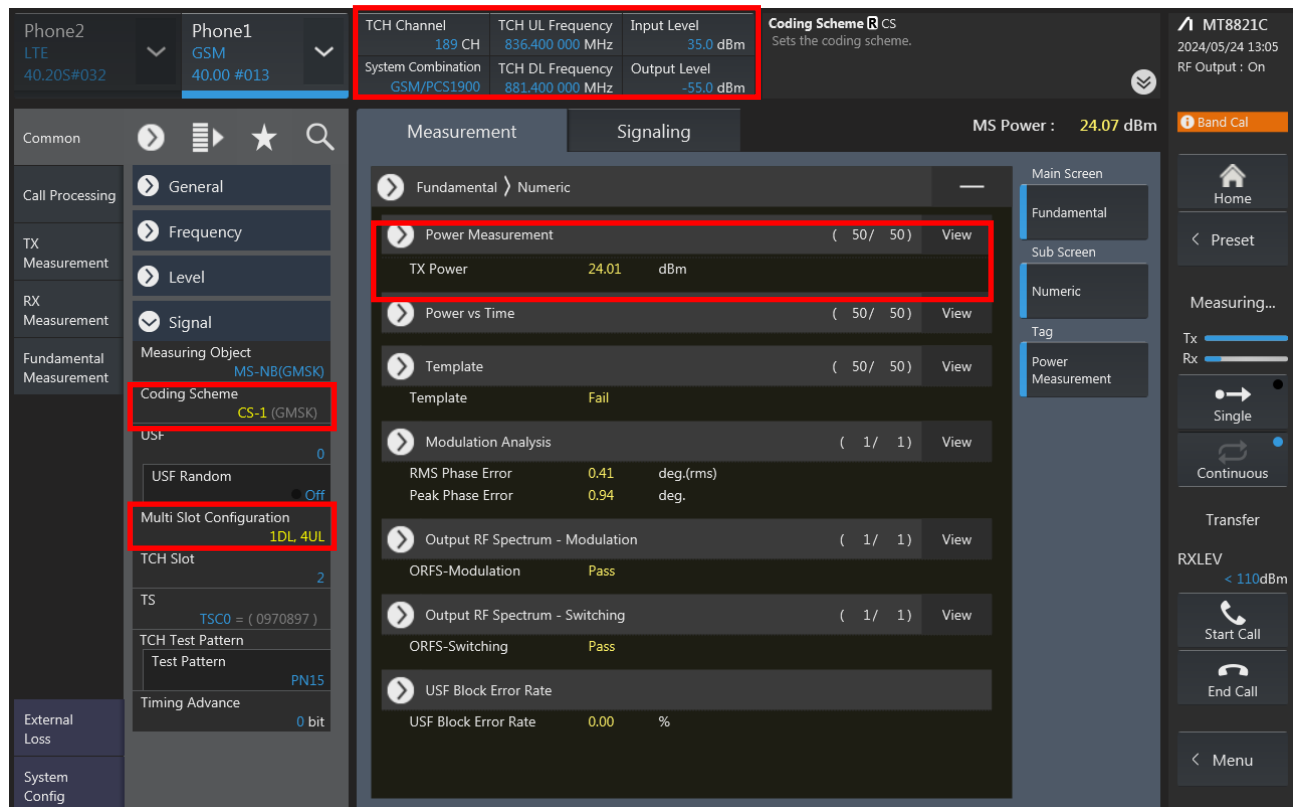


## Appendix F-3. 2G/3G/LTE/5G FR1/UL and DL CA connection diagram

### General Note:

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 MT8821C test equipment interface for GSM configuration and measurement. The interface is divided into several sections:

- Top Status Bar:** Shows Phone2 (LTE 40.205#032) and Phone1 (GSM 40.00 #013) configurations. It also displays TCH Channel (189 CH), TCH UL Frequency (836.400 000 MHz), Input Level (35.0 dBm), Coding Scheme (CS), System Combination (GSM/PCS1900), TCH DL Frequency (881.400 000 MHz), and Output Level (-55.0 dBm). The MT8821C model and date/time (2024/05/24 13:05) are also shown.
- Left Sidebar:** Contains navigation options for Call Processing, TX Measurement, RX Measurement, and Fundamental Measurement. The 'Fundamental Measurement' section is expanded, showing 'Measuring Object' (MS-NB(GMSK)), 'Coding Scheme' (CS-1 (GMSK)), 'USF' (0), 'USF Random' (Off), 'Multi Slot Configuration' (1DL, 4UL), 'TCH Slot' (2), 'TS' (TSC0 = (0970897)), 'TCH Test Pattern' (Test Pattern), and 'Timing Advance' (0 bit).
- Main Area:** Divided into 'Measurement' and 'Signaling' tabs. The 'Measurement' tab shows 'Power Measurement' with 'TX Power' at 24.01 dBm. The 'Signaling' tab shows 'Modulation Analysis' with 'RMS Phase Error' at 0.41 deg.(rms) and 'Peak Phase Error' at 0.94 deg. Other measurements include 'Template' (Fail), 'Output RF Spectrum - Modulation' (ORFS-Modulation: Pass), 'Output RF Spectrum - Switching' (ORFS-Switching: Pass), and 'USF Block Error Rate' (0.00 %).
- Right Sidebar:** Shows 'Main Screen' with 'Fundamental' and 'Sub Screen' options. The 'Tag' section shows 'Power Measurement'. The 'RXLEV' section shows '< 110dBm'. The 'Transfer' section shows 'Start Call' and 'End Call' buttons. The 'Menu' button is at the bottom.

