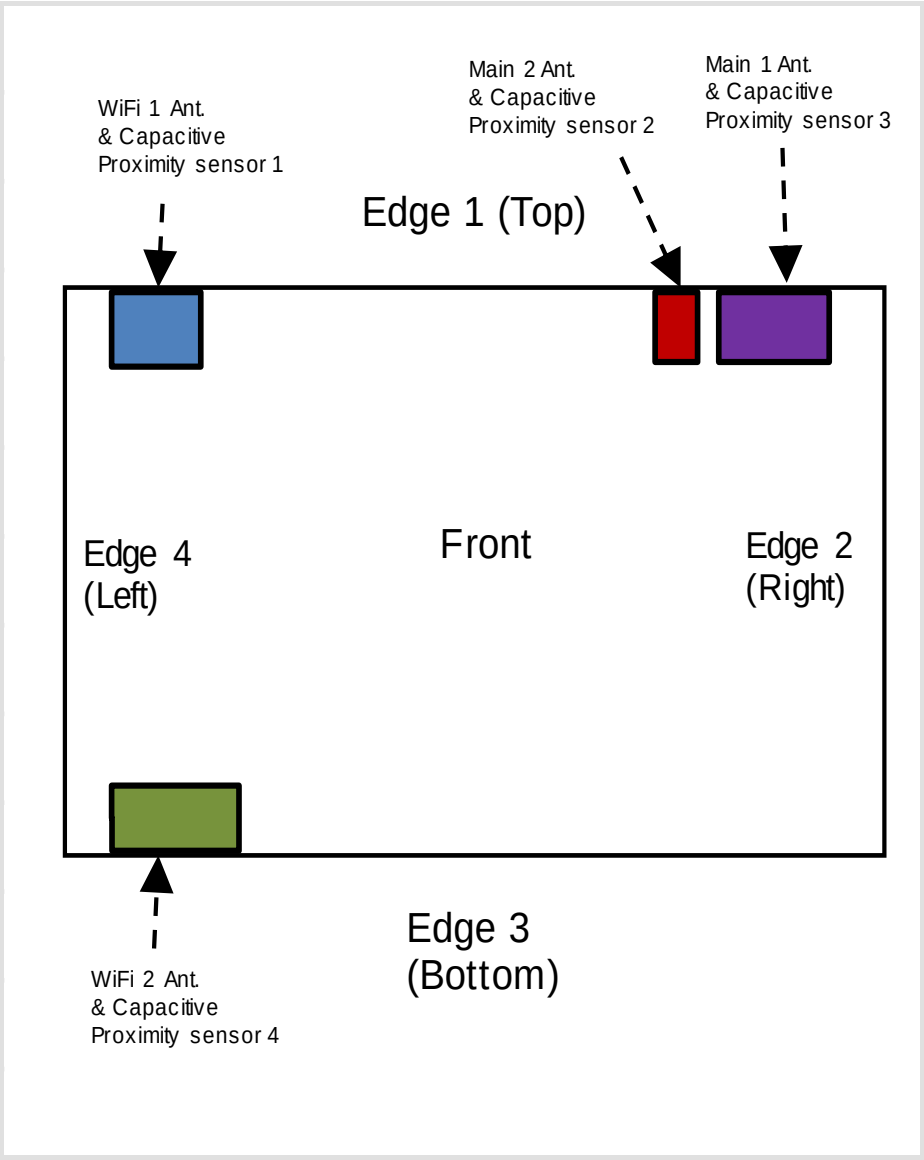
Appendix G. Proximity sensor feature

The DUT has four proximity sensors to reduce the output power. The position of the sensors and antenna are as shown in the graphic.

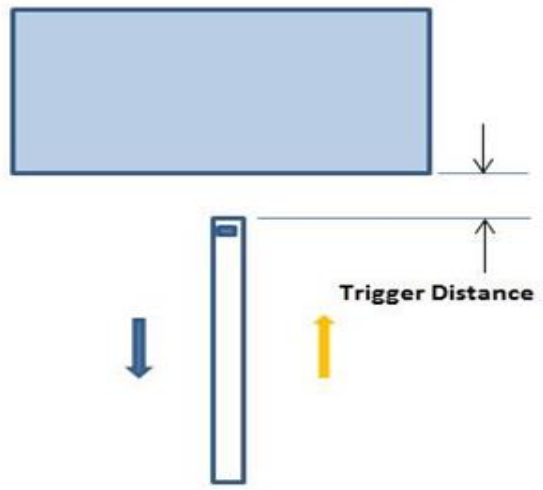


G.1 Proximity Sensor Triggering Distance (KDB 616217 §6.2)

