

APPENDIX F: 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 included the evaluation of output power levels or device state indices for individual or multiple triggering mechanisms.

F.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 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. The conducted power was recorded before and after each mechanism was triggered.

F.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 conducted 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. The conducted power was monitored to determine the triggering state.
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 and 2 were repeated for low, mid, and high bands, as appropriate (see note in section F.3 for more details).
4. Steps 1 through 3 were repeated for all distance-based power reduction mechanisms.
5. The conducted power was monitored to confirm the triggering state for each applicable test condition.

FCC ID A3LSMA185G	RF EXPOSURE TEST REPORT	Approved by: Technical Manager
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F.3 Main Antenna Verification Summary

- Low band refers to: GSM850, UMTS B5, LTE B12/13/17/26/5; Mid band refers to: GSM1900, UMTS B2/4, LTE B2/4/66; High band refers to: LTE B41;

Table F-1
Power Measurement Verification for WWAN Antennas – UMTS Band 4, 2

Mechanism(s)			Mode/Band	Conducted Power (dBm)			
1st	2nd	3rd		Free Space	Mechanism #1 (Head)	Mechanism #2 (Hotspot)	Mechanism #3 (Grip)
Held-to-Ear	Grip	Hotspot On	UMTS Band 4 ANT A	23.85	22.87	19.87	19.86
Held-to-Ear	Grip	Hotspot On	UMTS Band 2 ANT A	23.68	22.67	19.70	19.69

Table F-2
Power Measurement Verification for WWAN Antennas – GSM, UMTS Band 5, LTE Band

Mechanism(s)		Mode/Band	Conducted Power (dBm)		
1st	2nd		Free Space	Mechanism #1 (Hotspot)	Mechanism #2 (Grip)
Grip	Hotspot On	LTE Band 12 ANT A	24.53	23.14	23.12
Grip	Hotspot On	LTE Band 13 ANT A	24.60	23.14	23.13
Grip	Hotspot On	LTE Band 26/5 ANT A	24.35	23.07	23.04
Grip	Hotspot On	LTE Band 66/4 ANT A	23.94	20.84	20.85
Grip	Hotspot On	LTE Band 2 ANT A	23.70	19.56	19.56
Grip	Hotspot On	LTE Band 41 ANT A	23.05	19.04	19.03
Grip	Hotspot On	GSM850 ANT A 1TX	33.06	32.96	33.00
Grip	Hotspot On	GSM850 ANT A 2TX	32.07	30.72	30.77
Grip	Hotspot On	GSM850 ANT A 3TX	30.16	28.65	28.67
Grip	Hotspot On	GSM850 ANT A 4TX	28.91	27.57	27.57
Grip	Hotspot On	GSM1900 ANT A 1TX	29.81	22.83	22.83
Grip	Hotspot On	GSM1900 ANT A 2TX	28.32	24.12	24.15
Grip	Hotspot On	GSM1900 ANT A 3TX	26.06	22.52	22.53
Grip	Hotspot On	GSM1900 ANT A 4TX	24.77	20.79	20.77
Grip	Hotspot On	UMTS Band 5 ANT A	24.25	23.25	23.23

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F.4 WIFI Verification Summary

Table F-3
Power Measurement Verification WIFI – Ant C

Mechanism(s)		Mode/Band	Conducted Power (dBm)		
1st	2nd		Free Space	Mechanism #1 (Head)	Mechanism #2 (Grip)
Held-to-Ear	Grip	2.4 GHz WLAN Ant C 802.11b	18.11	18.22	14.34
Held-to-Ear	Grip	2.4 GHz WLAN Ant C 802.11g	16.05	15.96	14.02
Held-to-Ear	Grip	2.4 GHz WLAN Ant C 802.11n	15.98	16.07	13.91
Held-to-Ear	Grip	5 GHz WLAN Ant C 20MHz 802.11a	16.21	13.46	10.42
Held-to-Ear	Grip	5 GHz WLAN Ant C 40MHz 802.11n	15.62	13.42	10.49
Held-to-Ear	Grip	5 GHz WLAN Ant C 40MHz 802.11ac	16.03	13.61	10.48
Held-to-Ear	Grip	5 GHz WLAN Ant C 80MHz 802.11ac	16.33	13.88	10.64

