



### Appendix D-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 a mobile testing application interface. At the top, it shows 'Phone2 LTE 40.205#032' and 'Phone1 GSM 40.00 #013'. A table of parameters is visible:

TCH Channel	189 CH	TCH UL Frequency	836.400 000 MHz	Input Level	35.0 dBm
System Combination	GSM/PCS1900	TCH DL Frequency	881.400 000 MHz	Output Level	-55.0 dBm

The 'Coding Scheme' is set to CS. The 'MS Power' is 24.07 dBm. The 'Fundamental' measurement section shows 'Power Measurement' with 'TX Power' at 24.01 dBm. Other measurements 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' (0.00 %).



WCDMA

Phone2 LTE 40.20S#032 | Phone1 W-CDMA 40.00 #013

UL Channel	UL Frequency	Input Level
9400 CH	1 880.000 000 MHz	35.0 dBm
DL Channel	DL Frequency	Output Level
9800 CH	1 960.000 000 MHz	-65.7 dBm

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

UE Power : 22.6 dBm

Measurement: 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 )

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 )

PCDE	-39.86	dB
------	--------	----

Common: Authentication / Integrity, Integrity Protection On, 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, Meas Setup: Inner Loop Power Control, Power Control Algorithm Algorithm 1, TPC StepSize 1dB, External Loss Power Control All 1, System Config 10101 01010 10101 01010 10101 01010

LTE

Phone2 LTE 40.20S#032 | Phone1 LTE 40.20S#032

UL Channel	TPC Pattern	Input Level
18900 ch	All +3dB	35.0 dBm
Operation Band	Channel Bandwidth	Output Level
2	20 MHz	-54.2 dBm

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

UE Power : 25.4 dBm

Measurement: Fundamental | Numeric

Power Measurement ( 50 / 50 )

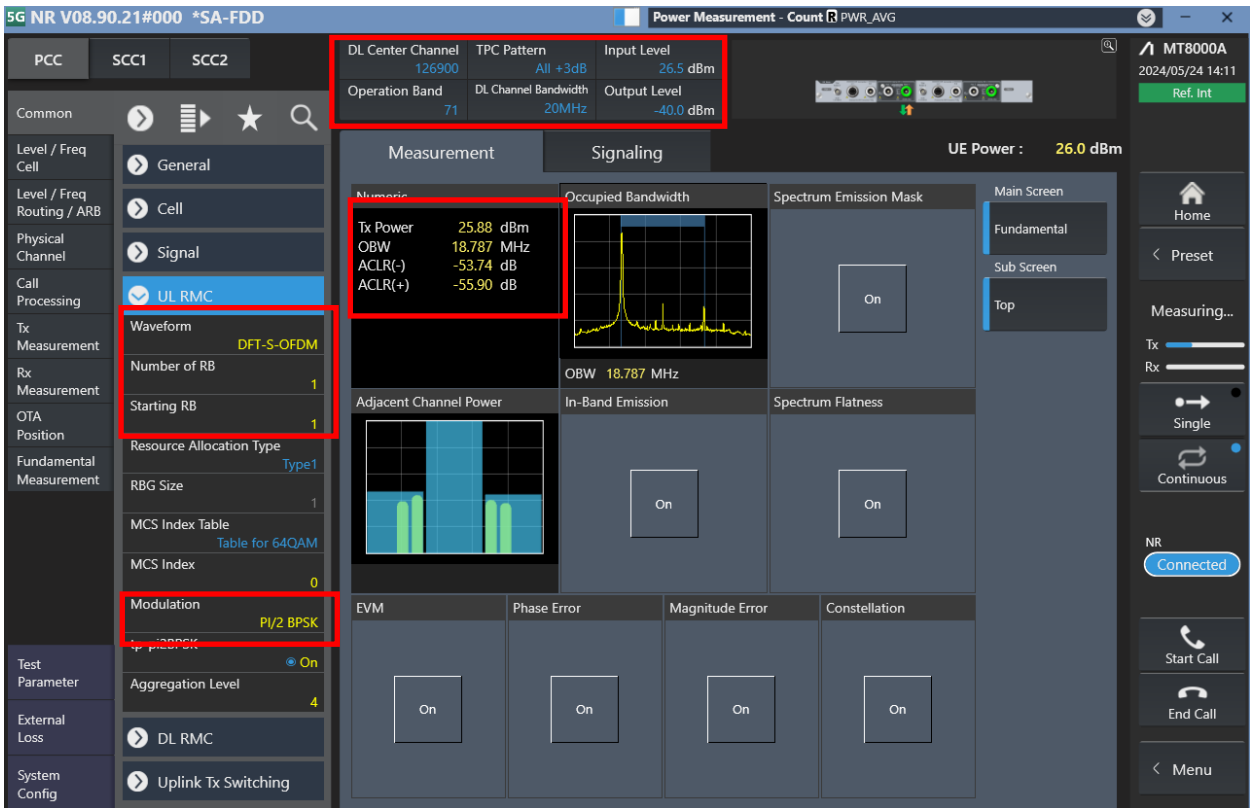
TX Power	25.12	dBm
----------	-------	-----

