

Appendix H. – Power reduction verification

Per the May 2017 TCBC Workshop notes, demonstration of proper functioning of the power reduction mechanism is required to support the corresponding SAR Configurations.

Procedures for determining proximity sensor triggering distances

(KDB 616217 D04v01r02 §6.2)

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. For Licensed modes, the device state index(DSI) on the device UI 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. Each applicable test position was evaluated. The distance was conformed to be the same or larger (more conservative) than the minimum distances provided by the manufacturer.
3. Step 1 and 2 were repeated for the relevant modes, as appropriate
4. Steps 1 through 3 were repeated for all distance-based power reduction mechanisms.

For detailed measurement conducted power results, please refer to the Section .11

1. Power reduction Verification for WLAN 1 Ant

This device uses a power reduction mechanism for SAR compliance for WLAN operations during Grip sensor is activated.

Mechanism(s)	Mode/Band	Un-triggered (Max Power) Except 38ch, 42ch, 50ch, 58ch, 62ch, 102ch, 106ch, 114ch	Mechanism 1: (Reduced Power)
Grip	2.4GHz 802.11g	15.08	11.30
Grip	2.4GHz 802.11b	17.19	11.09
Grip	2.4GHz 802.11n	17.08	10.94
Grip	2.4GHz 802.11ax SU	17.26	11.05
Grip	2.4GHz Bluetooth	16.36	8.79
Grip	5GHz 802.11a	16.55	8.31
Grip	5GHz 802.11n 20MHz	16.34	7.85
Grip	5GHz 802.11ac 20MHz	16.37	8.23
Grip	5GHz 802.11ax 20MHz SU	16.61	8.01
Grip	5GHz 802.11n 40MHz	16.58	8.26
Grip	5GHz 802.11ac 40MHz	16.46	8.27
Grip	5GHz 802.11ax 40MHz SU	16.48	8.04
Grip	5GHz 802.11ac 80MHz	15.66	8.25
Grip	5GHz 802.11ax 80MHz SU	15.77	8.19
Grip	5GHz 802.11ac 160MHz	14.00	7.48
Grip	5GHz 802.11ax 160MHz SU	14.30	8.26
Grip	6GHz 802.11a	9.74	9.02
Grip	6GHz 802.11ax 20MHz	9.99	8.97
Grip	6GHz 802.11ax 40MHz	8.63	7.78
Grip	6GHz 802.11ax 80MHz	9.03	7.69
Grip	6GHz 802.11ax 160MHz	9.03	8.00

Mechanism(s)	Mode/Band	Un-triggered (Max Power) Except 38ch, 42ch, 50ch, 58ch, 62ch, 102ch, 106ch, 114ch	Mechanism 1: (Reduced Power)
RSDB active	2.4GHz 802.11g	15.08	10.57
RSDB active	2.4GHz 802.11b	17.19	10.42
RSDB active	2.4GHz 802.11n	17.08	10.30
RSDB active	2.4GHz 802.11ax SU	17.26	10.33
RSDB active	2.4GHz Bluetooth	16.36	7.94
RSDB active	5GHz 802.11a	16.55	7.77
RSDB active	5GHz 802.11n 20MHz	16.34	7.32
RSDB active	5GHz 802.11ac 20MHz	16.37	7.68
RSDB active	5GHz 802.11ax 20MHz SU	16.61	7.49
RSDB active	5GHz 802.11n 40MHz	16.58	7.75
RSDB active	5GHz 802.11ac 40MHz	16.46	7.76
RSDB active	5GHz 802.11ax 40MHz SU	16.48	7.51
RSDB active	5GHz 802.11ac 80MHz	15.66	7.73
RSDB active	5GHz 802.11ax 80MHz SU	15.77	7.64
RSDB active	5GHz 802.11ac 160MHz	14.00	7.01
RSDB active	5GHz 802.11ax 160MHz SU	14.30	7.74
RSDB active	6GHz 802.11a	9.74	6.98
RSDB active	6GHz 802.11ax 20MHz	9.99	6.93
RSDB active	6GHz 802.11ax 40MHz	8.63	5.93
RSDB active	6GHz 802.11ax 80MHz	9.03	5.75
RSDB active	6GHz 802.11ax 160MHz	9.03	6.56

Tissue simulating liquid	Trigger distance Rear		Trigger distance Right Side		Trigger distance Top	
	Moving toward phantom [mm]	Moving away from phantom [mm]	Moving toward phantom [mm]	Moving away from phantom [mm]	Moving toward phantom [mm]	Moving away from phantom [mm]
2450MHz	20	21	10	11	20	21
5000MHz	20	21	10	11	20	21
6500MHz	20	21	10	11	20	21

