



### 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 a mobile testing application interface with the following sections:

- Phone Information:** Phone2 (LTE, 40.205#032) and Phone1 (GSM, 40.00 #013).
- Configuration Table:**

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
- Coding Scheme:** CS (Sets the coding scheme).
- Measurement Section:**
  - Power Measurement:** TX Power 24.01 dBm (50/50)
  - Power vs Time:** (50/50)
  - Template:** Template Fail (50/50)
  - Modulation Analysis:** (1/1)
  - Output RF Spectrum - Modulation:** ORFS-Modulation Pass (1/1)
  - Output RF Spectrum - Switching:** ORFS-Switching Pass (1/1)
  - USF Block Error Rate:** USF Block Error Rate 0.00 %
- Left Panel (Fundamental Measurement):** Measuring Object MS-NB(GMSK), Coding Scheme CS-1 (GMSK), Multi Slot Configuration 1DL, 4UL, TCH Slot 2, TS TSC0 = (0970897), TCH Test Pattern PN15, Timing Advance 0 bit.
- Right Panel:** MS Power: 24.07 dBm, Band Cal, Home, Preset, Measuring..., Tx/Rx bars, Single/Continuous modes, Transfer, RXLEV < 110dBm, Start Call, End Call, Menu.



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
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Frequency Error ( 1 / 1 )

Carrier Frequency Error	-0.0002	kHz
Freq. Err	0.00	ppm

Occupied Bandwidth ( 1 / 1 ) View

OBW	4.163	MHz
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Spectrum Emission Mask ( 1 / 1 ) View

SEM	Pass
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Adjacent Channel Power ( 1 / 1 )

ACLR(-5MHz)	-40.24	dB
ACLR(+5MHz)	-42.79	dB

Modulation Analysis ( 1 / 1 ) View

EVM	5.15	%(rms)
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Peak Code Domain Error ( 1 / 1 )

PCDE	-39.86	dB
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Meas Setup: Power Control All 1

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 )

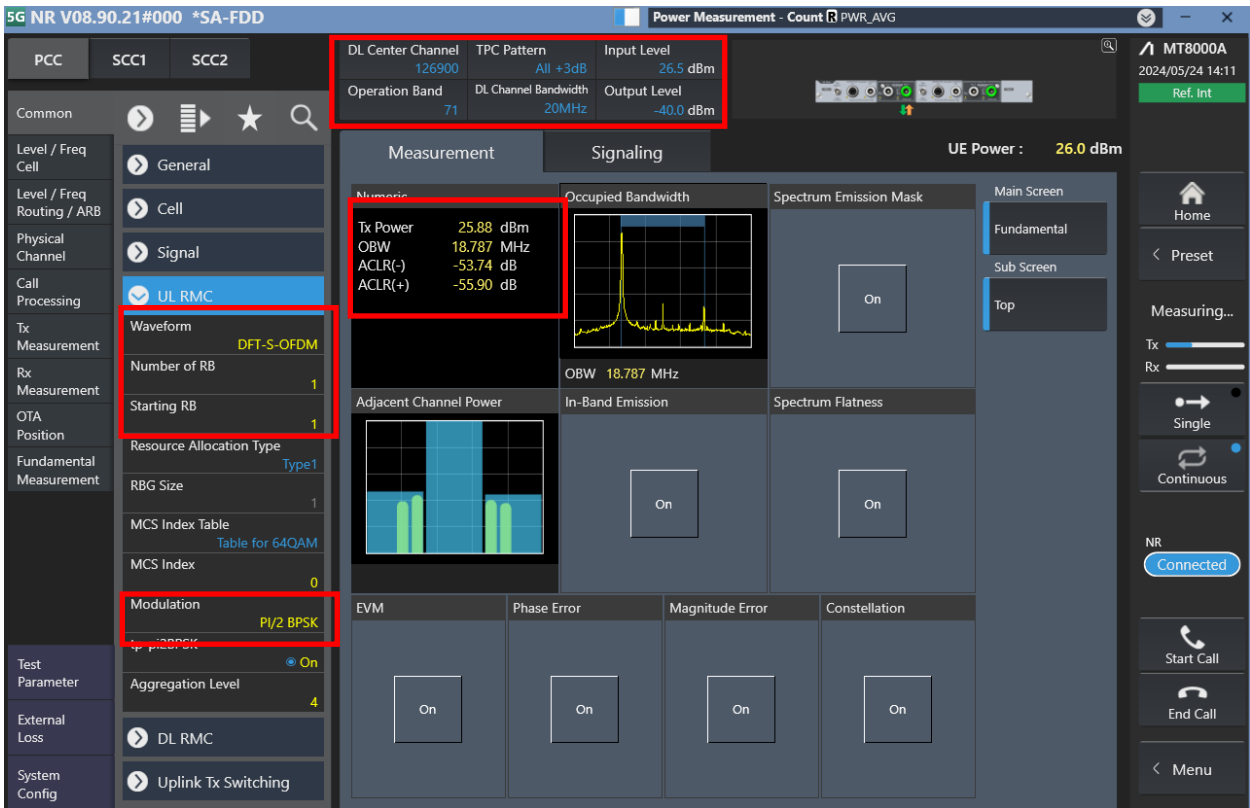
TX Power	25.12	dBm
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Modulation Analysis ( 1 / 1 ) View

