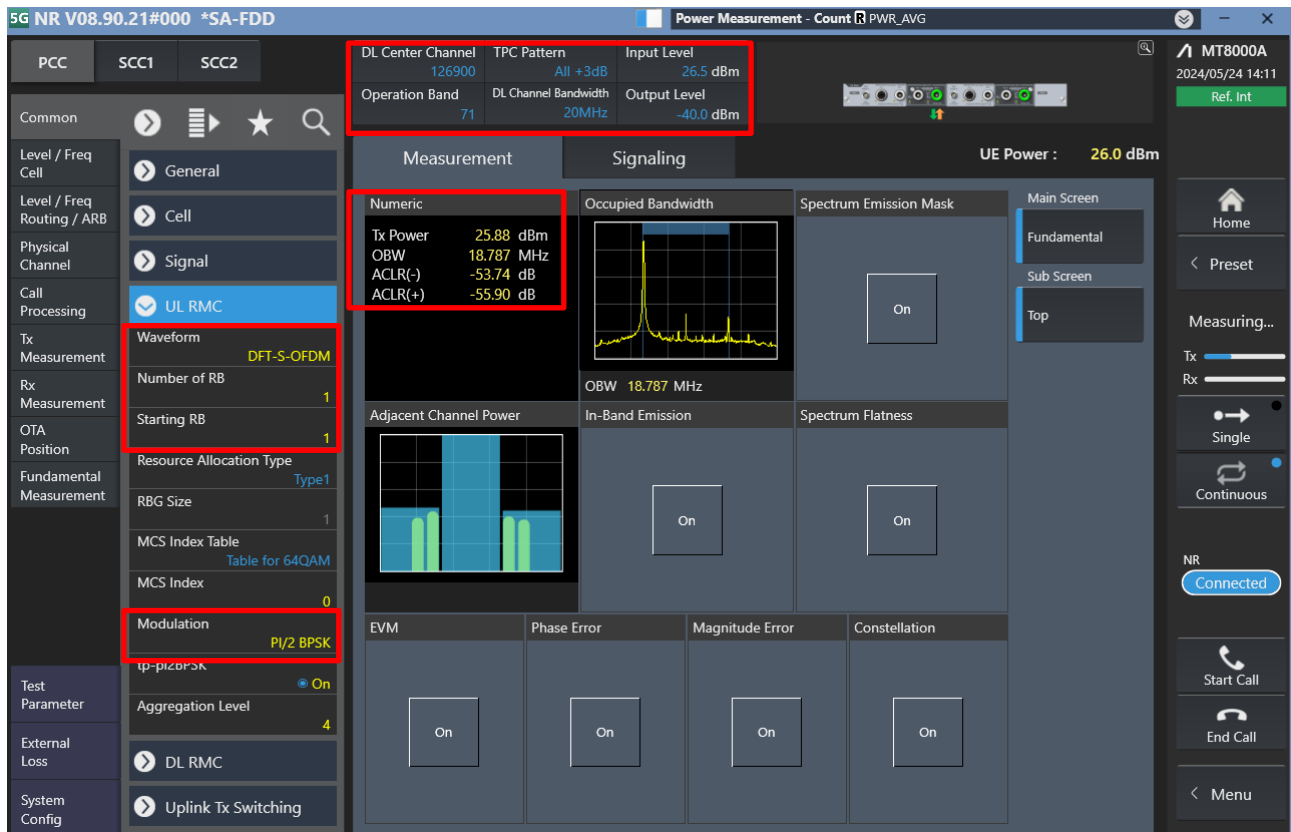
On On On On

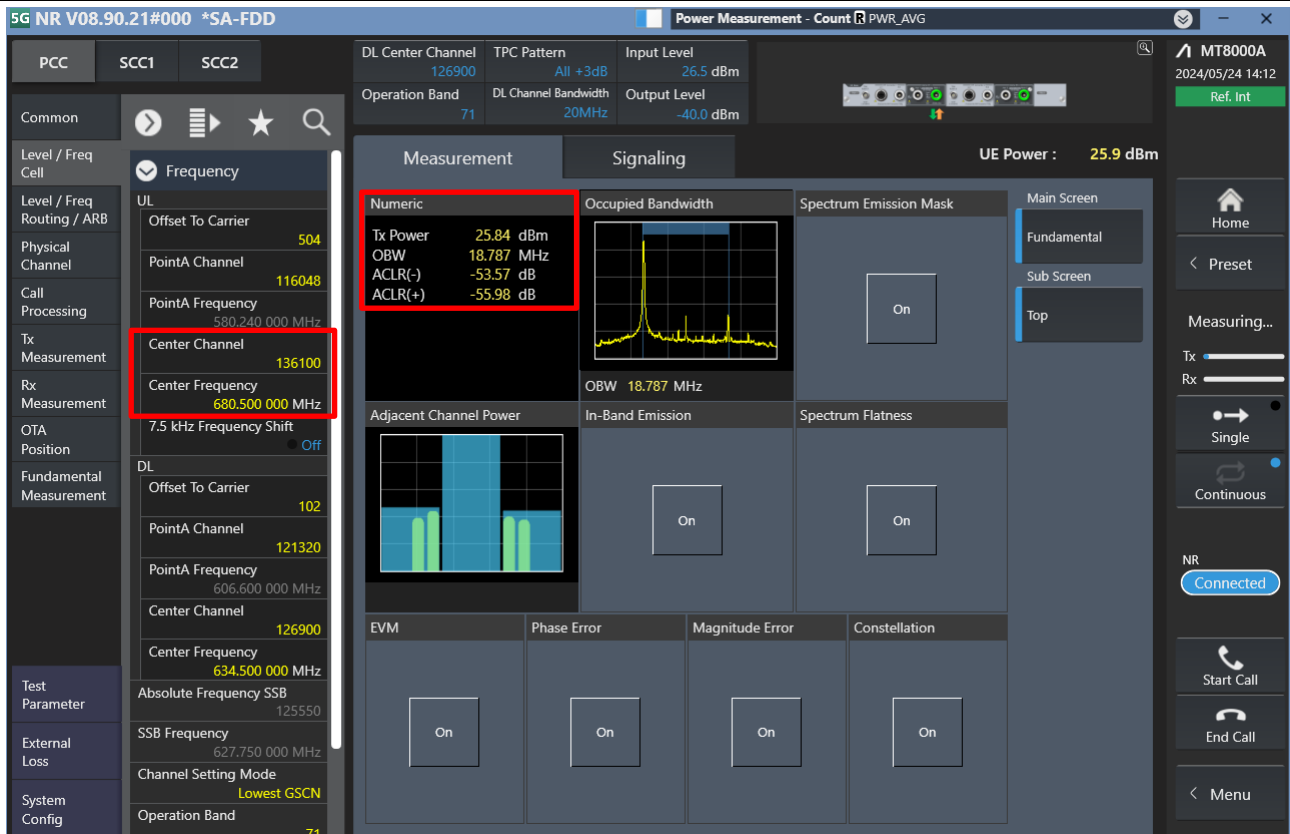
UE Power : 23.5 dBm

Main Screen Fundamental Sub Screen Top