Modulation Analysis ( 1 / 1 ) View

Freq. Err	0.00	ppm
EVM	1.35	%(rms)

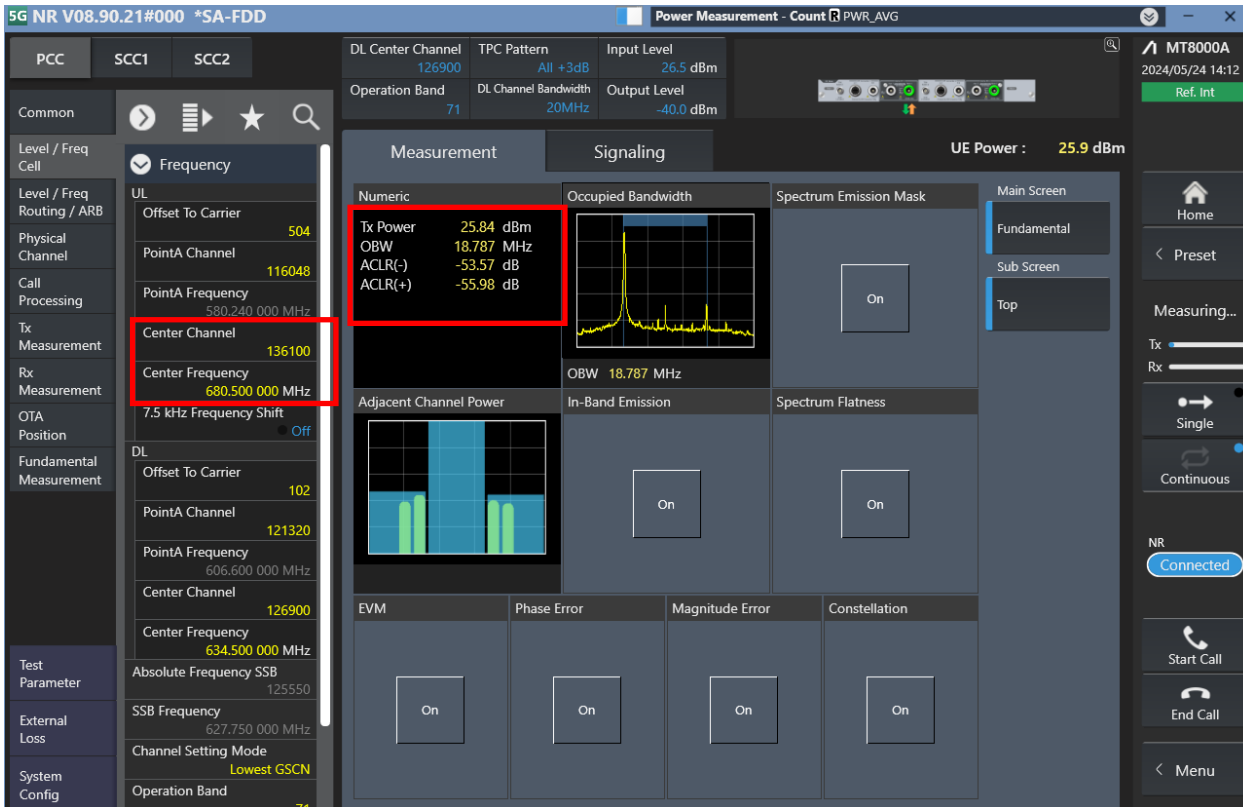
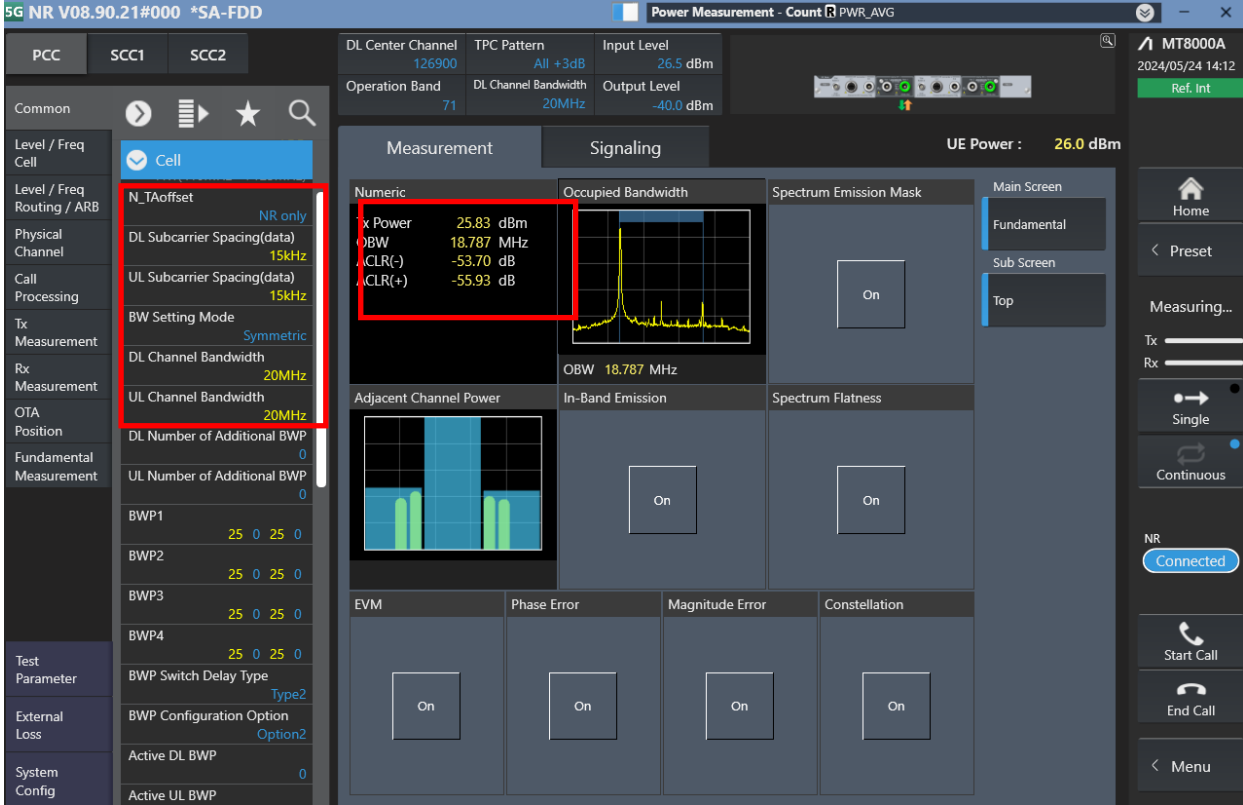
Common: General, Frequency, Level, Signal, UL RMC, UL Allocation Mode Normal, RB Pos. Min(#0), Test Parameter: Number of RB 1, Starting RB 0, Max UL Throughput 72 kbps, Band Definition: MCS Index 5 QPSK 5 72 8, External Loss 256QAM Disabled, System Config DL RMC

**5GNR FR1**



The screenshot displays a software interface for 5G NR testing. The top status bar shows '5G NR V08.90.21#000 \*SA-FDD' and 'Power Measurement - Count PWR\_AVG'. The interface is divided into several sections:

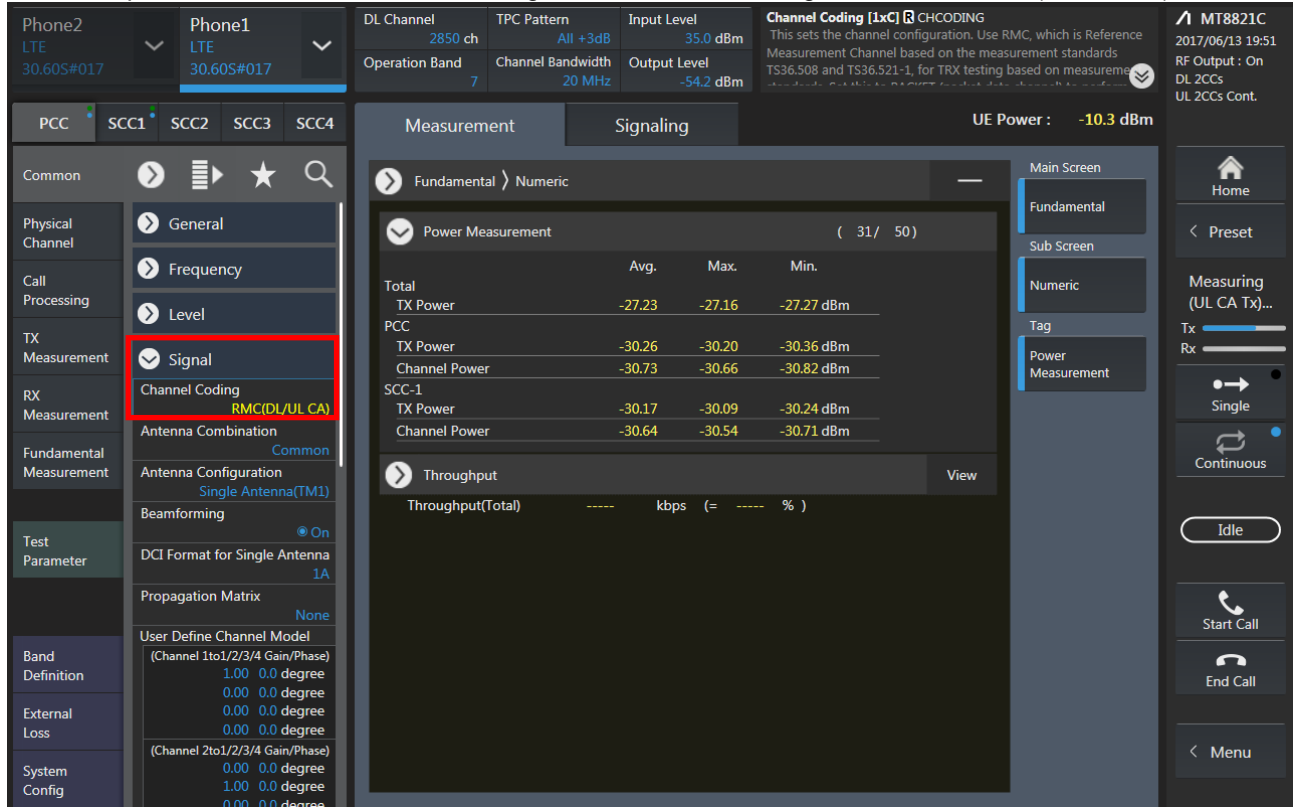
- DL Parameters (Red Box):**
  - DL Center Channel: 126900
  - TPC Pattern: All +3dB
  - Input Level: 26.5 dBm
  - Operation Band: 71
  - DL Channel Bandwidth: 20MHz
  - Output Level: -40.0 dBm
- Measurement Section (Red Box):**
  - Tx Power: 25.88 dBm
  - OBW: 18.787 MHz
  - ACLR(-): -53.74 dB
  - ACLR(+): -55.90 dB
- Configuration Section (Red Box):**
  - 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: P/2 BPSK
  - Aggregation Level: 4
- Other Parameters:**
  - UE Power: 26.0 dBm
  - Occupied Bandwidth: 18.787 MHz
  - Adjacent Channel Power: (Graph shown)
  - In-Band Emission: (On)
  - Spectrum Flatness: (On)
  - EVM: (On)
  - Phase Error: (On)
  - Magnitude Error: (On)
  - Constellation: (On)
- UI Elements:**
  - Left sidebar: Navigation menu with categories like 'Level / Freq Cell', 'Physical Channel', 'Call Processing', etc.
  - Right sidebar: 'Home', 'Preset', 'Measuring...', 'NR Connected', 'Start Call', 'End Call', 'Menu'.
  - Top right: 'MT8000A', '2024/05/24 14:11', 'Ref. Int'.