## WCDMA

Phone2  
LTE  
40.20S#032

Phone1  
W-CDMA  
40.00 #013

UL Channel  
9400 CH

UL Frequency  
1 880.000 000 MHz

Input Level  
35.0 dBm

Average Count PWR\_AVG  
Sets the average count (measurement count) for power measurement.

DL Channel  
9800 CH

DL Frequency  
1 960.000 000 MHz

Output Level  
-65.7 dBm

MT8821C  
2024/05/24 12:58  
RF Output : On

Common

Physical Channel

Call Processing

TX Measurement

RX Measurement

Fundamental Measurement

Meas Setup

External Loss

System Config

Authentication / Integrity

Integrity Protection

SIM Model Number

P0035

Authentication Algorithm

XOR

Authentication Key Ki

00112233 44556677  
8899AABB CCDDDEFF

AMF

0000

H

Opc

00000000 00000000  
00000000 00000000

Connection Setting

Measurement Report

Inner Loop Power Control

Power Control Algorithm

Algorithm 1

TPC StepSize

1dB

Power Control

All 1

User Command

10101 01010 10101  
01010 10101 01010

Measurement

Signaling

UE Power : 22.6 dBm

Band Cal

Home

Preset

Measuring...

Tx

Rx

Single

Continuous

Loop Mode 1

Start Call

End Call

Menu

Fundamental

Numeric

Power Measurement

( 50/ 50 )

TX Power

23.28

dBm

Frequency Error

( 1/ 1 )

Carrier Frequency Error

-0.0002

kHz

Freq. Err

0.00

ppm

Occupied Bandwidth

( 1/ 1 )

View

OBW

4.163

MHz

Spectrum Emission Mask

( 1/ 1 )

View

SEM

Pass

Adjacent Channel Power

( 1/ 1 )

View

ACLR(-5MHz)

-40.24

dB

ACLR(+5MHz)

-42.79

dB

Modulation Analysis

( 1/ 1 )

View

EVM

5.15

%(rms)

Peak Code Domain Error

( 1/ 1 )

View

PCDE

-39.86

dB

## LTE

Phone2  
LTE  
40.20S#032

Phone1  
LTE  
40.20S#032

UL Channel  
18900 ch

TPC Pattern  
All +3dB

Input Level  
35.0 dBm

Power Measurement - Meas. Count PWR\_AVG  
This sets the measurement count of the power measurement.

Operation Band  
2

Channel Bandwidth  
20 MHz

Output Level  
-54.2 dBm

MT8821C  
2024/05/24 12:51  
RF Output : On

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

Level

Signal

UL RMC

UL Allocation Mode

Normal

RB Pos.

Min(#0)

Number of RB

1

Starting RB

0

Max UL Throughput

72 kbps

MCS Index

5 QPSK 5 72 8

256QAM

Disabled

DL RMC

Measurement

Signaling

UE Power : 25.4 dBm

Band Cal

Home

Preset

Measuring...

Tx

Rx

Single

Continuous

Connected

Start Call

End Call

Menu

Fundamental

Numeric

Power Measurement

( 50/ 50 )

TX Power

25.12

dBm

Modulation Analysis

( 1/ 1 )