Rear side – EUT Moving toward (trigger) to the Phantom

Mode	Distance to DUT Output power (dBm)									
	25	24	23	22	21	20	19	18	17	16
2.4GHz 802.11g	15.03	15.04	15.04	15.07	15.03	11.27	11.26	11.25	11.28	11.27
2.4GHz 802.11b	17.16	17.15	17.15	17.15	17.18	11.05	11.06	11.04	11.05	11.09
2.4GHz 802.11n	17.07	17.04	17.04	17.03	17.06	10.91	10.93	10.90	10.90	10.89
2.4GHz 802.11ax SU	17.24	17.25	17.24	17.23	17.24	11.02	11.04	11.01	11.02	11.03
2.4GHz Bluetooth	16.33	16.33	16.33	16.35	16.36	8.76	8.79	8.78	8.78	8.77
5GHz 802.11a	16.52	16.52	16.52	16.51	16.53	8.30	8.31	8.29	8.30	8.27
5GHz 802.11n 20MHz	16.29	16.33	16.33	16.33	16.29	7.82	7.84	7.81	7.80	7.84
5GHz 802.11ac 20MHz	16.32	16.34	16.37	16.33	16.36	8.20	8.20	8.20	8.22	8.20
5GHz 802.11ax 20MHz SU	16.60	16.59	16.59	16.56	16.57	7.96	7.97	7.97	7.99	8.00
5GHz 802.11n 40MHz	16.53	16.57	16.55	16.55	16.55	8.22	8.25	8.23	8.25	8.23
5GHz 802.11ac 40MHz	16.43	16.41	16.42	16.45	16.41	8.26	8.22	8.25	8.25	8.26
5GHz 802.11ax 40MHz SU	16.44	16.47	16.45	16.46	16.43	8.02	8.01	7.99	8.02	7.99
5GHz 802.11ac 80MHz	15.66	15.62	15.62	15.64	15.61	8.20	8.21	8.23	8.23	8.21
5GHz 802.11ax 80MHz SU	15.76	15.76	15.74	15.75	15.75	8.14	8.15	8.17	8.17	8.17
5GHz 802.11ac 160MHz	13.95	13.97	13.96	13.98	13.97	7.45	7.46	7.46	7.46	7.43
5GHz 802.11ax 160MHz SU	14.25	14.27	14.29	14.30	14.25	8.21	8.24	8.25	8.24	8.24
6GHz 802.11a	9.71	9.70	9.72	9.71	9.73	9.00	8.99	8.98	8.98	9.01
6GHz 802.11ax 20MHz	9.98	9.98	9.99	9.98	9.99	8.97	8.97	8.93	8.95	8.93
6GHz 802.11ax 40MHz	8.62	8.63	8.59	8.63	8.61	7.77	7.77	7.74	7.74	7.77
6GHz 802.11ax 80MHz	9.01	8.99	9.03	9.02	8.99	7.67	7.65	7.67	7.66	7.64
6GHz 802.11ax 160MHz	9.01	9.02	9.02	8.99	9.00	7.99	8.00	7.99	7.96	7.98

Rear side – EUT Moving away (Release) from the Phantom

Mode	Distance to DUT Output power (dBm)									
	17	18	19	20	21	22	23	24	25	26
2.4GHz 802.11g	11.29	11.28	11.28	11.28	11.25	15.06	15.05	15.03	15.06	15.04
2.4GHz 802.11b	11.05	11.08	11.08	11.07	11.07	17.16	17.16	17.15	17.18	17.19
2.4GHz 802.11n	10.91	10.90	10.92	10.93	10.90	17.05	17.06	17.08	17.08	17.05
2.4GHz 802.11ax SU	11.01	11.04	11.04	11.01	11.01	17.21	17.21	17.26	17.22	17.22
2.4GHz Bluetooth	8.78	8.78	8.75	8.75	8.76	16.33	16.34	16.35	16.36	16.33
5GHz 802.11a	8.31	8.27	8.27	8.29	8.27	16.55	16.52	16.53	16.55	16.55
5GHz 802.11n 20MHz	7.82	7.80	7.80	7.80	7.80	16.32	16.29	16.32	16.33	16.31
5GHz 802.11ac 20MHz	8.22	8.19	8.20	8.22	8.22	16.36	16.34	16.32	16.36	16.34
5GHz 802.11ax 20MHz SU	8.00	7.99	7.99	7.97	8.00	16.58	16.58	16.56	16.56	16.56
5GHz 802.11n 40MHz	8.21	8.23	8.23	8.25	8.23	16.55	16.53	16.55	16.56	16.58
5GHz 802.11ac 40MHz	8.24	8.23	8.24	8.26	8.25	16.43	16.43	16.44	16.43	16.43
5GHz 802.11ax 40MHz SU	8.00	7.99	8.00	8.03	8.01	16.45	16.46	16.43	16.44	16.45
5GHz 802.11ac 80MHz	8.20	8.23	8.22	8.24	8.23	15.65	15.63	15.64	15.64	15.63
5GHz 802.11ax 80MHz SU	8.14	8.17	8.14	8.15	8.14	15.75	15.73	15.72	15.72	15.76
5GHz 802.11ac 160MHz	7.45	7.44	7.46	7.43	7.47	14.00	13.96	13.98	13.98	14.00
5GHz 802.11ax 160MHz SU	8.21	8.21	8.23	8.23	8.24	14.27	14.25	14.29	14.25	14.25
6GHz 802.11a	8.98	8.98	8.99	8.98	9.00	9.73	9.70	9.70	9.72	9.69
6GHz 802.11ax 20MHz	8.96	8.94	8.95	8.97	8.93	9.97	9.96	9.97	9.96	9.98
6GHz 802.11ax 40MHz	7.77	7.75	7.74	7.74	7.74	8.62	8.59	8.63	8.59	8.60
6GHz 802.11ax 80MHz	7.67	7.66	7.69	7.67	7.68	9.00	9.02	8.99	8.98	9.01
6GHz 802.11ax 160MHz	8.00	7.96	7.98	8.00	7.99	8.98	8.99	9.03	8.98	8.99

Based on the most conservative measured triggering distance of 20mm, additional Body SAR measurements were required at 19mm from rear side for the above modes.

