

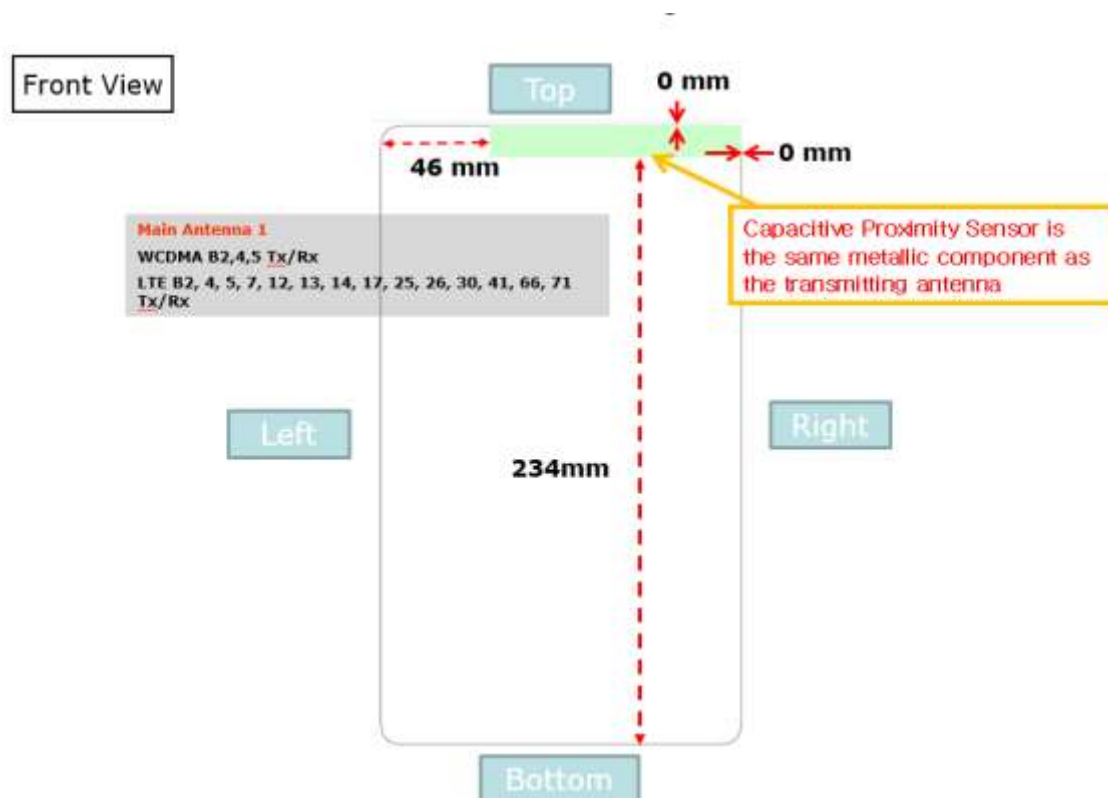
The Verification of Power Reduction

Per the May 2017 TCBC Workshop notes, demonstration of proper functioning of the power reduction mechanism is required to support the corresponding SAR Configurations. The verification process was divided into two parts:

Evaluation of the triggering distances for proximity-based sensors.

1. Power Reduction Verification for Main Antenna

This device utilizes a power reduction mechanism for Main Antenna wireless modes and bands for SAR compliance under some conditions when the device is being used in close proximity to the user's hand. All SAR evaluations for this device were performed at the maximum allowed output Power when Proximity Sensor is activated. FCC KDB Publication 616217D04v01r02 section 6 was used as a guideline for selection SAR test distances for this device when being used in proximity sensor used conditions. For detailed measurement conducted power results, please refer to the Section.11



1.1 Power Verification Procedure for Main Ant.

The Power verification was performed according to the following procedure:

Power Reduction Verification for Main Bands

Mechanism(s)	Mode/Band	Conducted Power (dBm)	
		Un-triggered (Max Power)	Triggered (Reduced Power)
Proximity sensor On	WCDMA Band 4	24.36	13.31
Proximity sensor On	LTE Band 12	23.82	16.21
Proximity sensor On	LTE Band 17	23.74	15.62
Proximity sensor On	LTE Band 14	23.77	14.71
Proximity sensor On	LTE Band 25	23.67	12.14
Proximity sensor On	LTE Band 26	23.96	16.40
Proximity sensor On	LTE Band 30	21.57	13.30
Proximity sensor On	LTE Band 41 PC3	24.36	13.88
Proximity sensor On	LTE Band 41 PC2	25.79	13.88
Proximity sensor On	LTE Band 71	24.45	14.29

