Power Density Evaluation Report

FCC ID	**: IHDT56AA6**
Equipment	**: Wearable Cellular Device**
Brand Name	**Motorola**
Model Name	**: XT2209-1**
Applicant	**: Motorola Mobility, LLC 222 W Merchandise Mart Plaza, Suite 1800, Chicago, IL 60654, United States**
Standard	**: FCC 47 CFR Part 2 (2.1093)**

The product was received on Nov 01, 2021 and testing was started from Nov 03, 2021 and completed on Nov 17, 2021. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample provide by manufacturer and the test data has been evaluated in accordance with the test procedures given in 47 CFR part2.1093 and has been pass the FCC requirement.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Cona Huang / Deputy Manager

Testing Laboratory
1190

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History of this test report

Report No.	Version	Description	Issued Date
FA1O2008B	01	Initial issue of report	Dec. 03, 2021

1. Summary

The maximum measured average power density found during testing for Motorola Mobility, LLC, Wearable Cellular Device, are as follows.

Standalone transmission				Simultaneous transmission with other transmitters
RF Transmitter		Measured PD (mW/cm^2)	Reported PD (mW/cm^2)	Summation of Exposure Ratio
5G FR2	n260	0.619	0.903	0.998
	n261	0.534	0.903	
Result		PASS		

Reviewed by: Jason Wang
Report Producer: Carlie Tsai

2. Guidance Applied

The Power Density testing specification, method, and procedure for this device is in accordance with the following standards:

- FCC 47 CFR Part 1.1310
- FCC 47 CFR Part 2.1093
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r03
- TCBC workshop notes
- IEC Draft TR 63170

3. Equipment Under Test (EUT) Information

3.1 General Information

Product Feature & Specification	
Equipment Name	Wearable Cellular Device
Brand Name	Motorola
Model Name	XT2209-1
FCC ID	IHDT56AA6
Wireless Technology and Frequency Range	LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz 5G NR n2 : 1850 MHz ~ 1910 MHz 5G NR n5 : 824 MHz ~ 849 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n77: 3700 MHz ~ 3980 MHz 5G NR n260: 37GHz ~ 40GHz 5G NR n261: 27.5GHz ~ 28.35GHz WLAN 2.4 GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5.2 GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.3 GHz Band: 5250 MHz ~ 5350 MHz WLAN 5.6 GHz Band: 5470 MHz ~ 5725 MHz WLAN 5.8 GHz Band: 5725 MHz ~ 5850 MHz WLAN 6GHz: 5925 MHz ~ 6425 MHz, 6425 MHz ~ 6525 MHz, 6525 MHz ~ 6875 MHz, 6875 MHz ~ 7125 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz
Mode	LTE: QPSK, 16QAM, 64QAM, 256QAM 5G NR: DFT-s-OFDM/CP-OFDM, Pi/2 BPSK/QPSK/16QAM/64QAM/256QAM WLAN: 802.11a/b/g/n/ac/ax HT20/HT40/VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160 Bluetooth BR/EDR/LE
HW Version	EVT1
EUT Stage	Identical Prototype

4. RF Exposure Limits

4.1 Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

4.2 Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. The exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure above 6GHz to radio frequency (RF) radiation as specified in §1.1310.

General Population Basic restriction for power density for frequencies between 1.5GHz/WIFI6E and 100 GHz is 1.0 $mW/cm^2 = 10\ W/m^2$

