



NEAR-FIELD POWER DENSITY EVALUATION REPORT

Applicant Name

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06/27/2023

Test Site/Location

Element, Columbia, MD, USA

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A3LSMF731U

APPLICANT:

SAMSUNG ELECTRONICS CO., LTD.

DUT Type:

Portable Handset

Application Type:

Class II Permissive Change

FCC Rule Part(s):

CFR §2.1093

Model:


SM-F731U

Additional Model(s):

SM-F731U1

Total Exposure Ratio	0.989
Verdict	PASS

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. Test results reported herein relate only to the item(s) tested.



RJ Ortanez
Executive Vice President



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1 DEVICE UNDER TEST

1.1 NR FR2 Checklist

NR FR2 Operations Information	
Form Factor	Portable Handset
Subcarrier Spacing (kHz)	120
Total Number of Supported Uplink CCs (SISO)	2
Total Number of Supported Uplink CCs (MIMO)	2
Total Number of Supported DL CCs	8
CP-OFDM Modulations Supported in UL	QPSK, 16QAM, 64QAM
DFT-s-OFDM Modulations Supported in UL	PI/2 BPSK, QPSK, 16QAM, 64QAM
LTE Anchor Bands	n258: 2/5/12/14/30/66, n261: 2/5/12/13/48/66, n260: 2/5/12/13/14/30/48/66
NR FR1 Anchor Bands	n258: 2/5/12/25/30/41/66, n261: 2/5/25/41/48/66/77, n260: 2/5/12/25/30/41/48/66/77
Duplex Type (mmWave)	TDD

NR FR2 Channels & Frequencies							
NR Band	Bandwidth (MHz)	Low		Mid		High	
		Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
n258	100	2018333	24350.04	2025833	24800.04	2032499	25200.00
n258	50	2018333	24350.04	2025833	24800.04	2032915	25224.96
n261	100	2071667	27550.08	2077915	27924.96	2084165	28299.96
n261	50	2071249	27525.00	2077915	27924.96	2084581	28324.92
n260	100	2229999	37050.00	2254165	38499.96	2278331	39949.92
n260	50	2229599	37026.00	2254165	38499.96	2278749	39975.00

1.2 Time-Averaging Algorithm for RF Exposure Compliance

The device is enabled with Qualcomm® Smart Transmit GEN1 feature. This feature performs time averaging algorithm in real time to control and manage transmitting power and ensure the time-averaged RF exposure is in compliance with FCC requirements all the time. Refer to Compliance Summary document for detailed description of Qualcomm® Smart Transmit.

The Smart Transmit algorithm maintains the time-averaged transmit power, in turn, time-averaged RF exposure of *SAR_design_target* or *PD_design_target*, below the predefined time-averaged power limit (i.e., P_{limit} for sub-6 radio, and *input.power.limit* for 5G mmW NR), for each characterized technology and band (see RF Exposure Part 0 Test Report).

Smart Transmit allows the device to transmit at higher power instantaneously when needed, but manages power limiting to maintain time-averaged transmit power to *input.power.limit*.

The purpose of this report (Part 1 test) is to demonstrate that the EUT meets FCC PD limits when transmitting in static transmission scenario at maximum allowable time-averaged power level given by *input.power.limit*.

1.3 Power Density Design Target and Uncertainty

Power Density Design Specifications	
<i>PD_design_target</i> (mW/m ²)	0.631
Design Related Total Uncertainty (dB)	2

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1.4 Input Power Specifications

When input.power.limit is calculated to be above the maximum input power, the device is limited to the maximum input power.