1.2 Procedures for determining proximity sensor triggering distances

(KDB 616217 D04v01r02 §6.2)

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

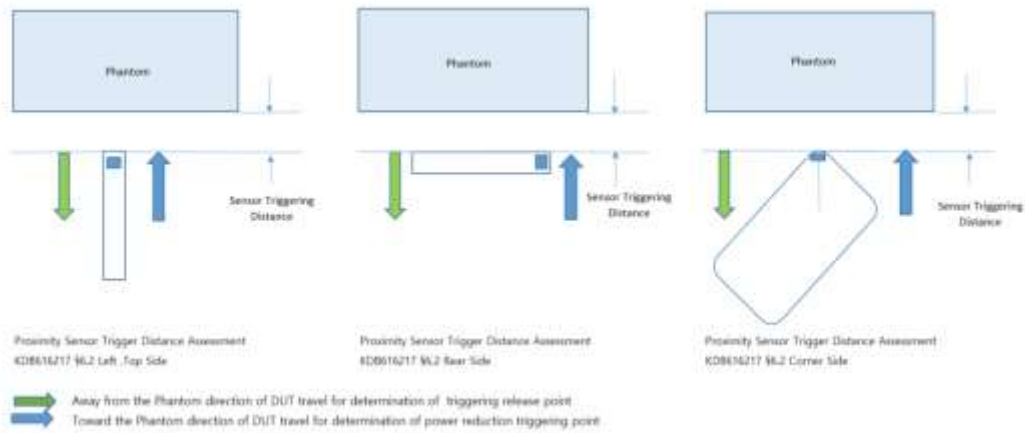
A base station simulator was used to establish an RF connection and to monitor the power levels. The device being tested was placed below the relevant section of the phantom with the relevant side or edge of the device facing toward the phantom.

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 .Each applicable test position was evaluated. The distance were conformed to be the same or larger (more conservative) than the minimum distances provided by the manufacturer.

Step 1 and 2 were repeated for the relevant modes, as appropriate

Step1 through 3 were repeated for all distance-based power reduction mechanisms.

For detailed measurement conducted power results, please refer to the Section .9



Tissue simulating Liquid	Trigger distance - Rear		Trigger distance - Top		Trigger distance - Right		Trigger distance - Right corner	
	Moving toward phantom	Moving away from phantom	Moving toward phantom	Moving away from phantom	Moving toward phantom	Moving away from phantom	Moving toward phantom	Moving away from phantom
750 MHz Muscle	17	18	18	19	11	13	7	9
835 MHz Muscle	17	18	18	19	11	13	7	9
1750 MHz Muscle	17	18	18	19	11	13	7	9
1900 MHz Muscle	17	18	18	19	11	13	7	9
2300 MHz Muscle	17	18	18	19	11	13	7	9
2600 MHz Muscle	17	18	18	19	11	13	7	9

Distance Measurement verification for Proximity sensor

Rear side – EUT Moving toward (trigger) to the Phantom WCDMA B4, LTE B12/17/14/25/26/30/41/71

Distance	Distance to DUT Output power (dBm)									
	22	21	20	19	18	17	16	15	14	13
WCDMA Band 4	24.37	24.35	24.35	24.31	24.43	13.33	13.27	13.25	13.4	13.39
LTE Band 12	23.75	23.78	23.85	23.81	23.87	16.21	16.18	16.2	16.22	16.15
LTE Band 17	23.72	23.77	23.65	23.76	23.66	15.58	15.63	15.65	15.66	15.54
LTE Band 14	23.7	23.8	23.81	23.86	23.81	14.61	14.8	14.79	14.68	14.68
LTE Band 25	23.58	23.71	23.68	23.65	23.68	12.12	12.11	12.2	12.05	12.24
LTE Band 26	24.04	23.99	24.03	24.04	24	16.48	16.45	16.46	16.35	16.49
LTE Band 30	21.56	21.57	21.49	21.65	21.53	13.36	13.28	13.21	13.34	13.4
LTE Band 41 PC3	24.28	24.32	24.37	24.41	24.4	13.94	13.91	13.95	13.89	13.94
LTE Band 41 PC2	25.86	25.77	25.75	25.69	25.8	13.97	13.95	13.94	13.94	13.78
LTE Band 71	24.46	24.44	24.44	24.46	24.43	14.26	14.28	14.29	14.36	14.33