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

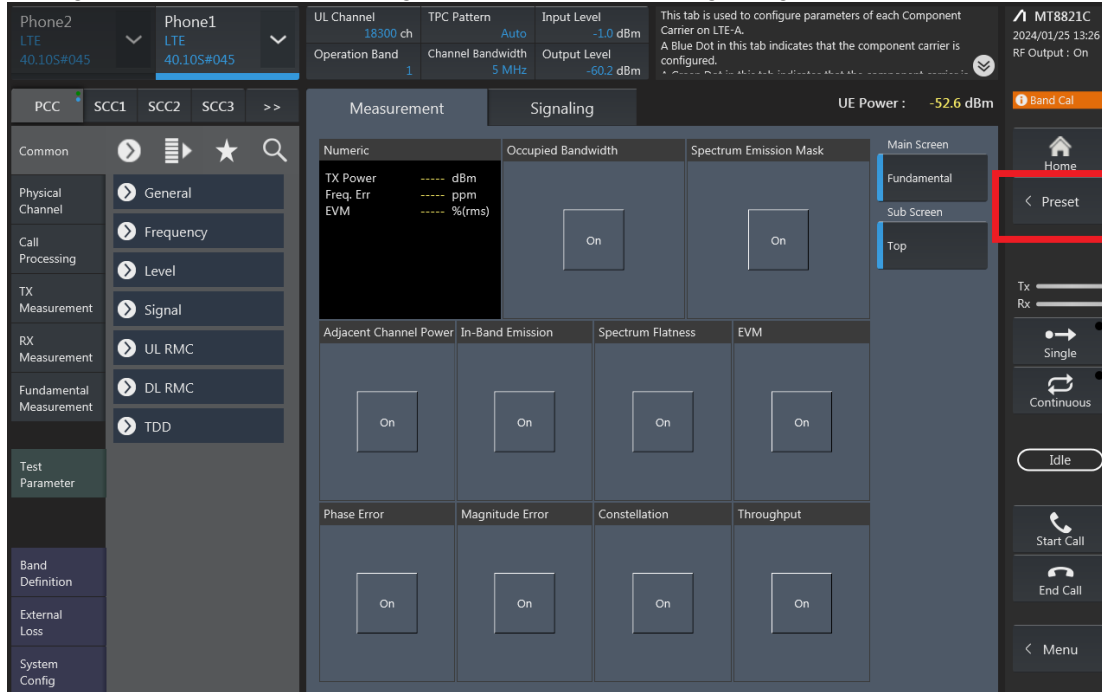
<5G NR FR1>





LTE Uplink and Downlink Carrier