Right side – EUT Moving toward (trigger) to the Phantom

Mode	Distance to DUT Output power (dBm)									
	15	14	13	12	11	10	9	8	7	6
2.4GHz 802.11g	15.04	15.04	15.04	15.05	15.05	11.25	11.27	11.26	11.26	11.28
2.4GHz 802.11b	17.16	17.15	17.17	17.19	17.14	11.05	11.06	11.08	11.05	11.08
2.4GHz 802.11n	17.07	17.07	17.06	17.03	17.06	10.91	10.90	10.94	10.89	10.89
2.4GHz 802.11ax SU	17.22	17.25	17.26	17.21	17.26	11.05	11.04	11.02	11.04	11.00
2.4GHz Bluetooth	16.35	16.34	16.35	16.35	16.33	8.76	8.78	8.77	8.75	8.74
5GHz 802.11a	16.54	16.51	16.51	16.54	16.51	8.30	8.28	8.27	8.31	8.30
5GHz 802.11n 20MHz	16.32	16.29	16.29	16.31	16.31	7.84	7.82	7.80	7.84	7.83
5GHz 802.11ac 20MHz	16.35	16.33	16.33	16.33	16.32	8.18	8.18	8.23	8.21	8.22
5GHz 802.11ax 20MHz SU	16.60	16.56	16.57	16.56	16.57	7.98	7.98	8.00	8.00	7.99
5GHz 802.11n 40MHz	16.57	16.55	16.54	16.57	16.54	8.21	8.25	8.25	8.22	8.22
5GHz 802.11ac 40MHz	16.42	16.44	16.45	16.42	16.45	8.22	8.22	8.22	8.26	8.22
5GHz 802.11ax 40MHz SU	16.45	16.47	16.47	16.43	16.43	8.00	8.02	7.99	7.99	8.03
5GHz 802.11ac 80MHz	15.65	15.64	15.64	15.62	15.63	8.22	8.23	8.21	8.24	8.20
5GHz 802.11ax 80MHz SU	15.72	15.74	15.73	15.75	15.75	8.14	8.17	8.14	8.18	8.17
5GHz 802.11ac 160MHz	13.97	13.96	13.97	13.99	13.97	7.43	7.48	7.47	7.45	7.47
5GHz 802.11ax 160MHz SU	14.28	14.28	14.25	14.28	14.27	8.22	8.23	8.22	8.21	8.21
6GHz 802.11a	9.72	9.69	9.73	9.70	9.71	8.98	8.98	9.00	9.00	8.99
6GHz 802.11ax 20MHz	9.98	9.95	9.98	9.98	9.96	8.94	8.97	8.95	8.96	8.95
6GHz 802.11ax 40MHz	8.62	8.60	8.59	8.63	8.62	7.74	7.76	7.74	7.78	7.78
6GHz 802.11ax 80MHz	9.00	9.03	9.02	9.02	8.99	7.65	7.65	7.67	7.65	7.64
6GHz 802.11ax 160MHz	8.98	9.00	8.99	9.03	9.00	7.98	7.98	7.96	7.98	7.98

Right side – EUT Moving away (Release) from the Phantom

Mode	Distance to DUT Output power (dBm)									
	7	8	9	10	11	12	13	14	15	16
2.4GHz 802.11g	11.29	11.28	11.28	11.26	11.27	15.08	15.04	15.03	15.06	15.07
2.4GHz 802.11b	11.08	11.06	11.06	11.06	11.07	17.19	17.15	17.18	17.16	17.17
2.4GHz 802.11n	10.91	10.90	10.92	10.94	10.91	17.06	17.07	17.08	17.04	17.08
2.4GHz 802.11ax SU	11.04	11.03	11.02	11.03	11.03	17.23	17.21	17.24	17.25	17.23
2.4GHz Bluetooth	8.76	8.74	8.77	8.74	8.75	16.33	16.34	16.35	16.33	16.33
5GHz 802.11a	8.28	8.31	8.31	8.31	8.29	16.55	16.55	16.52	16.51	16.55
5GHz 802.11n 20MHz	7.83	7.80	7.81	7.80	7.80	16.32	16.32	16.33	16.31	16.32
5GHz 802.11ac 20MHz	8.23	8.22	8.22	8.21	8.20	16.33	16.34	16.35	16.32	16.36
5GHz 802.11ax 20MHz SU	7.96	8.00	8.00	7.99	7.97	16.58	16.60	16.58	16.57	16.59
5GHz 802.11n 40MHz	8.22	8.22	8.24	8.26	8.22	16.56	16.53	16.56	16.55	16.54
5GHz 802.11ac 40MHz	8.22	8.25	8.26	8.25	8.26	16.42	16.44	16.46	16.43	16.45
5GHz 802.11ax 40MHz SU	8.01	8.02	8.00	7.99	7.99	16.46	16.44	16.44	16.47	16.44
5GHz 802.11ac 80MHz	8.22	8.24	8.24	8.21	8.24	15.62	15.61	15.62	15.65	15.61
5GHz 802.11ax 80MHz SU	8.15	8.15	8.17	8.17	8.15	15.76	15.75	15.74	15.75	15.72
5GHz 802.11ac 160MHz	7.45	7.43	7.44	7.46	7.44	13.99	13.98	13.97	13.97	13.96
5GHz 802.11ax 160MHz SU	8.22	8.24	8.23	8.24	8.23	14.30	14.29	14.26	14.28	14.27
6GHz 802.11a	8.99	9.01	8.99	9.00	8.99	9.70	9.70	9.73	9.71	9.71
6GHz 802.11ax 20MHz	8.93	8.93	8.95	8.94	8.96	9.94	9.96	9.97	9.96	9.94
6GHz 802.11ax 40MHz	7.76	7.74	7.78	7.75	7.74	8.59	8.61	8.62	8.59	8.63
6GHz 802.11ax 80MHz	7.68	7.68	7.65	7.68	7.66	9.00	9.00	9.02	8.99	9.03
6GHz 802.11ax 160MHz	7.98	7.99	7.97	7.99	8.00	9.01	8.98	9.02	9.00	9.01

Based on the most conservative measured triggering distance of 10mm, additional Body SAR measurements were required at 9mm from right side for the above modes.

