APPENDIX E: MULTI-TX AND ANTENNA SAR CONSIDERATIONS

E.1 Introduction

The following procedures adopted from FCC KDB Publication 447498 D01v06 are applicable to devices with built-in unlicensed transmitters such as 802.11 and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

E.2 Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore, simultaneous transmission analysis is required. Per FCC KDB Publication 447498 D01v06 and IEEE 1528-2013 Section 6.3.4.1.2, simultaneous transmission SAR test exclusion may be applied when the sum of the 1g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤1.6 W/kg. The different test positions in an exposure condition may be considered collectively to determine SAR test exclusion according to the sum of 1g or 10g SAR.

In 5G + LTE + WLAN + BT simultaneous transmission, WWAN transmission is managed and controlled by MediaTeK TAS (TA-SAR/TA-PD) feature.

Since WLAN/BT does not employ time-averaging, 1g SAR measurements for WLAN/BT need to be conducted at their corresponding rated power following current FCC test procedures to determine reported SAR values.

MediaTek TAS (TA-SAR/TA-PD) current implementation assumes hotspots from 5G NR and UMTS/LTE are collocated. Therefore, for a total of 100% exposure margin, if UMTS/LTE uses x, then the exposure margin left for 5G NR is capped to y. Thus, the compliance equation for 5G + UMTS/LTE + WLAN + BT is

$$x * A + y * B + m \leq 1$$
$$x + y = g \leq 1$$
$$g + m \leq 1$$

Where, A is normalized reported time-averaged SAR exposure ratio from UMTS/LTE, and A ≤ 1.0; B is normalized reported time-averaged exposure ratio from 5G NR, and B ≤ 1.0. Let m = normalized reported time-averaged SAR exposure ratio from WLAN + BT, then for compliance

$$x * A + y * B + m \leq 1 \ (1)$$
$$x * A + y * B \leq x * \max(A, B) + (g - x) * \max(A, B) \leq \max(A, B)$$
$$x * A + (g - x) * B + m \leq \max(A, B) + m \leq 1.0 \ (2)$$

If A + m $\leq$ 1.0 and B + m $\leq$ 1.0 can be proven, then "x * A + y * B + m $\leq$ 1.0". Therefore, simultaneous transmission analysis for 5G NR + LTE + WLAN + BT can be performed in two steps.

Step 1: Prove total exposure ratio (TER) of UMTS/LTE + WLAN + BT < 1
Step 2: Prove total exposure ratio (TER) of 5G NR + WLAN + BT < 1

Else, if A + m > 1.0 and/or B + m >1.0, then the following need to hold true for compliance:

i. A and m need to be checked if decoupled based on SPLSR criteria
ii. $y * B + m \leq 1.0$ (or B and m need to be checked if decoupled based on SPLSR, and

iii. $x * A + y * B \leq 1.0$

Note iii is covered in Part 2 report; I, and ii are covered in the Part 1 report. Above analysis is also apply to LTE/NR inter band uplink, LTE(NR)1 + LTE(NR)2 + WLAN + BT simultaneous transmission, so inter-band uplink CA no need to do additional simultaneously analysis again. Only required comply with total exposure ratio (TER) of LTE/NR + WLAN + BT < 1. Above analysis is also apply to NR band UL MIMO, NR(SISO1) + NR(SISO2) + WLAN + BT simultaneous transmission, So UL MIMO no need to do additional simultaneously analysis again. Only required comply with total exposure ratio (TER) of NR + WLAN + BT < 1.

E.3 Tablet Power Density Theoretical Calculations

Table E-1
Worst Case PD Theoretical Exposure

PD Antennas - Theoretical Worst Case					
Antenna	PD Design Target (W/m^2)	PD Uncertainty (dB)	Permanent Back off (dB)	PD Limit (W/m^2)	Theoritical Ratio to Limit
L	7.41	1.3	3.6	10	0.436
K	7.41	1.3	1.1	10	0.776

Table E-2
PD Theoretical Exposure per Position at 2mm

PD Antennas - 2mm theoretical per position					
Antenna L					
Back	Front	Top	Bottom	Right	Left
0.436	0.040	0.008	0.218	0.099	0.002
Antenna K					
Back	Front	Top	Bottom	Right	Left
0.047	0.776	0.048	0.010	0.564	0.007

E.4 Tablet UMTS/LTE Simultaneous Analysis

Table E-3
UMTS/LTE Highest Adjusted SAR

	Configuration	UMTS/LTE SAR (W/kg)			UMTS/LTE Max
		M1	S2	S4	
Body	Back	0.618	0.768	0.908	0.908
	Top	0.830	0.400*	0.400*	0.830
	Bottom	0.400*	0.796	0.539	0.796
	Right	0.821	0.476	0.217	0.821
	Left	0.454	0.227	0.739	0.739

	Configuration	UMTS/LTE Ratio to Limit			UMTS/LTE Max
		M1	S2	S4	
Body	Back	0.386	0.480	0.568	0.568
	Top	0.519	0.250	0.250	0.519
	Bottom	0.250	0.498	0.337	0.498
	Right	0.513	0.298	0.136	0.513
	Left	0.284	0.142	0.462	0.462

* When the antenna separation distance was > 50 mm, an estimated SAR of 0.4 W/kg was used to determine the simultaneous transmission SAR exclusion for test positions excluded per FCC KDB Publication 447498 D01v06

Table E-4
Simultaneous Transmission Scenarios of WLAN/BT

Configuration	2.4 GHz WLAN Ant WIFI 0 SAR (W/kg)	2.4 GHz WLAN Ant WIFI 0 at 11 dBm SAR (W/kg)	2.4 GHz WLAN Ant WIFI 1 SAR (W/kg)	2.4 GHz WLAN Ant WIFI 1 at 11 dBm SAR (W/kg)	2.4 GHz WLAN Ant WIFI 1 at 9 dBm SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	2.4 GHz WLAN MIMO at 14 dBm SAR (W/kg)	2.4 GHz WLAN MIMO at 12 dBm SAR (W/kg)	5 GHz WLAN Ant WIFI 0 SAR (W/kg)	5 GHz WLAN Ant WIFI 0 at 7 dBm SAR (W/kg)	5 GHz WLAN Ant WIFI 1 SAR (W/kg)	5 GHz WLAN Ant WIFI 1 at 7 dBm SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	5 GHz WLAN MIMO at 10 dBm SAR (W/kg)	5 GHz WLAN MIMO at 8.5 dBm SAR (W/kg)	6 GHz WLAN Ant WIFI 0 SAR (W/kg)	6 GHz WLAN Ant WIFI 0 at 5.5 dBm SAR (W/kg)	6 GHz WLAN Ant WIFI 1 SAR (W/kg)	6 GHz WLAN Ant WIFI 1 at 5.5 dBm SAR (W/kg)	6 GHz WLAN MIMO SAR (W/kg)	6 GHz WLAN MIMO at 8.5 dBm SAR (W/kg)	6 GHz WLAN MIMO at 4.5 dBm SAR (W/kg)	2.4 GHz Bluetooth Ant WIFI 0 SAR (W/kg)	2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm SAR (W/kg)	2.4 GHz Bluetooth Ant WIFI 1 SAR (W/kg)	2.4 GHz Bluetooth Ant WIFI 1 at 6.5 dBm SAR (W/kg)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Back	0.079	0.421	0.086	0.396	0.259	0.105	0.427	0.297	0.087	0.646	0.096	0.307	0.106	0.651	0.382	0.015	0.709	0.005	0.129	0.013	0.816	0.468	0.020	0.153	0.029	0.135
Top	0.051	0.209	0.073	0.213	0.175	0.094	0.235	0.203	0.074	0.096	0.094	0.123	0.093	0.114	0.107	0.009	0.025	0.007	0.023	0.006	0.048	0.048*	0.012	0.059	0.021	0.067
Bottom	0.044	0.044*	0.107	0.107*	0.107*	0.155	0.155*	0.155*	0.019	0.019*	0.079	0.079*	0.087	0.087*	0.087*	0.005	0.005*	0.000	0.000*	0.000	0.000*	0.000*	0.017	0.017*	0.035	0.035*
Right	0.009	0.009*	0.207	0.471	0.274	0.240	0.571	0.360	0.014	0.014*	0.283	0.478	0.247	0.523	0.334	0.001	0.001*	0.013	0.222	0.010	0.377	0.110	0.000	0.000*	0.079	0.150
Left	0.146	0.248	0.005	0.005*	0.005*	0.138	0.241	0.192	0.272	0.634	0.005	0.005*	0.222	0.675	0.493	0.034	0.167	0.002	0.002*	0.028	0.447	0.157	0.025	0.081	0.001	0.001*