Aggregation configurations:

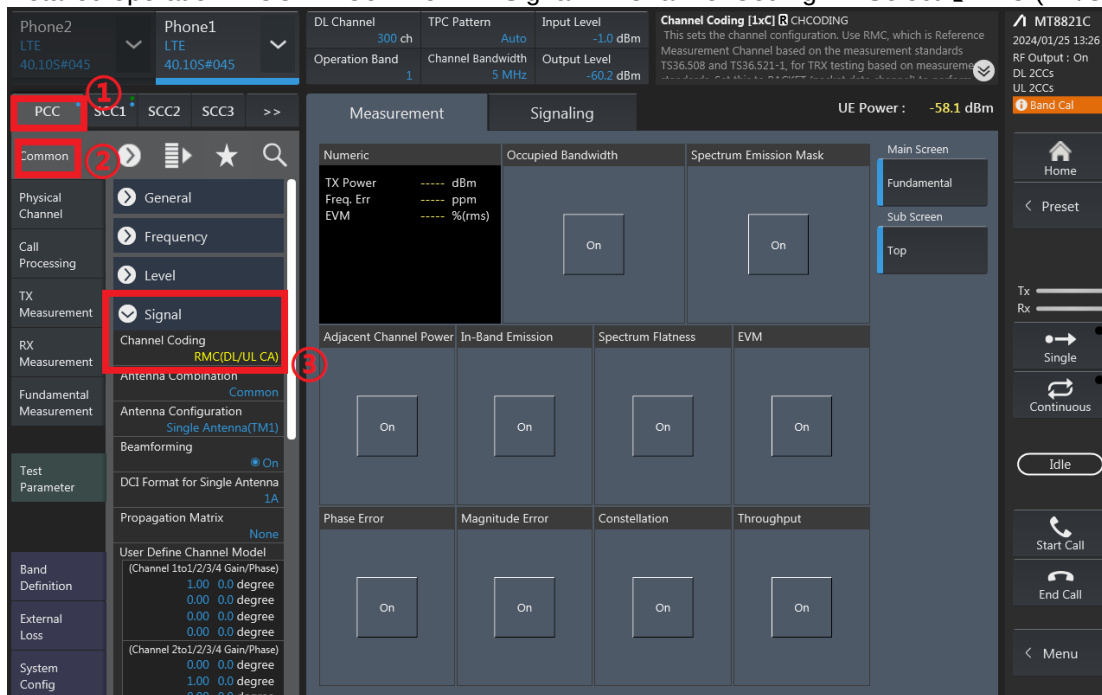
1. Change the Scenario in the Configuration of Phone1 LTE Signaling and Preset.