Freq. Err	0.00	ppm
EVM	1.35	%(rms)

Test Parameter: Number of RB 1, Starting RB 0, MCS Index 5 QPSK 5 72 8

5GNR FR1



The screenshot displays the 'Power Measurement - Count PWR\_AVG' window of a 5G NR test software. The interface is divided into several sections:

- Configuration (Left Panel):**
  - Waveform: DFT-S-OFDM
  - Modulation: **PI/2 BPSK** (highlighted with a red box)
  - Aggregation Level: 4
  - DL RMC: On
  - Uplink Tx Switching: On
- Measurement Summary (Top Center):**
  - 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 Data (Middle Left):**
  - Tx Power: 25.88 dBm
  - OBW: 18.787 MHz
  - ACLR(-): -53.74 dB
  - ACLR(+): -55.90 dB
- Occupied Bandwidth (Middle Right):**
  - OBW: 18.787 MHz
  - Graph showing frequency spectrum with a peak at the center.
- Other Measurements (Bottom):**
  - Adjacent Channel Power: Graph showing side lobes.
  - In-Band Emission: On
  - Spectrum Flatness: On
  - EVM: On
  - Phase Error: On
  - Magnitude Error: On
  - Constellation: On
- System Information (Right Panel):**
  - UE Power: 26.0 dBm
  - MT8000A
  - 2024/05/24 14:11
  - Ref. Int
  - NR Connected



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

Power Measurement - Count PWR\_AVG

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

UE Power : 26.0 dBm

Measurement Signaling

Numeric Tx Power 25.83 dBm  
OBW 18.787 MHz  
ACLR(-) -53.70 dB  
ACLR(+) -55.93 dB

Occupied Bandwidth  
OBW 18.787 MHz

Spectrum Emission Mask On

Adjacent Channel Power

In-Band Emission On

Spectrum Flatness On

EVM On

Phase Error On

Magnitude Error On

Constellation On

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

Cell

N\_TAOffset NR only

DL Subcarrier Spacing(data) 15kHz

UL Subcarrier Spacing(data) 15kHz

BW Setting Mode Symmetric

DL Channel Bandwidth 20MHz

UL Channel Bandwidth 20MHz

DL Number of Additional BWP 0

UL Number of Additional BWP 0

BWP1 25 0 25 0

BWP2 25 0 25 0

BWP3 25 0 25 0

BWP4 25 0 25 0

BWP Switch Delay Type Type2

BWP Configuration Option Option2

Active DL BWP 0

Active UL BWP 0

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

Power Measurement - Count PWR\_AVG

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

UE Power : 25.9 dBm

Measurement Signaling

Numeric Tx Power 25.84 dBm  
OBW 18.787 MHz  
ACLR(-) -53.57 dB  
ACLR(+) -55.98 dB