Table 1-1
5G mmWave NR n258 Antenna K Patch input.power.limit

Band	Beam ID 1	Beam ID 2	input.power.limit
n258	0	-	8.3
n258	1	-	10.6
n258	2	-	9.4
n258	3	-	9.0
n258	4	-	9.4
n258	5	-	5.3
n258	6	-	5.3
n258	7	-	7.4
n258	8	-	6.9
n258	9	-	4.9
n258	10	-	5.3
n258	11	-	6.7
n258	12	-	1.2
n258	13	-	1.6
n258	14	-	1.5
n258	15	-	1.8
n258	16	-	2.8
n258	17	-	1.1
n258	18	-	2.0
n258	19	-	1.2
n258	20	-	3.0
n258	-	128	13.5
n258	-	129	10.8
n258	-	130	11.9
n258	-	131	11.4
n258	-	132	12.1
n258	-	133	9.1
n258	-	134	9.0
n258	-	135	8.5
n258	-	136	8.2
n258	-	137	8.2
n258	-	138	8.6
n258	-	139	8.9
n258	-	140	5.6
n258	-	141	5.7
n258	-	142	4.0
n258	-	143	3.2
n258	-	144	5.2
n258	-	145	5.9
n258	-	146	5.6
n258	-	147	3.2
n258	-	148	3.5
n258	0	128	5.9
n258	1	129	7.4
n258	2	130	6.7
n258	3	131	6.2
n258	4	132	6.9
n258	5	133	3.1
n258	6	134	4.1
n258	7	135	4.3
n258	8	136	4.0
n258	9	137	2.9
n258	10	138	2.9
n258	11	139	4.3
n258	12	140	-0.4
n258	13	141	-0.6
n258	14	142	-1.2
n258	15	143	-1.4
n258	16	144	-0.3
n258	17	145	-0.8
n258	18	146	-0.2
n258	19	147	-1.7
n258	20	148	-0.6

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**Table 1-2
5G mmWave NR n261 Antenna K Patch input.power.limit**

Band	Beam ID 1	Beam ID 2	input.power.limit
n261	0	-	7.5
n261	1	-	9.0
n261	2	-	8.4
n261	3	-	7.5
n261	4	-	7.9
n261	5	-	5.2
n261	6	-	4.8
n261	7	-	5.7
n261	8	-	6.7
n261	9	-	5.0
n261	10	-	5.7
n261	11	-	5.4
n261	12	-	1.5
n261	13	-	1.5
n261	14	-	1.4
n261	15	-	1.5
n261	16	-	2.4
n261	17	-	1.2
n261	18	-	1.5
n261	19	-	1.3
n261	20	-	1.8
n261	-	128	10.3
n261	-	129	8.9
n261	-	130	8.9
n261	-	131	8.6
n261	-	132	9.3
n261	-	133	6.6
n261	-	134	6.4
n261	-	135	6.1
n261	-	136	6.3
n261	-	137	6.1
n261	-	138	5.6
n261	-	139	5.8
n261	-	140	4.5
n261	-	141	2.2
n261	-	142	2.2
n261	-	143	1.5
n261	-	144	2.2
n261	-	145	2.8
n261	-	146	1.8
n261	-	147	1.8
n261	-	148	1.8
n261	0	128	5.0
n261	1	129	4.7
n261	2	130	4.8
n261	3	131	4.4
n261	4	132	5.0
n261	5	133	2.4
n261	6	134	1.7
n261	7	135	1.7
n261	8	136	2.3
n261	9	137	2.0
n261	10	138	3.1
n261	11	139	2.1
n261	12	140	-1.2
n261	13	141	-1.6
n261	14	142	-2.0
n261	15	143	-2.6
n261	16	144	-2.0
n261	17	145	-2.0
n261	18	146	-2.0
n261	19	147	-2.5
n261	20	148	-2.4

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Table 1-3
5G mmWave NR n260 Antenna K Patch input.power.limit