Rear side – EUT Moving away (Release) from the Phantom WCDMA B4, LTE B12/17/14/25/26/30/41/71

Distance	Distance to DUT Output power (dBm)									
	14	15	16	17	18	19	20	21	22	23
WCDMA Band 4	13.35	13.34	13.34	13.25	13.26	24.39	24.37	24.31	24.33	24.45
LTE Band 12	16.18	16.27	16.28	16.22	16.25	23.9	23.81	23.81	23.72	23.79
LTE Band 17	15.68	15.64	15.61	15.67	15.6	23.79	23.73	23.67	23.67	23.74
LTE Band 14	14.75	14.67	14.81	14.76	14.67	23.86	23.74	23.7	23.87	23.83
LTE Band 25	12.2	12.24	12.18	12.19	12.05	23.74	23.77	23.61	23.71	23.75
LTE Band 26	16.44	16.44	16.39	16.36	16.39	23.86	24.05	23.99	24.02	24
LTE Band 30	13.36	13.39	13.38	13.23	13.22	21.64	21.65	21.51	21.55	21.6
LTE Band 41 PC3	13.88	13.86	13.94	13.87	13.92	24.42	24.39	24.29	24.4	24.42
LTE Band 41 PC2	13.78	13.81	13.93	13.94	13.87	25.79	25.84	25.85	25.85	25.73
LTE Band 71	14.33	14.39	14.38	14.19	14.38	24.42	24.49	24.51	24.45	24.44

Based on the most conservative measured triggering distance of 17 mm, additional Body SAR measurements were required at 16 mm from Rear side for the above modes.

Top side – EUT Moving toward (trigger) to the Phantom WCDMA B4, LTE B12/17/14/25/26/30/41/71

Distance	Distance to DUT Output power (dBm)									
	23	22	21	20	19	18	17	16	15	14
WCDMA Band 4	24.39	24.41	24.37	24.47	24.35	13.34	13.21	13.25	13.38	13.34
LTE Band 12	23.9	23.74	23.81	23.91	23.78	16.25	16.19	16.28	16.16	16.24
LTE Band 17	23.73	23.77	23.7	23.72	23.8	15.65	15.58	15.66	15.58	15.7
LTE Band 14	23.74	23.79	23.75	23.85	23.71	14.7	14.77	14.78	14.81	14.75
LTE Band 25	23.76	23.77	23.76	23.72	23.58	12.04	12.09	12.1	12.12	12.08
LTE Band 26	24.01	23.87	23.86	23.93	24.05	16.31	16.35	16.34	16.3	16.36
LTE Band 30	21.67	21.55	21.48	21.59	21.62	13.2	13.35	13.28	13.33	13.32
LTE Band 41 PC3	24.44	24.37	24.36	24.27	24.45	13.98	13.93	13.98	13.78	13.79
LTE Band 41 PC2	25.71	25.7	25.83	25.85	25.81	13.79	13.87	13.93	13.96	13.85
LTE Band 71	24.44	24.36	24.54	24.53	24.49	14.3	14.2	14.31	14.21	14.27

Top side – EUT Moving away (Release) from the Phantom WCDMA B4, LTE B12/17/14/25/26/30/41/71