Occupied Bandwidth  
OBW 18.787 MHz

Spectrum Emission Mask On

Adjacent Channel Power

In-Band Emission On

Spectrum Flatness On

EVM On

Phase Error On

Magnitude Error On

Constellation On

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

Frequency

UL

Offset To Carrier 504

PointA Channel 116048

PointA Frequency 580.240 000 MHz

Center Channel 136100

Center Frequency 680.500 000 MHz

7.5 kHz Frequency Shift Off

DL

Offset To Carrier 102

PointA Channel 121320

PointA Frequency 606.600 000 MHz

Center Channel 126900

Center Frequency 634.500 000 MHz

Absolute Frequency SSB 125550

SSB Frequency 627.750 000 MHz

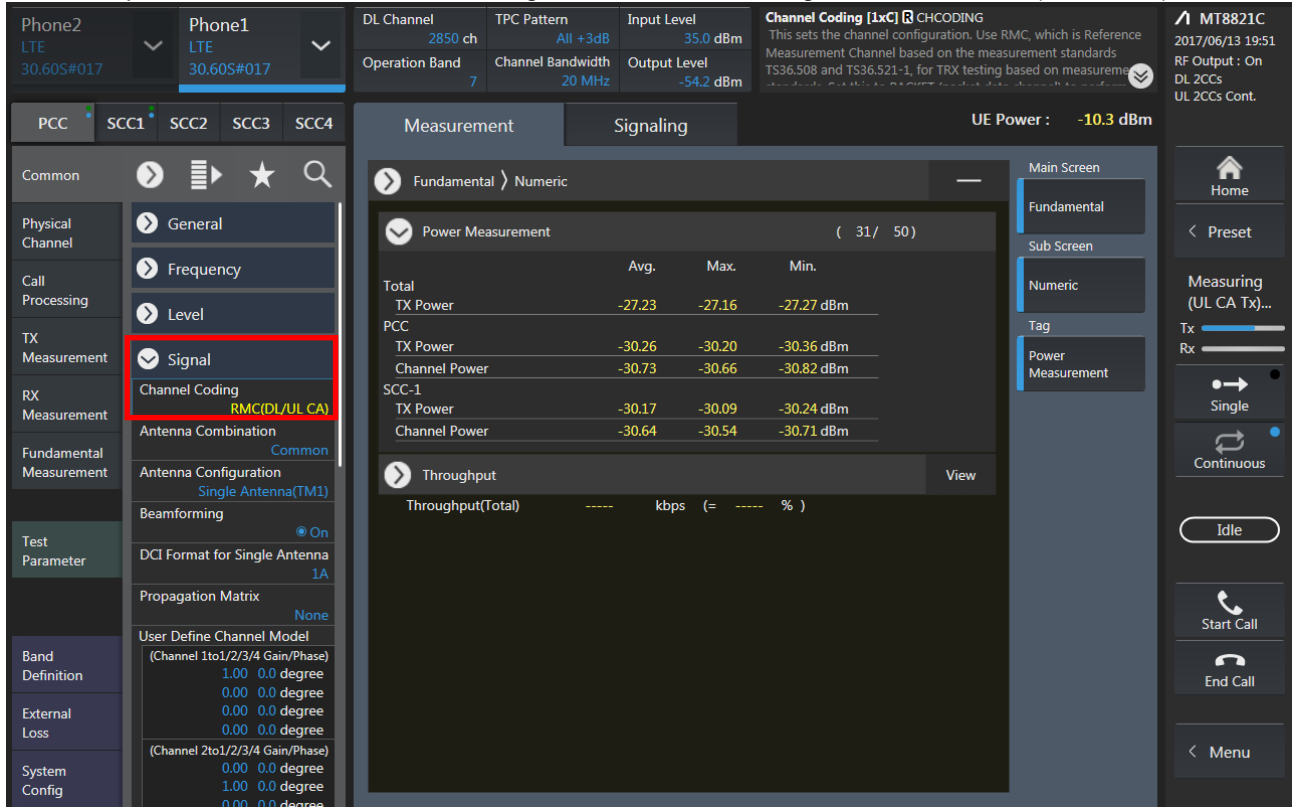
Channel Setting Mode Lowest GSCN

Operation Band 71