**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 shows the configuration and measurement interface of an LTE test equipment. The left sidebar contains various configuration menus, with 'Signal' and 'Channel Coding' highlighted in red. The main display area shows 'Power Measurement' data for PCC and SCC-1, and a 'Throughput' section.

	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



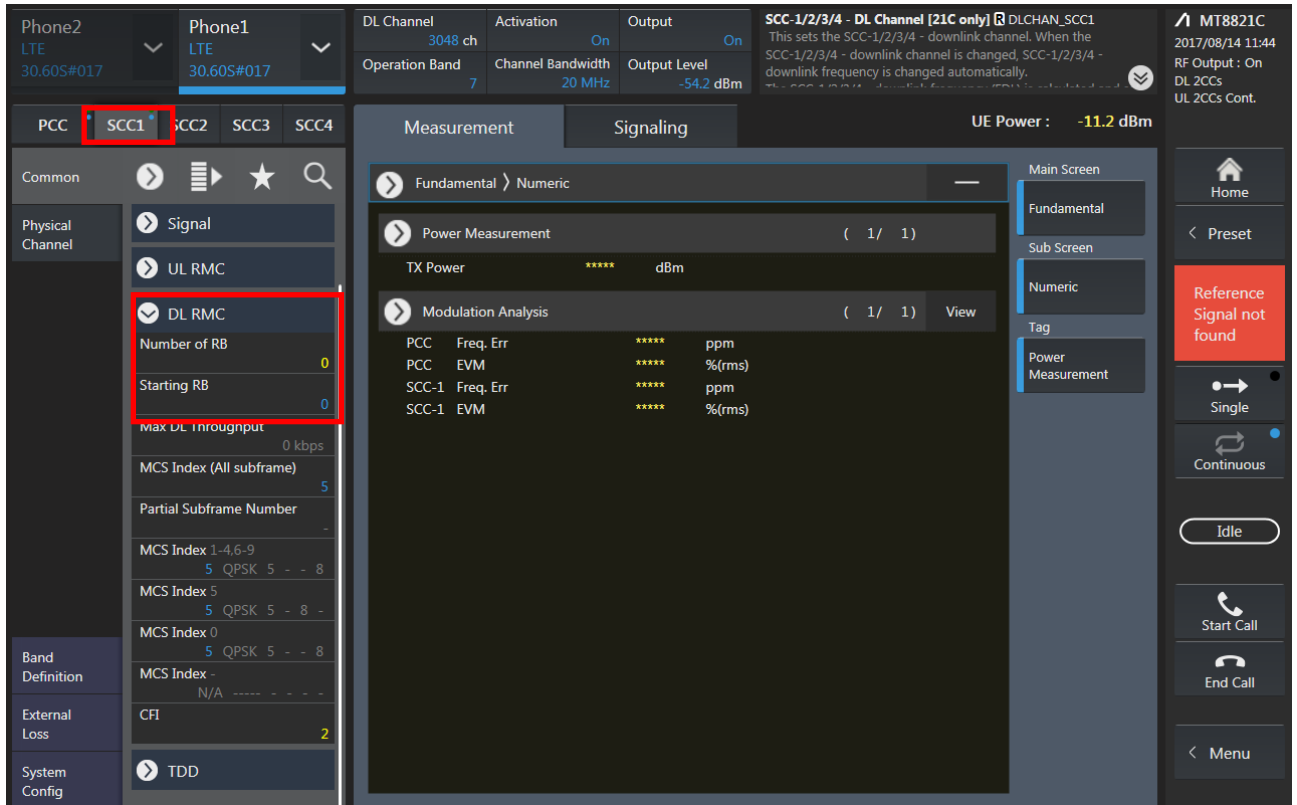
- 2. PCC parameter Settings: select the PCC tab and Set operating band, BW, channel and RB configurations for PCC.

