Power reduction mechanism verification

According to the May 2017 TCBC Workshop, Demonstration of proper functioning of the detection and triggering mechanisms is required to support the corresponding RF exposure conditions. The verification is through a base station simulator is used to establish a conducted RF connection and monitor output power under different operating conditions related to the power reduction mechanisms. Detail of power reduction mechanisms referring to Operational Description

1. Power Verification Procedure

The power verification was performed according to the following procedure:

1. A base station simulator was used to establish a conducted RF connection and the output power was monitored. The power measurements were confirmed to be within expected tolerances for all states before and after a power reduction mechanism was triggered.
2. Step 1 was repeated for all relevant modes and frequency bands for the mechanism being investigated.
3. Steps 1 and 2 were repeated for all individual power reduction mechanisms and combinations thereof. For the combination cases, one mechanism was switched to a 'triggered' state at a time; powers were confirmed to be within tolerances after each additional mechanism was activated.

General Note:

1. This device uses different Exposure Condition Index (ECI) to configure different time averaged power levels based on certain exposure scenarios as the following table:

Exposure Condition	ECI	Trigger conditions
Head SAR-Standalone	ECI 2	Receiver on
Head SAR- Simultaneous	ECI 4	Receiver on + WLAN/BT
Body worn/Extremity SAR-Standalone	ECI 1	Receiver off
Hotspot Body worn/Extremity SAR- Simultaneous	ECI 3	Receiver off + WLAN/BT

2. Select the bands with the largest power reduction for power verification:
   a. Establish voice call and audio routed through the earpiece to monitor output power under head power states.
      - Tradition voice call for GSM/WCDMA, voice over IP CMRS operations for LTE/5G FR1
      - GSM1900 is set to GPRS 4TX slot, LTE Band 66 is set at 'highest BW, 1RB, RB Offset = 0, QPSK', WCDMA II is set AMR 12.2Kbps, 5G FR1 n41 is set at highest BW, 1RB, RB offset = 1.

   b. Establish data connection monitor body worn power state.
      - GSM1900 is set to GPRS 4TX slot, LTE Band 66 is set at 'highest BW, 1RB, RB Offset = 0, QPSK' WCDMA II is set RMC 12.2Kbps, 5G FR1 n41 is set at highest BW, 1RB, RB offset = 1.
      - Body Detect mechanism was performed for the in-hand and on a stationary object (placed on a table)
3. In this power validation purpose is to demonstrate of proper functioning of the detection and triggering mechanisms to support the corresponding RF exposure conditions.
4. Verification performed for one technology/Band to demonstrate that the power reduction applies for same technology/band and call origination.

2. Verification output Power Results

Head exposure conditions

Ear acoustic output Status:		OFF		ON	
Power state		WWAN ECI 1		WWAN ECI 2	
Wireless technology	Antenna	Measured (dBm)	Max. Tune-up (dBm)	Measured (dBm)	Max. Tune-up (dBm)
GSM1900 GPRS 4 Tx slots	Ant 1	20.80	21.50	20.80	21.50
WCDMA II	Ant 1	20.77	21.00	18.30	18.50
LTE Band 66	Ant 4	21.12	21.80	18.62	19.30
FR1 n41	Ant 1	20.89	21.70	17.38	18.20

Hotspot exposure condition

Hotspot output Status:		OFF		ON	
Power state		WWAN ECI 1		WWAN ECI 3	
Wireless technology	Antenna	Measured (dBm)	Max. Tune-up (dBm)	Measured (dBm)	Max. Tune-up (dBm)
GSM1900 GPRS 4 Tx slots	Ant 1	20.80	21.50	16.62	17.80
WCDMA II	Ant 1	20.77	21.00	15.59	16.00
LTE Band 66	Ant 4	21.12	21.80	17.20	17.80
FR1 n41	Ant 1	20.89	21.70	15.89	16.70