**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 LTE test software interface. On the left, the 'Common' menu is open, and 'Signal' is selected, with 'Channel Coding' and 'RMC(DL/UL CA)' highlighted in red. The top status bar shows 'Phone2 LTE 30.60S#017' and 'Phone1 LTE 30.60S#017'. The 'DL Channel' is set to 2850 ch, 'TPC Pattern' to All +3dB, and 'Input Level' to 35.0 dBm. The 'Channel Coding' section is expanded, showing 'RMC (DL/UL CA)' selected. The 'Measurement' screen displays power measurements 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



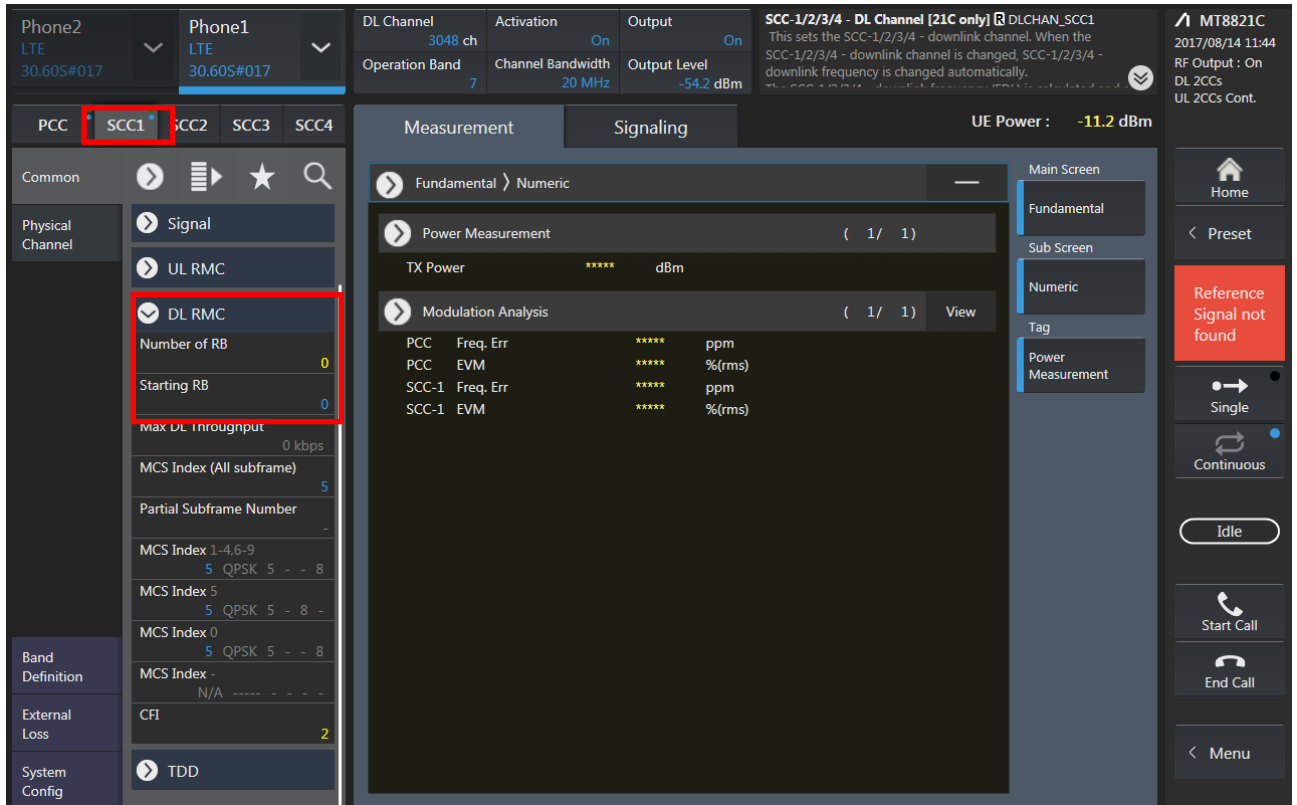
- 2. PCC parameter Settings: select the PCC tab and Set operating band, BW, channel and RB configurations for PCC.