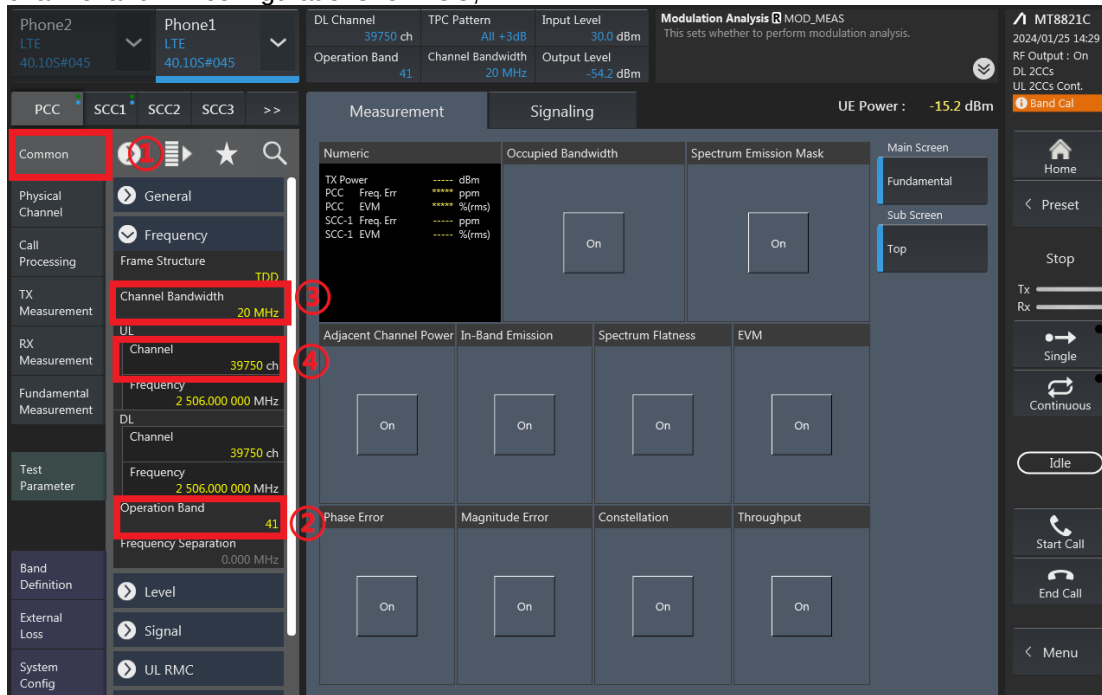
2. If Select "RMC (DL/UL CA)" for Uplink Carrier Aggregation;
If Select "RMC (DL CA)" for Downlink Carrier Aggregation.