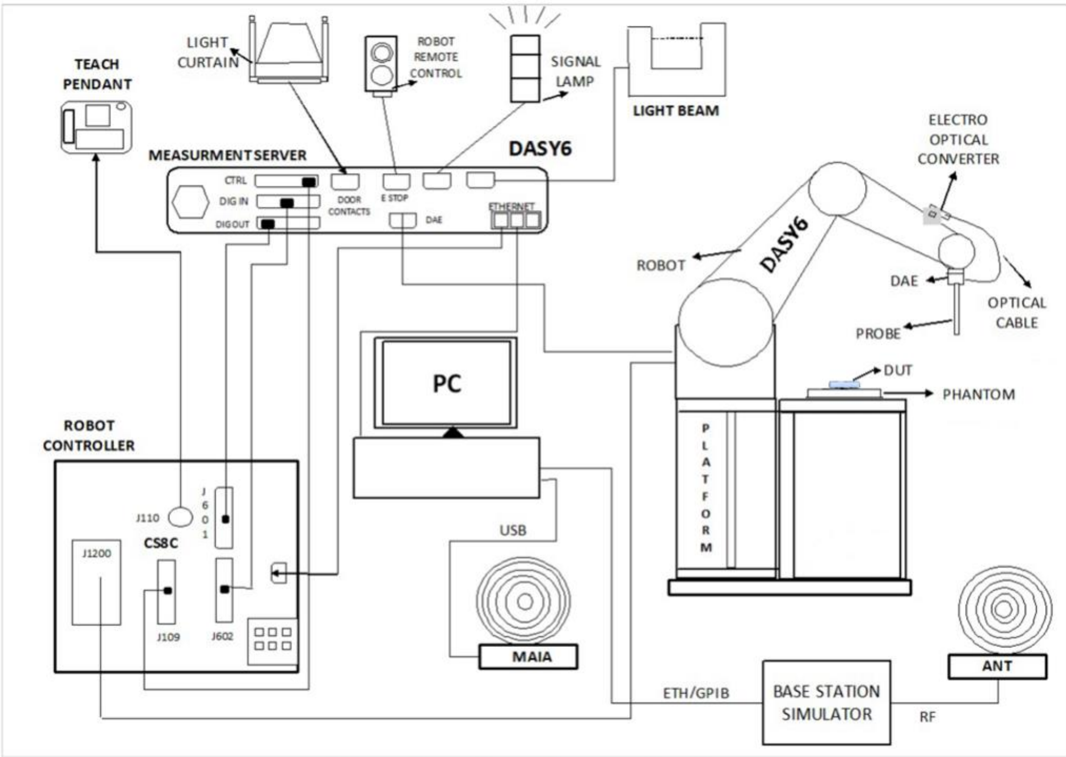
Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f2)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f2)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

Table 1

5. System Description and Setup

The system to be used for the near field power density measurement

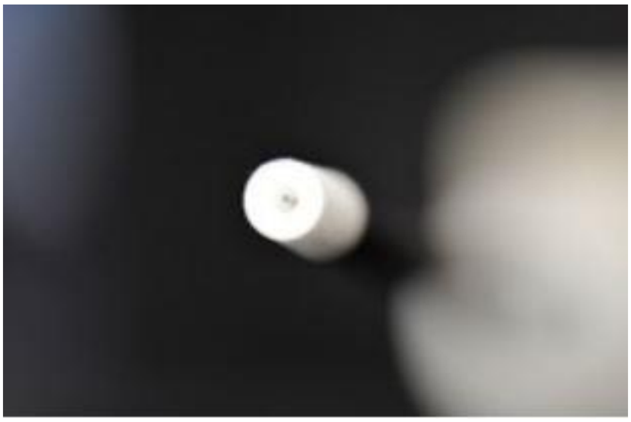
- SPEAG DASY6 system
- SPEAG cDASY6 5G module software
- EUmmWVx probe
- 5G Phantom cover

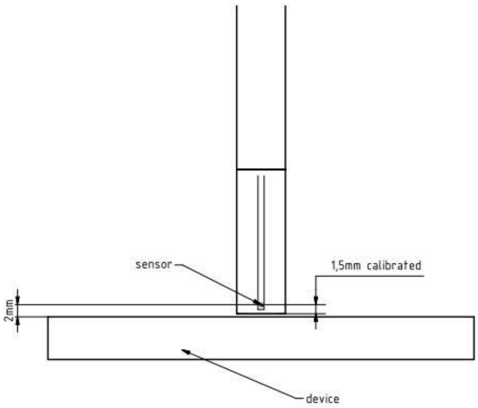


5.1 EUmmWave Probe / E-Field 5G Probe

The probe design allows measurements at distances as small as 2 mm from the sensors to the surface of the device under test (DUT). The typical sensor to probe tip distance is 1.5 mm.