Distance	Distance to DUT Output power (dBm)									
	15	16	17	18	19	20	21	22	23	24
WCDMA Band 4	13.22	13.34	13.24	13.21	13.4	24.46	24.32	24.41	24.35	24.33
LTE Band 12	16.12	16.26	16.13	16.26	16.17	23.8	23.75	23.81	23.83	23.79
LTE Band 17	15.62	15.65	15.61	15.53	15.62	23.68	23.68	23.75	23.64	23.75
LTE Band 14	14.64	14.64	14.72	14.67	14.75	23.68	23.72	23.73	23.71	23.85
LTE Band 25	12.2	12.04	12.21	12.18	12.19	23.76	23.73	23.69	23.68	23.72
LTE Band 26	16.42	16.3	16.37	16.41	16.36	23.89	23.89	23.88	23.88	24.05
LTE Band 30	13.33	13.37	13.37	13.34	13.36	21.54	21.47	21.5	21.64	21.58
LTE Band 41 PC3	13.87	13.84	13.94	13.84	13.8	24.26	24.42	24.29	24.38	24.29
LTE Band 41 PC2	13.87	13.84	13.9	13.79	13.88	25.86	25.73	25.87	25.71	25.83
LTE Band 71	14.37	14.28	14.36	14.24	14.3	24.51	24.41	24.44	24.41	24.47

Based on the most conservative measured triggering distance of 18 mm, additional Body SAR measurements were required at 17 mm from Rear side for the above modes.

Right side – EUT Moving toward (trigger) to the Phantom WCDMA B4, LTE B12/17/14/25/26/30/41/71

Distance	Distance to DUT Output power (dBm)									
	16	15	14	13	12	11	10	9	8	7
WCDMA Band 4	24.29	24.34	24.35	24.44	24.32	13.36	13.38	13.34	13.28	13.24
LTE Band 12	23.78	23.87	23.87	23.92	23.73	16.27	16.15	16.23	16.21	16.12
LTE Band 17	23.65	23.81	23.73	23.82	23.76	15.52	15.57	15.66	15.66	15.52
LTE Band 14	23.78	23.86	23.73	23.83	23.69	14.62	14.61	14.8	14.66	14.78
LTE Band 25	23.68	23.74	23.69	23.6	23.77	12.1	12.23	12.04	12.13	12.11
LTE Band 26	24.05	23.96	23.9	24.02	23.88	16.33	16.37	16.42	16.46	16.41
LTE Band 30	21.63	21.63	21.6	21.58	21.54	13.32	13.23	13.22	13.37	13.38
LTE Band 41 PC3	24.41	24.32	24.3	24.46	24.29	13.83	13.8	13.88	13.88	13.95
LTE Band 41 PC2	25.76	25.8	25.84	25.87	25.73	13.83	13.94	13.9	13.88	13.91
LTE Band 71	24.44	24.36	24.54	24.5	24.45	14.35	14.25	14.32	14.39	14.39

Right side – EUT Moving away (Release) from the Phantom WCDMA B4, LTEB12/17/14/25/26/30/41/71

Distance	Distance to DUT Output power (dBm)									
	9	10	11	12	13	14	15	16	17	18
WCDMA Band 4	13.33	13.21	13.28	13.3	13.3	24.28	24.34	24.45	24.33	24.43
LTE Band 12	16.17	16.16	16.18	16.19	16.19	23.78	23.77	23.85	23.89	23.92
LTE Band 17	15.61	15.54	15.62	15.58	15.54	23.65	23.69	23.67	23.82	23.64
LTE Band 14	14.76	14.74	14.72	14.68	14.68	23.69	23.71	23.79	23.84	23.77
LTE Band 25	12.15	12.06	12.2	12.12	12.05	23.71	23.62	23.7	23.58	23.74
LTE Band 26	16.33	16.42	16.5	16.36	16.48	24.04	23.9	24.03	23.87	24.06
LTE Band 30	13.2	13.33	13.31	13.24	13.37	21.6	21.61	21.49	21.49	21.54
LTE Band 41 PC3	13.79	13.78	13.78	13.91	13.82	24.38	24.33	24.34	24.28	24.31
LTE Band 41 PC2	13.79	13.79	13.97	13.91	13.79	25.74	25.78	25.84	25.84	25.69
LTE Band 71	14.35	14.33	14.36	14.29	14.23	24.5	24.43	24.43	24.45	24.4

Based on the most conservative measured triggering distance of 11 mm, additional Body SAR measurements were required at 10 mm from Rear side for the above modes.