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

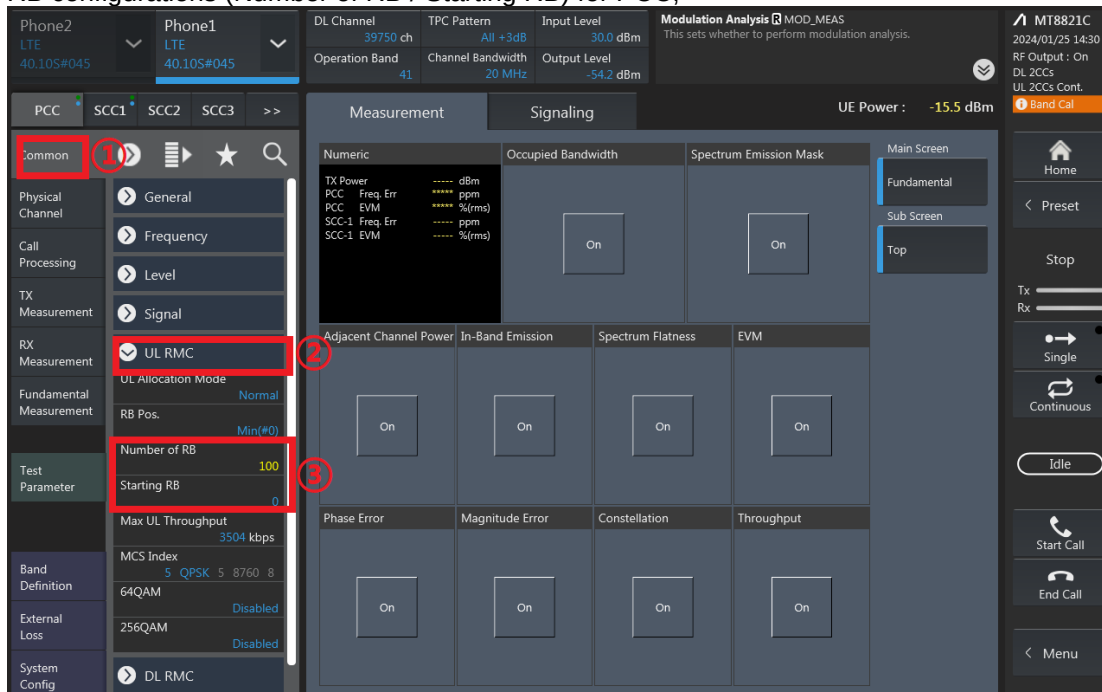
Main Screen Fundamental Sub Screen Top

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

UL Allocation Mode Normal

RB Pos. Min(#0)