Configuration	2.4 GHz WLAN Ant WIFI 0 Ratio to Limit	2.4 GHz WLAN Ant WIFI 0 at 11 dBm Ratio to Limit	2.4 GHz WLAN Ant WIFI 1 Ratio to Limit	2.4 GHz WLAN Ant WIFI 1 at 11 dBm Ratio to Limit	2.4 GHz WLAN Ant WIFI 1 at 9 dBm Ratio to Limit	2.4 GHz WLAN MIMO Ratio to Limit	2.4 GHz WLAN MIMO at 14 dBm Ratio to Limit	2.4 GHz WLAN MIMO at 12 dBm Ratio to Limit	5 GHz WLAN Ant WIFI 0 Ratio to Limit	5 GHz WLAN Ant WIFI 0 at 7 dBm Ratio to Limit	5 GHz WLAN Ant WIFI 1 Ratio to Limit	5 GHz WLAN Ant WIFI 1 at 7 dBm Ratio to Limit	5 GHz WLAN MIMO Ratio to Limit	5 GHz WLAN MIMO at 10 dBm Ratio to Limit	5 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	6 GHz WLAN Ant WIFI 0 Ratio to Limit	6 GHz WLAN Ant WIFI 0 at 5.5 dBm Ratio to Limit	6 GHz WLAN Ant WIFI 1 Ratio to Limit	6 GHz WLAN Ant WIFI 1 at 5.5 dBm Ratio to Limit	6 GHz WLAN MIMO Ratio to Limit	6 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	6 GHz WLAN MIMO at 4.5 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 1 Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 1 at 6.5 dBm Ratio to Limit
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Back	0.049	0.263	0.054	0.248	0.162	0.066	0.267	0.186	0.054	0.404	0.060	0.192	0.066	0.407	0.239	0.009	0.443	0.003	0.081	0.008	0.510	0.293	0.013	0.096	0.018	0.084
Top	0.032	0.131	0.046	0.133	0.109	0.059	0.147	0.127	0.046	0.060	0.059	0.077	0.058	0.071	0.067	0.006	0.016	0.004	0.014	0.004	0.030	0.030*	0.008	0.037	0.013	0.042
Bottom	0.028	0.028*	0.067	0.067*	0.067*	0.097	0.097*	0.097*	0.012	0.012*	0.049	0.049*	0.054	0.054*	0.054*	0.003	0.003*	0.000	0.000*	0.000	0.000*	0.000*	0.011	0.011*	0.022	0.022*
Right	0.006	0.006*	0.129	0.294	0.171	0.150	0.357	0.225	0.009	0.009*	0.177	0.299	0.154	0.327	0.209	0.001	0.001*	0.008	0.139	0.006	0.236	0.089	0.000	0.000*	0.049	0.094
Left	0.091	0.155	0.003	0.003*	0.003*	0.086	0.151	0.120	0.170	0.396	0.003	0.003*	0.139	0.422	0.308	0.021	0.104	0.001	0.001*	0.018	0.279	0.098	0.016	0.051	0.001	0.001*

Configuration	2.4 GHz Bluetooth Ant WIFI 1 Worst Case Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 1 at 6.5 dBm + 5 GHz WLAN MIMO at 10 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 1 at 6.5 dBm + 6 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 Worst Case Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 5 GHz WLAN MIMO at 10 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 6 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	2.4 GHz WLAN MIMO at 12 dBm + 6 GHz WLAN MIMO at 4.5 dBm Ratio to Limit	2.4 GHz WLAN MIMO at 12 dBm + 5 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	2.4 GHz WLAN MIMO Worst Case Ratio to Limit	5 GHz WLAN MIMO Worst Case Ratio to Limit	6 GHz WLAN MIMO Worst Case Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 2.4 GHz WLAN Ant WIFI 1 at 9 dBm + 5 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 2.4 GHz WLAN Ant WIFI 1 at 9 dBm + 6 GHz WLAN MIMO at 4.5 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 2.4 GHz WLAN Ant WIFI 1 at 11 dBm Ratio to Limit	2.4 GHz WLAN Ant WIFI 0 Worst Case Ratio to Limit	2.4 GHz WLAN Ant WIFI 1 Worst Case Ratio to Limit	5 GHz WLAN Ant WIFI 0 Worst Case Ratio to Limit	5 GHz WLAN Ant WIFI 1 Worst Case Ratio to Limit	6 GHz WLAN Ant WIFI 0 Worst Case Ratio to Limit	6 GHz WLAN Ant WIFI 1 Worst Case Ratio to Limit	WLAN/BT Worst-case Combination Ratio to Limit
	26	26+14	26+21	24	24+14	24+21	8+22	8+15	7	14	21	24+5+15	24+5+22	24+4	2	4	10	12	17	19	
Back	0.084	0.491	0.594	0.096	0.503	0.606	0.478	0.424	0.267	0.407	0.510	0.496	0.550	0.343	0.263	0.248	0.404	0.192	0.443	0.081	0.606
Top	0.042	0.113	0.072	0.037	0.108	0.067	0.157	0.194	0.147	0.071	0.030	0.213	0.176	0.170	0.131	0.133	0.060	0.077	0.016	0.014	0.213
Bottom	0.022	0.076	0.022	0.011	0.065	0.011	0.097	0.151	0.097	0.054	0.000	0.132	0.078	0.078	0.028	0.067	0.012	0.049	0.003	0.000	0.151
Right	0.094	0.421	0.329	0.000	0.327	0.236	0.294	0.434	0.357	0.327	0.236	0.380	0.240	0.294	0.006	0.294	0.009	0.299	0.001	0.139	0.434
Left	0.001	0.423	0.280	0.051	0.473	0.330	0.218	0.428	0.151	0.422	0.279	0.362	0.152	0.054	0.155	0.003	0.396	0.003	0.104	0.001	0.473

Values with * were tested at a higher, more conservative power level.