View

Freq. Err

0.00

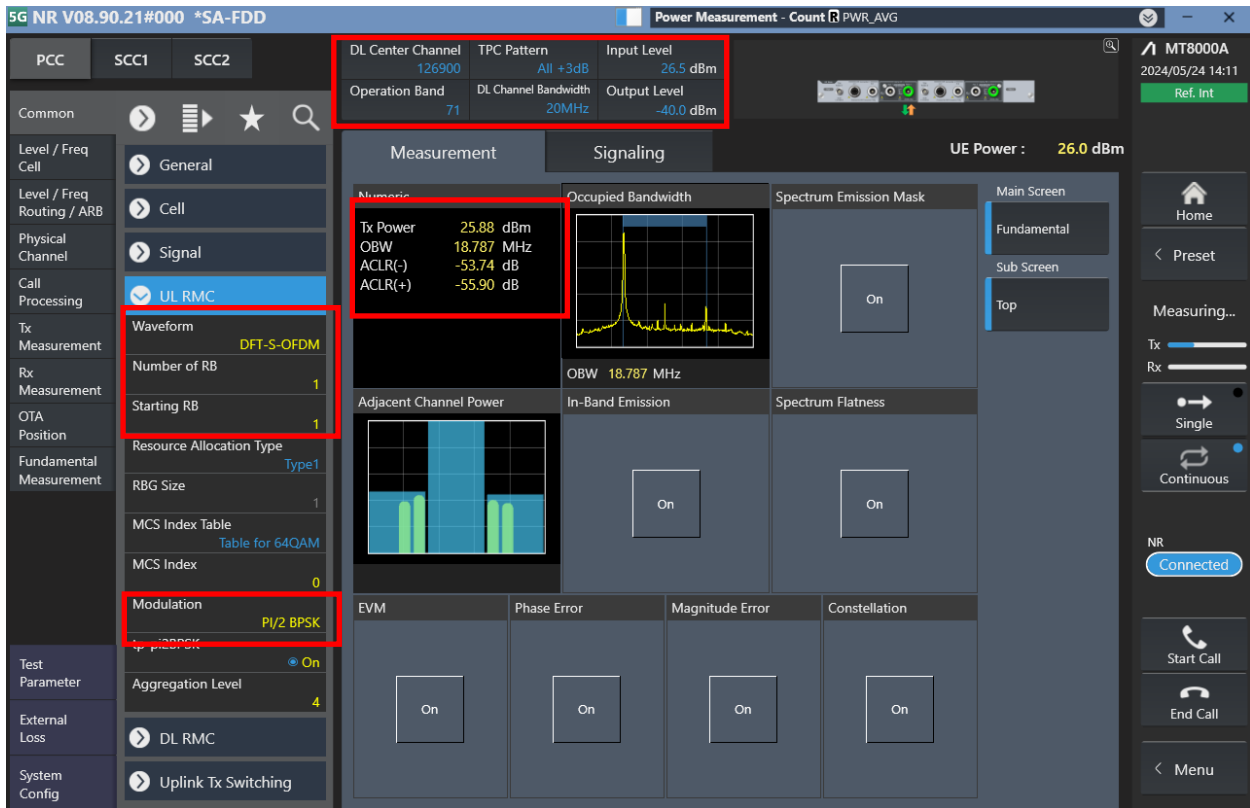
ppm