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 box 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 DLRMC\_RB. The main area is divided into 'Measurement' and 'Signaling' sections. The 'Measurement' section is active, showing 'Fundamental' and 'Numeric' views. Under 'Fundamental', there are 'Power Measurement' and 'Modulation Analysis' options. The 'Power Measurement' section shows TX Power (\*\*\*\*\* dBm). The 'Modulation Analysis' section displays a table of error rates for PCC and SCC-1. The 'Signaling' section is currently empty. 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' section is highlighted with a red box, showing Allocation Mode (Normal), Number of RB (0), and Starting RB (0). The right side of the screen features a 'Main Screen' menu with options like Home, Preset, Reference Signal not found, Single, Continuous, Idle, Start Call, End Call, and Menu. The top right corner shows the device ID MT8821C, the date and time 2017/08/14 11:42, and RF Output status (On DL 2CCs, UL 2CCs). The UE Power is indicated as -15.8 dBm.

DL Channel	TPC Pattern	Input Level	DL RMC - Number of RB [1x]	DLRMC_RB
2850 ch	All +3dB	35.0 dBm		This sets number of Resource Blocks (RBs) for Downlink signals.
Operation Band	Channel Bandwidth	Output Level		
7	20 MHz	-54.2 dBm		

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

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', 'Activation' is 'On', and 'Output' is 'On'. The 'Operation Band' is '7', 'Channel Bandwidth' is '20 MHz', and 'Output Level' is '-54.2 dBm'. A warning message states: 'SCC-1/2/3/4 - DL Channel [21C only] DLCHAN\_SCC1. This sets the 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. The SCC-1/2/3/4 - downlink frequency (DF) is not fixed and...'. The 'UE Power' is '-11.2 dBm'. The 'DL RMC' configuration is shown with 'Number of RB' set to 0 and 'Starting RB' set to 0. The 'Modulation Analysis' table is as follows:

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

Other parameters shown include '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 - - - - -), and 'CFI' (2). The 'TDD' system configuration is also visible.



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

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

The screenshot shows a mobile testing application interface. At the top, there are settings for Phone1 and Phone2, DL Channel (2850 ch), TPC Pattern (All +3dB), Input Level (35.0 dBm), Channel Coding (1xC), and CHCODING. The main display is divided into 'Measurement' and 'Signaling' tabs. The 'Measurement' tab is active, showing 'Fundamental' and 'Numeric' views. A red box highlights the 'Power Measurement' section, which includes a table with columns for 'Avg.', 'Max.', and 'Min.' values in dBm. Below this, there is a 'Throughput' section showing 'Measuring...' status and various throughput and error rate metrics. On the right side of the screen, there is a 'Main Screen' menu with options like 'Fundamental', 'Sub Screen', 'Numeric', and 'Power Measurement'. At the bottom right, there is a 'Connected' button highlighted with a red box, along with '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

	Throughput	(= %)
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  
Transmitted/Sample: 1350 / 2000 Block