Table E-5
UMTS/LTE Simultaneous Sums

Body	Configuration	Ant M1 Ratio to Limit	WLAN/BT Worst-case Combination Ratio to Limit	Ant M1 + WLAN/BT Ratio to Limit
	Back	0.386	0.606	0.992
	Top	0.519	0.213	0.732
	Bottom	0.250	0.151	0.401
	Right	0.513	0.434	0.947
	Left	0.284	0.473	0.757

Body	Configuration	Ant S2 Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 1 Worst Case Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 1 at 6.5 dBm + 5 GHz WLAN MIMO at 10 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 1 at 6.5 dBm + 6 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 Worst Case Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 5 GHz WLAN MIMO at 10 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 6 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	2.4 GHz WLAN MIMO at 12 dBm + 6 GHz WLAN MIMO at 4.5 dBm Ratio to Limit	2.4 GHz WLAN MIMO at 12 dBm + 5 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	2.4 GHz WLAN MIMO Worst Case Ratio to Limit	5 GHz WLAN MIMO Worst Case Ratio to Limit	6 GHz WLAN MIMO Worst Case Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 2.4 GHz WLAN Ant WIFI 1 at 9 dBm + 5 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 2.4 GHz WLAN Ant WIFI 1 at 9 dBm + 6 GHz WLAN MIMO at 4.5 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 2.4 GHz WLAN Ant WIFI 1 at 11 dBm Ratio to Limit	2.4 GHz WLAN Ant WIFI 0 Worst Case Ratio to Limit	2.4 GHz WLAN Ant WIFI 1 Worst Case Ratio to Limit	5 GHz WLAN Ant WIFI 0 Worst Case Ratio to Limit	5 GHz WLAN Ant WIFI 1 Worst Case Ratio to Limit	6 GHz WLAN Ant WIFI 0 Worst Case Ratio to Limit	6 GHz WLAN Ant WIFI 1 Worst Case Ratio to Limit	Ant S2 + 2.4 GHz Bluetooth Ant WIFI 1 at 6.5 dBm + 6 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	Ant S2 + 2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 5 GHz WLAN MIMO at 10 dBm Ratio to Limit	Ant S2 + 2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 6 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	Ant S2 + 2.4 GHz WLAN MIMO at 12 dBm + 5 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	Ant S2 + 6 GHz WLAN MIMO Worst Case Ratio to Limit	Ant S2 + 2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 2.4 GHz WLAN Ant WIFI 1 at 9 dBm + 5 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	Ant S2 + 2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 2.4 GHz WLAN Ant WIFI 1 at 9 dBm + 6 GHz WLAN MIMO at 4.5 dBm SAR (W/kg)
	Back	0.480	0.084	0.491	0.594	0.096	0.503	0.606	0.478	0.424	0.267	0.407	0.510	0.496	0.550	0.343	0.263	0.248	0.404	0.192	0.443	0.083	See Table Below	0.983	See Table Below	0.904	**0.990**	0.976	See Table Below
	Top	0.250	0.042	0.113	0.072	0.037	0.108	0.067	0.157	0.194	0.147	0.071	0.030	0.213	0.176	0.170	0.131	0.133	0.060	0.077	0.016	0.014	0.322	0.358	0.317	0.444	0.280	**0.463**	0.426
	Bottom	0.498	0.022	0.076	0.022	0.011	0.065	0.011	0.097	0.151	0.097	0.054	0.000	0.132	0.078	0.078	0.028	0.067	0.012	0.049	0.003	0.000	0.520	0.563	0.509	**0.649**	0.498	0.630	0.576
	Right	0.798	0.094	0.421	0.329	0.000	0.327	0.236	0.294	0.434	0.357	0.327	0.236	0.380	0.240	0.294	0.006	0.294	0.009	0.299	0.001	0.139	0.657	0.625	0.534	**0.732**	0.534	0.678	0.538
	Left	0.342	0.001	0.423	0.280	0.051	0.473	0.330	0.218	0.428	0.151	0.422	0.279	0.362	0.152	0.054	0.155	0.003	0.396	0.003	0.104	0.001	0.422	**0.615**	0.472	0.570	0.421	0.504	0.294

Body	Configuration	Ant S4 Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 1 Worst Case Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 1 at 6.5 dBm + 5 GHz WLAN MIMO at 10 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 1 at 6.5 dBm + 6 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 Worst Case Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 5 GHz WLAN MIMO at 10 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 6 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	2.4 GHz WLAN MIMO at 12 dBm + 6 GHz WLAN MIMO at 4.5 dBm Ratio to Limit	2.4 GHz WLAN MIMO at 12 dBm + 5 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	2.4 GHz WLAN MIMO Worst Case Ratio to Limit	5 GHz WLAN MIMO Worst Case Ratio to Limit	6 GHz WLAN MIMO Worst Case Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 2.4 GHz WLAN Ant WIFI 1 at 9 dBm + 5 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 2.4 GHz WLAN Ant WIFI 1 at 9 dBm + 6 GHz WLAN MIMO at 4.5 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 2.4 GHz WLAN Ant WIFI 1 at 11 dBm Ratio to Limit	2.4 GHz WLAN Ant WIFI 0 Worst Case Ratio to Limit	2.4 GHz WLAN Ant WIFI 1 Worst Case Ratio to Limit	5 GHz WLAN Ant WIFI 0 Worst Case Ratio to Limit	5 GHz WLAN Ant WIFI 1 Worst Case Ratio to Limit	6 GHz WLAN Ant WIFI 0 Worst Case Ratio to Limit	6 GHz WLAN Ant WIFI 1 Worst Case Ratio to Limit	Ant S4 + 2.4 GHz Bluetooth Ant WIFI 1 at 6.5 dBm + 5 GHz WLAN MIMO at 10 dBm Ratio to Limit	Ant S4 + 2.4 GHz Bluetooth Ant WIFI 1 at 6.5 dBm + 6 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	Ant S4 + 2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 5 GHz WLAN MIMO at 10 dBm Ratio to Limit	Ant S4 + 2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 6 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	Ant S4 + 2.4 GHz WLAN MIMO at 12 dBm + 6 GHz WLAN MIMO at 4.5 dBm Ratio to Limit	Ant S4 + 2.4 GHz WLAN MIMO at 12 dBm + 5 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	Ant S4 + 6 GHz WLAN MIMO Worst Case Ratio to Limit	Ant S4 + 2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 2.4 GHz WLAN Ant WIFI 1 at 9 dBm + 5 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	Ant S4 + 2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 2.4 GHz WLAN Ant WIFI 1 at 9 dBm + 6 GHz WLAN MIMO at 4.5 dBm Ratio to Limit	Ant S4 + 6 GHz WLAN Ant WIFI 0 Worst Case Ratio to Limit
	Back	0.568	0.084	0.491	0.594	0.096	0.503	0.606	0.478	0.424	0.267	0.407	0.510	0.496	0.550	0.343	0.263	0.248	0.404	0.192	0.443	0.083	See Table Below	See Table Below	See Table Below	See Table Below	See Table Below	**0.992**	See Table Below	See Table Below	See Table Below	See Table Below
	Top	0.250	0.042	0.113	0.072	0.037	0.108	0.067	0.157	0.194	0.147	0.071	0.030	0.213	0.176	0.170	0.131	0.133	0.060	0.077	0.016	0.014	0.363	0.322	0.358	0.317	0.407	0.444	0.280	**0.463**	0.426	0.266
	Reborn	0.337	0.022	0.076	0.022	0.011	0.065	0.011	0.097	0.151	0.097	0.054	0.000	0.132	0.078	0.078	0.028	0.067	0.012	0.049	0.003	0.000	0.413	0.359	0.402	0.348	0.434	**0.488**	0.337	0.469	0.415	0.340
	Right	0.136	0.094	0.421	0.329	0.000	0.327	0.236	0.294	0.434	0.357	0.327	0.236	0.380	0.240	0.294	0.006	0.294	0.009	0.299	0.001	0.139	0.557	0.465	0.463	0.372	0.430	**0.570**	0.372	0.516	0.376	0.127
	Left	0.462	0.001	0.423	0.280	0.051	0.473	0.330	0.218	0.428	0.151	0.422	0.279	0.362	0.152	0.054	0.155	0.003	0.396	0.003	0.104	0.001	0.885	0.742	**0.935**	0.792	0.680	0.890	0.741	0.824	0.654	0.566