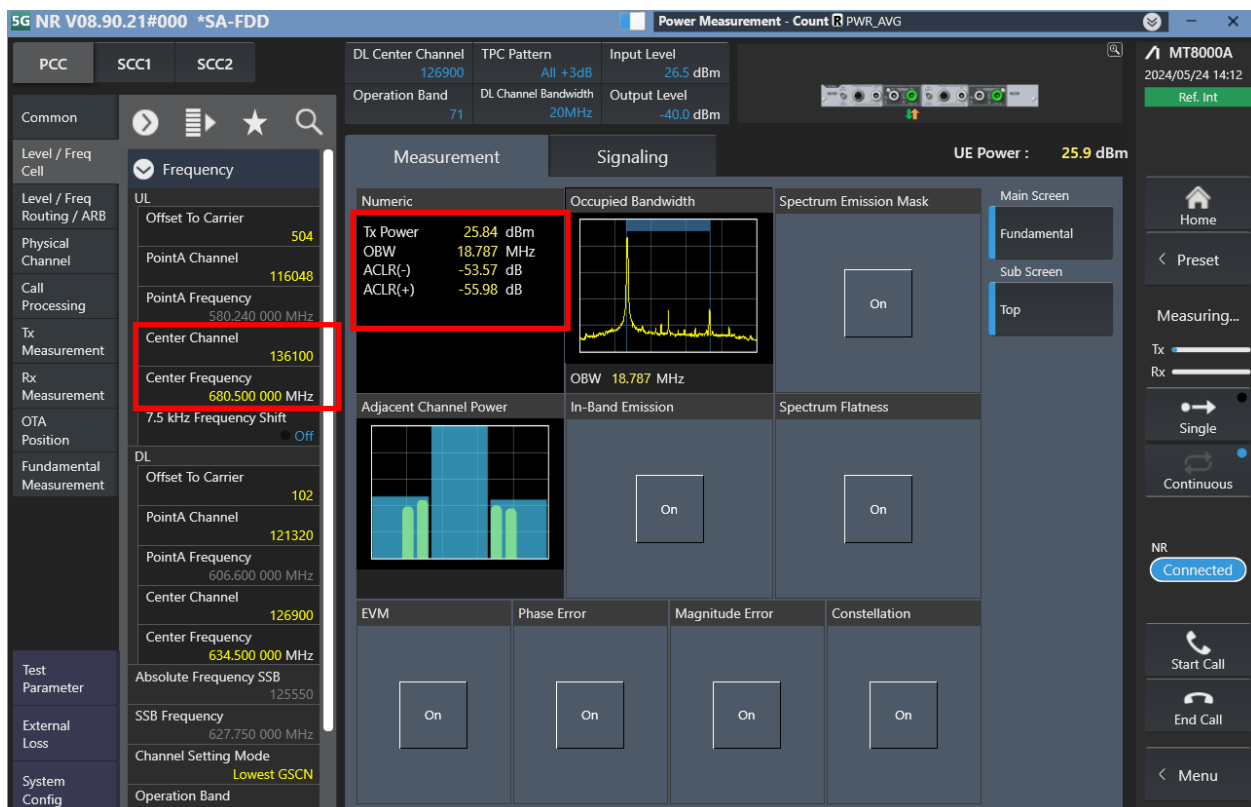
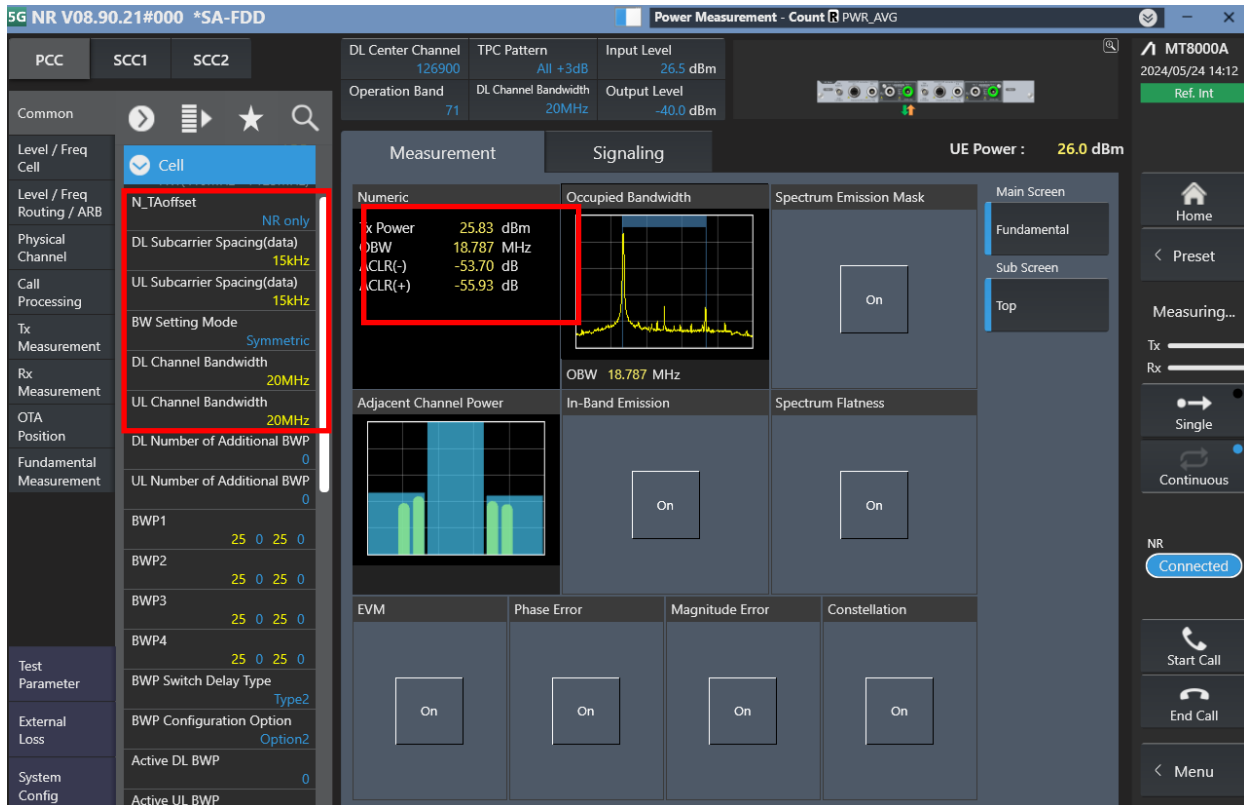
EVM

1.35

%(rms)