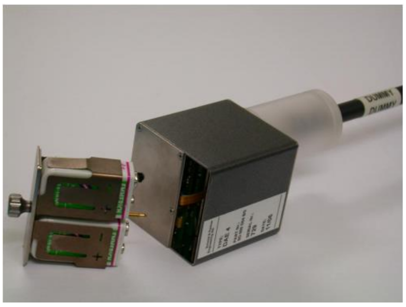
Frequency	750 MHz – 110 GHz
Probe Overall Length	320 mm
Probe Body Diameter	8.0 mm
Tip Length	23.0 mm
Tip Diameter	8.0 mm
Probe's two dipoles length	0.9 mm – Diode loaded
Dynamic Range	< 20 V/m - 10000 V/m with PRE-10 (min < 50 V/m - 3000 V/m)
Position Precision	< 0.2 mm
Distance between diode sensors and probe's tip	1.5 mm
Minimum Mechanical separation between probe tip and a Surface	0.5 mm
Applications	E-field measurements of 5G devices and other mm-wave transmitters operating above 10GHz in < 2 mm distance from device (free-space) Power density, H-field and far-field analysis using total field reconstruction.
Compatibility	cDASY6 + 5G-Module SW1.0 and higher





5.2 Data Acquisition Electronics (DAE)

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.
The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.



5.3 Scan configuration

Fine-resolution scans on 2 different planes are performed to reconstruct the E- and H-fields as well as the power density; the z-distance between the 2 planes is set to $\lambda/4$.
The (x, y) grid step is also set $\lambda/4$, the grid extent is set to sufficiently large to identify the field pattern and the peak.

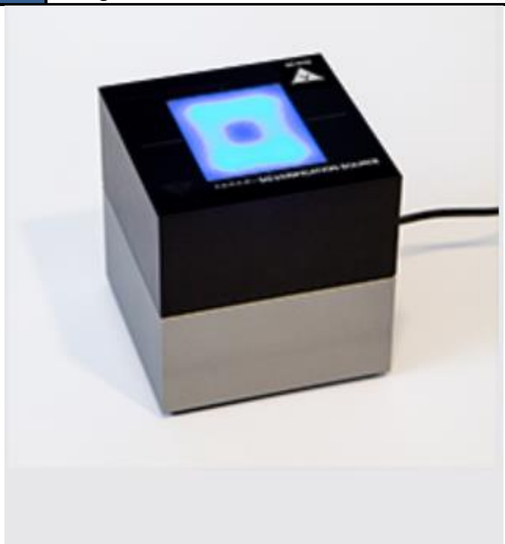
6. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	5G Verification Source	30GHz	1009	May. 25, 2021	May. 24, 2022
SPEAG	EUmmWV Probe Tip Protection	EUmmWV4	9441	Nov. 24, 2020	Nov. 23, 2021
SPEAG	EUmmWV Probe Tip Protection	EUmmWV4	9461	Oct. 22, 2021	Oct. 21, 2022
SPEAG	Data Acquisition Electronics	DAE4	778	May. 21, 2021	May. 20, 2022
SPEAG	Data Acquisition Electronics	DAE4	853	Jul. 14, 2021	Jul. 13, 2022
TESTO	Hygro meter	608-H1	34893240	Nov. 18, 2020	Nov. 17, 2021
TESTO	Hygro meter	608-H1	34913912	Nov. 18, 2020	Nov. 17, 2021
Aglient	Spectrum Analyzer	E4408B	MY44211028	Aug. 19, 2021	Aug. 18, 2022
Custom Microwave	Standard Horn antenna	M15RH	V91113-A	NCR	NCR

7. System Verification Source

The System Verification sources at 30 GHz and above comprise horn-antennas and very stable signal generators.