Note: Bolded values represent the highest sums for their respective edges.

Antenna Pair			Standalone Values		Standalone Sum	Peak Separation Distance (mm)	SPLS Ratio	Plot Number
			Exposure Ratio (ER)	Exposure Ratio (ER)				
	Ant "a"	Ant "b"	a	b	a+b	D_{a-b}	$(a+b)^{1.5}/D_{a-b}$	
Ant S2 + 2.4 GHz Bluetooth Ant WIFI 1 at 6.5 dBm + 6 GHz WLAN MIMO at 8.5 dBm	LTE Band 66 (AWS) Ant S2	2.4 GHz Bluetooth Ant WIFI 1	0.477	0.084	0.561	284.21	0.00	1
	LTE Band 25 (PCS) Ant S2	2.4 GHz Bluetooth Ant WIFI 1	0.480	0.084	0.564	278.03	0.00	
	LTE Band 30 Ant S2	2.4 GHz Bluetooth Ant WIFI 1	0.311	0.084	0.395	281.48	0.00	
	LTE Band 7 Ant S2	2.4 GHz Bluetooth Ant WIFI 1	0.396	0.084	0.48	280.32	0.00	
	LTE Band 66 (AWS) Ant S2	6 GHz WLAN MIMO (Peak 1)	0.477	0.510	0.987	296.05	0.00	
	LTE Band 25 (PCS) Ant S2	6 GHz WLAN MIMO (Peak 1)	0.480	0.510	0.99	291.19	0.00	
	LTE Band 30 Ant S2	6 GHz WLAN MIMO (Peak 1)	0.311	0.510	0.821	294.37	0.00	
	LTE Band 7 Ant S2	6 GHz WLAN MIMO (Peak 1)	0.396	0.510	0.906	293.87	0.00	
	LTE Band 66 (AWS) Ant S2	6 GHz WLAN MIMO (Peak 2)	0.477	0.085	0.562	281.97	0.00	
	LTE Band 25 (PCS) Ant S2	6 GHz WLAN MIMO (Peak 2)	0.480	0.085	0.565	275.80	0.00	
	LTE Band 30 Ant S2	6 GHz WLAN MIMO (Peak 2)	0.311	0.085	0.396	279.25	0.00	
	LTE Band 7 Ant S2	6 GHz WLAN MIMO (Peak 2)	0.396	0.085	0.481	278.10	0.00	
	6 GHz WLAN MIMO (Peak 1)	2.4 GHz Bluetooth Ant WIFI 1	0.510	0.084	0.594	171.12	0.00	
	6 GHz WLAN MIMO (Peak 2)	2.4 GHz Bluetooth Ant WIFI 1	0.085	0.084	0.169	3.16	0.02	
Ant S2 + 2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 6 GHz WLAN MIMO at 8.5 dBm	LTE Band 66 (AWS) Ant S2	6 GHz WLAN MIMO (Peak 1) + Bluetooth Ant WIFI 0 Co-Located	0.477	0.606	1.083	296.05	0.00	1
	LTE Band 25 (PCS) Ant S2	6 GHz WLAN MIMO (Peak 1) + Bluetooth Ant WIFI 0 Co-Located	0.480	0.606	1.086	291.19	0.00	
	LTE Band 30 Ant S2	6 GHz WLAN MIMO (Peak 1) + Bluetooth Ant WIFI 0 Co-Located	0.311	0.606	0.917	294.37	0.00	
	LTE Band 7 Ant S2	6 GHz WLAN MIMO (Peak 1) + Bluetooth Ant WIFI 0 Co-Located	0.396	0.606	1.002	293.87	0.00	
	6 GHz WLAN MIMO (Peak 2)	2.4 GHz Bluetooth Ant WIFI 0	0.085	0.096	0.181	174.48	0.00	
Ant S2 + 2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 2.4 GHz WLAN Ant WIFI 1 at 9 dBm + 6 GHz WLAN MIMO at 4.5 dBm	6 GHz WLAN MIMO (Peak 1) + Bluetooth Ant WIFI 0 Co-Located	2.4 GHz WLAN Ant WIFI 1	0.606	0.162	0.768	172.07	0.00	1
	LTE Band 66 (AWS) Ant S2	6 GHz WLAN MIMO (Peak 2) + 2.4 GHz WLAN Ant WIFI 1 Co-Located	0.477	0.201	0.678	281.97	0.00	
	LTE Band 25 (PCS) Ant S2	6 GHz WLAN MIMO (Peak 2) + 2.4 GHz WLAN Ant WIFI 1 Co-Located	0.480	0.201	0.681	275.80	0.00	
	LTE Band 30 Ant S2	6 GHz WLAN MIMO (Peak 2) + 2.4 GHz WLAN Ant WIFI 1 Co-Located	0.311	0.201	0.512	279.25	0.00	
	LTE Band 7 Ant S2	6 GHz WLAN MIMO (Peak 2) + 2.4 GHz WLAN Ant WIFI 1 Co-Located	0.396	0.201	0.597	278.10	0.00	
	2.4 GHz Bluetooth Ant WIFI 0	6 GHz WLAN MIMO (Peak 2) + 2.4 GHz WLAN Ant WIFI 1 Co-Located	0.096	0.201	0.297	174.48	0.00	
Ant S4 + 2.4 GHz Bluetooth Ant WIFI 1 at 6.5 dBm + 5 GHz WLAN MIMO at 10 dBm	LTE Band 48 Ant S4	5 GHz WLAN MIMO (Peak 2) + Bluetooth Ant WIFI 1 Co-Located	0.568	0.338	0.906	289.32	0.00	2
