POWER REDUCTION VERIFICATION

This device supports manufacturer's proprietary power reduction mechanism called, 'Detect mode' for the cellular, Wi-Fi and Bluetooth transmitters. There are additional power reduction mechanisms for the Wi-Fi and Bluetooth transmitters based on the operating state of the cellular and (for Bluetooth) Wi-Fi transmitters. Details of these mechanisms can be found in the Operational Description.

The verification plan consists of measuring the power levels of the cellular, Bluetooth and Wi-Fi transmitters under different operating conditions related to the power reduction mechanisms.

A. Verification of Body Detect mechanism was performed for the following test cases for cellular, Wi-Fi and Bluetooth transmitters. For voice calls (when audio is routed to the earpiece) this mechanism is disabled and so all measurements are made using data calls.

- In-hand
- On a stationary object (placed on a table)

B. Verification of power reduction levels for Wi-Fi was performed with cellular transmitter on and off.

C. Verification of power reduction levels for Bluetooth and Wi-Fi was performed with different combinations of cellular transmitter on and off and Wi-Fi transmitter on and off.

For testing purposes the device was loaded with a power table[1] for each transmitter that had different power settings for each of the operating states. The target / expected power level and measured power levels are detailed in the following tables and clearly show that mechanisms operate as expected.

Table 1 –Body detect validation for cellular

Air Transport	Band	Measured Power	
		Stationary	**In Hand**
GSM	1900 (2Slots)	28 dBm	28 dBm
CDMA	BC1	19.5 dBm	19.5 dBm
WCDMA	B4	22.7 dBm	22.7 dBm
	B2	13.5 dBm	13.5 dBm
LTE FDD	B25	22.7 dBm	22.7 dBm
	B30	14 dBm	14 dBm
	B7	25.7 dBm	25.7 dBm
LTE TDD	B41	16.5 dBm	16.5 dBm
All measured values were within the expected tolerances of the target / expected power levels programmed into the power table for the head versus body states. Mechanism of body detect was verified.			

[1] The power tables used for the mechanism validation may not match the production power tables detailed in the main SAR report because production power levels are not established at the time these measurements were made.

Table 2 –Body detect and Cellular State validation for Wi-Fi

Body detect	Head (device stationary on table)		Body (device in hand)	
Cellular State	ON	OFF	ON	OFF
2.4 GHz 11n HT20 Ch6 SISO	E: 14.5 M: 14.1	E: 19.0 M: 18.7	E: 16.75 M: 16.4	E: 19.75 M: 19.5
5.0 GHz 802.11n HT20 Ch40 SISO Ant6	E: 11.0 M: 10.6	E: 17.0 M: 16.6	E: 13.0 M: 12.6	E: 16.75 M: 16.3
All measured power values (M) were within the expected tolerances of the target / expected power levels (E) programmed into the power table for the head versus body and cellular on/off states. Mechanism of body detect and cellular state was verified				

Table 3 –Body detect and Cellular State validation for Wi-Fi

Body detect	Head (device on table)				Body (device in hand)			
Cellular State	ON		OFF		ON		OFF	
5GHz Wi-Fi state	ON	OFF	ON	OFF	ON	OFF	ON	OFF
Expected power condition	Plow mode A BT Table P_1	PHigh mode A BT Table P_3	PHigh mode A BT Table P_5	$P_{Standalone}$ BT Table P_7	Plow mode B BT Table P_2	PHigh mode B BT Table P_4	PHigh mode B BT Table P_6	$P_{Standalone}$ BT Table P_8
Power (dBm)	E: 8.0 M: 7.6	E: 14.0 M:13.6	E: 14.0 M:13.5	E: 14.5 M:14.0	E: 8.5 M:8.3	E: 14.5 M:14.0	E: 14.5 M:14.3	E: 14.5 M:14.2
Bluetooth transmitter set for channel 39 in EDR mode. All measured power values (M) were within the expected tolerances of the target / expected power levels (E) programmed into the power table for the head versus body, cellular on/off and Wi-Fi on/off states. Mechanism of body detect and cellular state and Wi-Fi state was verified								