Appendix E. Power reduction mechanism verification

According to the May 2017 TCBC Workshop, Demonstration of proper functioning of the detection and triggering mechanisms 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

- Establish voice call and audio routed through the earpiece to monitor output power under head exposure condition
- Establish data connection monitor hotspot power state.
- Establish data connection monitor body worn power state.
  - Body Detect mechanism was performed for the in-hand and on a stationary object (placed on a table)
- In this power validation purpose is to demonstrate of proper functioning of the detection and triggering mechanisms to support the corresponding RF exposure conditions.
- Verification performed for each technology to demonstrate that the power reduction applies for both technology and call origination.

2. Test setup for measuring power

Figure 1

3. Verification output Power Results

Head exposure condition

Head exposure condition		Output Power (data connection)			
		G-Sensor status			
Power state		Sensor Off		Sensor On	
Wireless technology	Antenna	Measured (dBm)	Target power(dBm)	Measured (dBm)	Target power(dBm)
802.11b, Ch6	(Ant6+7)Ant 6	20.2	20 ±1.5	18.6	19 ±1.5
	(Ant6+7)Ant 7	20.0	20 ±1.5	18.5	19 ±1.5
802.11a UNII2 ,CH157	(Ant6+7)Ant 6	19.4	19 ±1.5	18.0	19 ±1.5
	(Ant6+7)Ant 7	19.2	19 ±1.5	18.1	19 ±1.5
802.11ax UNII6 ,CH160	(Ant6+7)Ant 6	12.0	11.5 ±1.5	12.3	11.5 ±1.5
	(Ant6+7)Ant 7	12.0	11.5 ±1.5	12.0	11.5 ±1.5

Hotspot exposure condition

Hotspot exposure condition		Output Power (data connection)			
		G-Sensor status			
Power state		Sensor Off		Sensor On	
Wireless technology	Antenna	Measured (dBm)	Target power(dBm)	Measured (dBm)	Target power(dBm)
802.11b, Ch6	(Ant6+7)Ant 6	20.3	20 ±1.5	15.2	15 ±1.5
	(Ant6+7)Ant 7	20.0	20 ±1.5	15.0	15 ±1.5

Body worn exposure condition

Body exposure condition		Output Power (data connection)			
		G-Sensor status			
Power state		Sensor Off		Sensor On	
Wireless technology	Antenna	Measured (dBm)	Target power(dBm)	Measured (dBm)	Target power(dBm)
802.11b, Ch6	(Ant6+7)Ant 6	20.2	20 ±1.5	15.1	15 ±1.5
	(Ant6+7)Ant 7	20.1	20 ±1.5	15.0	15 ±1.5
802.11a UNII2 ,CH157	(Ant6+7)Ant 6	18.8	19 ±1.5	15.6	16 ±1.5
	(Ant6+7)Ant 7	18.7	19 ±1.5	15.5	16 ±1.5
802.11ax UNII6 ,CH160	(Ant6+7)Ant 6	12.2	11.5 ±1.5	8.6	7.5 ±1.5
	(Ant6+7)Ant 7	12.1	11.5 ±1.5	8.5	7.5 ±1.5

1. Conducted Power verification Plan:

a) According to the May 2017 TCBC Workshop, Demonstration of proper functioning of the detection and triggering mechanisms 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.
b) Body Detect mechanism will be performed for the in-hand and on a stationary object (placed on a table).
c) Verify the functionality of the motion sensor by measuring the output power in the following steps.