	LTE Band 48 Ant S4	5 GHz WLAN MIMO (Peak 1)	0.568	0.407	0.975	264.88	0.00	
	2.4 GHz Bluetooth Ant WIFI 1	5 GHz WLAN MIMO (Peak 1)	0.084	0.407	0.491	169.96	0.00	
Ant S4 + 2.4 GHz Bluetooth Ant WIFI 1 at 6.5 dBm + 6 GHz WLAN MIMO at 8.5 dBm	LTE Band 48 Ant S4	6 GHz WLAN MIMO (Peak 1)	0.568	0.510	1.078	274.47	0.00	2
	LTE Band 48 Ant S4	6 GHz WLAN MIMO (Peak 2)	0.568	0.085	0.653	294.12	0.00	
	LTE Band 48 Ant S4	2.4 GHz Bluetooth Ant WIFI 1	0.568	0.084	0.652	296.74	0.00	
	2.4 GHz Bluetooth Ant WIFI 1	6 GHz WLAN MIMO (Peak 1)	0.084	0.510	0.594	171.12	0.00	
	2.4 GHz Bluetooth Ant WIFI 1	6 GHz WLAN MIMO (Peak 2)	0.084	0.085	0.169	3.16	0.02	
Ant S4 + 2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 5 GHz WLAN MIMO at 10 dBm	LTE Band 48 Ant S4	6 GHz WLAN MIMO (Peak 1) + Bluetooth Ant WIFI 0 Co-Located	0.568	0.606	1.174	274.47	0.00	2
	LTE Band 48 Ant S4	5 GHz WLAN MIMO (Peak 2)	0.568	0.254	0.822	289.32	0.00	
	2.4 GHz Bluetooth Ant WIFI 0	5 GHz WLAN MIMO (Peak 2)	0.096	0.254	0.35	177.00	0.00	
Ant S4 + 2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 6 GHz WLAN MIMO at 8.5 dBm	LTE Band 48 Ant S4	6 GHz WLAN MIMO (Peak 1) + Bluetooth Ant WIFI 0 Co-Located	0.568	0.606	1.174	274.47	0.00	2
	LTE Band 48 Ant S4	6 GHz WLAN MIMO (Peak 2)	0.568	0.085	0.653	294.12	0.00	
	2.4 GHz Bluetooth Ant WIFI 0	6 GHz WLAN MIMO (Peak 2)	0.096	0.085	0.181	174.48	0.00	
Ant S4 + 2.4 GHz WLAN MIMO at 12 dBm + 6 GHz WLAN MIMO at 4.5 dBm	LTE Band 48 Ant S4	6 GHz WLAN MIMO (Peak 1) + 2.4 GHz WLAN MIMO (Peak 1) Co-Located	0.568	0.458	1.026	274.47	0.00	2
	LTE Band 48 Ant S4	6 GHz WLAN MIMO (Peak 2) + 2.4 GHz WLAN MIMO (Peak 2) Co-Located	0.568	0.225	0.793	294.12	0.00	
	2.4 GHz WLAN MIMO (Peak 1)	6 GHz WLAN MIMO (Peak 2)	0.165	0.085	0.25	174.48	0.00	
	2.4 GHz WLAN MIMO (Peak 2)	6 GHz WLAN MIMO (Peak 1)	0.186	0.510	0.696	170.17	0.00	
Ant S4 + 6 GHz WLAN MIMO Worst Case	LTE Band 48 Ant S4	6 GHz WLAN MIMO (Peak 1)	0.568	0.510	1.078	274.47	0.00	2
	LTE Band 48 Ant S4	6 GHz WLAN MIMO (Peak 2)	0.568	0.085	0.653	294.12	0.00	
Ant S4 + 2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 2.4 GHz WLAN Ant WIFI 1 at 9 dBm + 5 GHz WLAN MIMO at 8.5 dBm	LTE Band 48 Ant S4	5 GHz WLAN MIMO (Peak 1) + Bluetooth Ant WIFI 0 Co-Located	0.568	0.503	1.071	264.88	0.00	2
	LTE Band 48 Ant S4	5 GHz WLAN MIMO (Peak 2) + 2.4 GHz WLAN Ant WIFI 1 Co-Located	0.568	0.306	0.874	289.32	0.00	
	5 GHz WLAN MIMO (Peak 1) + Bluetooth Ant WIFI 0 Co-Located	5 GHz WLAN MIMO (Peak 2) + 2.4 GHz WLAN Ant WIFI 1 Co-Located	0.503	0.306	0.809	169.30	0.00	
Ant S4 + 2.4 GHz Bluetooth Ant WIFI 0 at 6.5 dBm + 2.4 GHz WLAN Ant WIFI 1 at 9 dBm + 6 GHz WLAN MIMO at 4.5 dBm	LTE Band 48 Ant S4	6 GHz WLAN MIMO (Peak 1) + Bluetooth Ant WIFI 0 Co-Located	0.568	0.606	1.174	274.47	0.00	2
	LTE Band 48 Ant S4	6 GHz WLAN MIMO (Peak 2) + 2.4 GHz WLAN Ant WIFI 1 Co-Located	0.568	0.201	0.769	294.12	0.00	
	6 GHz WLAN MIMO (Peak 1) + Bluetooth Ant WIFI 0 Co-Located	6 GHz WLAN MIMO (Peak 2) + 2.4 GHz WLAN Ant WIFI 1 Co-Located	0.606	0.201	0.807	168.44	0.00	
Ant S4 + 6 GHz WLAN Ant WIFI 0 Worst Case	LTE Band 48 Ant S4	WIFI 6 GHz WLAN Ant WIFI 1	0.568	0.443	1.011	294.12	0.00	2