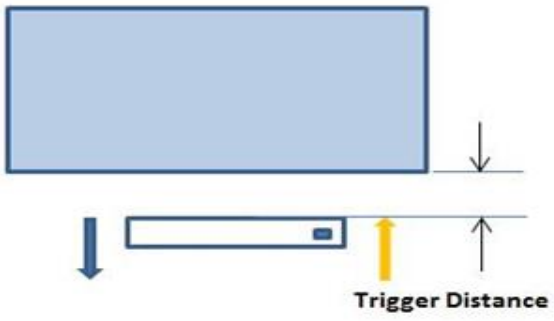
Rear, Edge 1, Edge 3 of the DUT was placed directly below the flat phantom. The DUT was moved toward the phantom in accordance with the steps outlined in KDB 616217 §6.2 to determine the trigger distance for enabling power reduction. The DUT was moved away from the phantom to determine the trigger distance for resuming full power.

The DUT featured a visual indicator on its display that showed the status of the proximity sensor (Triggered or not triggered). This was used to determine the status of the sensor during the proximity sensor assessment as monitoring the output power directly was not practical without affecting the measurement.

It was confirmed separately that the output power was altered according to the proximity sensor status indication. This was achieved by observing the proximity sensor status at the same time as monitoring the conducted power. Section 9 contains both the full and reduced conducted power measurements.



Proximity Sensor Trigger Distance Assessment
KDB 616217 §6.2, Edge 1, Edge 3,



Proximity Sensor Trigger Distance Assessment
KDB 616217 §6.2, Rear

LEGEND

Direction of DUT travel for determination of power reduction triggering point

Direction of DUT travel for determination of full power resumption triggering point

Summary of Trigger Distances

Antenna	Trigger distance - Rear		Trigger distance – Edge 1	
	Moving toward phantom	Moving from phantom	Moving toward phantom	Moving from phantom
WiFi 1 Ant.	15 mm	15 mm	17 mm	17 mm
Antenna	Trigger distance – Rear		Trigger distance – Edge 1	
	Moving toward phantom	Moving from phantom	Moving toward phantom	Moving from phantom
Main 1 Ant.	18 mm	18 mm	19 mm	19 mm
Antenna	Trigger distance – Rear		Trigger distance – Edge 1	
	Moving toward phantom	Moving from phantom	Moving toward phantom	Moving from phantom
Main 2 Ant.	17 mm	17 mm	13 mm	13 mm
Antenna	Trigger distance – Rear		Trigger distance – Edge 3	
	Moving toward phantom	Moving from phantom	Moving toward phantom	Moving from phantom
WiFi 2 Ant.	15 mm	15 mm	14 mm	14 mm

Proximity Sensor Triggering Distance Measurement Results

WiFi 1 Ant.

Rear, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	11	12	13	14	15	16	17	18	19	20
2.4GHz WLAN 11b	9.96	9.63	10.24	9.92	9.81	18.75	19.18	18.87	19.20	19.23
2.4GHz WLAN 11g	10.24	10.22	10.09	10.24	10.16	18.04	18.07	18.17	17.95	18.05
2.4GHz WLAN 11n	10.04	10.15	9.99	9.96	9.82	17.20	17.03	17.11	17.13	16.93
2.4GHz WLAN 11ax	9.97	10.08	9.92	9.89	9.75	17.13	17.09	17.04	17.06	16.86
5GHz WLAN(20MHz BW) 11a	7.05	7.17	7.23	7.17	7.09	16.99	17.22	17.05	17.16	17.09
5GHz WLAN(20MHz BW) 11n	7.05	7.17	7.23	7.17	7.09	15.99	16.19	16.23	16.16	16.24
5GHz WLAN(20MHz BW) 11ac	7.11	6.92	7.27	6.88	7.24	16.05	16.11	16.20	15.92	16.37
5GHz WLAN(20MHz BW) 11ax	6.90	7.12	6.88	7.20	6.91	16.05	16.04	15.99	16.25	16.14
5GHz WLAN(40MHz BW) 11n	6.98	7.09	7.17	7.04	6.97	15.93	16.21	16.20	16.04	15.96
5GHz WLAN(40MHz BW) 11ac	6.96	6.89	7.14	7.08	6.96	14.21	14.02	14.05	13.88	13.90
5GHz WLAN(40MHz BW) 11ax	7.30	7.08	6.90	7.10	7.14	16.17	16.17	15.98	16.24	16.05
5GHz WLAN(80MHz BW) 11ac	7.02	7.11	6.82	7.19	6.99	12.97	13.09	13.09	13.18	12.91
5GHz WLAN(80MHz BW) 11ax	6.97	7.19	7.15	7.06	7.14	14.88	15.14	14.93	15.27	15.03
Bluetooth BDR	7.53	7.47	7.57	7.44	7.69	18.12	18.02	18.19	18.05	18.08
Bluetooth EDR	8.54	8.81	8.62	8.75	8.57	16.71	16.57	16.93	16.57	16.42

