

APPENDIX E: SIMULTANEOUS NUMERICAL CALCULATIONS

E.1 Introduction

The standalone reported SAR and antenna group separation distances in the original filing were used to determine simultaneous transmission compliance as they are more conservative. Please see the original filing for complete evaluation of simultaneous transmission analysis and standalone reported SAR for modes and bands not evaluated for this permissive change.




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 4.3.2 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.

Per FCC KDB Publication 941225 D06v02r01, the devices edges with antennas more than 2.5 cm from edge are not required to be evaluated for SAR (“-“).

This device is enabled with Qualcomm® Smart Transmit Gen2 with pre-defined sub6 antenna groups (AG0 and AG1). Simultaneous transmission analysis is performed per antenna groups. Appendix D contains analysis to demonstrate the AG0 and AG1 are operate mutually exclusive. Additional analysis is provided below to show compliance between AG0 and BT/WLAN and AG1 and BT/WLAN.

When operating in the same antenna group, Qualcomm Smart Transmit algorithm in WWAN directly adds the time-averaged RF exposure from 4G and time-averaged RF exposure from 5G NR. Smart Transmit algorithm controls the total RF exposure from both 4G and 5G NR to not exceed FCC limit. Therefore, simultaneous transmission compliance between 4G+5G operations within an antenna group is demonstrated in the Part 2 Report during algorithm validation.

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Test Dates: 10/25/21 - 11/1/21	DUT Type: Portable Handset			APPENDIX E: Page 1 of 2

E.3 Head Simultaneous Transmission Analysis

Table E-1
Simultaneous Transmission Scenario with WLAN/BT (Held to Ear)

	Configuration	AG1	WLAN/BT Worst-case Combination	AG1 + WLAN/BT
Head SAR	Right Cheek	0.945	0.303	1.248
	Right Tilt	0.850	0.202	1.052
	Left Cheek	1.049	0.257	1.306
	Left Tilt	1.186	0.052	1.238

E.4 Phablet Simultaneous Transmission Analysis

For SAR summation, the highest reported SAR across all test distances was used as the most conservative evaluation for simultaneous transmission analysis for each device edge.

Per FCC KDB Publication 648474 D04 Handset SAR, Phablet SAR tests were not required if wireless router 1g SAR (scaled to the maximum output power, including tolerance) < 1.2 W/kg. Therefore, no further analysis beyond the tables included in this section was required to determine that possible simultaneous transmission scenarios would not exceed the SAR limit.

Table E-2
Simultaneous Transmission Scenarios with WLAN/BT (Phablet Max DSI= 0)




	Configuration	AG1	WLAN/BT Worst-case Combination	AG1 + WLAN/BT
Phablet SAR	Back	1.716	1.303	3.019
	Front	0.000	0.535	0.535
	Top	3.144	0.072	3.216
	Bottom	0.000	-	0.000
	Right	0.000	-	0.000
	Left	2.719	0.518	3.237

Table E-3
Simultaneous Transmission Scenarios with WLAN/BT (Phablet Reduced DSI= 1)

	Configuration	AG1	WLAN/BT Worst-case Combination	AG1 + WLAN/BT
Phablet SAR	Back	1.716	1.303	3.019
	Front	0.000	0.535	0.535
	Top	3.144	0.072	3.216
	Bottom	0.000	-	0.000
	Right	0.000	-	0.000
	Left	2.719	0.518	3.237

E.5 Simultaneous Transmission Conclusion

The above numerical summed SAR results are sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v06 and IEEE 1528- 2013 Section 6.3.4.1.

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