## 5G NR FR1



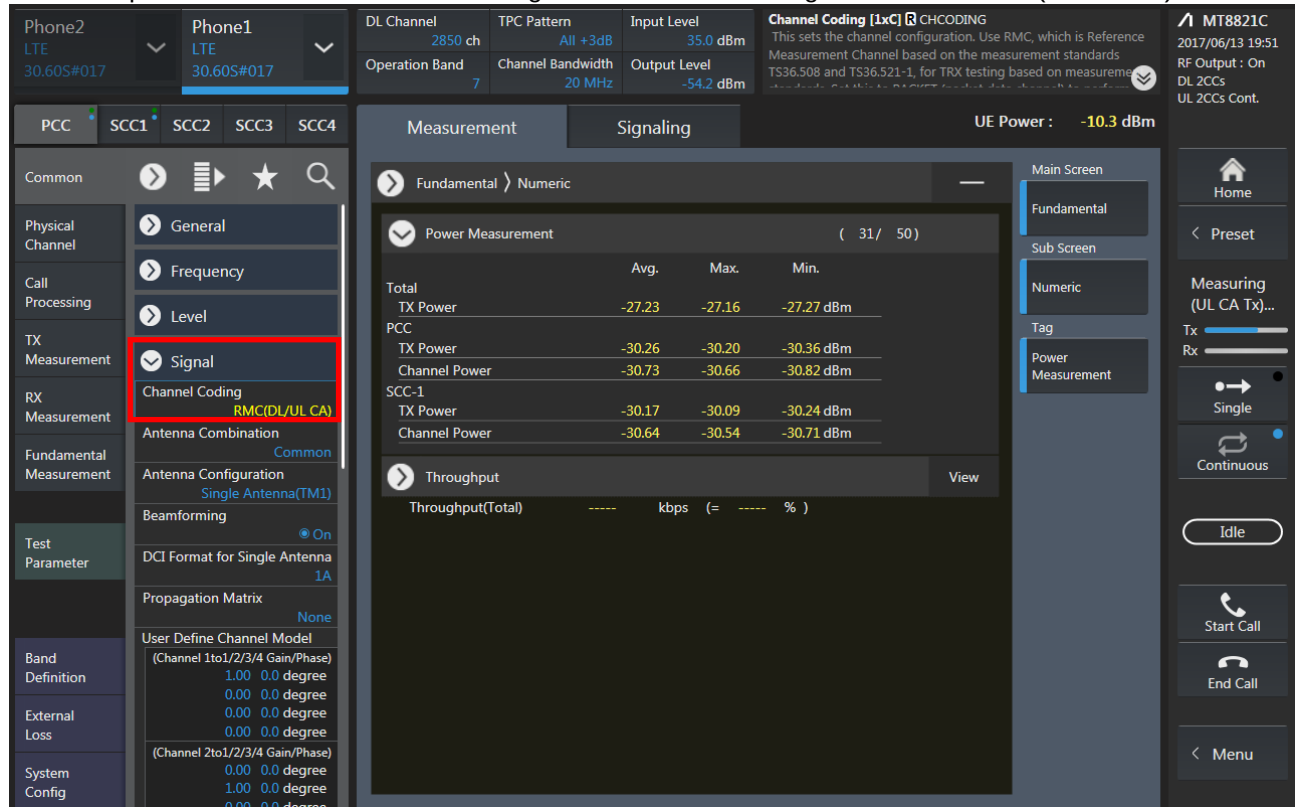


**LTE Uplink and Downlink Carrier Aggregation configurations:**

1. Select "RMC (DL/UL CA)" for Uplink Carrier Aggregation;  
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)】**

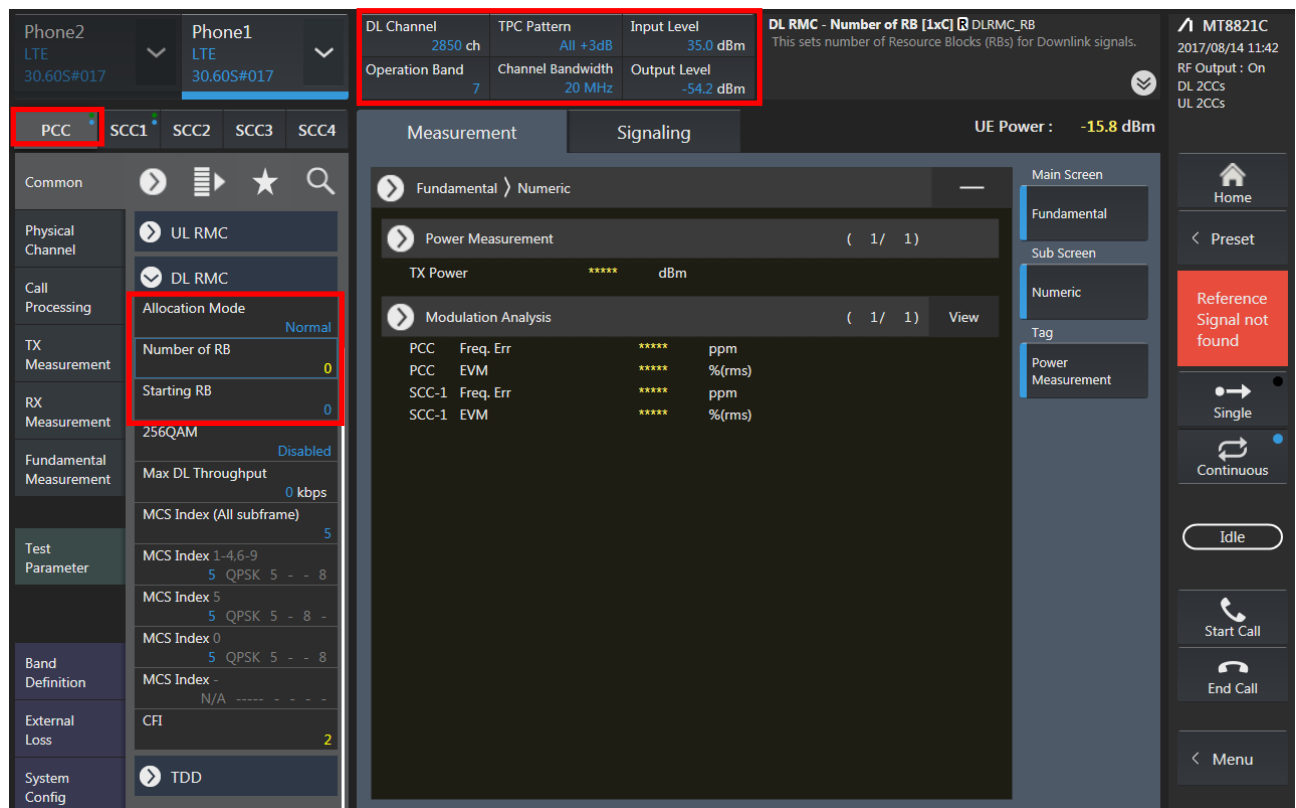


The screenshot displays the SPORTON LAB. LTE test software interface. On the left, a sidebar menu shows various configuration options. The 'Signal' option under 'TX Measurement' is highlighted with a red box, and the 'Channel Coding' option is selected, showing 'RMC(DL/UL CA)' in yellow. The main area shows the 'Channel Coding' configuration page with a table of power measurements.