Edge 1, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	13	14	15	16	17	18	19	20	21	22
2.4GHz WLAN 11b	10.00	9.67	10.28	9.96	9.85	18.79	19.22	18.91	19.24	19.27
2.4GHz WLAN 11g	10.28	10.26	10.13	10.28	10.20	18.08	18.11	18.21	17.99	18.09
2.4GHz WLAN 11n	10.08	10.19	10.03	10.00	9.86	17.24	17.07	17.15	17.17	16.97
2.4GHz WLAN 11ax	10.01	10.12	9.96	9.93	9.79	17.17	17.13	17.08	17.10	16.90
5GHz WLAN(20MHz BW) 11a	7.26	7.23	7.22	7.13	7.10	17.03	17.26	17.09	17.20	17.13
5GHz WLAN(20MHz BW) 11n	7.09	7.21	7.27	7.21	7.13	16.03	16.23	16.27	16.20	16.28
5GHz WLAN(20MHz BW) 11ac	7.15	6.96	7.31	6.92	7.28	16.09	16.15	16.24	15.96	16.41
5GHz WLAN(20MHz BW) 11ax	6.94	7.16	6.92	7.24	6.95	16.09	16.08	16.03	16.29	16.18
5GHz WLAN(40MHz BW) 11n	7.02	7.13	7.21	7.08	7.01	15.97	16.25	16.24	16.08	16.00
5GHz WLAN(40MHz BW) 11ac	7.00	6.93	7.18	7.12	7.00	14.25	14.06	14.09	13.92	13.94
5GHz WLAN(40MHz BW) 11ax	7.34	7.12	6.94	7.14	7.18	16.21	16.21	16.02	16.28	16.09
5GHz WLAN(80MHz BW) 11ac	7.06	7.15	6.86	7.23	7.03	13.01	13.13	13.13	13.22	12.95
5GHz WLAN(80MHz BW) 11ax	7.01	7.23	7.19	7.10	7.18	14.92	15.18	14.97	15.31	15.07
Bluetooth BDR	7.59	7.53	7.63	7.50	7.75	18.25	18.11	18.14	18.12	18.19
Bluetooth EDR	8.60	8.87	8.68	8.81	8.63	16.99	16.63	16.48	16.74	16.59

Main 1 Ant.

Rear, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	14	15	16	17	18	19	20	21	22	23
WCDMA 2	10.32	10.25	10.50	10.46	10.40	21.71	21.26	21.49	21.38	21.56
WCDMA 4	11.16	11.37	11.22	11.07	11.16	22.44	22.35	22.26	22.37	21.93
WCDMA 5	14.16	13.86	14.33	14.13	13.96	24.25	23.83	24.45	23.94	24.42
LTE B2	11.93	11.91	11.94	12.28	12.11	22.88	22.63	22.55	22.99	22.68
LTE B4	11.41	11.48	11.67	11.50	11.71	22.30	22.73	22.57	22.89	22.39
LTE B5	15.07	14.93	15.14	14.81	14.97	23.97	24.06	24.38	24.26	23.95
LTE B12	13.87	14.16	13.95	14.03	14.12	23.88	23.82	24.17	24.19	24.37
LTE B13	14.15	13.86	13.92	14.03	14.16	23.84	23.94	24.13	23.95	24.27
LTE B14	15.99	15.93	16.10	15.86	15.96	24.15	23.84	23.93	24.10	24.28
LTE B25	12.07	11.83	11.94	12.13	12.17	22.97	22.75	22.50	22.40	22.58
LTE B26	16.10	16.20	16.16	15.90	15.80	24.10	23.91	24.28	24.33	24.03
LTE B66	11.79	11.63	11.40	11.73	11.45	22.38	22.43	22.45	22.71	22.64
LTE B71	16.05	16.03	15.81	16.14	16.13	23.87	24.15	24.03	23.85	23.95
NR n2	10.96	10.97	11.06	11.11	11.19	22.67	22.27	22.71	22.72	22.53
NR n5	14.93	15.17	14.93	14.86	15.02	24.11	23.90	24.13	24.03	23.95
NR n25	10.95	10.94	11.30	11.08	11.04	22.51	22.59	22.90	22.73	22.69
NR n66	11.08	11.01	10.99	10.82	11.18	22.13	21.93	21.85	22.05	22.12
NR n71	15.88	16.12	15.95	16.10	15.94	23.92	24.16	24.25	24.13	23.95