Model	Ka-band horn antenna
Calibrated frequency:	30 GHz at 10mm from the case surface
Frequency accuracy	± 100 MHz
E-field polarization	linear
Harmonics	-20 dBc
Total radiated power	14 dBm
Power stability	0.05 dB
Power consumption	5 W
Size	00 x 100 x 100 mm
Weight	1 kg



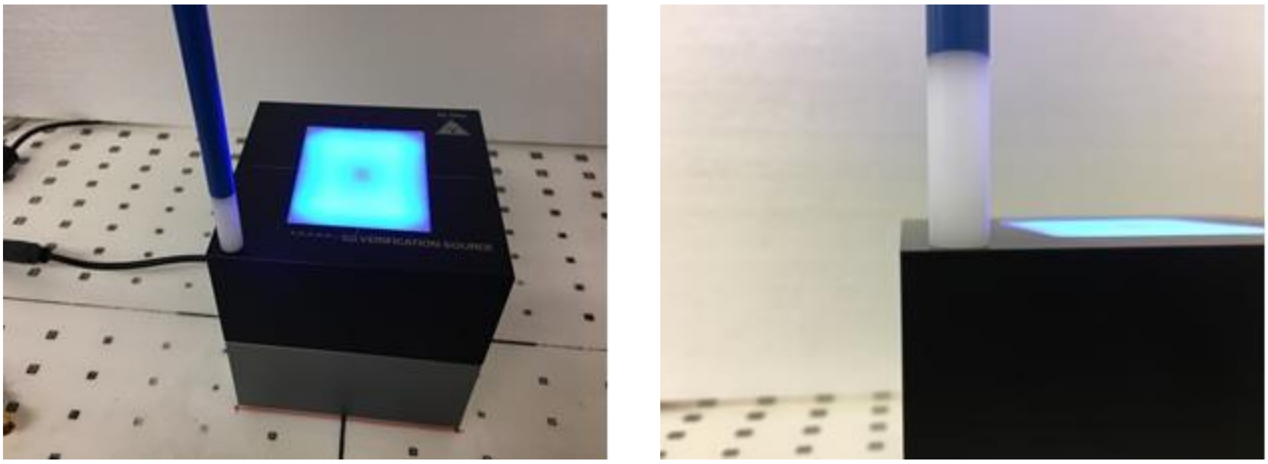
8. Power Density System Verification

The system performance check verifies that the system operates within its specifications.

The EUT is replaced by a calibrated source, the same spatial resolution, measurement region and the test separation used in the calibration was applied to system check. Through visual inspection into the measured power density distribution, both spatially (shape) and numerically (level) have no noticeable difference. The measured results should be within 0.66dB of the calibrated targets.

Frequency [GHz]	Grid step	Grid extent X/Y [mm]	Measurement points
10	$0.25\ (\frac{\lambda}{4})$	120/120	16×16
30	$0.25\ (\frac{\lambda}{4})$	60/60	24×24
60	$0.25\ (\frac{\lambda}{4})$	32.5/32.5	26×26
90	$0.25\ (\frac{\lambda}{4})$	30/30	36×36

Settings for measurement of verification sources



Verification Setup photo

9. System Verification Results

Date	Frequency (GHz)	5G Verification Source	Probe S/N	DAE S/N	Distance (mm)	Measured 4 cm^2 (W/m^2)	Targeted 4 cm^2 (W/m^2)	Deviation (dB)
2021/11/3	30G	30GHz_1009	9441	853	5.55	31.1	29.5	0.23
2021/11/12	30G	30GHz_1009	9461	778	5.55	31.6	29.5	0.30
2021/11/17	30G	30GHz_1009	9461	778	5.55	30	29.5	0.07

9.1 Computation of the Electric Field Polarization Ellipse

For the numerical description of an arbitrarily oriented ellipse in three-dimensional space, five parameters are needed: the semi-major axis (a), the semi-minor axis (b), two angles describing the orientation of the normal vector of the ellipse (ø, θ), and one angle describing the tilt of the semi-major axis (ψ). For the two extreme cases, i.e., circular and linear polarizations, three parameters only (a, ø and θ) are sufficient for the description of the incident field.

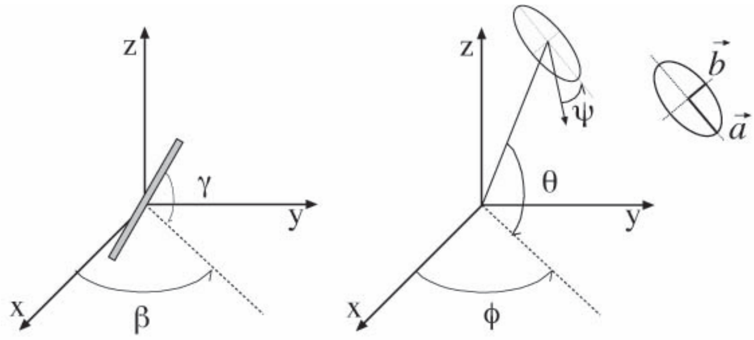


Illustration of the angles used for the numerical description of the sensor and the orientation of an ellipse in 3-D space.