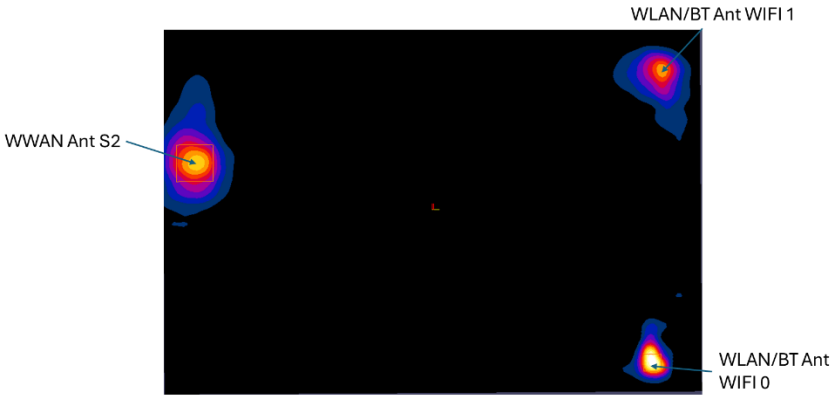

Figure E-1
Tablet Back Side Antenna S2 SAR to Peak Location Separation Ratio Plot

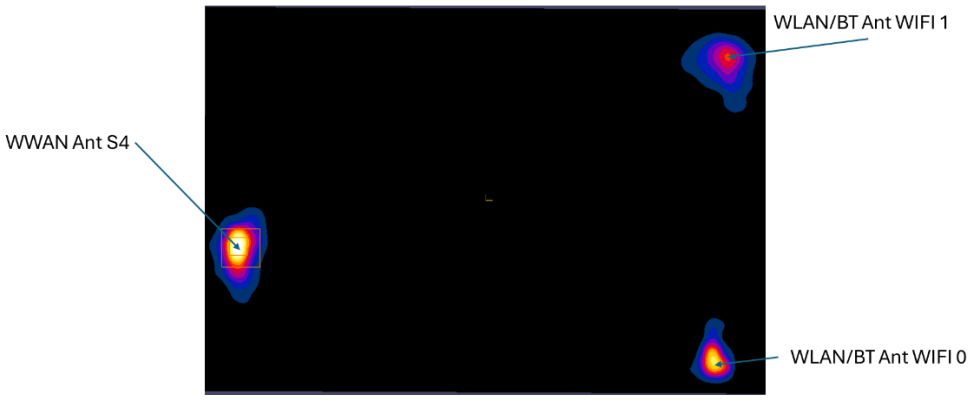

Figure E-2
Tablet Back Side Antenna S4 SAR to Peak Location Separation Ratio Plot

Notes:

1. For all combinations where the sum of WWAN+WLAN+BT is less than 1, there's no further analysis required for compliance demonstration.

2. No evaluation was performed to determine the aggregate 1g SAR for these configurations as the SPLS ratio between the antenna pairs was not greater than 0.02 per FCC 447498 D04v01. Please see the Highest Reported SAR and Hotspot Location Section for axis peak locations.

E.5 Tablet NR Simultaneous Analysis

Table E-6
NR Highest Adjusted Ratio to Limit

	Configuration	NR SAR (W/kg)						Max NR
		M1	S2	S4	M2	S3	S1	
Body	Back	0.699	0.481	0.546	0.450	0.452	0.713	0.713
	Top	0.867	0.400*	0.400*	0.400*	0.115	0.400*	0.867
	Bottom	0.400*	0.734	0.477	0.193	0.400*	0.167	0.734
	Right	0.706	0.526	0.068	0.011	0.000	0.344	0.706
	Left	0.476	0.053	0.184	0.535	0.890	0.001	0.890

	Configuration	NR Ratio to Limit								Max NR Ratio to Limit
		M1	S2	S4	M2	S3	S1	K	L	
Body	Back	0.437	0.301	0.341	0.281	0.283	0.446	0.047	0.436	0.446
	Front	-	-	-	-	-	-	0.776	0.040	0.776
	Top	0.542	0.250	0.250	0.250	0.072	0.250	0.048	0.008	0.542
	Bottom	0.250	0.459	0.298	0.121	0.250	0.104	0.010	0.218	0.459
	Right	0.441	0.329	0.043	0.007	0.000	0.215	0.564	0.099	0.564
	Left	0.298	0.033	0.115	0.334	0.556	0.001	0.007	0.002	0.556

* When the antenna separation distance was > 50 mm, an estimated SAR of 0.4 W/kg was used to determine the simultaneous transmission SAR exclusion for test positions excluded per FCC KDB Publication 447498 D01v06

Table E-7
Simultaneous Transmission Scenarios of WLAN/BT when NR Active

Configuration	2.4 GHz WLAN Ant WiFi 0 SAR (W/kg)	2.4 GHz WLAN Ant WiFi 0 at 11 dBm SAR (W/kg)	2.4 GHz WLAN Ant WiFi 1 SAR (W/kg)	2.4 GHz WLAN Ant WiFi 1 at 11 dBm SAR (W/kg)	2.4 GHz WLAN Ant WiFi 1 at 9 dBm SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	2.4 GHz WLAN MIMO at 14 dBm SAR (W/kg)	2.4 GHz WLAN MIMO at 12 dBm SAR (W/kg)	5 GHz WLAN Ant WiFi 0 SAR (W/kg)	5 GHz WLAN Ant WiFi 0 at 7 dBm SAR (W/kg)	5 GHz WLAN Ant WiFi 1 SAR (W/kg)	5 GHz WLAN Ant WiFi 1 at 7 dBm SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	5 GHz WLAN MIMO at 10 dBm SAR (W/kg)	5 GHz WLAN MIMO at 8.5 dBm SAR (W/kg)	6 GHz WLAN Ant WiFi 0 SAR (W/kg)	6 GHz WLAN Ant WiFi 0 at 5.5 dBm SAR (W/kg)	6 GHz WLAN Ant WiFi 1 SAR (W/kg)	6 GHz WLAN Ant WiFi 1 at 5.5 dBm SAR (W/kg)	6 GHz WLAN MIMO SAR (W/kg)	6 GHz WLAN MIMO at 8.5 dBm SAR (W/kg)	6 GHz WLAN MIMO at 4.5 dBm SAR (W/kg)	2.4 GHz Bluetooth Ant WiFi 0 SAR (W/kg)	2.4 GHz Bluetooth Ant WiFi 0 at 6.5 dBm SAR (W/kg)	2.4 GHz Bluetooth Ant WiFi 1 SAR (W/kg)	2.4 GHz Bluetooth Ant WiFi 1 at 6.5 dBm SAR (W/kg)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Back	0.079	0.421	0.086	0.396	0.259	0.105	0.427	0.297	0.087	0.646	0.096	0.307	0.106	0.651	0.382	0.015	0.709	0.005	0.129	0.013	0.816	0.468	0.020	0.153	0.029	0.135
Top	0.051	0.209	0.073	0.213	0.175	0.094	0.235	0.203	0.074	0.096	0.094	0.123	0.093	0.114	0.107	0.009	0.025	0.007	0.023	0.006	0.048	0.048*	0.012	0.059	0.021	0.067
Bottom	0.044	0.044*	0.107	0.107*	0.107*	0.155	0.155*	0.155*	0.019	0.019*	0.079	0.079*	0.087	0.087*	0.087*	0.005	0.005*	0.000	0.000*	0.000	0.000*	0.000*	0.017	0.017*	0.035	0.035*
Right	0.009	0.009*	0.207	0.471	0.274	0.240	0.571	0.360	0.014	0.014*	0.283	0.478	0.247	0.523	0.334	0.001	0.001*	0.013	0.222	0.010	0.377	0.110	0.000	0.000*	0.079	0.150
Left	0.146	0.248	0.005	0.005*	0.005*	0.138	0.241	0.192	0.272	0.634	0.005	0.005*	0.222	0.675	0.493	0.034	0.167	0.002	0.002*	0.028	0.447	0.157	0.025	0.081	0.001	0.001*

