APPENDIX E: MULTI-TX AND ANTENNA SAR CONSIDERATIONS

E.1 Introduction

The following procedures adopted from FCC KDB Publication 447498 D04v01 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 D04v01 and IEC/IEEE 62209-1528:2020 Section 7.4.4, 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. Alternatively, simultaneous transmission SAR test exclusion may be evaluated using Total Exposure Ratio (TER). The different test positions in an exposure condition may be considered collectively to determine SAR test exclusion according to the sum of 1g SAR.

This device is enabled with Qualcomm® FastConnect Time Average SAR with pre-defined antenna groups (AG0 and AG1) for WLAN. Simultaneous transmission analysis is performed per antenna groups. Below analysis demonstrates the mutually exclusive operation of AG0 and AG1 and the compliance between each antenna group and BT/NFC.

Qualcomm FastConnect TAS algorithm directly adds the time-averaged RF exposure of all simultaneous transmissions of WLAN radios within an antenna group and controls the total RF exposure from all WLAN radios to not exceed FCC limit. Therefore, simultaneous transmission compliance between WLAN operations is demonstrated in the Part 2 Report during algorithm validation.

Table E-1
Worst Case Per Exposure Condition

SAR (W/kg)	
Laptop	Tablet
< 0.1	1.59

E.3 Conclusion

Detailed numerical summed SAR results for all the combinations of antenna groups and external radios are demonstrated in the “FCC Proprietary Analysis for Multi-Tx and Antenna SAR considerations” document and worst-case Simultaneous Tx reported SAR for each exposure condition are reported on SAR summary table on page 1 of SAR RF Exposure Part 1 Test Report (Report SN: 1M2311170118-01.C3K). All results are sufficient to show that AG0 is mutually exclusive from AG1 and that simultaneous transmission cases will not exceed the SAR limit and therefore no more measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v06 and IEEE 1528- 2013 Section 6.3.4.1.