Top side – EUT Moving toward (trigger) to the Phantom

Mode	Distance to DUT Output power (dBm)									
	25	24	23	22	21	20	19	18	17	16
2.4GHz 802.11g	15.04	15.06	15.05	15.04	15.06	11.27	11.28	11.29	11.26	11.26
2.4GHz 802.11b	17.16	17.17	17.15	17.15	17.17	11.07	11.08	11.06	11.09	11.07
2.4GHz 802.11n	17.06	17.06	17.06	17.06	17.04	10.93	10.94	10.92	10.94	10.89
2.4GHz 802.11ax SU	17.24	17.24	17.21	17.25	17.24	11.04	11.05	11.01	11.02	11.02
2.4GHz Bluetooth	16.32	16.34	16.33	16.35	16.32	8.77	8.77	8.78	8.78	8.77
5GHz 802.11a	16.55	16.55	16.55	16.52	16.55	8.28	8.30	8.31	8.27	8.29
5GHz 802.11n 20MHz	16.32	16.33	16.33	16.32	16.31	7.81	7.81	7.83	7.82	7.81
5GHz 802.11ac 20MHz	16.33	16.35	16.36	16.35	16.33	8.18	8.20	8.20	8.22	8.19
5GHz 802.11ax 20MHz SU	16.59	16.60	16.60	16.59	16.59	7.98	7.99	7.96	7.97	7.99
5GHz 802.11n 40MHz	16.54	16.53	16.53	16.56	16.54	8.23	8.25	8.24	8.22	8.23
5GHz 802.11ac 40MHz	16.43	16.44	16.45	16.43	16.44	8.22	8.24	8.25	8.22	8.24
5GHz 802.11ax 40MHz SU	16.45	16.44	16.44	16.46	16.47	7.99	8.03	8.03	8.00	8.00
5GHz 802.11ac 80MHz	15.64	15.66	15.62	15.64	15.65	8.24	8.22	8.24	8.23	8.21
5GH 802.11ax 80MHz SU	15.73	15.76	15.72	15.72	15.76	8.17	8.16	8.16	8.17	8.14
5GHz 802.11ac 160MHz	13.99	13.99	13.99	13.99	13.96	7.48	7.45	7.47	7.43	7.45
5GHz 802.11ax 160MHz SU	14.25	14.28	14.29	14.26	14.28	8.25	8.23	8.21	8.23	8.21
6GHz 802.11a	9.71	9.70	9.72	9.72	9.72	8.98	9.01	9.01	8.98	8.98
6GHz 802.11ax 20MHz	9.96	9.96	9.95	9.98	9.94	8.93	8.93	8.93	8.95	8.95
6GHZ 802.11ax 40MHz	8.61	8.63	8.61	8.60	8.61	7.75	7.78	7.78	7.75	7.74
6GHz 802.11ax 80MHz	9.03	9.00	9.03	9.03	9.01	7.68	7.65	7.67	7.67	7.68
6GHz 802.11ax 160MHz	9.02	9.03	9.02	8.98	9.03	7.98	7.97	7.98	7.98	7.99

Top side – EUT Moving away (Release) from the Phantom

Mode	Distance to DUT Output power (dBm)									
	17	18	19	20	21	22	23	24	25	26
2.4GHz 802.11g	11.27	11.27	11.29	11.27	11.25	15.05	15.06	15.03	15.05	15.06
2.4GHz 802.11b	11.08	11.04	11.04	11.08	11.07	17.15	17.18	17.16	17.15	17.19
2.4GHz 802.11n	10.93	10.92	10.94	10.93	10.92	17.05	17.05	17.04	17.05	17.05
2.4GHz 802.11ax SU	11.03	11.03	11.02	11.04	11.02	17.24	17.23	17.24	17.22	17.26
2.4GHz Bluetooth	8.78	8.79	8.76	8.77	8.75	16.35	16.33	16.33	16.32	16.33
5GHz 802.11a	8.31	8.30	8.31	8.30	8.31	16.54	16.54	16.53	16.52	16.52
5GHz 802.11n 20MHz	7.83	7.82	7.80	7.80	7.80	16.32	16.29	16.33	16.29	16.32
5GHz 802.11ac 20MHz	8.18	8.19	8.21	8.20	8.18	16.35	16.36	16.35	16.35	16.33
5GHz 802.11ax 20MHz SU	7.98	7.98	7.99	7.96	7.97	16.59	16.56	16.57	16.56	16.59
5GHz 802.11n 40MHz	8.22	8.25	8.25	8.23	8.25	16.56	16.55	16.55	16.58	16.55
5GHz 802.11ac 40MHz	8.24	8.22	8.23	8.24	8.22	16.45	16.42	16.45	16.41	16.45
5GHz 802.11ax 40MHz SU	8.02	8.01	8.01	8.00	7.99	16.46	16.47	16.45	16.44	16.43
5GHz 802.11ac 80MHz	8.24	8.21	8.22	8.24	8.23	15.63	15.62	15.64	15.61	15.64
5GHz 802.11ax 80MHz SU	8.14	8.14	8.16	8.15	8.16	15.76	15.74	15.73	15.74	15.74
5GHz 802.11ac 160MHz	7.44	7.45	7.47	7.44	7.48	13.98	13.99	13.96	13.96	13.98
5GHz 802.11ax 160MHz SU	8.21	8.21	8.21	8.22	8.23	14.25	14.27	14.25	14.28	14.27
6GHz 802.11a	9.01	9.01	9.01	9.00	8.97	9.70	9.70	9.72	9.70	9.73
6GHz 802.11ax 20MHz	8.93	8.93	8.93	8.97	8.95	9.95	9.96	9.95	9.99	9.94
6GHz 802.11ax 40MHz	7.74	7.76	7.76	7.76	7.74	8.60	8.62	8.62	8.60	8.62
6GHz 802.11ax 80MHz	7.65	7.69	7.66	7.67	7.65	9.01	9.02	8.99	8.99	9.01
6GHz 802.11ax 160MHz	8.00	7.98	7.96	7.95	7.98	9.00	9.00	8.99	9.00	9.00

Based on the most conservative measured triggering distance of 20mm, additional Body SAR measurements were required at 19mm from top side for the above modes.

1.1 Proximity Sensor Coverage for SAR measurements

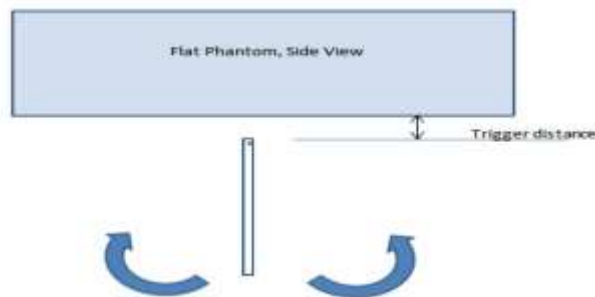
(KDB 616217 D04v01r02 §6.3)

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

1.2 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 Bottom 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 (Top 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°
2450 MHz	20 mm	On	On	On	On	On	On	On	On	On	On	On
5000 MHz	20 mm	On	On	On	On	On	On	On	On	On	On	On
6500MHz	20 mm	On	On	On	On	On	On	On	On	On	On	On

1.3 Resulting test positions for Body SAR measurements

Wireless technologies	Position	§6.2 Triggering Distance [mm]	§6.3 Coverage	§6.4 Tilt Angle	Worst case distance for Body SAR [mm]
WLAN 1 Ant	Rear	20	N/A	N/A	19
	Right	10	N/A	N/A	9
	Top	20	N/A	N/A	19

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 phablet use conditions.