Band	Beam ID 1	Beam ID 2	input.power.limit
n260	0	-	9.9
n260	1	-	10.1
n260	2	-	9.7
n260	3	-	10.2
n260	4	-	9.4
n260	5	-	6.4
n260	6	-	7.0
n260	7	-	7.8
n260	8	-	6.9
n260	9	-	6.6
n260	10	-	7.6
n260	11	-	6.9
n260	12	-	3.3
n260	13	-	2.9
n260	14	-	3.9
n260	15	-	4.3
n260	16	-	3.7
n260	17	-	3.0
n260	18	-	3.4
n260	19	-	4.3
n260	20	-	3.6
n260	-	128	10.8
n260	-	129	9.5
n260	-	130	8.9
n260	-	131	9.0
n260	-	132	8.9
n260	-	133	6.7
n260	-	134	6.4
n260	-	135	6.5
n260	-	136	5.6
n260	-	137	5.9
n260	-	138	6.6
n260	-	139	6.1
n260	-	140	2.8
n260	-	141	2.6
n260	-	142	2.8
n260	-	143	2.6
n260	-	144	2.9
n260	-	145	2.2
n260	-	146	2.9
n260	-	147	2.8
n260	-	148	2.5
n260	0	128	6.7
n260	1	129	6.3
n260	2	130	5.8
n260	3	131	6.1
n260	4	132	5.6
n260	5	133	3.3
n260	6	134	3.3
n260	7	135	3.8
n260	8	136	2.5
n260	9	137	3.5
n260	10	138	3.6
n260	11	139	3.8
n260	12	140	-0.8
n260	13	141	-0.7
n260	14	142	0.4
n260	15	143	-0.3
n260	16	144	-1.1
n260	17	145	-0.8
n260	18	146	-0.5
n260	19	147	-0.3
n260	20	148	-0.7

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1.5 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D01v06, transmitters are considered to be operating simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds.

This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according to FCC KDB Publication 447498 D01v06 4.3.2 procedures.

**Table 1-4
Simultaneous Transmission**

No.	Capable Transmit Configuration	Head	Body-worn	Wireless Router	Phablet	Notes
1	LTE + 5G NR FR2	Yes	Yes	N/A	Yes	
2	LTE + 2.4 GHz WLAN MIMO + 5G NR FR2	Yes	Yes	Yes	Yes	
3	LTE + Bluetooth Ant 1 + 5G NR FR2	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
4	LTE + 5 GHz WLAN MIMO + 5G NR FR2	Yes	Yes	Yes	Yes	
5	LTE + Bluetooth Ant 1 + 2.4 GHz WLAN Ant 2 + 5G NR FR2	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
6	LTE + Bluetooth Ant 1 + 5 GHz WLAN MIMO + 5G NR FR2	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
7	LTE + Bluetooth Ant 2 + 5 GHz WLAN MIMO + 5G NR FR2	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
8	LTE + Bluetooth Ant 1 + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN MIMO + 5G NR FR2	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
9	LTE + 2.4 GHz WLAN MIMO + 5 GHz WLAN MIMO + 5G NR FR2	Yes	Yes	Yes	Yes	
10	5G NR FR1 + 5G NR FR2	Yes	Yes	N/A	Yes	
11	5G NR FR1 + 2.4 GHz WLAN MIMO + 5G NR FR2	Yes	Yes	Yes	Yes	
12	5G NR FR1 + Bluetooth Ant 1 + 5G NR FR2	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
13	5G NR FR1 + 5 GHz WLAN MIMO + 5G NR FR2	Yes	Yes	Yes	Yes	
14	5G NR FR1 + Bluetooth Ant 1 + 2.4 GHz WLAN Ant 2 + 5G NR FR2	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
15	5G NR FR1 + Bluetooth Ant 1 + 5 GHz WLAN MIMO + 5G NR FR2	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
16	5G NR FR1 + Bluetooth Ant 2 + 5 GHz WLAN MIMO + 5G NR FR2	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
17	5G NR FR1 + Bluetooth Ant 1 + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN MIMO + 5G NR FR2	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
18	5G NR FR1 + 2.4 GHz WLAN MIMO + 5 GHz WLAN MIMO + 5G NR FR2	Yes	Yes	Yes	Yes	

NOTE:

- NR antenna arrays cannot transmit simultaneously.
- LTE + 5G NR FR2 and 5G NR1 + 5G NR FR2 scenarios are limited to EN-DC combinations with anchor bands as shown in the NR FR2 checklist.
- This device supports time averaging smart transmit algorithm in WWAN. Smart transmit adds directly the time-averaged RF exposure from 4G/5G NR FR1 and time-averaged RF exposure from 5G mmW NR FR2 to ensure that the normalized RF exposure from 4G/5G NR FR1 and 5G mmW NR FR2 does not exceed FCC limit.
- NFC can transmit simultaneously with all scenarios above.
- 2.4 GHz WLAN ant 1 and 2.4 GHz Bluetooth ant 1 share the same antenna path and cannot transmit simultaneously.

