

## 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 Device State Indices (DSI) to configure different time averaged power levels based on certain exposure scenarios, as the following table:

| Exposure conditions  | Trigger Conditions        | DSI  |
|----------------------|---------------------------|------|
| Head                 | Receiver on               | DSI1 |
| Body Worn (15mm)     | Sensor Off / Receiver off | DSI4 |
| Hotspot (10mm)       | Hotspot On                | DSI5 |
| Extremity (Handheld) | Sensor On                 | DSI3 |
|                      | Sensor Off / Receiver off | DSI4 |

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 WCDMA, voice over IP CMRS operations for LTE
    - LTE Band 66 is set at 'highest BW, 1RB, RB Offset = 0, QPSK', WCDMA IV is set AMR 12.2Kbps.
  - b. Establish data connection monitor hotspot power state.
    - GSM850 is set to GPRS 4TX slot, LTE Band 42 is set at 'highest BW, 1RB, RB Offset = 0, QPSK', WCDMA IV is set RMC 12.2Kbps, 5G FR1 n77 is set at highest BW, 1RB, RB offset = 1.
  - c. Establish data connection monitor extremity power state.
    - 5G FR1 n77/78 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).
2. In this power validation purpose is to demonstrate of proper functioning of the detection and triggering mechanisms to support the corresponding RF exposure conditions.
3. 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

| Head Exposure condition     |         | Output Power for Voice Call |                    |                |                    |
|-----------------------------|---------|-----------------------------|--------------------|----------------|--------------------|
| Ear acoustic output Status: |         | ON                          |                    | OFF            |                    |
| Power state                 |         | WWAN DSI1                   |                    | WWAN DSI4      |                    |
| Wireless technology         | Antenna | Measured (dBm)              | Max. Tune-up (dBm) | Measured (dBm) | Max. Tune-up (dBm) |
| WCDMA IV                    | Ant5    | 19.61                       | 20.50              | 24.25          | 25.00              |
| LTE Band 66                 | Ant4    | 14.47                       | 15.50              | 21.83          | 23.00              |

### Hotspot exposure condition

| Hotspot exposure condition |         | Output Power for data connection |                    |                   |                    |
|----------------------------|---------|----------------------------------|--------------------|-------------------|--------------------|
| Wifi Hotspot Status        |         | OFF                              |                    | ON                |                    |
| Power state                |         | WWAN DSI4                        |                    | WWAN DSI5         |                    |
|                            |         | WiFi Standalone                  |                    | WiFi Simultaneous |                    |
| Wireless Technology        | Antenna | Measured (dBm)                   | Max. Tune-up (dBm) | Measured (dBm)    | Max. Tune-up (dBm) |
| GSM850 (GPRS 4Tx slots)    | Ant1    | 27.01                            | 28.60              | 24.55             | 26.10              |
| WCDMA IV                   | Ant5    | 24.25                            | 25.00              | 19.60             | 20.50              |
| LTE Band 42                | Ant5    | 25.08                            | 26.00              | 17.72             | 18.50              |
| FR1 n77                    | Ant5    | 25.61                            | 26.00              | 16.21             | 16.50              |

### Extremity exposure condition

| Extremity exposure condition |         | Output Power (data connection) |                    |                |                    |
|------------------------------|---------|--------------------------------|--------------------|----------------|--------------------|
|                              |         | sensor off                     |                    | sensor on      |                    |
| Power state                  |         | WWAN DSI4                      |                    | WWAN DSI3      |                    |
| Wireless Technology          | Antenna | Measured (dBm)                 | Max. Tune-up (dBm) | Measured (dBm) | Max. Tune-up (dBm) |
| FR1 n77                      | Ant5    | 25.61                          | 26.00              | 17.88          | 18.00              |
| FR1 n78                      | Ant4    | 24.40                          | 25.10              | 17.79          | 18.60              |