2. Power reduction Verification for WLAN 2 Ant

This device uses a power reduction mechanism for SAR compliance for WLAN operations during Grip sensor is activated.

Mechanism(s)	Mode/Band	Un-triggered (Max Power)	Mechanism 1: (Reduced Power)
Grip	2.4GHz 802.11g	15.55	11.47
Grip	2.4GHz 802.11b	17.49	11.42
Grip	2.4GHz 802.11n	17.46	11.26
Grip	2.4GHz 802.11ax SU	17.58	11.31
Grip	2.4GHz Bluetooth	15.42	8.14
Grip	5GHz 802.11a	16.76	8.49
Grip	5GHz 802.11n 20MHz	16.75	7.88
Grip	5GHz 802.11ac 20MHz	16.79	8.24
Grip	5GHz 802.11ax 20MHz SU	16.91	7.96
Grip	5GHz 802.11n 40MHz	16.93	8.23
Grip	5GHz 802.11ac 40MHz	16.84	8.24
Grip	5GHz 802.11ax 40MHz SU	16.78	8.12
Grip	5GHz 802.11ac 80MHz	15.85	8.50
Grip	5GHz 802.11ax 80MHz SU	15.95	8.21
Grip	5GHz 802.11ac 160MHz	14.62	8.16
Grip	5GHz 802.11ax 160MHz SU	14.92	8.44
Grip	6GHz 802.11a	9.39	8.69
Grip	6GHz 802.11ax 20MHz	9.71	8.43
Grip	6GHz 802.11ax 40MHz	9.45	8.51
Grip	6GHz 802.11ax 80MHz	9.70	8.38
Grip	6GHz 802.11ax 160MHz	9.72	8.53

Mechanism(s)	Mode/Band	Un-triggered (Max Power)	Mechanism 1: (Reduced Power)
RSDB active	2.4GHz 802.11g	15.55	10.65
RSDB active	2.4GHz 802.11b	17.49	10.63
RSDB active	2.4GHz 802.11n	17.46	10.48
RSDB active	2.4GHz 802.11ax SU	17.58	10.56
RSDB active	2.4GHz Bluetooth	15.42	7.29
RSDB active	5GHz 802.11a	16.76	7.95
RSDB active	5GHz 802.11n 20MHz	16.75	7.33
RSDB active	5GHz 802.11ac 20MHz	16.79	7.73
RSDB active	5GHz 802.11ax 20MHz SU	16.91	7.44
RSDB active	5GHz 802.11n 40MHz	16.93	7.69
RSDB active	5GHz 802.11ac 40MHz	16.84	7.74
RSDB active	5GHz 802.11ax 40MHz SU	16.78	7.58
RSDB active	5GHz 802.11ac 80MHz	15.85	7.97
RSDB active	5GH 802.11ax 80MHz SU	15.95	7.70
RSDB active	5GHz 802.11ac 160MHz	14.62	7.59
RSDB active	5GHz 802.11ax 160MHz SU	14.92	7.89
RSDB active	6GHz 802.11a	9.39	6.86
RSDB active	6GHz 802.11ax 20MHz	9.71	6.67
RSDB active	6GHZ 802.11ax 40MHz	9.45	6.53
RSDB active	6GHz 802.11ax 80MHz	9.70	6.33
RSDB active	6GHz 802.11ax 160MHz	9.72	6.97

Tissue simulating liquid	Trigger distance – Rear		Trigger distance – Left Side		Trigger distance – Top	
	Moving toward phantom [mm]	Moving away from phantom [mm]	Moving toward phantom [mm]	Moving away from phantom [mm]	Moving toward phantom [mm]	Moving away from phantom [mm]
2450MHz	20	21	10	11	18	19
5000MHz	20	21	10	11	18	19
6500MHz	20	21	10	11	18	19

Rear side – EUT Moving toward (trigger) to the Phantom

Mode	Distance to DUT Output power (dBm)									
	25	24	23	22	21	20	19	18	17	16
2.4GHz 802.11g	15.53	15.54	15.54	15.54	15.53	11.47	11.44	11.43	11.46	11.45
2.4GHz 802.11b	17.45	17.46	17.46	17.45	17.47	11.38	11.41	11.40	11.39	11.40
2.4GHz 802.11n	17.43	17.43	17.42	17.43	17.45	11.25	11.24	11.22	11.25	11.26
2.4GHz 802.11ax SU	17.54	17.57	17.58	17.54	17.56	11.29	11.29	11.27	11.30	11.30
2.4GHz Bluetooth	15.41	15.37	15.38	15.38	15.39	8.11	8.09	8.14	8.13	8.10
5GHz 802.11a	16.72	16.73	16.75	16.76	16.72	8.46	8.46	8.47	8.47	8.46
5GHz 802.11n 20MHz	16.71	16.74	16.74	16.74	16.71	7.87	7.84	7.84	7.85	7.84
5GHz 802.11ac 20MHz	16.79	16.78	16.74	16.76	16.77	8.19	8.23	8.21	8.22	8.23
5GHz 802.11ax 20MHz SU	16.90	16.88	16.87	16.88	16.90	7.92	7.92	7.91	7.95	7.92
5GHz 802.11n 40MHz	16.92	16.92	16.91	16.92	16.90	8.22	8.23	8.18	8.19	8.20
5GHz 802.11ac 40MHz	16.84	16.80	16.80	16.81	16.80	8.22	8.24	8.19	8.23	8.23
5GHz 802.11ax 40MHz SU	16.76	16.76	16.74	16.76	16.77	8.08	8.07	8.07	8.10	8.09
5GHz 802.11ac 80MHz	15.82	15.83	15.81	15.80	15.81	8.48	8.47	8.45	8.46	8.47
5GHz 802.11ax 80MHz SU	15.92	15.94	15.92	15.92	15.92	8.18	8.19	8.20	8.17	8.18
5GHz 802.11ac 160MHz	14.58	14.59	14.57	14.62	14.61	8.12	8.14	8.14	8.15	8.14
5GHz 802.11ax 160MHz SU	14.89	14.91	14.89	14.89	14.87	8.41	8.39	8.40	8.39	8.43
6GHz 802.11a	9.37	9.35	9.38	9.38	9.37	8.65	8.69	8.65	8.67	8.68
6GHz 802.11ax 20MHz	9.70	9.68	9.70	9.71	9.70	8.42	8.41	8.43	8.40	8.42
6GHz 802.11ax 40MHz	9.41	9.44	9.40	9.43	9.44	8.47	8.51	8.46	8.51	8.48
6GHz 802.11ax 80MHz	9.70	9.68	9.66	9.67	9.68	8.34	8.35	8.35	8.35	8.36
6GHz 802.11ax 160MHz	9.69	9.70	9.68	9.68	9.72	8.51	8.49	8.52	8.52	8.51