|                     | Avg.   | Max.   | Min.       |
|---------------------|--------|--------|------------|
| Total TX Power      | -27.23 | -27.16 | -27.27 dBm |
| PCC TX Power        | -30.26 | -30.20 | -30.36 dBm |
| PCC Channel Power   | -30.73 | -30.66 | -30.82 dBm |
| SCC-1 TX Power      | -30.17 | -30.09 | -30.24 dBm |
| SCC-1 Channel Power | -30.64 | -30.54 | -30.71 dBm |

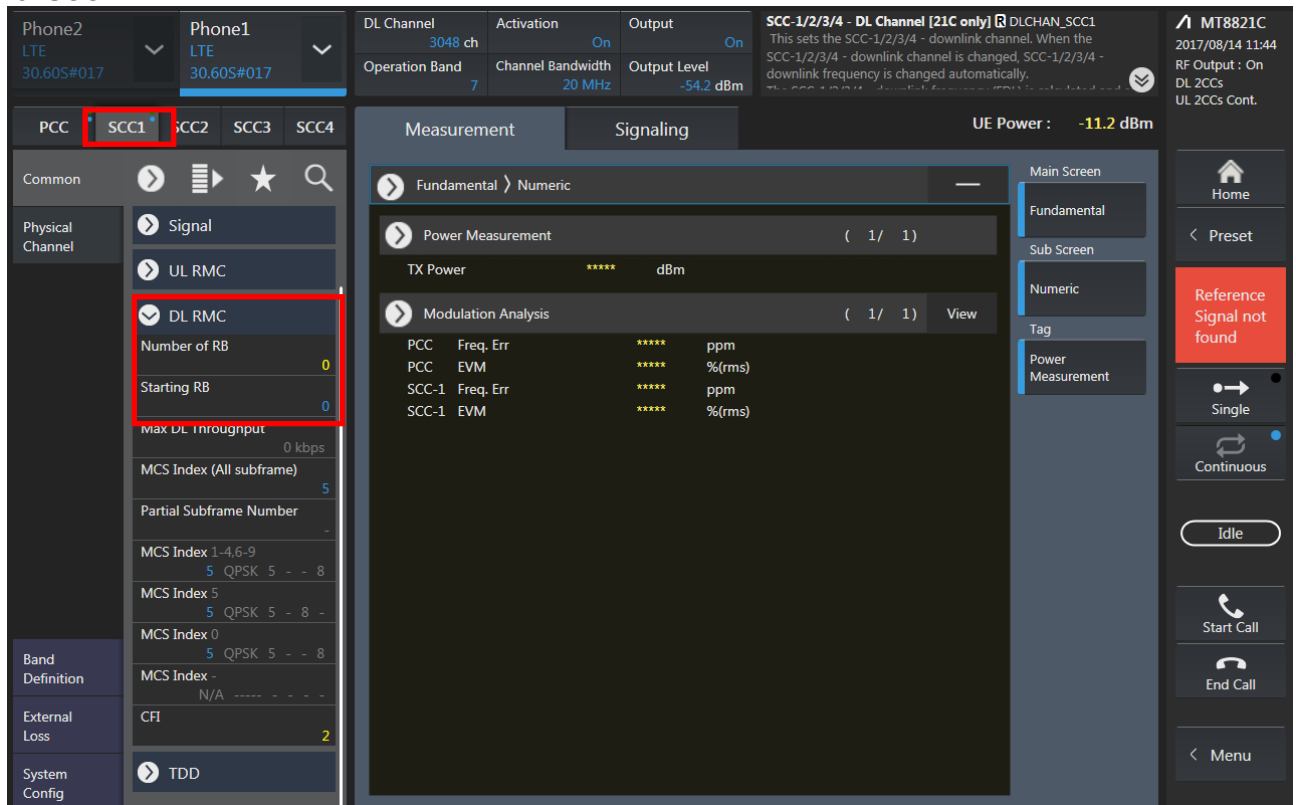
The interface also shows a 'Throughput' section with a 'View' button. The top status bar indicates 'UE Power : -10.3 dBm'.