Test Parameter Number of RB 100 Starting RB 0 Max UL Throughput 3504 kbps

Band Definition MCS Index 5 QPSK 5 8760 8 64QAM

External Loss 256QAM Disabled

System Config 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

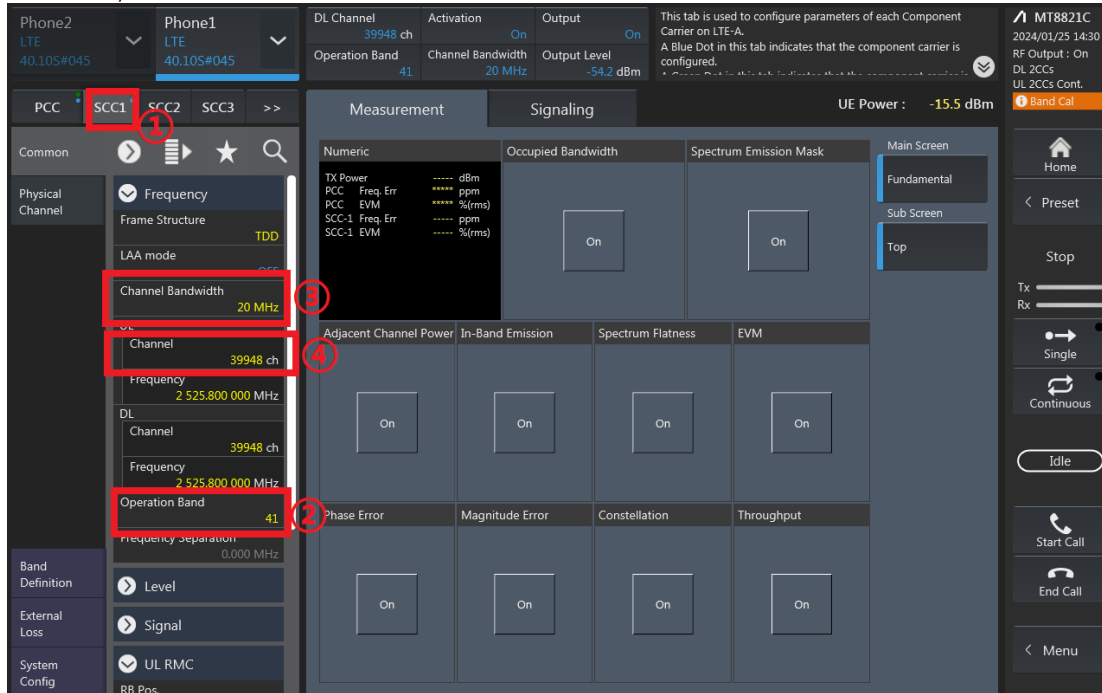
Main Screen Fundamental Sub Screen Top

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

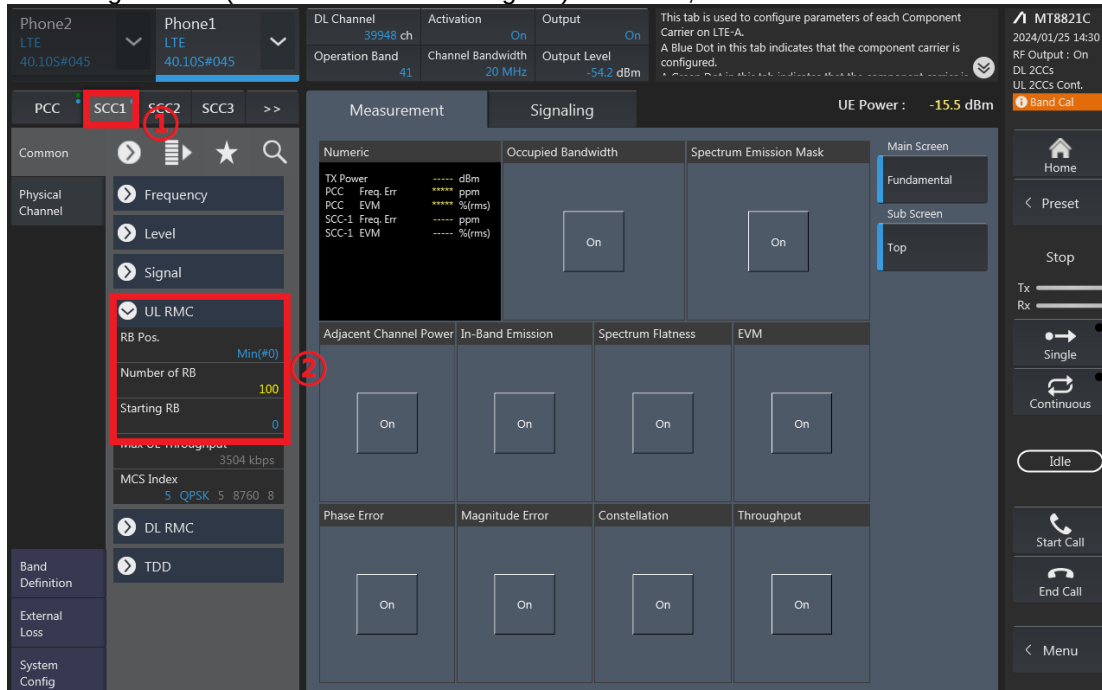
Adjacent Channel Power In-Band Emission Spectrum Flatness EVM