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1.6 Guidance Applied

- November 2017, October 2018, April 2019, November 2019 TCBC Workshop Notes
- SPEAG DASY6 System Handbook
- IEC/IEEE 63195-1:2022
- FCC KDB 865664 D02 v01r04
- FCC KDB 447498 D01 v02r01

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2 TOTAL EXPOSURE RATIO

2.1 Total Exposure Ratio

**Table 2-1
5G mmW NR FR2 psPD - Open**

NR Band	Antenna	Surface	Evaluation Distance (mm)	Adjustment Factor due to Simulation	Adjusted Reported psPD (mW/cm ²)	Measured Total psPD (mW/cm ²)	Final Reported psPD (mW/cm ²)
n258	K	Back	2	0.779	0.619	-	0.619
n258	K	Front	2	0.654	0.519	-	0.519
n258	K	Top	2	0.106	0.084	-	0.084
n258	K	Bottom	2	0.016	0.013	-	0.013
n258	K	Right	2	0.049	0.039	-	0.039
n258	K	Left	2	1.000	0.794	0.478	0.794
n261	K	Back	2	0.577	0.458	-	0.458
n261	K	Front	2	0.720	0.572	-	0.572
n261	K	Top	2	0.070	0.056	-	0.056
n261	K	Bottom	2	0.014	0.011	-	0.011
n261	K	Right	2	0.034	0.027	-	0.027
n261	K	Left	2	1.000	0.794	0.520	0.794
n260	K	Back	2	0.708	0.562	-	0.562
n260	K	Front	2	0.675	0.536	-	0.536
n260	K	Top	2	0.056	0.044	-	0.044
n260	K	Bottom	2	0.024	0.019	-	0.019
n260	K	Right	2	0.055	0.044	-	0.044
n260	K	Left	2	1.000	0.794	0.620	0.794

Note: Adjusted factor is (simulated PD on desired exposure plane)/(PD on worst-surface at 2mm evaluation distance) out of all beams and out of all channels. See Power Density Simulation Report.

**Table 2-2
5G mmW NR FR2 psPD - Closed**

NR Band	Antenna	Surface	Evaluation Distance (mm)	Adjustment Factor due to Simulation	Adjusted Reported psPD (mW/cm ²)	Measured Total psPD (mW/cm ²)	Final Reported psPD (mW/cm ²)
n258	K	Back	2	0.411	0.326	-	0.326
n258	K	Front	2	0.818	0.650	-	0.650
n258	K	Top	2	0.123	0.098	-	0.098
n258	K	Bottom	2	0.079	0.063	-	0.063
n258	K	Right	2	0.062	0.049	-	0.049
n258	K	Left	2	1.000	0.794	0.426	0.794
n261	K	Back	2	0.462	0.367	-	0.367
n261	K	Front	2	0.560	0.445	-	0.445
n261	K	Top	2	0.124	0.098	-	0.098
n261	K	Bottom	2	0.086	0.068	-	0.068
n261	K	Right	2	0.039	0.031	-	0.031
n261	K	Left	2	1.000	0.794	0.549	0.794
n260	K	Back	2	0.332	0.264	-	0.264
n260	K	Front	2	0.752	0.597	-	0.597
n260	K	Top	2	0.195	0.155	-	0.155
n260	K	Bottom	2	0.066	0.052	-	0.052
n260	K	Right	2	0.038	0.030	-	0.030
n260	K	Left	2	1.000	0.794	0.592	0.794

Note: Adjusted factor is (simulated PD on desired exposure plane)/(PD on worst-surface at 2mm evaluation distance) out of all beams and out of all channels. See Power Density Simulation Report.