- PCC parameter Settings: select the PCC tab and Set operating band, BW, channel and RB configurations for PCC.



The screenshot displays the SPORTON LAB. FCC SAR TEST REPORT interface. The left sidebar contains various configuration tabs, with 'PCC' selected. The main area shows the 'PCC' configuration settings, including 'DL Channel' (2850 ch), 'TPC Pattern' (All +3dB), 'Input Level' (35.0 dBm), 'Operation Band' (7), 'Channel Bandwidth' (20 MHz), and 'Output Level' (-54.2 dBm). The 'DL RMC - Number of RB [1x] [3] DLRMC\_RB' is set to 1. The 'Allocation Mode' is set to 'Normal'. The 'Number of RB' is set to 0, and the 'Starting RB' is set to 0. The '256QAM' is set to 'Disabled'. The 'Max DL Throughput' is set to 0 kbps. The 'MCS Index (All subframe)' is set to 5. The 'MCS Index 1-4,6-9' is set to 5 QPSK. The 'MCS Index 5' is set to 5 QPSK. The 'MCS Index 0' is set to 5 QPSK. The 'MCS Index -' is set to N/A. The 'CFI' is set to 2. The 'System Config' is set to TDD. The 'UE Power' is set to -15.8 dBm. The 'Reference Signal not found' message is displayed in a red box on the right side of the interface.

3. SCC parameter Settings: select the SCC tab and Set operating band, BW, channel and RB configurations for SCC.



The screenshot displays the SCC parameter settings interface. The top section shows the DL Channel (3048 ch), Activation (On), and Output (On) settings. The SCC-1/2/3/4 - DL Channel [21C only] is selected, and the SCC-1/2/3/4 - downlink channel is changed. The SCC-1/2/3/4 - downlink frequency is changed automatically. The SCC-1/2/3/4 - downlink frequency (RB) is set to 0.

The SCC parameter settings are shown in the table below:

| Parameter                             | Value                                                                                                          |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------|
| DL Channel                            | 3048 ch                                                                                                        |
| Activation                            | On                                                                                                             |
| Output                                | On                                                                                                             |
| Operation Band                        | 7                                                                                                              |
| Channel Bandwidth                     | 20 MHz                                                                                                         |
| Output Level                          | -54.2 dBm                                                                                                      |
| SCC-1/2/3/4 - DL Channel [21C only]   | DLCHAN_SCC1                                                                                                    |
| SCC-1/2/3/4 - downlink channel        | When the SCC-1/2/3/4 - downlink channel is changed, SCC-1/2/3/4 - downlink frequency is changed automatically. |
| SCC-1/2/3/4 - downlink frequency (RB) | 0                                                                                                              |

The SCC parameter settings are also shown in the table below:

| Parameter                | Value          |
|--------------------------|----------------|
| Number of RB             | 0              |
| Starting RB              | 0              |
| Max DL Throughput        | 0 kbps         |
| MCS Index (All subframe) | 5              |
| Partial Subframe Number  | -              |
| MCS Index 1-4,6-9        | 5 QPSK 5 - - 8 |
| MCS Index 5              | 5 QPSK 5 - - 8 |
| MCS Index 0              | 5 QPSK 5 - - 8 |
| MCS Index -              | N/A - - - - -  |
| CFI                      | 2              |
| TDD                      |                |

The SCC parameter settings are also shown in the table below:

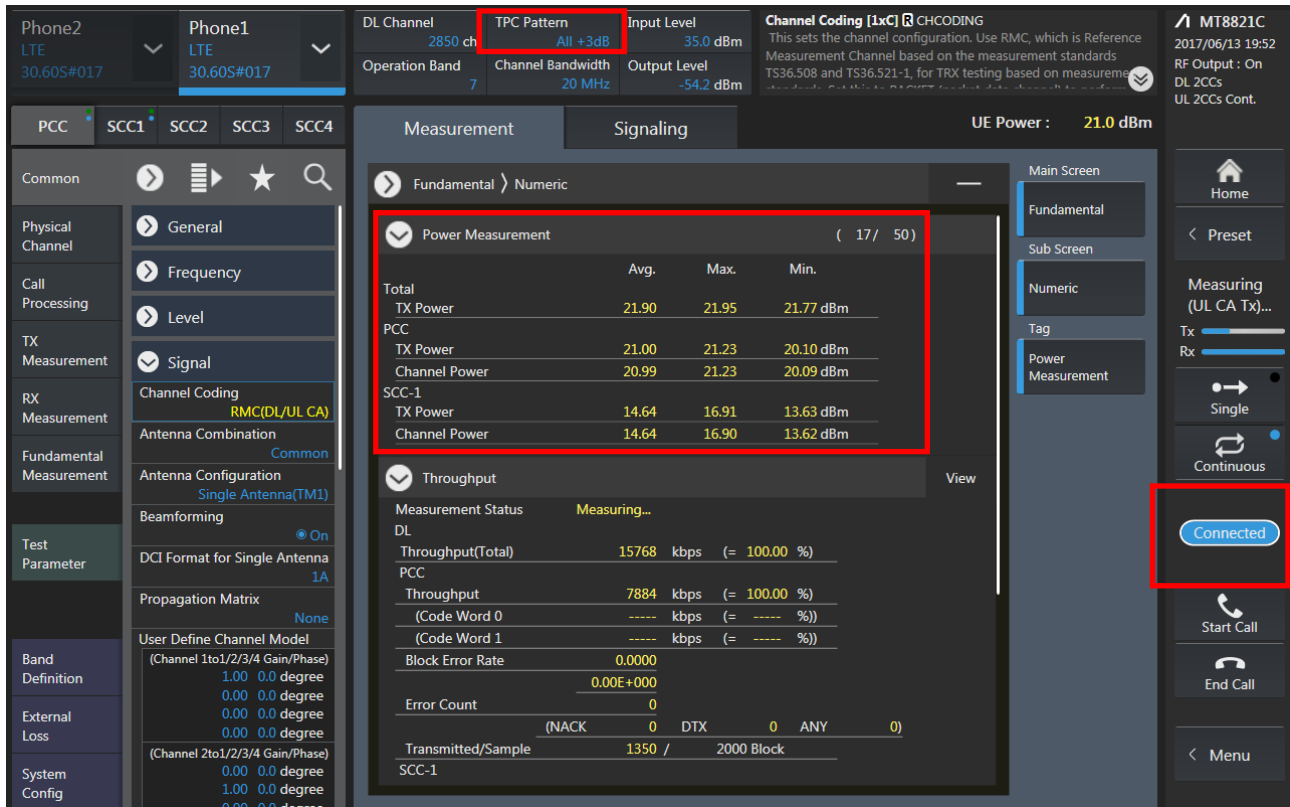
| Parameter           | Value          |
|---------------------|----------------|
| TX Power            | ***** dBm      |
| Modulation Analysis | ( 1 / 1 ) View |
| PCC Freq. Err       | ***** ppm      |
| PCC EVM             | ***** %(rms)   |
| SCC-1 Freq. Err     | ***** ppm      |
| SCC-1 EVM           | ***** %(rms)   |

The SCC parameter settings are also shown in the table below:

| Parameter | Value     |
|-----------|-----------|
| UE Power  | -11.2 dBm |

4. Select the PCC tab, and select max power;

Click the “Connect” button at the Right of the screen.



The screenshot displays the FCC SAR Test Report software interface. The top bar shows 'Phone2' and 'Phone1' both set to 'LTE' with frequency '30.605#017'. The 'DL Channel' is '2850 ch', 'Operation Band' is '7', 'Channel Bandwidth' is '20 MHz', 'Input Level' is '35.0 dBm', and 'Output Level' is '-54.2 dBm'. The 'Channel Coding' is '1xC' and 'CHCODING' is 'RMC(DL/UL CA)'. The 'UE Power' is '21.0 dBm'.

The left sidebar contains various tabs: 'PCC', 'SCC1', 'SCC2', 'SCC3', and 'SCC4'. The 'PCC' tab is selected. Below the tabs, there are sections for 'Physical Channel', 'Call Processing', 'TX Measurement', 'RX Measurement', 'Fundamental Measurement', 'Test Parameter', 'Band Definition', 'External Loss', and 'System Config'.

The main area is divided into 'Measurement' and 'Signaling' tabs. The 'Measurement' tab is active, showing 'Fundamental' and 'Numeric' views. The 'Power Measurement' section is highlighted with a red box, showing the following data:

|                | Avg.  | Max.  | Min.      |
|----------------|-------|-------|-----------|
| Total TX Power | 21.90 | 21.95 | 21.77 dBm |
| PCC TX Power   | 21.00 | 21.23 | 20.10 dBm |
| Channel Power  | 20.99 | 21.23 | 20.09 dBm |
| SCC-1 TX Power | 14.64 | 16.91 | 13.63 dBm |
| Channel Power  | 14.64 | 16.90 | 13.62 dBm |

The 'Throughput' section shows 'Measuring...' status. The 'DL' throughput is '15768 kbps (= 100.00 %)' and the 'PCC' throughput is '7884 kbps (= 100.00 %)'. The 'Block Error Rate' is '0.0000' and the 'Error Count' is '0'. The 'Transmitted/Sample' is '1350 / 2000 Block'.

On the right side, there is a 'Main Screen' section with 'Fundamental', 'Sub Screen', 'Numeric', and 'Tag' options. Below this, there is a 'Connected' button highlighted with a red box. Other buttons include 'Home', 'Preset', 'Measuring (UL CA Tx)...', 'Single', 'Continuous', 'Start Call', 'End Call', and 'Menu'.