Rear side – EUT Moving away (Release) from the Phantom

Mode	Distance to DUT Output power (dBm)									
	17	18	19	20	21	22	23	24	25	26
2.4GHz 802.11g	11.47	11.47	11.43	11.46	11.42	15.52	15.55	15.54	15.52	15.50
2.4GHz 802.11b	11.39	11.40	11.42	11.41	11.41	17.48	17.45	17.48	17.47	17.46
2.4GHz 802.11n	11.21	11.24	11.21	11.23	11.26	17.44	17.41	17.42	17.44	17.42
2.4GHz 802.11ax SU	11.28	11.28	11.29	11.30	11.30	17.54	17.54	17.55	17.54	17.54
2.4GHz Bluetooth	8.09	8.12	8.13	8.13	8.10	15.42	15.40	15.39	15.42	15.42
5GHz 802.11a	8.49	8.47	8.47	8.49	8.45	16.76	16.75	16.73	16.76	16.76
5GHz 802.11n 20MHz	7.83	7.84	7.84	7.83	7.84	16.71	16.71	16.74	16.74	16.70
5GHz 802.11ac 20MHz	8.23	8.23	8.20	8.21	8.19	16.77	16.76	16.77	16.74	16.78
5GHz 802.11ax 20MHz SU	7.94	7.93	7.91	7.95	7.92	16.88	16.88	16.89	16.90	16.87
5GHz 802.11n 40MHz	8.21	8.19	8.19	8.21	8.20	16.90	16.90	16.92	16.88	16.90
5GHz 802.11ac 40MHz	8.22	8.19	8.23	8.23	8.24	16.84	16.79	16.79	16.82	16.82
5GHz 802.11ax 40MHz SU	8.10	8.09	8.08	8.09	8.11	16.76	16.75	16.75	16.73	16.76
5GHz 802.11ac 80MHz	8.45	8.46	8.45	8.47	8.47	15.82	15.82	15.84	15.82	15.83
5GHz 802.11ax 80MHz SU	8.16	8.20	8.16	8.18	8.16	15.93	15.93	15.91	15.94	15.90
5GHz 802.11ac 160MHz	8.16	8.13	8.13	8.14	8.14	14.62	14.60	14.58	14.60	14.58
5GHz 802.11ax 160MHz SU	8.43	8.42	8.40	8.39	8.41	14.88	14.89	14.88	14.91	14.89
6GHz 802.11a	8.66	8.66	8.66	8.69	8.64	9.39	9.36	9.38	9.36	9.35
6GHz 802.11ax 20MHz	8.43	8.40	8.42	8.43	8.40	9.69	9.69	9.71	9.70	9.67
6GHz 802.11ax 40MHz	8.49	8.51	8.50	8.50	8.51	9.45	9.41	9.43	9.44	9.45
6GHz 802.11ax 80MHz	8.35	8.38	8.37	8.36	8.36	9.66	9.66	9.67	9.67	9.66
6GHz 802.11ax 160MHz	8.52	8.52	8.50	8.52	8.51	9.68	9.71	9.67	9.69	9.68

Based on the most conservative measured triggering distance of 20mm, additional Body SAR measurements were required at 19mm from rear side for the above modes.

Left side – EUT Moving toward (trigger) to the Phantom

Mode	Distance to DUT Output power (dBm)									
	15	14	13	12	11	10	9	8	7	6
2.4GHz 802.11g	15.50	15.55	15.50	15.53	15.53	11.42	11.46	11.45	11.44	11.44
2.4GHz 802.11b	17.45	17.47	17.44	17.48	17.47	11.41	11.38	11.38	11.38	11.42
2.4GHz 802.11n	17.45	17.43	17.44	17.45	17.41	11.22	11.22	11.25	11.22	11.24
2.4GHz 802.11ax SU	17.56	17.53	17.56	17.53	17.55	11.28	11.27	11.28	11.29	11.26
2.4GHz Bluetooth	15.41	15.37	15.37	15.40	15.42	8.12	8.11	8.11	8.12	8.09
5GHz 802.11a	16.75	16.74	16.74	16.75	16.75	8.46	8.47	8.48	8.48	8.47
5GHz 802.11n 20MHz	16.74	16.73	16.74	16.71	16.74	7.87	7.85	7.84	7.83	7.83
5GHz 802.11ac 20MHz	16.76	16.77	16.75	16.79	16.75	8.21	8.23	8.24	8.22	8.19
5GHz 802.11ax 20MHz SU	16.87	16.89	16.89	16.86	16.88	7.95	7.91	7.95	7.95	7.94
5GHz 802.11n 40MHz	16.90	16.89	16.89	16.89	16.92	8.18	8.22	8.19	8.19	8.22
5GHz 802.11ac 40MHz	16.80	16.80	16.82	16.80	16.81	8.23	8.19	8.21	8.19	8.21
5GHz 802.11ax 40MHz SU	16.74	16.73	16.76	16.75	16.77	8.08	8.07	8.11	8.10	8.10
5GHz 802.11ac 80MHz	15.83	15.82	15.83	15.85	15.83	8.46	8.48	8.48	8.45	8.46
5GH 802.11ax 80MHz SU	15.93	15.93	15.92	15.92	15.93	8.17	8.19	8.20	8.18	8.18
5GHz 802.11ac 160MHz	14.59	14.57	14.59	14.60	14.62	8.12	8.16	8.12	8.12	8.13
5GHz 802.11ax 160MHz SU	14.88	14.90	14.89	14.91	14.88	8.40	8.42	8.40	8.40	8.39
6GHz 802.11a	9.35	9.34	9.36	9.37	9.35	8.68	8.65	8.65	8.66	8.66
6GHz 802.11ax 20MHz	9.70	9.68	9.69	9.70	9.70	8.39	8.43	8.42	8.41	8.41
6GHZ 802.11ax 40MHz	9.43	9.44	9.45	9.41	9.41	8.50	8.49	8.50	8.50	8.47
6GHz 802.11ax 80MHz	9.68	9.69	9.68	9.66	9.70	8.36	8.34	8.35	8.38	8.37
6GHz 802.11ax 160MHz	9.70	9.67	9.71	9.72	9.70	8.50	8.49	8.53	8.53	8.50