For the reconstruction of the ellipse parameters from measured data, the problem can be reformulated as a nonlinear search problem. The semi-major and semi-minor axes of an elliptical field can be expressed as functions of the three angles (ø, θ and ψ). The parameters can be uniquely determined towards minimizing the error based on least-squares for the given set of angles and the measured data. In this way, the number of free parameters is reduced from five to three, which means that at least three sensor readings are necessary to gain sufficient information for the reconstruction of the ellipse parameters. However, to suppress the noise and increase the reconstruction accuracy, it is desirable that the system of equations be over determined. The solution to use a probe consisting of two sensors angled by r_1 and r_2 toward the probe axis and to perform measurements at three angular positions of the probe, i.e., at β_1, β_2 and β_3, results in over-determinations by a factor of two. If there is a need for more information or increased accuracy, more rotation angles can be added. The reconstruction of the ellipse parameters can be separated into linear and non-linear parts that are best solved by the Givens algorithm combined with a downhill simplex algorithm. To minimize the mutual coupling, sensor angles are set with a shift of 90 degree ($r_2 = r_1 + 90$ degree), and to simplify, the first rotation angle of the probe (β_1) can be set to 0 degree.

9.2 Total Field and Power Flux Density Reconstruction

Computation of the power density in general requires knowledge of the electric and magnetic field amplitudes and phases in the plane of incidence. Reconstruction of these quantities from pseudo-vector E-field measurements is feasible, as they are constrained by Maxwell's equations. SPEAG have developed a reconstruction approach based on the Gerchberg-Saxton algorithm, which benefits from the availability of the E-field polarization ellipse information obtained with the EUmmWV2 probe.
The average of the reconstructed power density is evaluated over a circular area in each measurement plane. Two average power density values can be computed, the average total power density and the average incident power density, and the average total power density is used to determine compliance.

- $|Re\{S\}|$ is the total Poynting vector
- $\mathrm{n} \cdot Re\{S\}$ is the normal Poything vector

The software post-processing reports to values, "S avg tot" and "S avg inc". "S avg tot" represents average total power density (all three xyz components included), and "S avg inc" represents average normal power density. The average total power density "S avg tot" is reported to determine the device compliance.

9.3 Test Positions

Band		Measurement Plane			
		Front surface 14mm	Back Surface 2mm	Long Edge 2mm	Inner Surface 2mm
5G NR Band 260	Beam ID 1	Yes	No	No	No
	Beam ID 2	No	No	Yes	No
5G NR Band 261	Beam ID 1	Yes	No	No	No
	Beam ID 2	No	No	Yes	No