Right Corner side – EUT Moving toward (trigger) to the Phantom WCDMA B4, LTEB12/17/14/25/26/30/41/71

Distance	Distance to DUT Output power (dBm)									
	12	11	10	9	8	7	6	5	4	3
WCDMA Band 4	24.42	24.43	24.46	24.33	24.34	13.35	13.24	13.27	13.34	13.34
LTE Band 12	23.93	23.86	23.9	23.74	23.89	16.28	16.25	16.28	16.2	16.12
LTE Band 17	23.76	23.72	23.82	23.81	23.71	15.68	15.71	15.7	15.61	15.68
LTE Band 14	23.87	23.67	23.82	23.84	23.72	14.73	14.69	14.79	14.77	14.66
LTE Band 25	23.62	23.63	23.75	23.59	23.6	12.22	12.16	12.09	12.21	12.04
LTE Band 26	23.97	23.96	24.01	23.98	24.02	16.31	16.44	16.34	16.34	16.32
LTE Band 30	21.59	21.58	21.49	21.55	21.59	13.21	13.39	13.23	13.4	13.23
LTE Band 41 PC3	24.28	24.26	24.27	24.46	24.45	13.84	13.88	13.86	13.78	13.79
LTE Band 41 PC2	25.73	25.74	25.81	25.7	25.72	13.81	13.79	13.91	13.98	13.84
LTE Band 71	24.44	24.36	24.49	24.55	24.45	14.39	14.26	14.26	14.3	14.26

Right Corner side – EUT Moving away (Release) from the Phantom WCDMA B4, LTEB12/17/14/25/26/30/41/71

Distance	Distance to DUT Output power (dBm)									
	5	6	7	8	9	10	11	12	13	14
WCDMA Band 4	13.28	13.35	13.37	13.27	13.32	24.42	24.4	24.36	24.35	24.43
LTE Band 12	16.15	16.26	16.29	16.3	16.23	23.76	23.79	23.88	23.87	23.75
LTE Band 17	15.52	15.58	15.56	15.56	15.61	23.79	23.68	23.76	23.64	23.69
LTE Band 14	14.72	14.64	14.73	14.71	14.63	23.76	23.67	23.78	23.77	23.73
LTE Band 25	12.09	12.1	12.19	12.22	12.04	23.6	23.69	23.68	23.67	23.65
LTE Band 26	16.47	16.32	16.4	16.37	16.4	23.94	23.99	24.01	23.98	24.02
LTE Band 30	13.27	13.28	13.32	13.38	13.32	21.51	21.61	21.52	21.62	21.62
LTE Band 41 PC3	13.8	13.94	13.95	13.85	13.94	24.46	24.31	24.45	24.4	24.32
LTE Band 41 PC2	13.93	13.78	13.89	13.84	13.83	25.81	25.71	25.76	25.81	25.69
LTE Band 71	14.32	14.3	14.28	14.21	14.26	24.51	24.35	24.43	24.52	24.4

Based on the most conservative measured triggering distance of 7 mm, additional Body SAR measurements were required at 6 mm from Rear side for the above modes.

1.3 Proximity Sensor Coverage for SAR measurements

(KDB 616217 D04v01r02 §6.3)

As there is no spatial offset between the antenna and the proximity sensor element, proximity sensor coverage did not need to be assessed.

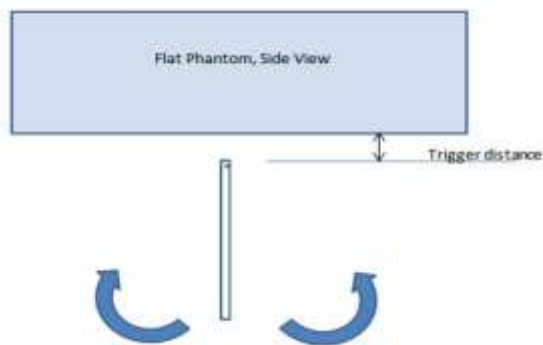
1.4 Proximity Sensor Tilt Angle Assessment

(KDB 616217 D04v01r02 §6.4)

The DUT was positioned directly below the flat phantom at the minimum measured trigger distance with Top/Left side parallel to the base of the flat phantom for each band.

The EUT was rotated about Bottom side for angles up to $\pm 45^\circ$. If the output power increased during the rotation the DUT was moved 1mm toward the phantom and the rotation repeated. This procedure was repeated until the power remained reduced for all angles up to $\pm 45^\circ$.