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Table 2-3
5G mmW NR FR2 Head Total Exposure Ratio - Open

	NR FR2	2.4 GHz WLAN Ant 2	2.4 GHz WLAN MIMO	Bluetooth Ant 1	Bluetooth Ant 2	5 GHz WLAN MIMO	6 GHz WLAN MIMO	NR FR2 + 2.4 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1	NR FR2 + Bluetooth Ant 2	NR FR2 + 5 GHz WLAN MIMO	NR FR2 + 6 GHz WLAN MIMO	NR FR2 + 2.4 GHz WLAN MIMO + 5 GHz WLAN MIMO	NR FR2 + 2.4 GHz WLAN MIMO + 6 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1 + 2.4 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1 + 5 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1 + 6 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1 + 2.4 GHz WLAN MIMO + 5 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1 + 2.4 GHz WLAN MIMO + 6 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 2 + 2.4 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 2 + 5 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 2 + 6 GHz WLAN MIMO
		Reported SAR	Reported SAR	Reported SAR	Reported SAR	Reported SAR	Reported SAR															
		18.0 dBm	15.0 dBm	6.0 dBm	9.0 dBm	15.0 dBm	0.0 dBm															
Applicable Limit	1	2	4	4	6	6	7	1+3	1+4	1+5	1+6	1+7	1+3+6	1+3+7	1+4+2	1+4+5	1+4+7	1+4+2+6	1+4+2+7	1+5+6	1+5+7	1+6+7
Reported Value	0.572	0.255	0.289	0.078	0.119	0.461	0.123	0.628	0.623	0.646	0.823	0.849	0.879	0.705	0.728	0.871	0.698	0.968	0.795	0.897	0.723	
Ratio to Limit	0.572	0.097	0.056	0.049	0.074	0.251	0.077	0.628	0.623	0.646	0.823	0.849	0.879	0.705	0.728	0.871	0.698	0.968	0.795	0.897	0.723	

Table 2-4
5G mmW NR FR2 Body-worn Total Exposure Ratio - Open

	NR FR2	2.4 GHz WLAN Ant 2	2.4 GHz WLAN MIMO	Bluetooth Ant 1	Bluetooth Ant 2	5 GHz WLAN MIMO	6 GHz WLAN MIMO	NR FR2 + 2.4 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1	NR FR2 + Bluetooth Ant 2	NR FR2 + 5 GHz WLAN MIMO	NR FR2 + 6 GHz WLAN MIMO	NR FR2 + 2.4 GHz WLAN MIMO + 5 GHz WLAN MIMO	NR FR2 + 2.4 GHz WLAN MIMO + 6 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1 + 2.4 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1 + 5 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1 + 6 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1 + 2.4 GHz WLAN MIMO + 5 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1 + 2.4 GHz WLAN MIMO + 6 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 2 + 2.4 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 2 + 5 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 2 + 6 GHz WLAN MIMO
		Reported SAR	Reported SAR	Reported SAR	Reported SAR	Reported SAR	Reported SAR															
		18.0 dBm	15.0 dBm	15.5 dBm	15.0 dBm	18.0 dBm	0.0 dBm															
Applicable Limit	1	2	4	4	6	6	7	1+3	1+4	1+5	1+6	1+7	1+3+6	1+3+7	1+4+2	1+4+5	1+4+7	1+4+2+6	1+4+2+7	1+5+6	1+5+7	1+6+7
Reported Value	0.572	0.244	0.281	0.087	0.084	0.105	0.018	0.622	0.648	0.640	0.722	0.830	0.735	0.645	0.676	0.750	0.660	0.778	0.687	0.743	0.602	
Ratio to Limit	0.572	0.099	0.071	0.020	0.021	0.020	0.021	0.622	0.648	0.640	0.722	0.830	0.735	0.645	0.676	0.750	0.660	0.778	0.687	0.743	0.602	