10. RF Exposure Evaluation Results

1. The PD test was performed of a 2mm separation between sensor and EUT surface (the probe tip is The PD test was performed of a 2mm separation between sensor and EUT surface (the probe tip is 0.5mm to the EUT surface), 2 mm separation distance PD testing is for hotspot and body worn exposure conditions.
2. According to TCBC Workshop in October 2018, 4 cm^2 averaging area are used.
3. Input power limit parameter for 5G mmW NR radio was calculated in RF Exposure Part 0 test report.
4. The device was configured to transmit CW wave signal for testing, due to Qualcomm® Smart Transmit feature, additional testing was not required for different modulations (CP-OFDM QPSK, CP-OFDM 16QAM, CP-OFDM 64QAM), RB configurations, component carriers, channel configurations (low channel, mid channel, high channel). The validation of the time-averaging algorithm and compliance under the Tx varying transmission scenario for WWAN technologies are reported in Part 2 report.
5. From the Part 0 and simulation report, beam IDs with highest PD and corresponding input power limit were selected to be tested for each antenna module and for each frequency band. Power density measurements were performed with DUT transmitting at input.power.limit for one single beam for each polarization (H & V) and one beam-pair, for each antenna type and for each antenna module on the worst-surfaces.
6. It's illustrated in Part 0 report that, for 5G mmW NR since there is total design-related uncertainty arising from TxAGC and device-to-device variation, the worst-case RF exposure should be determined by accounting for this device total uncertainty of 2.0 dB, as well as PD design target of 5.7W/m2. Therefore, 5G mmW NR RF exposure for this DUT is evaluated by reported PD calculated as:
   Reported PD=PD design target + 2.0 dB =9.03 W/m2 = 0.903 mW/cm^2
7. The 2nd generation of Smart Transmit (GEN2) operates based on pre-defined sub6 antenna groups (AG) and mmW module groups (MG) and was implemented on this device
   - Per QC's guidance, for simultaneous TER analysis, the device needs to demonstrate that combined PD for these identified PD beams at each QTM's dominant surface are less than PD_design_target+total uncertainty. However In this device, the 2 QTM modules are in physically separated devices, and each QTM module has its own PD evaluation planes, unlike conventional devices where the QTM modules are collocated in the same physical device and share the same PD evaluation plane.
   - Since the 2 QTM modules have different RF exposure conditions, the combined PD doesn't apply here. Hence, there's no need for additional verifications for Smart Transmit Gen 2 mmWave favor mode.
8. The device integrates the proximity sensor, and when the FrontPod sensor is be triggered, the mmWave module 0 would be disabled; therefore, PD for the front surface of FrontPod mmWave module was tested at proximity sensor trigger distance -1 mm.

Test Number	Antenna Module	Beam ID 1	Beam ID 2	Band	Frequency (GHz)	Exposure Surface	Input Power limit	Test Separation	Modulation	Epeak [V/m]	Hpeak [A/m]	Measured results Savg inc 4cm^2 (W/m2)	Measured results Savg tot 4cm^2 (W/m2)
01	Module 0	30	-	n260	37	Front surface	6	14mm	CW	73.8	0.194	5.92	6.19
	Module 0	-	158	n260	37	Front surface	5.5	14mm	CW	72.4	0.178	5.27	5.51
	Module 0	30	158	n260	37	Front surface	2.2	14mm	CW	65	0.172	5.03	5.21
	Module 0	39	-	n260	38.5	Front surface	5.8	14mm	CW	51.5	0.149	3.69	3.87
	Module 0	5	-	n260	38.5	Front surface	12.5	14mm	CW	53.8	0.138	3.38	3.57
	Module 1	36	-	n260	38.5	Long Edge	10.2	2mm	CW	63	0.17	4.06	4.61
	Module 1	-	164	n260	40	Long Edge	7.9	2mm	CW	34.5	0.087	1.43	1.75
	Module 1	36	164	n260	38.5	Long Edge	7.2	2mm	CW	51.4	0.151	2.67	3.1
	Module 0	40	-	n261	28.35	Front surface	3.7	14mm	CW	56.2	0.151	4.41	4.51
	Module 0	-	168	n261	28.35	Front surface	4.6	14mm	CW	58.1	0.148	4.68	4.79
	Module 0	40	168	n261	28.35	Front surface	0.3	14mm	CW	61.8	0.151	4.79	4.88
02	Module 1	36	-	n261	27.925	Long Edge	8.9	2mm	CW	60.3	0.145	5.13	5.34
	Module 1	-	164	n261	28.35	Long Edge	7.2	2mm	CW	51	0.124	3.46	3.66
	Module 1	36	164	n261	28.35	Long Edge	3.5	2mm	CW	44.6	0.119	3.26	3.33
	Module 1	2	-	n261	27.925	Long Edge	13.5	2mm	CW	28.8	0.077	1.40	1.50

11. 5G NR + LTE + WLAN + BT Sim-Tx analysis

In 5G NR + LTE + WLAN + BT simultaneous transmission, 5G NR and LTE transmission are managed and controlled by Qualcomm® Smart Transmit, while the RF exposure from WLAN and BT radios is managed using legacy approach, i.e., through a fixed power back-off if needed.