Edge 1, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	15	16	17	18	19	20	21	22	23	24
WCDMA 2	10.25	10.18	10.43	10.39	10.33	21.42	21.64	21.19	21.42	21.31
WCDMA 4	11.09	11.30	11.15	11.00	11.09	21.75	22.37	22.28	22.19	22.30
WCDMA 5	14.09	13.79	14.26	14.06	13.89	23.92	24.18	23.76	24.38	23.87
LTE B2	11.86	11.84	11.87	12.21	12.04	22.18	22.81	22.56	22.48	22.92
LTE B4	11.34	11.41	11.60	11.43	11.64	22.64	22.23	22.66	22.50	22.82
LTE B5	15.00	14.86	15.07	14.74	14.90	23.75	23.90	23.99	24.31	24.19
LTE B12	13.80	14.09	13.88	13.96	14.05	24.08	23.81	23.75	24.10	24.12
LTE B13	14.08	13.79	13.85	13.96	14.09	23.87	23.77	23.87	24.06	23.88
LTE B14	15.92	15.86	16.03	15.79	15.89	23.81	24.08	23.77	23.86	24.03
LTE B25	12.00	11.76	11.87	12.06	12.10	22.57	22.90	22.68	22.43	22.33
LTE B26	16.03	16.13	16.09	15.83	15.73	24.11	24.03	23.84	24.21	24.26
LTE B66	11.72	11.56	11.33	11.66	11.38	22.59	22.31	22.36	22.38	22.64
LTE B71	15.98	15.96	15.74	16.07	16.06	23.99	23.80	24.08	23.96	23.78
NR n2	10.89	10.90	10.99	11.04	11.12	22.76	22.60	22.20	22.64	22.65
NR n5	14.86	15.10	14.86	14.79	14.95	24.01	24.04	23.83	24.06	23.96
NR n25	10.88	10.87	11.23	11.01	10.97	22.47	22.44	22.52	22.83	22.66
NR n66	11.01	10.94	10.92	10.75	11.11	22.25	22.06	21.86	21.78	21.98
NR n71	15.81	16.05	15.88	16.03	15.87	23.86	23.85	24.09	24.18	24.06

Main 2 Ant.

Rear, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm	13	14	15	16	17	18	19	20	21	22
LTE B7	12.59	12.70	12.57	12.44	12.40	22.67	22.65	22.55	22.74	22.65
LTE B41	13.05	12.95	13.04	13.15	12.85	22.88	22.97	23.17	23.25	22.83
LTE B41 PC2	15.12	15.18	15.04	14.84	15.04	26.16	25.83	25.94	26.13	26.27
LTE B48	14.08	13.99	13.93	14.03	14.14	21.95	21.74	21.50	21.98	21.70
NR n41	10.92	11.04	11.30	11.18	11.08	19.88	19.85	19.90	20.15	20.17
NR n41 PC2	10.97	11.07	10.91	11.19	11.17	19.88	19.91	20.16	20.07	20.28
NR n77	8.80	8.77	8.58	8.45	8.52	18.33	18.55	18.44	18.45	18.57
NR n77 PC2	8.54	8.65	8.66	8.75	8.45	18.12	18.42	18.46	18.36	18.19
NR n78	8.52	8.72	8.49	8.58	8.57	18.27	18.25	18.43	18.37	18.57