The screenshot displays a mobile testing application interface. At the top, there are two phone profiles: Phone2 (LTE, 30.60S#017) and Phone1 (LTE, 30.60S#017). Below this, a navigation bar includes tabs for PCC, SCC1, SCC2, SCC3, and SCC4. The PCC tab is selected and highlighted with a red box. To the right of the navigation bar, a summary table shows: 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). Further right, it indicates DL RMC - Number of RB [1x] and DL RMC - This sets number of Resource Blocks (RBs) for Downlink signals. The UE Power is shown as -15.8 dBm. The main display area is divided into 'Measurement' and 'Signaling' sections. The 'Measurement' section shows 'Fundamental' and 'Numeric' views. Under 'Fundamental', there are 'Power Measurement' and 'Modulation Analysis' sections. The 'Power Measurement' section shows TX Power (\*\*\*\*\* dBm). The 'Modulation Analysis' section shows a table of error rates for PCC and SCC-1. The 'Signaling' section shows 'Fundamental' and 'Numeric' views. On the left side, there is a 'Common' menu with various settings like Physical Channel, Call Processing, TX Measurement, RX Measurement, Fundamental Measurement, Test Parameter, Band Definition, External Loss, and System Config. The 'DL RMC' settings are highlighted with a red box, showing Allocation Mode (Normal), Number of RB (0), and Starting RB (0). The 'Modulation Analysis' table is as follows:

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

On the right side, there is a 'Main Screen' menu with options for Home, Preset, Reference Signal not found, Single, Continuous, Idle, Start Call, End Call, and Menu.

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



The screenshot displays the configuration and measurement interface for SCC1. The top status bar shows 'Phone2 LTE 30.60S#017' and 'Phone1 LTE 30.60S#017'. Below this, the 'DL Channel' is set to '3048 ch' and 'Operation Band' is '7'. The 'Activation' and 'Output' are both 'On', with 'Channel Bandwidth' at '20 MHz' and 'Output Level' at '-54.2 dBm'. A warning message indicates 'SCC-1/2/3/4 - DL Channel [21C only]'. The 'UE Power' is shown as '-11.2 dBm'. The 'SCC1' tab is selected in the top navigation bar. The left sidebar shows 'DL RMC' selected under 'Physical Channel'. The 'DL RMC' configuration shows 'Number of RB' as 0 and 'Starting RB' as 0. The 'Modulation Analysis' table shows the following data:

Modulation Analysis	Value	Unit
PCC Freq. Err	*****	ppm
PCC EVM	*****	%(rms)
SCC-1 Freq. Err	*****	ppm
SCC-1 EVM	*****	%(rms)

The right sidebar shows 'Reference Signal not found' and 'Power Measurement' options. The bottom navigation bar includes 'Home', 'Preset', 'Single', 'Continuous', 'Idle', 'Start Call', 'End Call', and 'Menu'.



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

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

The screenshot displays a mobile testing application interface. At the top, it shows 'Phone2' and 'Phone1' settings, both on LTE with frequency 30.605#017. The 'DL Channel' is 2850 ch, and the 'TPC Pattern' is highlighted in red as 'All +3dB'. The 'Input Level' is 35.0 dBm and the 'Output Level' is -54.2 dBm. The 'Channel Coding' is [1xC] CHCODING. The 'UE Power' is 21.0 dBm. The interface is divided into 'Measurement' and 'Signaling' tabs. The 'Measurement' tab is active, showing 'Fundamental' and 'Numeric' views. A red box highlights the 'Power Measurement' table, which includes data for Total, PCC, and SCC-1 channels. The 'Throughput' section shows 'Measuring...' status. On the right side, a 'Connected' button is highlighted in red. The bottom right corner contains 'Start Call' and 'End Call' buttons.

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

DL Throughput(Total)	15768 kbps	(= 100.00 %)
PCC Throughput	7884 kbps	(= 100.00 %)
(Code Word 0)	----- kbps	(= ----- %)
(Code Word 1)	----- kbps	(= ----- %)
Block Error Rate	0.0000	
Error Count	0	
(NACK)	0	DTX 0 ANY 0)
Transmitted/Sample	1350 /	2000 Block