Since WLAN and BT do not employ time-averaging, 1gSAR and 10gSAR measurement for WLAN and BT need to be conducted at their corresponding rated power following current FCC test procedures to determine reported SAR values.

Smart Transmit current implementation assumes hotspots from 5G NR and LTE are collocated. Therefore, for a total of 100% exposure margin, if LTE uses x%, then the exposure margin left for 5G NR is capped to (100-x)%. Thus, the compliance equation for LTE + 5G NR is

$$x\% * A + (100-x)\% * B \le 1.0,$$

Where, A is normalized reported time-averaged SAR exposure ratio from LTE, and A ≤ 1.0; B is normalized reported time-averaged exposure ratio from 5G NR (i.e., PD exposure for mmW NR or SAR exposure for sub6 NR), and B ≤1.0.

Let C = normalized reported SAR exposure ratio from WLAN+BT, then for compliance,

$$x\% * A + (100-x)\% * B + C \le 1.0 \qquad (1)$$

$$x\% * A + (100-x)\% * B \le x\% * \max(A, B) + (100-x)\% * \max(A, B) \le \max(A, B)$$

$$x\% * A + (100-x)\% * B + C \le \max(A, B) + C \le 1.0 \qquad (2)$$

if A + C ≤ 1.0 and B + C ≤ 1.0 can be proven, then "x% * A + (100-x)% * B + C ≤ 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 LTE + WLAN + BT < 1
Step 2: Prove total exposure ratio (TER) of 5G NR + WLAN + BT < 1

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

i. A and C are decoupled based on the SPLSR criteria , and
ii. (100-x)% * B + C ≤ 1.0, and
iii. x% * A + (100-x)% * B ≤ 1.0

Note iii. is covered in Part 2 report; i. and ii. should be addressed in Part 2 report.

Step 1: it's justified in Part 1 SAR report
Step 2: it's justified in section 12.1

Smart Transmit EFS version 16 (or higher) with backoff in WWAN/FR2 when WLAN/BT is ON:

Smart Transmit EFS version 16 (or higher) provides the option to backoff WWAN radio when WLAN/BT ON. This WWAN/FR2 backoff can be configured per tech/band/antenna (or mmW module)/DSI of WWAN radios. The analysis performed above in this section is still applicable after applying the backoff to WWAN radio exposures, i.e., **A**, **and B** should be replaced as shown below:

normalized exposure of WWAN primary radio: A → replaced with "A * 10^(-WWAN backoff in dB for A when WLAN/BT ON)/10".

normalized exposure of 5GNR secondary radio: B → replaced with "B * 10^(-WWAN backoff in dB for B when WLAN/BT ON)/10".

12. Simultaneous-Tx analysis

NO.	Simultaneous Transmission Configurations	Exposure Positions
		Body
1.	WiFi 5G/6G MIMO + Bluetooth (Ant 4) + LTE + n260/n261	Yes
2.	WiFi 5G/6G MIMO + Bluetooth (Ant 5) + LTE + n260/n261	Yes
3.	WiFi 2.4G MIMO + LTE + n260/n261	Yes
4.	WiFi 2.4G MIMO + WiFi 5G/6G MIMO + LTE + n260/n261	Yes

General Note:

1. Following the analysis in Section 11, the simultaneous transmission compliance can be justified from LTE + WiFi/BT (which is addressed in Part 1 SAR report), and FR2 + WiFi/BT which is addressed in this section. WiFi and Bluetooth SAR test results are referenced from Part 1 SAR report of FCC ID: IHDT56AA6 (Sporton SAR Report No. FA1O2008).
2. ~~The Sim-Tx configuration combination include in operation description will be match the title in the below Sum-Tx evaluation table~~.
3. To evaluate the simultaneous transmission compliance of SAR and PD, the following calculation is used:.
   The [∑ of (the highest measured or estimated SAR for each standalone antenna configuration, adjusted for maximum tune-up tolerance) / 1.6 W/kg] + [∑ of MPE ratios] is ≤ 1.0.
4. Considering the physical separation of Frontpod and Rearpod in normal use cases, the antennas on the Frontpod are deemed to have no RF exposure contribution on the Readpod, and the opposite holds true. Therefore, the TER calculation is done on the Frontpod and on the Rearpod separately.
5. For 5G mmW NR, compute reported time-averaged PD when WiFi is ON= PD_design_target * $10^{\wedge(\text{mmW device design uncertainty in dB/10})}$*$10^{\wedge(\text{-WWAN backoff in dB /10})}$, and use this computed reported time-averaged PD in total exposure ratio (TER) analysis.