Left side – EUT Moving away (Release) from the Phantom

Mode	Distance to DUT Output power (dBm)									
	7	8	9	10	11	12	13	14	15	16
2.4GHz 802.11g	11.43	11.44	11.44	11.47	11.44	15.53	15.52	15.55	15.52	15.53
2.4GHz 802.11b	11.37	11.41	11.40	11.37	11.39	17.46	17.48	17.45	17.46	17.46
2.4GHz 802.11n	11.21	11.21	11.21	11.23	11.26	17.44	17.45	17.41	17.42	17.42
2.4GHz 802.11ax SU	11.28	11.30	11.29	11.27	11.28	17.56	17.54	17.57	17.56	17.56
2.4GHz Bluetooth	8.13	8.09	8.09	8.12	8.10	15.40	15.41	15.39	15.39	15.40
5GHz 802.11a	8.48	8.49	8.47	8.47	8.45	16.74	16.75	16.72	16.74	16.73
5GHz 802.11n 20MHz	7.86	7.84	7.87	7.87	7.86	16.71	16.72	16.73	16.70	16.70
5GHz 802.11ac 20MHz	8.23	8.19	8.23	8.22	8.21	16.75	16.76	16.77	16.78	16.76
5GHz 802.11ax 20MHz SU	7.95	7.92	7.92	7.92	7.94	16.89	16.89	16.90	16.89	16.90
5GHz 802.11n 40MHz	8.21	8.19	8.19	8.21	8.22	16.90	16.89	16.88	16.90	16.89
5GHz 802.11ac 40MHz	8.21	8.21	8.19	8.24	8.19	16.83	16.80	16.82	16.80	16.83
5GHz 802.11ax 40MHz SU	8.09	8.11	8.09	8.08	8.10	16.74	16.74	16.75	16.74	16.75
5GHz 802.11ac 80MHz	8.48	8.48	8.48	8.48	8.49	15.84	15.81	15.81	15.85	15.84
5GHz 802.11ax 80MHz SU	8.16	8.20	8.18	8.18	8.20	15.90	15.94	15.91	15.92	15.94
5GHz 802.11ac 160MHz	8.11	8.15	8.12	8.12	8.11	14.62	14.58	14.58	14.61	14.61
5GHz 802.11ax 160MHz SU	8.42	8.43	8.42	8.41	8.40	14.91	14.89	14.88	14.90	14.87
6GHz 802.11a	8.67	8.65	8.65	8.68	8.65	9.36	9.38	9.35	9.36	9.37
6GHz 802.11ax 20MHz	8.38	8.40	8.39	8.42	8.39	9.68	9.66	9.71	9.66	9.71
6GHz 802.11ax 40MHz	8.47	8.49	8.49	8.49	8.49	9.42	9.44	9.45	9.45	9.44
6GHz 802.11ax 80MHz	8.35	8.36	8.35	8.37	8.37	9.70	9.69	9.67	9.69	9.66
6GHz 802.11ax 160MHz	8.51	8.51	8.49	8.52	8.50	9.68	9.67	9.68	9.68	9.68

Based on the most conservative measured triggering distance of 10mm, additional Body SAR measurements were required at 9mm from left side for the above modes.