Proximity sensor tilt angle assessment (Bottom side) KDB 616217 §6.4



Summary of Tablet Tilt Angle influence to Proximity Sensor Triggering (Top side)

Band (MHz)	Minimum distance at which power reduction was maintained over -45°	Power reduction status										
		-45°	-40°	-30°	-20°	-10°	0°	10°	20°	30°	40°	45°
WCDMA Band 4	18 mm	13.29	13.35	13.3	13.4	13.36	13.29	13.33	13.33	13.28	13.38	13.21
LTE Band 12	18 mm	16.25	16.13	16.23	16.18	16.29	16.25	16.24	16.22	16.23	16.18	16.19
LTE Band 17	18 mm	15.53	15.67	15.66	15.65	15.61	15.53	15.65	15.64	15.72	15.7	15.57
LTE Band 14	18 mm	14.79	14.7	14.68	14.66	14.72	14.79	14.66	14.66	14.73	14.71	14.8
LTE Band 25	18 mm	12.08	12.2	12.1	12.2	12.09	12.08	12.07	12.14	12.18	12.24	12.13
LTE Band 26	18 mm	16.45	16.37	16.35	16.37	16.38	16.45	16.42	16.44	16.46	16.39	16.35
LTE Band 30	18 mm	13.33	13.21	13.3	13.25	13.31	13.33	13.23	13.38	13.22	13.21	13.27
LTE Band 41 PC3	18 mm	13.88	13.8	13.94	13.91	13.98	13.88	13.78	13.78	13.95	13.91	13.82
LTE Band 41 PC2	18 mm	13.9	13.84	13.97	13.88	13.93	13.9	13.85	13.87	13.79	13.84	13.93
LTE Band 71	18 mm	14.25	14.33	14.23	14.27	14.33	14.25	14.22	14.22	14.25	14.38	14.37

Summary of Tablet Tilt Angle influence to Proximity Sensor Triggering (Right side)

Band (MHz)	Minimum distance at which power reduction was maintained over -45°	Power reduction status										
		-45°	-40°	-30°	-20°	-10°	0°	10°	20°	30°	40°	45°
WCDMA Band 4	11 mm	13.29	13.29	13.32	13.29	13.37	13.29	13.39	13.23	13.39	13.21	13.23
LTE Band 12	11mm	16.21	16.2	16.15	16.29	16.3	16.21	16.27	16.31	16.27	16.27	16.22
LTE Band 17	11 mm	15.64	15.57	15.7	15.57	15.64	15.64	15.54	15.64	15.58	15.61	15.55
LTE Band 14	11 mm	14.67	14.81	14.67	14.62	14.65	14.67	14.61	14.62	14.64	14.79	14.72
LTE Band 25	11 mm	12.13	12.22	12.04	12.15	12.21	12.13	12.1	12.23	12.09	12.06	12.04
LTE Band 26	11 mm	16.31	16.41	16.5	16.47	16.37	16.31	16.41	16.3	16.3	16.3	16.4
LTE Band 30	11 mm	13.25	13.21	13.26	13.26	13.29	13.25	13.39	13.21	13.4	13.35	13.32
LTE Band 41 PC3	11 mm	13.85	13.87	13.78	13.97	13.95	13.85	13.98	13.93	13.86	13.86	13.86
LTE Band 41 PC2	11 mm	13.95	13.89	13.8	13.88	13.95	13.95	13.97	13.94	13.92	13.94	13.88
LTE Band 71	11mm	14.26	14.29	14.34	14.31	14.23	14.26	14.28	14.22	14.32	14.33	14.3

1.5 Resulting test positions for Tablet SAR measurements

Wireless technologies	Position	§6.2 Triggering Distance	§6.3 Coverage	§6.4 Tilt Angle	Worst case distance for Tablet SAR
WWAN (WCDMA B4, LTEB12/17/14/25/26/30/41/71)	Rear	17	N/A	N/A	16
	Top Side	18	N/A	18	17
	Right Side	11	N/A	11	10
	Right Corner	7	N/A	N/A	6

Note: FCC KDB Publication 616217 D04v01r02 Section 6 was used as a guideline for selecting SAR test distances for this device when being used in proximity use conditions.