Edge 1, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance	9	10	11	12	13	14	15	16	17	18
LTE B7	12.74	12.63	12.74	12.61	12.48	22.71	22.69	22.59	22.78	22.69
LTE B41	12.96	13.09	12.99	13.08	13.19	22.92	23.01	23.21	23.29	22.87
LTE B41 PC2	14.95	15.16	15.22	15.08	14.88	26.20	25.87	25.98	26.17	26.31
LTE B48	14.14	14.12	14.03	13.97	14.07	21.99	21.78	21.54	22.02	21.74
NR n41	10.97	10.96	11.08	11.34	11.22	19.92	19.89	19.94	20.19	20.21
NR n41 PC2	11.12	11.01	11.11	10.95	11.23	19.92	19.95	20.20	20.11	20.32
NR n77	8.65	8.84	8.81	8.62	8.49	18.37	18.59	18.48	18.49	18.61
NR n77 PC2	8.70	8.58	8.69	8.70	8.79	18.16	18.46	18.50	18.40	18.23
NR n78	8.47	8.56	8.76	8.53	8.62	18.31	18.29	18.47	18.41	18.61

WiFi 2 Ant.

Rear, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	11	12	13	14	15	16	17	18	19	20
2.4GHz WLAN 11b	9.92	9.59	10.20	9.88	9.77	18.71	19.14	18.83	19.16	19.19
2.4GHz WLAN 11g	10.20	10.18	10.05	10.20	10.12	18.00	18.03	18.13	17.91	18.01
2.4GHz WLAN 11n	10.00	10.11	9.95	9.92	9.78	17.16	16.99	17.07	17.09	16.89
2.4GHz WLAN 11ax	9.93	10.04	9.88	9.85	9.71	17.09	17.05	17.00	17.02	16.82
5GHz WLAN(20MHz BW) 11a	7.18	7.15	7.14	7.05	7.02	16.95	17.18	17.01	17.12	17.05
5GHz WLAN(20MHz BW) 11n	7.01	7.13	7.19	7.13	7.05	15.95	16.15	16.19	16.12	16.20
5GHz WLAN(20MHz BW) 11ac	7.07	6.88	7.23	6.84	7.20	16.01	16.07	16.16	15.88	16.33
5GHz WLAN(20MHz BW) 11ax	6.86	7.08	6.84	7.16	6.87	16.01	16.00	15.95	16.21	16.10
5GHz WLAN(40MHz BW) 11n	6.94	7.05	7.13	7.00	6.93	15.89	16.17	16.16	16.00	15.92
5GHz WLAN(40MHz BW) 11ac	6.92	6.85	7.10	7.04	6.92	14.17	13.98	14.01	13.84	13.86
5GHz WLAN(40MHz BW) 11ax	7.26	7.04	6.86	7.06	7.10	16.13	16.13	15.94	16.20	16.01
5GHz WLAN(80MHz BW) 11ac	6.98	7.07	6.78	7.15	6.95	12.93	13.05	13.05	13.14	12.87
5GHz WLAN(80MHz BW) 11ax	6.93	7.15	7.11	7.02	7.10	14.84	15.10	14.89	15.23	14.99
Bluetooth BDR	7.50	7.44	7.54	7.41	7.66	18.09	17.99	18.16	18.02	18.05
Bluetooth EDR	8.51	8.78	8.59	8.72	8.54	16.68	16.54	16.90	16.54	16.39

Edge 3, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	10	11	12	13	14	15	16	17	18	19
2.4GHz WLAN 11b	10.16	10.19	9.98	9.65	10.26	18.77	19.20	18.89	19.22	19.25
2.4GHz WLAN 11g	10.13	10.16	10.26	10.24	10.11	18.06	18.09	18.19	17.97	18.07
2.4GHz WLAN 11n	10.09	10.12	10.06	10.17	10.01	17.22	17.05	17.13	17.15	16.95
2.4GHz WLAN 11ax	10.02	10.05	9.99	10.10	9.94	17.15	17.11	17.06	17.08	16.88
5GHz WLAN(20MHz BW) 11a	7.12	7.15	7.24	7.21	7.20	17.01	17.24	17.07	17.18	17.11
5GHz WLAN(20MHz BW) 11n	7.28	7.31	7.07	7.19	7.25	16.01	16.21	16.25	16.18	16.26
5GHz WLAN(20MHz BW) 11ac	6.96	6.99	7.13	6.94	7.29	16.07	16.13	16.22	15.94	16.39
5GHz WLAN(20MHz BW) 11ax	7.08	7.11	6.92	7.14	6.90	16.07	16.06	16.01	16.27	16.16
5GHz WLAN(40MHz BW) 11n	6.81	6.84	7.00	7.11	7.19	15.95	16.23	16.22	16.06	15.98
5GHz WLAN(40MHz BW) 11ac	7.08	7.11	6.98	6.91	7.16	14.23	14.04	14.07	13.90	13.92
5GHz WLAN(40MHz BW) 11ax	6.90	6.93	7.32	7.10	6.92	16.19	16.19	16.00	16.26	16.07
5GHz WLAN(80MHz BW) 11ac	7.08	7.11	7.04	7.13	6.84	12.99	13.11	13.11	13.20	12.93
5GHz WLAN(80MHz BW) 11ax	6.92	6.95	6.99	7.21	7.17	14.90	15.16	14.95	15.29	15.05
Bluetooth BDR	7.47	7.65	7.48	7.42	7.52	17.97	18.14	18.00	18.03	18.01
Bluetooth EDR	8.68	8.46	8.49	8.76	8.57	16.52	16.88	16.52	16.37	16.63