Phase Error Magnitude Error Constellation Throughput

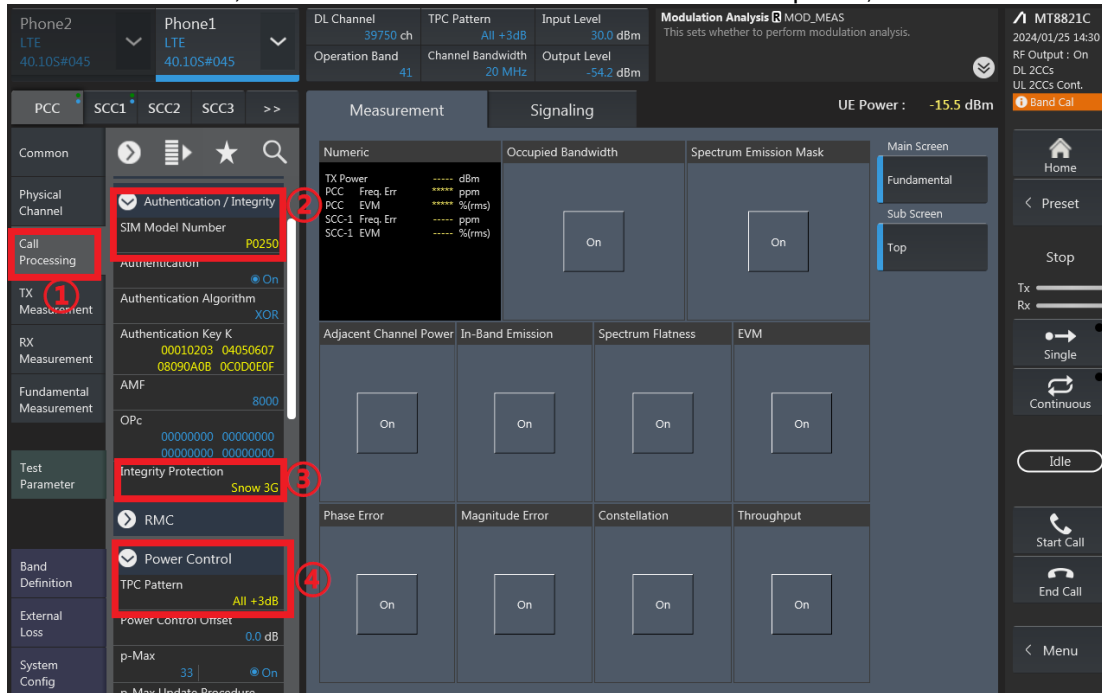
4. SCC parameter Settings: Select the SCC1 tab, Set operating band, BW, channel, and RB configurations for SCC1;



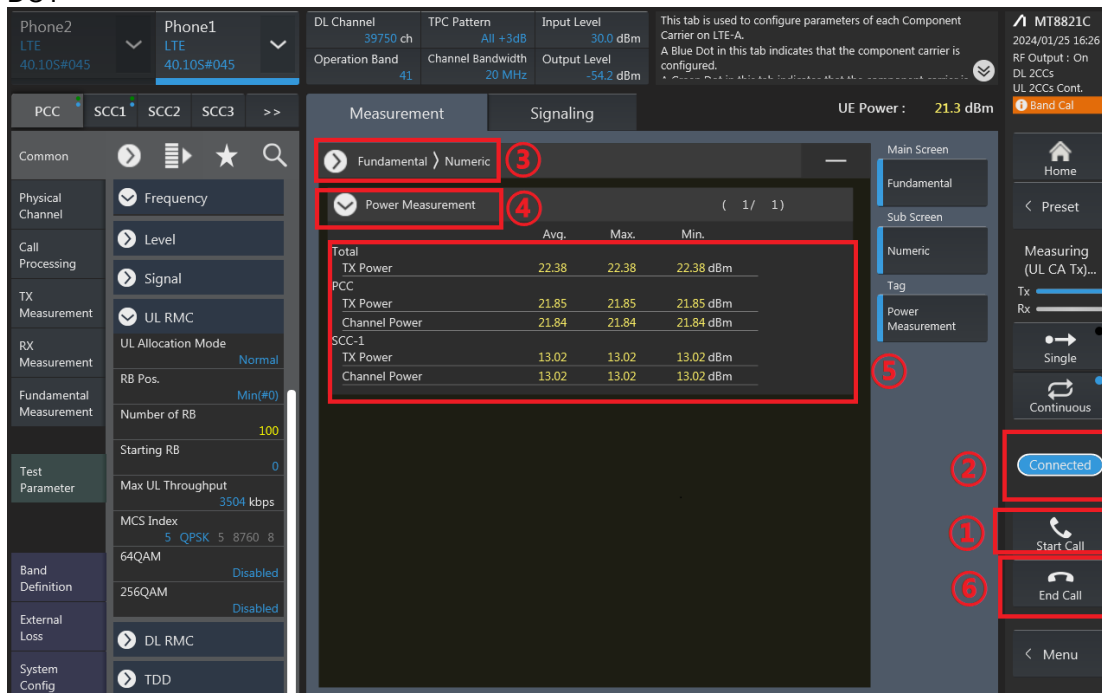
RB configurations (Number of RB / Starting RB) for SCC1;



