

APPENDIX H: POWER REDUCTION VERIFICATION

Per the May 2017 TCBC Workshop Notes, demonstration of proper functioning of the power reduction mechanisms is required to support the corresponding SAR configurations. The verification process was divided into two parts: (1) evaluation of output power levels for individual or multiple triggering mechanisms and (2) evaluation of the triggering distances for proximity-based sensors.

1.1 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.

1.2 Distance Verification Procedure

The distance verification procedure was performed according to the following procedure:

1. A base station simulator was used to establish an RF connection and to monitor the power levels. The device being tested was placed below the relevant section of the phantom with the relevant side or edge of the device facing toward the phantom.
2. The device was moved toward and away from the phantom to determine the distance at which the mechanism triggers and the output power is reduced, per KDB Publication 616217 D04v01r02 and FCC Guidance. Each applicable test position was evaluated. The distances were confirmed to be the same or larger (more conservative) than the minimum distances provided by the manufacturer.
3. Steps 1 through 2 were repeated for all distance-based power reduction mechanisms.

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Test Dates: 10/20/2017 – 11/15/2017	DUT Type: Portable Handset			APPENDIX H: Page 1 of 2

1.3 Main Antenna Verification Summary

Table H-1
Power Measurement Verification for Main Antenna

Mechanism(s)	Mode/Band	Power Measurements (dBm)	
		Un-triggered (Max)	1st Trigger (Reduced)
Hotspot On	UMTS B2	22.98	19.9
Hotspot On	UMTS B4	23.43	20.47
Hotspot On	LTE B66	23.14	20.16
Hotspot On	LTE B4	23.81	20.72
Hotspot On	LTE B25	22.69	19.63
Hotspot On	LTE B2	22.64	19.49
Hotspot On	LTE B7	23.11	20.34

1.4 WIFI Verification Summary

Table H-2
Power Measurement Verification WIFI

Mechanism(s)	Mode/Band	Conducted Power (dBm)	
		Un-triggered (Max)	Mechanism #1 (Reduced)
Held-to-Ear	802.11b	18.27	16.5
Held-to-Ear	802.11g	17.18	16.48
Held-to-Ear	802.11n (2.4GHz)	15.98	15.97
Held-to-Ear	802.11a	16.26	12.95
Held-to-Ear	802.11n (5GHz, 20MHz BW)	16.99	12.99
Held-to-Ear	802.11ac (20MHz BW)	16.46	12.79
Held-to-Ear	802.11n (5GHz, 40MHz BW)	16.24	13.37
Held-to-Ear	802.11ac (40MHz BW)	16.47	13.43

IEEE 802.11ac (80 MHz BW) was not evaluated due to equipment limitation.

Table H-3
Distance Measurement Verification for WIFI

Mechanism(s)	Test Condition	Mode/Band	Distance Measurements (mm)		Minimum Distance from Manufacturer (mm)
			Moving Toward	Moving Away	
Held-to-Ear	Head - Right Cheek	2.4 GHz	72	>93	60
Held-to-Ear	Head - Right Cheek	5 GHz	72	>93	60
Held-to-Ear	Head - Left Cheek	2.4 GHz	71	>93	60
Held-to-Ear	Head - Left Cheek	5 GHz	68	>93	60

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