F.5 Distance Verification Summary

Table F-4
Distance Measurement Verification for Antenna A

Mechanism(s)	Test Condition	Band	Distance Measurements (mm)		Minimum Distance per Manufacturer (mm)
			Moving Toward	Moving Away	
Grip	Phablet - Back Side	Low	18	19	18
Grip	Phablet - Back Side	Mid	18	19	18
Grip	Phablet - Back Side	High	18	20	18
Grip	Phablet - Bottom Edge	Low	15	19	15
Grip	Phablet - Bottom Edge	Mid	15	18	15
Grip	Phablet - Bottom Edge	High	15	17	15

Table F-5
Distance Measurement Verification for Antenna C

Mechanism(s)	Test Condition	Distance Measurements (mm)		Minimum Distance per Manufacturer (mm)
		Moving Toward	Moving Away	
Grip	Phablet - Back Side	15	16	12
Grip	Phablet - Top Edge	17	20	14

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Table F-6
Back Side, Moving Toward Phantom

KDB 616217 Section 6.2 Measured Power Moving Toward Phantom [dBm]												
Distance [mm]	23	22	21	20	19	18	17	16	15	14	13	12
Ant A	Max	Max	Max	Max	Max	Red	Red	Red	Red	Red	Red	Red
KDB 616217 Section 6.2 Measured Power Moving Toward Phantom [dBm]												
Distance [mm]	20	19	18	17	16	15	14	13	12	11	10	9
Ant C	Max	Max	Max	Max	Max	Red	Red	Red	Red	Red	Red	Red

Table F-7
Back Side, Moving Away From Phantom

KDB 616217 Section 6.2 Measured Power Moving Away From Phantom [dBm]												
Distance [mm]	13	14	15	16	17	19	20	21	22	23	24	25
Ant A	Red	Red	Red	Red	Red	Max	Max	Max	Max	Max	Max	Max
KDB 616217 Section 6.2 Measured Power Moving Away From Phantom [dBm]												
Distance [mm]	11	12	13	14	15	16	17	18	19	20	21	22
Ant C	Red	Red	Red	Red	Red	Max	Max	Max	Max	Max	Max	Max

Table F-8
Bottom Edge, Moving Toward Phantom

KDB 616217 Section 6.2 Measured Power Moving Toward Phantom [dBm]												
Distance [mm]	20	19	18	17	16	15	14	13	12	11	10	9
Ant A	Max	Max	Max	Max	Max	Red	Red	Red	Red	Red	Red	Red

Table F-9
Bottom Edge, Moving Away From Phantom

KDB 616217 Section 6.2 Measured Power Moving Away From Phantom [dBm]												
Distance [mm]	12	13	14	15	16	17	18	19	20	21	22	23
Ant A	Red	Red	Red	Red	Red	Max	Max	Max	Max	Max	Max	Max

Table F-10
Top Edge, Moving Toward Phantom

KDB 616217 Section 6.2 Measured Power Moving Toward Phantom [dBm]												
Distance [mm]	22	21	20	19	18	17	16	15	14	13	12	10
Ant C	Max	Max	Max	Max	Max	Red	Red	Red	Red	Red	Red	Red

Table F-11
Top Edge, Moving Away From Phantom

KDB 616217 Section 6.2 Measured Power Moving Away From Phantom [dBm]												
Distance [mm]	15	16	17	18	19	20	21	22	23	24	25	26
Ant C	Red	Red	Red	Red	Red	Max	Max	Max	Max	Max	Max	Max