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



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

Downlink CA Power

Full Power															
2CC															
Configure		CA Configuration (BCS)	PCC							SCC				Power	
			LTE Band	BW (MHz)	UL Freq. (MHz)	UL Channel	Mod.	UL# RB	UL RB Offset	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx.Power (dBm)	W/O CA Tx.Power (dBm)
Inter-Band	CA_2A-5A	2	20	1880	18900	QPSK	1	0	5	10M	881.5	2525	24.05	24.15	
	CA_2A-4A	2	20	1880	18900	QPSK	1	0	4	20M	2132.5	2175	23.77	24.15	
	CA_2A-66A	2	20	1880	18900	QPSK	1	0	66	20M	2155	66886	23.94	24.15	
	CA_2A-12A	2	20	1880	18900	QPSK	1	0	12	10M	737.5	5095	23.81	24.15	
	CA_2A-71A	2	20	1880	18900	QPSK	1	0	71	20M	634.5	68786	23.83	24.15	
	CA_2A-29A	2	20	1880	18900	QPSK	1	0	29	10M	722.5	9715	23.79	24.15	
	CA_2A-30A	2	20	1880	18900	QPSK	1	0	30	10M	2355	9820	23.94	24.15	
	CA_4A-5A	4	20M	1732.5	20175	QPSK	1	0	5	10M	881.5	2525	23.34	23.56	
	CA_4A-12A	4	20M	1732.5	20175	QPSK	1	0	12	10M	737.5	5095	23.45	23.56	
	CA_4A-13A	4	20M	1732.5	20175	QPSK	1	0	13	10M	751	5230	23.30	23.56	
	CA_4A-71A	4	20M	1732.5	20175	QPSK	1	0	71	20M	634.5	68786	23.37	23.56	
	CA_4A-29A	4	20M	1732.5	20175	QPSK	1	0	29	10M	722.5	9715	23.27	23.56	
	CA_4A-30A	4	20M	1732.5	20175	QPSK	1	0	30	10M	2355	9820	23.29	23.56	
	CA_5A-66A	5	10M	836.5	20525	QPSK	1	0	66	20M	2155	66886	23.69	24.03	
	CA_5A-30A	5	10M	836.5	20525	QPSK	1	0	30	10M	2355	9820	23.71	24.03	
	CA_12A-66A	12	10M	707.5	23095	QPSK	1	0	66	20M	2155	66886	23.70	23.83	
	CA_12A-30A	12	10M	707.5	23095	QPSK	1	0	30	10M	2355	9820	23.60	23.83	
	CA_13A-66A	13	10M	782	23230	QPSK	1	0	66	20M	2155	66886	23.90	24.05	
	CA_13A-2A	13	10M	782	23230	QPSK	1	0	2	20M	1880	900	24.06	24.05	
	CA_30A-29A	30	10M	2355	9820	QPSK	1	0	29	10M	722.5	9715	22.60	22.98	
	CA_30A-66A	30	10M	2355	9820	QPSK	1	0	66	20M	2155	66886	22.77	22.98	
Intra-Band	Non-Contiguous	CA_66A-29A	66	20M	1745	132322	QPSK	1	0	29	10M	722.5	9715	23.57	23.62
		CA_66A-71A	66	20M	1745	132322	QPSK	1	0	71	20M	634.5	68786	23.31	23.62
		CA_2A-2A	2	20M	1880	18900	QPSK	1	0	2	5M	1987.5	1175	23.91	24.15
	Contiguous	CA_4A-4A	4	20M	1732.5	20175	QPSK	1	0	4	5M	2152.5	2375	23.43	23.56
		CA_66A-66A	66	20M	1745	132322	QPSK	1	0	66	5M	2197.5	67311	23.43	23.62
		CA_2C	2	20M	1880	18900	QPSK	1	0	2	20M	1979.8	1098	24.02	24.15
		CA_66B	66	15	1717.5	132047	QPSK	1	0	66	5M	2126.80	66604	23.60	23.62
CA_66C	66	20M	1745	132322	QPSK	1	0	66	20M	2174.80	67084	23.46	23.62		