Configuration	2.4 GHz WLAN Ant WiFi 0 Ratio to Limit	2.4 GHz WLAN Ant WiFi 0 at 11 dBm Ratio to Limit	2.4 GHz WLAN Ant WiFi 1 Ratio to Limit	2.4 GHz WLAN Ant WiFi 1 at 11 dBm Ratio to Limit	2.4 GHz WLAN Ant WiFi 1 at 9 dBm Ratio to Limit	2.4 GHz WLAN MIMO Ratio to Limit	2.4 GHz WLAN MIMO at 14 dBm Ratio to Limit	2.4 GHz WLAN MIMO at 12 dBm Ratio to Limit	5 GHz WLAN Ant WiFi 0 Ratio to Limit	5 GHz WLAN Ant WiFi 0 at 7 dBm Ratio to Limit	5 GHz WLAN Ant WiFi 1 Ratio to Limit	5 GHz WLAN Ant WiFi 1 at 7 dBm Ratio to Limit	5 GHz WLAN MIMO Ratio to Limit	5 GHz WLAN MIMO at 10 dBm Ratio to Limit	5 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	6 GHz WLAN Ant WiFi 0 Ratio to Limit	6 GHz WLAN Ant WiFi 0 at 5.5 dBm Ratio to Limit	6 GHz WLAN Ant WiFi 1 Ratio to Limit	6 GHz WLAN Ant WiFi 1 at 5.5 dBm Ratio to Limit	6 GHz WLAN MIMO Ratio to Limit	6 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	6 GHz WLAN MIMO at 4.5 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WiFi 0 Ratio to Limit	2.4 GHz Bluetooth Ant WiFi 0 at 6.5 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WiFi 1 Ratio to Limit	2.4 GHz Bluetooth Ant WiFi 1 at 6.5 dBm Ratio to Limit
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Back	0.049	0.263	0.054	0.248	0.162	0.066	0.267	0.186	0.054	0.404	0.060	0.192	0.066	0.407	0.239	0.009	0.443	0.003	0.081	0.008	0.510	0.293	0.013	0.096	0.018	0.084
Top	0.032	0.131	0.046	0.133	0.109	0.059	0.147	0.127	0.046	0.060	0.059	0.077	0.058	0.071	0.067	0.006	0.016	0.004	0.014	0.004	0.030	0.030*	0.008	0.037	0.013	0.042
Bottom	0.028	0.028*	0.067	0.067*	0.067*	0.097	0.097*	0.097*	0.012	0.012*	0.049	0.049*	0.054	0.054*	0.054*	0.003	0.003*	0.000	0.000*	0.000	0.000*	0.000*	0.011	0.011*	0.022	0.022*
Right	0.006	0.006*	0.129	0.294	0.171	0.150	0.357	0.225	0.009	0.009*	0.177	0.299	0.154	0.327	0.209	0.001	0.001*	0.008	0.139	0.006	0.236	0.069	0.000	0.000*	0.049	0.094
Left	0.091	0.155	0.003	0.003*	0.003*	0.086	0.151	0.120	0.170	0.396	0.003	0.003*	0.139	0.422	0.308	0.021	0.104	0.001	0.001*	0.018	0.279	0.098	0.016	0.051	0.001	0.001*

Configuration	2.4 GHz Bluetooth Ant WiFi 1 at 6.5 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WiFi 1 at 6.5 dBm + 6 GHz WLAN MIMO at 4.5 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WiFi 1 at 6.5 dBm + 5 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WiFi 0 at 6.5 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WiFi 0 at 6.5 dBm + 6 GHz WLAN MIMO at 4.5 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WiFi 0 at 6.5 dBm + 5 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	2.4 GHz WLAN MIMO at 12 dBm + 6 GHz WLAN MIMO at 4.5 dBm Ratio to Limit	2.4 GHz WLAN MIMO at 12 dBm + 5 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	2.4 GHz WLAN MIMO at 12 dBm Ratio to Limit	5 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	6 GHz WLAN MIMO at 4.5 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WiFi 0 at 6.5 dBm + 2.4 GHz WLAN Ant WiFi 1 at 9 dBm + 5 GHz WLAN MIMO at 8.5 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WiFi 0 at 6.5 dBm + 2.4 GHz WLAN Ant WiFi 1 at 9 dBm + 6 GHz WLAN MIMO at 4.5 dBm Ratio to Limit	2.4 GHz Bluetooth Ant WiFi 0 at 6.5 dBm + 2.4 GHz WLAN Ant WiFi 1 at 9 dBm Ratio to Limit	2.4 GHz WLAN Ant WiFi 0 at 11 dBm Ratio to Limit	2.4 GHz WLAN Ant WiFi 1 at 9 dBm Ratio to Limit	5 GHz WLAN Ant WiFi 0 at 7 dBm Ratio to Limit	5 GHz WLAN Ant WiFi 1 at 7 dBm Ratio to Limit	6 GHz WLAN Ant WiFi 0 at 5.5 dBm Ratio to Limit	6 GHz WLAN Ant WiFi 1 at 5.5 dBm Ratio to Limit	WLAN/BT Worst-case Combination with NR Active Ratio to Limit
	26	26+22	26+15	24	24+22	24+15	8+22	8+15	8	15	22	24+5+15	24+5+22	24+5	2	5	10	12	17	19	
Back	0.084	0.377	0.323	0.096	0.388	0.334	0.478	0.424	0.186	0.239	0.293	0.496	0.550	0.258	0.263	0.162	0.404	0.192	0.443	0.081	0.550
Top	0.042	0.072	0.109	0.037	0.067	0.104	0.157	0.194	0.127	0.067	0.030	0.213	0.176	0.146	0.131	0.109	0.060	0.077	0.016	0.014	0.213
Bottom	0.022	0.022	0.076	0.011	0.011	0.065	0.097	0.151	0.097	0.054	0.000	0.132	0.078	0.078	0.028	0.067	0.012	0.049	0.003	0.000	0.151
Right	0.094	0.163	0.303	0.000	0.089	0.209	0.294	0.434	0.225	0.209	0.069	0.380	0.240	0.171	0.006	0.171	0.009	0.299	0.001	0.139	0.434
Left	0.001	0.099	0.309	0.051	0.149	0.359	0.218	0.428	0.120	0.308	0.098	0.362	0.152	0.054	0.155	0.003	0.396	0.003	0.104	0.001	0.428

Note: Front side WLAN/BT was excluded per FCC KDB Publication 616217 D04v01r01.

Table E-8
NR Simultaneous Sums

	Configuration	NR Ratio to Limit	WLAN/BT Worst-case Combination with NR Active Ratio to Limit	NR SAR + WLAN/BT with NR Active Ratio to Limit
Body	Back	0.446	0.550	**0.996**
	Front	0.776	-	0.776
	Top	0.542	0.213	0.755
	Bottom	0.459	0.151	0.610
	Right	0.564	0.434	0.998
	Left	0.556	0.428	0.984

E.6 Laptop Simultaneous Analysis

Table E-9
UMTS/LTE Highest Adjusted SAR and Ratio to Limit

Laptop SAR	Configuration	UMTS/LTE SAR (W/kg)			UMTS/LTE Max SAR (W/kg)
		M1	S2	S4	
	Bottom	0.277	0.141	0.402	0.402
Laptop	Configuration	UMTS/LTE Ratio to Limit			UMTS/LTE Max Ratio to Limit
		M1	S2	S4	
	Bottom	0.173	0.088	0.251	0.251

Table E-10
NR Highest Adjusted SAR and Ratio to Limit

Laptop	Configuration	NR SAR (W/kg)						Max NR
		M1	S2	S4	M2	S3	S1	
	Bottom	0.263	0.018	0.154	0.264	0.245	0.000	0.264
Laptop	Configuration	NR Ratio to Limit						Max NR
		M1	S2	S4	M2	S3	S1	
	Bottom	0.164	0.011	0.096	0.165	0.153	0.000	0.165