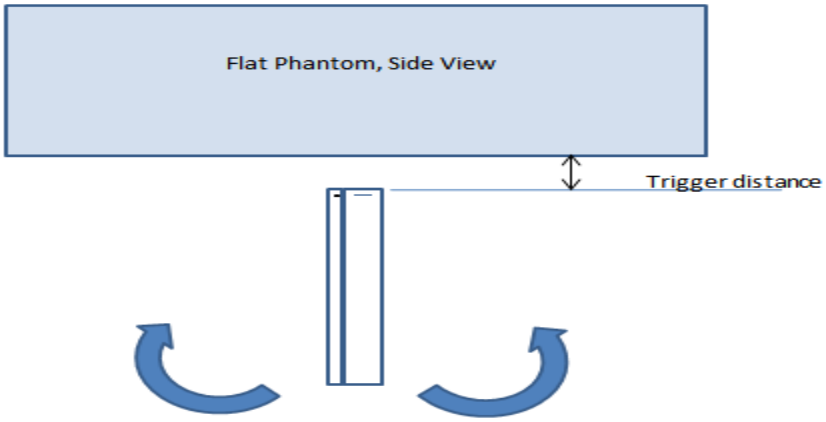
G.2 Proximity Sensor Coverage (KDB 616217 §6.3)

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

G.3 Proximity Sensor Tilt Angle Assessment (KDB 616217 §6.4)

The DUT was positioned directly below the flat phantom at the minimum measured trigger distance with Edge 1, Edge 3 parallel to the base of the flat phantom for each band.

The EUT was rotated about Edge 3 for angles up to +/- 45°. 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 +/- 45°.



Proximity sensor tilt angle assessment (Edge 1, Edge 3) KDB 616217 §6.4

Summary of Tablet Tilt Angle Influence to Proximity Sensor Triggering (Edge 1)

Antenna	Minimum trigger distance measured according to KDB 616217 §6.2	Minimum distance at which power reduction was maintained over +/-45°	Power reduction status										
			-45°	-40°	-30°	-20°	-10°	0°	10°	20°	30°	40°	45°
WiFi 1 Ant	17 mm	17 mm	On	On	On	On	On	On	On	On	On	On	On
Main 1 Ant.	19 mm	19 mm	On	On	On	On	On	On	On	On	On	On	On
Main 2 Ant.	13 mm	13 mm	On	On	On	On	On	On	On	On	On	On	On

Summary of Tablet Tilt Angle Influence to Proximity Sensor Triggering (Edge 3)

Antenna	Minimum trigger distance measured according to KDB 616217 §6.2	Minimum distance at which power reduction was maintained over +/-45°	Power reduction status										
			-45°	-40°	-30°	-20°	-10°	0°	10°	20°	30°	40°	45°
WiFi 2 Ant	14 mm	14 mm	On	On	On	On	On	On	On	On	On	On	On

G.4 Resulting test positions for SAR measurements

Wireless technologies	Position	§6.2 Triggering Distance	§6.3 Coverage	§6.4 Tilt Angle	Worst case distance for SAR
WiFi 1 Ant.	Rear	15 mm	N/A	N/A	14 mm
	Edge 1	17 mm	N/A	17 mm	16 mm
Main 1 Ant.	Rear	18 mm	N/A	N/A	17 mm
	Edge 1	19 mm	N/A	17 mm	18 mm
Main 2 Ant.	Rear	17 mm	N/A	N/A	16 mm
	Edge 1	13 mm	N/A	12 mm	12 mm
WiFi 2 Ant.	Rear	15 mm	N/A	N/A	14 mm
	Edge 3	14 mm	N/A	14 mm	13 mm

-End-