Table 2-5
5G mmW NR FR2 Hotspot Total Exposure Ratio - Open

	NR FR2	2.4 GHz WLAN Ant 2	2.4 GHz WLAN MIMO	Bluetooth Ant 1	5 GHz WLAN MIMO	NR FR2 + 2.4 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1	NR FR2 + 5 GHz WLAN MIMO	NR FR2 + 6 GHz WLAN MIMO	NR FR2 + 2.4 GHz WLAN MIMO + 5 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1 + 2.4 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1 + 5 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1 + 6 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1 + 2.4 GHz WLAN MIMO + 5 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1 + 2.4 GHz WLAN MIMO + 6 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 2 + 2.4 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 2 + 5 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 2 + 6 GHz WLAN MIMO
		Reported SAR	Reported SAR	Reported SAR	Reported SAR													
		18.0 dBm	15.0 dBm	15.5 dBm	18.0 dBm													
Applicable Limit	1	2	3	4	6	1+3	1+4	1+6	1+3+6	1+4+2	1+4+5	1+4+7	1+4+2+6	1+4+2+7	1+5+6	1+5+7	1+6+7	
Reported Value	0.619	0.125	0.033	0.030	0.134	0.640	0.638	0.703	0.723	0.716	0.722	0.800						
Ratio to Limit	0.619	0.078	0.021	0.019	0.084	0.640	0.638	0.703	0.723	0.716	0.722	0.800						
Front Side	Reported Value	0.572	0.167	0.046	0.022	0.053	0.601	0.586	0.605	0.634	0.690	0.619	0.723					
Top Edge	Reported Value	0.084	0.113	0.055	0.022	0.033	0.118	0.098	0.105	0.139	0.168	0.118	0.189					
Bottom Edge	Reported Value	0.019	0.000	0.000	0.000	0.000	0.019	0.019	0.019	0.019	0.019	0.019						
Right Edge	Reported Value	0.044	0.077	0.011	0.000	0.036	0.051	0.044	0.067	0.073	0.092	0.067	0.115					
Left Edge	Reported Value	0.044	0.048	0.007	0.000	0.023	0.051	0.044	0.067	0.073	0.092	0.067	0.115					
Ratio to Limit	0.794	0.000	0.046	0.126	0.119	0.823	0.873	0.868	0.897	0.873	0.947	0.947						
Ratio to Limit	0.794	0.000	0.029	0.079	0.074	0.823	0.873	0.868	0.897	0.873	0.947	0.947						

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**Table 2-6
5G mmW NR FR2 Phablet Total Exposure Ratio – Open**

		NR FR2	5 GHz WLAN MIMO Reported SAR	6 GHz WLAN MIMO Reported SAR	NR FR2 + 5 GHz WLAN MIMO	NR FR2 + 6 GHz WLAN MIMO
			14.0 dBm	0.0 dBm		
		mW/cm ²	W/kg	W/kg		
		1	2	3	1 + 2	1 + 3
Applicable Limit		1.0	4.0	4.0	1.0	1.0
Back Side	Reported Value	0.619	0.408	0.040		
	Ratio to Limit	0.619	0.102	0.010	0.721	0.629
Front Side	Reported Value	0.572	0.272	0.106		
	Ratio to Limit	0.572	0.068	0.027	0.640	0.599
Top Edge	Reported Value	0.084	0.228	0.089		
	Ratio to Limit	0.084	0.057	0.022	0.141	0.106
Bottom Edge	Reported Value	0.019	0.000	0.000		
	Ratio to Limit	0.019	0.000	0.000	0.019	0.019
Right Edge	Reported Value	0.044	0.195	0.201		
	Ratio to Limit	0.044	0.049	0.050	0.093	0.094
Left Edge	Reported Value	0.794	0.490	0.058		
	Ratio to Limit	0.794	0.123	0.015	0.917	0.809

	Worst Case Phablet TER	Worst Case NFC Reported SAR	Phablet Worst Case Scenario + NFC
	1	2	1 + 2
Applicable Limit	1.0	4.0	1.0
Reported Value		0.011	
Ratio to Limit	0.917	0.003	0.920

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Table 2-7
5G mmW NR FR2 Body-worn Total Exposure Ratio - Closed