Table E-11
Simultaneous Transmission Scenarios of WLAN/BT

Configuration	2.4 GHz WLAN Ant WIFI 0 SAR (W/kg)	2.4 GHz WLAN Ant WIFI 1 SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	5 GHz WLAN Ant WIFI 0 SAR (W/kg)	5 GHz WLAN Ant WIFI 1 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	6 GHz WLAN Ant WIFI 0 SAR (W/kg)	6 GHz WLAN Ant WIFI 1 SAR (W/kg)	6 GHz WLAN MIMO SAR (W/kg)	2.4 GHz Bluetooth Ant WIFI 0 SAR (W/kg)	2.4 GHz Bluetooth Ant WIFI 1 SAR (W/kg)
	1	2	3	4	5	6	7	8	9	10	11
Bottom	0.157	0.005	0.191	0.373	0.054	0.371	0.157	0.015	0.415	0.075	0.000
Configuration	2.4 GHz WLAN Ant WIFI 0 Ratio to Limit	2.4 GHz WLAN Ant WIFI 1 Ratio to Limit	2.4 GHz WLAN MIMO Ratio to Limit	5 GHz WLAN Ant WIFI 0 Ratio to Limit	5 GHz WLAN Ant WIFI 1 Ratio to Limit	5 GHz WLAN MIMO Ratio to Limit	6 GHz WLAN Ant WIFI 0 Ratio to Limit	6 GHz WLAN Ant WIFI 1 Ratio to Limit	6 GHz WLAN MIMO Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 1 Ratio to Limit
	1	2	3	4	5	6	7	8	9	10	11
Bottom	0.098	0.003	0.119	0.233	0.034	0.232	0.098	0.009	0.259	0.047	0.000

Configuration	2.4 GHz Bluetooth Ant WIFI 1 Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 1 + 6 GHz WLAN MIMO Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 1 + 5 GHz WLAN MIMO Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 + 6 GHz WLAN MIMO Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 + 5 GHz WLAN MIMO Ratio to Limit	2.4 GHz WLAN MIMO + 6 GHz WLAN MIMO Ratio to Limit	2.4 GHz WLAN MIMO + 5 GHz WLAN MIMO Ratio to Limit	2.4 GHz WLAN MIMO Ratio to Limit	6 GHz WLAN MIMO Ratio to Limit	5 GHz WLAN MIMO Ratio to Limit	2.4 GHz Bluetooth Ant WIFI 0 + 2.4 GHz WLAN Ant WIFI 1 + 5 GHz WLAN MIMO Ratio	2.4 GHz Bluetooth Ant WIFI 0 + 2.4 GHz WLAN Ant WIFI 1 + 6 GHz WLAN MIMO Ratio	2.4 GHz Bluetooth Ant WIFI 0 + 2.4 GHz WLAN Ant WIFI 1 Ratio to Limit	2.4 GHz WLAN Ant WIFI 0 Ratio to Limit	2.4 GHz WLAN Ant WIFI 1 Ratio to Limit	5 GHz WLAN Ant WIFI 0 Ratio to Limit	5 GHz WLAN Ant WIFI 1 Ratio to Limit	6 GHz WLAN Ant WIFI 0 Ratio to Limit	6 GHz WLAN Ant WIFI 1 Ratio to Limit	WLAN/BT Worst-case Combination Ratio to Limit
	11	11+9	11+6	10	10+9	10+6	3+9	3+6	3	9	6	10+2+6	10+2+9	10+2	1	2	4	5	7	8	
Bottom	0.000	0.259	0.232	0.047	0.306	0.279	0.379	0.351	0.119	0.259	0.232	0.282	0.309	0.050	0.098	0.003	0.233	0.034	0.098	0.009	0.379

Table E-12
Simultaneous Sums

Laptop	Configuration	UMTS/LTE Ratio to Limit	NR Ratio to Limit	WLAN/BT Worst-case Combination Ratio to Limit	UMTS/LTE + WLAN/BT Ratio to Limit	NR + WLAN/BT Ratio to Limit
	Bottom	0.251	0.165	0.379	0.630	0.544

E.7 Highest Reported SAR, Exposure Ratio, and SAR Hotspot Locations

Table E-13
Tablet Back Side Peak Coordinates

Mode/Band	Antenna	x (mm)	y (mm)	Reported SAR (W/kg)	SAR/SAR Limit (ER)
LTE Band 66 (AWS)	S2	-28.50	-142.50	0.763	0.477
LTE Band 25 (PCS)	S2	-30.00	-136.50	0.768	0.48
LTE Band 30	S2	-30.00	-140.00	0.498	0.311
LTE Band 7	S2	-31.00	-139.00	0.633	0.396
LTE Band 48	S4	29.00	-139.00	0.908	0.568
2.4 GHz WLAN	WIFI 1	-81.00	136.00	0.259	0.162
5 GHz WLAN MIMO (Peak 1)	MIMO	89.00	119.00	0.651	0.407
5 GHz WLAN MIMO (Peak 2)	MIMO	-80.00	129.00	0.406	0.254
6 GHz WLAN MIMO (Peak 1)	MIMO	90.90	128.40	0.816	0.51
6 GHz WLAN MIMO (Peak 2)	MIMO	-77.40	135.20	0.136	0.085
2.4 GHz Bluetooth	WIFI 0	97.00	130.00	0.153	0.096
2.4 GHz Bluetooth	WIFI 1	-80.00	137.00	0.135	0.084
6 GHz WLAN MIMO (Peak 1) + Bluetooth Ant WIFI 0 Co-Located	WIFI 0	90.90	128.40	0.969	0.606
6 GHz WLAN MIMO (Peak 2) + 2.4 GHz WLAN Ant WIFI 1 Co-Located	WIFI 1	-77.40	135.20	0.322	0.201
5 GHz WLAN MIMO (Peak 1) + Bluetooth Ant WIFI 0 Co-Located	WIFI 0	89.00	119.00	0.804	0.503
5 GHz WLAN MIMO (Peak 2) + Bluetooth Ant WIFI 1 Co-Located	WIFI 1	-80.00	129.00	0.541	0.338
2.4 GHz WLAN MIMO (Peak 1)	MIMO	97.00	130.00	0.264	0.165
2.4 GHz WLAN MIMO (Peak 2)	MIMO	-79.00	138.00	0.297	0.186
6 GHz WLAN MIMO (Peak 1) + 2.4 GHz WLAN MIMO (Peak 1) Co-Located	WIFI 0	90.90	128.40	0.732	0.458
6 GHz WLAN MIMO (Peak 2) + 2.4 GHz WLAN MIMO (Peak 2) Co-Located	WIFI 1	-77.40	135.20	0.360	0.225
5 GHz WLAN MIMO (Peak 2) + 2.4 GHz WLAN Ant WIFI 1 Co-Located	WIFI 1	-80.00	129.00	0.490	0.306
WIFI 6 GHz WLAN	WIFI 1	-77.40	135.20	0.709	0.443

E.8 Conclusion

The above numerical summed TER results and SPLSR are sufficient to show that simultaneous transmission cases will not exceed the SAR and PD limit and therefore no further analysis is required per FCC KDB Publication 447498 D04v01 and IEEE 1528- 2013 Section 6.3.4.1.