Top side – EUT Moving toward (trigger) to the Phantom

Mode	Distance to DUT Output power (dBm)									
	23	22	21	20	19	18	17	16	15	14
2.4GHz 802.11g	15.54	15.55	15.51	15.51	15.52	11.45	11.43	11.42	11.43	11.42
2.4GHz 802.11b	17.45	17.44	17.46	17.48	17.45	11.41	11.39	11.39	11.38	11.39
2.4GHz 802.11n	17.43	17.46	17.44	17.44	17.43	11.21	11.26	11.25	11.24	11.25
2.4GHz 802.11ax SU	17.57	17.56	17.56	17.56	17.57	11.27	11.29	11.28	11.30	11.29
2.4GHz Bluetooth	15.41	15.41	15.38	15.40	15.37	8.10	8.13	8.13	8.13	8.10
5GHz 802.11a	16.75	16.75	16.75	16.72	16.75	8.49	8.49	8.47	8.49	8.48
5GHz 802.11n 20MHz	16.73	16.72	16.74	16.70	16.71	7.85	7.86	7.85	7.87	7.86
5GHz 802.11ac 20MHz	16.79	16.78	16.79	16.78	16.78	8.24	8.19	8.21	8.22	8.21
5GHz 802.11ax 20MHz SU	16.86	16.86	16.86	16.89	16.87	7.94	7.93	7.95	7.93	7.93
5GHz 802.11n 40MHz	16.89	16.92	16.89	16.88	16.92	8.21	8.20	8.18	8.20	8.20
5GHz 802.11ac 40MHz	16.81	16.84	16.81	16.80	16.83	8.23	8.20	8.21	8.21	8.22
5GHz 802.11ax 40MHz SU	16.76	16.73	16.74	16.77	16.73	8.11	8.09	8.11	8.07	8.11
5GHz 802.11ac 80MHz	15.80	15.81	15.82	15.80	15.82	8.49	8.49	8.49	8.46	8.47
5GHz 802.11ax 80MHz SU	15.90	15.92	15.92	15.92	15.92	8.19	8.20	8.19	8.20	8.16
5GHz 802.11ac 160MHz	14.62	14.62	14.57	14.61	14.59	8.15	8.13	8.14	8.12	8.14
5GHz 802.11ax 160MHz SU	14.91	14.90	14.88	14.89	14.90	8.41	8.40	8.39	8.43	8.43
6GHz 802.11a	9.36	9.35	9.35	9.37	9.37	8.68	8.66	8.67	8.65	8.66
6GHz 802.11ax 20MHz	9.68	9.69	9.70	9.70	9.67	8.41	8.42	8.41	8.42	8.40
6GHz 802.11ax 40MHz	9.42	9.42	9.45	9.41	9.40	8.51	8.49	8.49	8.49	8.50
6GHz 802.11ax 80MHz	9.68	9.68	9.67	9.69	9.69	8.38	8.34	8.33	8.35	8.34
6GHz 802.11ax 160MHz	9.68	9.71	9.68	9.69	9.68	8.52	8.49	8.51	8.50	8.48

Top side – EUT Moving away (Release) from the Phantom

Mode	Distance to DUT Output power (dBm)									
	15	16	17	18	19	20	21	22	23	24
2.4GHz 802.11g	11.45	11.44	11.44	11.46	11.42	15.52	15.52	15.52	15.53	15.52
2.4GHz 802.11b	11.37	11.41	11.38	11.42	11.38	17.46	17.47	17.45	17.46	17.48
2.4GHz 802.11n	11.25	11.22	11.26	11.25	11.22	17.43	17.42	17.44	17.43	17.42
2.4GHz 802.11ax SU	11.27	11.29	11.29	11.26	11.30	17.57	17.54	17.57	17.57	17.56
2.4GHz Bluetooth	8.10	8.12	8.13	8.12	8.14	15.39	15.38	15.41	15.41	15.41
5GHz 802.11a	8.46	8.45	8.49	8.44	8.49	16.72	16.72	16.72	16.73	16.75
5GHz 802.11n 20MHz	7.84	7.86	7.86	7.86	7.87	16.71	16.70	16.71	16.74	16.73
5GHz 802.11ac 20MHz	8.23	8.23	8.19	8.21	8.22	16.77	16.74	16.77	16.77	16.78
5GHz 802.11ax 20MHz SU	7.93	7.91	7.93	7.95	7.95	16.88	16.86	16.89	16.87	16.86
5GHz 802.11n 40MHz	8.20	8.22	8.19	8.21	8.23	16.92	16.92	16.91	16.93	16.88
5GHz 802.11ac 40MHz	8.20	8.20	8.19	8.23	8.22	16.81	16.81	16.82	16.79	16.83
5GHz 802.11ax 40MHz SU	8.10	8.09	8.10	8.07	8.09	16.77	16.73	16.77	16.76	16.73
5GHz 802.11ac 80MHz	8.48	8.45	8.47	8.45	8.47	15.83	15.83	15.84	15.82	15.81
5GHz 802.11ax 80MHz SU	8.16	8.18	8.16	8.17	8.20	15.94	15.94	15.91	15.90	15.92
5GHz 802.11ac 160MHz	8.15	8.12	8.12	8.16	8.13	14.60	14.58	14.57	14.60	14.58
5GHz 802.11ax 160MHz SU	8.43	8.43	8.39	8.42	8.39	14.89	14.87	14.88	14.91	14.91
6GHz 802.11a	8.67	8.66	8.67	8.64	8.64	9.38	9.35	9.35	9.38	9.34
6GHz 802.11ax 20MHz	8.43	8.39	8.40	8.39	8.42	9.70	9.66	9.68	9.67	9.67
6GHz 802.11ax 40MHz	8.49	8.49	8.49	8.48	8.50	9.43	9.44	9.42	9.44	9.44
6GHz 802.11ax 80MHz	8.37	8.35	8.34	8.35	8.35	9.68	9.69	9.68	9.66	9.67
6GHz 802.11ax 160MHz	8.53	8.53	8.52	8.52	8.49	9.71	9.72	9.68	9.70	9.70

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

2.1 Proximity Sensor Coverage for SAR measurements

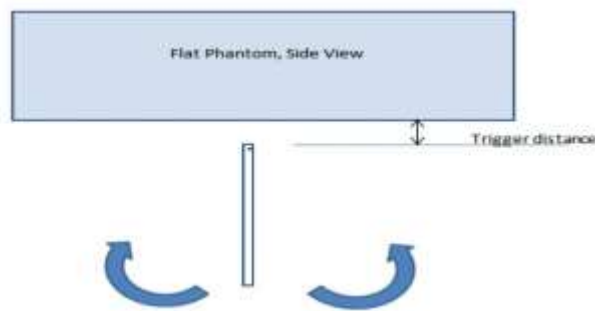
(KDB 616217 D04v01r02 §6.3)

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

2.2 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 Bottom 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°
2450 MHz	18 mm	On	On	On	On	On	On	On	On	On	On	On
5000 MHz	18 mm	On	On	On	On	On	On	On	On	On	On	On
6500 MHz	18 mm	On	On	On	On	On	On	On	On	On	On	On

2.3 Resulting test positions for Body SAR measurements

Wireless technologies	Position	§6.2 Triggering Distance [mm]	§6.3 Coverage	§6.4 Tilt Angle	Worst case distance for Body SAR [mm]
WLAN 2 Ant	Rear	20	N/A	N/A	19
	Left	10	N/A	N/A	9
	Top	18	N/A	N/A	17

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 phablet use conditions.