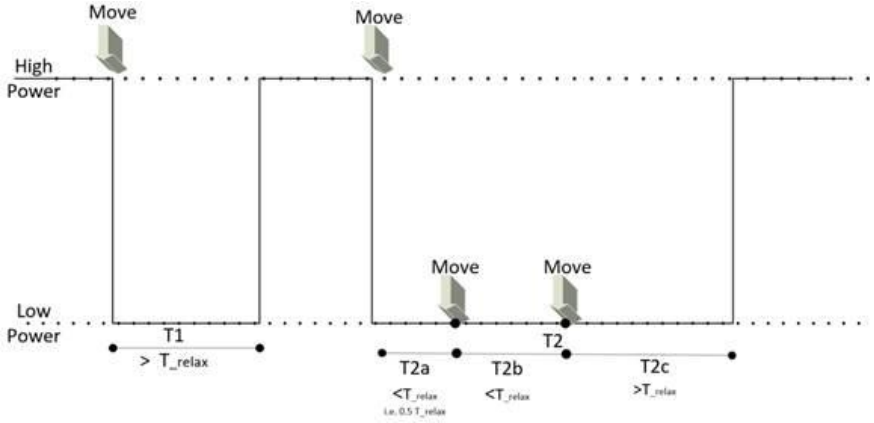

Figure 1 Illustration of the procedure for the validation of the power reduction

The device is embedded with motion sensors only, no proximity sensors are installed.

1. **Placed on a table:** Make the DUT transmit with the maximum output power by using a base station simulator.
   a) Confirm that motion sensor is not triggered by letting the DUT remain stationary with no movements for the period T_{relax} for the motion sensor to reach stationary state.
   b) Record P_{step1} (high power)
2. **In-hand:** Move the DUT to trigger the motion sensor. Apply the motion of the DUT with respect to movements in intended and reasonably foreseeable use conditions of the DUT.
   a) Record P_{step2} (low power)
3. For the validation of T_{relax}, wait a time period $T_1 > T_{relax}$ and confirm DUT restores to high power (P_{step1}).
4. Move the DUT to trigger the motion sensor.
5. Move DUT within T_{relax} to ensure T_{relax} resets when DUT is in motion.
   DUT can be moved once or twice within T_{relax}, (after time periods T_{2a} and T_{2b} in Figure 1.) followed by waiting for a time period greater than T_{relax} (time period T_{2c} in Figure 1.) for DUT to restore high power. The total time duration of this step is T_2, and the power during the whole period T_2 shall be reduced (low power – P_{step2}).

T_{relax}: *60 sec*
Monitor period, T_1: 70 *sec*, T_{2a}: 30 sec, T_{2b}:30 sec, T_{2c}: 70 sec

Exposure Condition		Output Power (data connection) (dBm)											
		Stationary Placed on a table		Sensor On		Stationary Placed on a table		Sensor On				Stationary Placed on a table	
Power state		Full Power P_{step1}		Low Power P_{step2}		Full Power P_{step1} & T_1 > T_{relax}		Low Power P_{step2} & T_{2a} < T_{relax}		Low Power P_{step2} & T_{2b} < T_{relax}		Full Power P_{step1} & T_{2c} > T_{relax}	
Wireless technology	Antenna	Measured	Max. Tune-up	Measured	Max. Tune-up	Measured	Max. Tune-up	Measured	Max. Tune-up	Measured	Max. Tune-up	Measured	Max. Tune-up
802.11b, Ch6	(Ant6+7) Ant 6	20.1	20 ±1.5	15.2	15 ±1.5	20.2	20 ±1.5	15.2	15 ±1.5	15.2	15 ±1.5	20.1	20 ±1.5
	(Ant6+7) Ant 7	20.0	20 ±1.5	15.0	15 ±1.5	20.1	20 ±1.5	15.1	15 ±1.5	15.0	15 ±1.5	20.1	20 ±1.5
802.11a UNII2 , CH157	(Ant6+7) Ant 6	19.2	19 ±1.5	15.4	16 ±1.5	19.0	19 ±1.5	15.5	16 ±1.5	15.6	16 ±1.5	19.1	19 ±1.5
	(Ant6+7) Ant 7	19.0	19 ±1.5	15.2	16 ±1.5	19.0	19 ±1.5	15.4	16 ±1.5	15.3	16 ±1.5	19.1	19 ±1.5