	NR FR2	2.4 GHz WLAN Ant 2	2.4 GHz WLAN MIMO	Bluetooth Ant 1	Bluetooth Ant 2	5 GHz WLAN MIMO	6 GHz WLAN MIMO	NR FR2 + 2.4 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1	NR FR2 + 5 GHz WLAN MIMO	NR FR2 + 6 GHz WLAN MIMO	NR FR2 + 2.4 GHz WLAN MIMO + 5 GHz WLAN MIMO	NR FR2 + 2.4 GHz WLAN MIMO + 6 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1 + 2.4 GHz WLAN Ant 2	NR FR2 + Bluetooth Ant 1 + 5 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1 + 6 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1 + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1 + 2.4 GHz WLAN Ant 2 + 6 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1 + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN MIMO + 6 GHz WLAN MIMO				
		Reported SAR	Reported SAR	Reported SAR	Reported SAR	Reported SAR	Reported SAR													Reported SAR	Reported SAR		
		18.0 dBm	21.0 dBm	15.5 dBm	16.0 dBm	18.0 dBm	0.0 dBm																
Applicable Limit		1	2	3	4	5	6	7	1+3	1+4	1+6	1+7	1+3+6	1+3+7	1+4+2	1+4+6	1+4+6	1+4+7	1+4+2+6	1+4+2+6			
Reported Value		0.367	0.011	0.045	0.008	0.007	0.025	0.001	0.408	0.315	0.382	0.358	0.423	0.408	0.388	0.375	0.390	0.376	0.388	0.403	0.389	0.389	0.375
Ratio to Limit		0.367	0.011	0.045	0.008	0.007	0.025	0.001	0.408	0.315	0.382	0.358	0.423	0.408	0.388	0.375	0.390	0.376	0.388	0.403	0.389	0.389	0.375

Table 2-8
5G mmW NR FR2 Hotspot Total Exposure Ratio - Closed

	NR FR2	2.4 GHz WLAN Ant 2	2.4 GHz WLAN MIMO	Bluetooth Ant 1	5 GHz WLAN MIMO	NR FR2 + 2.4 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1	NR FR2 + Bluetooth Ant 2	NR FR2 + 5 GHz WLAN MIMO	NR FR2 + 2.4 GHz WLAN MIMO + 5 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1 + 2.4 GHz WLAN Ant 2	NR FR2 + Bluetooth Ant 1 + 5 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1 + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN MIMO	NR FR2 + Bluetooth Ant 1 + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN MIMO + 6 GHz WLAN MIMO	
		Reported SAR	Reported SAR	Reported SAR	Reported SAR										Reported SAR
		12.0 dBm	15.0 dBm	15.5 dBm	15.0 dBm										
Applicable Limit		1	2	3	4	7	1+3	1+4	1+5	1+6	1+3+6	1+4+2	1+4+6	1+4+2+6	
Reported Value		0.367	0.011	0.019	0.019	0.027	0.379	0.379	0.367	0.384	0.396	0.386	0.396	0.403	0.384
Ratio to Limit		0.367	0.011	0.019	0.019	0.027	0.379	0.379	0.367	0.384	0.396	0.386	0.396	0.403	0.384

Notes:

1. Worst-case power density results for each test configuration among all antenna arrays and among all supported bands were considered for TER analysis.
2. Per FCC guidance, for power density measurements, a test separation distance of 2 mm was used for phablet configuration due to probe restraints.
3. The worst-case between Adjusted Reported_psPD and Measured Total psPD was chosen for TER analysis. The bolded psPD values in Table C-1 indicate the worst-case Reported psPD used in TER analysis.

The above numerical summed PD and SAR for all the worst-case simultaneous transmission conditions were below the Total Exposure Ratio. Therefore, the above analysis is sufficient to determine no further test cases are required and that simultaneous transmission is compliant to the FCC RF Exposure Limit.

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3 CONCLUSION

3.1 Measurement Conclusion

The power density measurements and total exposure ratio analysis indicate that the DUT complies with the RF radiation exposure limits of the FCC, with respect to all parameters subject to this test. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

Please note that the RF Exposure and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because various factors may interact with one another to vary the specific biological outcome of an exposure to electromagnetic fields, any protection guide should consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables.

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