Frequency band	Antenna module	Backoff Level (dB)	Reported PD W/m^2 (WIFI/BT off)	Reported PD W/m^2 (WIFI/BT on)
n260/n261	Module 0	4	9.03	3.6
n260/n261	Module 1	2	9.03	5.7

12.1 Simultaneous transmission analysis for WiFi/BT + 5G NR

<Body Exposure Condition>

<Non-DBS>

<FrontPod>

Band	Exposure Position	1	4	6	8	10	Reported SAR/1.6 + PD/10 Summation		
		PD	2.4GHz WLAN Ant 4	5GHz WLAN Ant 4	6GHz WLAN Ant 4	Bluetooth Ant 4	**1+4 Summed Ratio**	**1+6+10 Summed Ratio**	**1+8+10 Summed Ratio**
		4cm^2 (W/m^2)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)			
n260 Module 0	Back Surface at 0mm	3.6	0.461	0.655	0.069	0.091	**0.648**	**0.826**	**0.46**
	Front Surface at 14mm	3.6	0.162	0.707	0.182	0.078	**0.461**	**0.851**	**0.523**
n261 Module 0	Back Surface at 0mm	3.6	0.461	0.655	0.069	0.091	**0.648**	**0.826**	**0.46**
	Front Surface at 14mm	3.6	0.162	0.707	0.182	0.078	**0.461**	**0.851**	**0.523**

<RearPod>

Band	Exposure Position	1	3	5	7	9	Reported SAR/1.6 + PD/10 Summation		
		PD	2.4GHz WLAN Ant 5	5GHz WLAN Ant 5	6GHz WLAN Ant 5	Bluetooth Ant 5	**1+3 Summed Ratio**	**1+5+9 Summed Ratio**	**1+7+9 Summed Ratio**
		4cm^2 (W/m^2)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)			
n260 Module 1	Long Edge at 0mm	5.7	0.105	0.198	0.054	0.001	**0.636**	**0.694**	**0.604**
	Inner Surface at 0mm	5.7	0.224	0.46	0.108	0.02	**0.71**	**0.87**	**0.65**
n261 Module 1	Long Edge at 0mm	5.7	0.105	0.198	0.054	0.001	**0.636**	**0.694**	**0.604**
	Inner Surface at 0mm	5.7	0.224	0.46	0.108	0.02	**0.71**	**0.87**	**0.65**

<DBS>

<FrontPod>

WWAN Band	Exposure Position	1	4	6	8	10	Reported SAR/1.6 + PD/10 Summation		
		PD	2.4GHz WLAN Ant 4	5GHz WLAN Ant 4	6GHz WLAN Ant 4	Bluetooth Ant 4	1+4+6 Summed Ratio	1+4+8 Summed Ratio	1+8+10 Summed Ratio
		4cm^2 (W/m^2)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)			
n260 Module 0	Back Surface at 0mm	3.6	0.461	0.4	0.069	0.091	**0.898**	**0.691**	**0.46**
	Front Surface at 14mm	3.6	0.162	0.418	0.182	0.001	**0.723**	**0.575**	**0.474**
n261 Module 0	Back Surface at 0mm	3.6	0.461	0.4	0.069	0.091	**0.898**	**0.691**	**0.46**
	Front Surface at 14mm	3.6	0.162	0.418	0.182	0.001	**0.723**	**0.575**	**0.474**

<RearPod>

WWAN Band	Exposure Position	1	3	5	7	9	Reported SAR/1.6 + PD/10 Summation		
		PD	2.4GHz WLAN Ant 5	5GHz WLAN Ant 5	6GHz WLAN Ant 5	Bluetooth Ant 5	1+3+5 Summed Ratio	1+3+7 Summed Ratio	1+7+9 Summed Ratio
		4cm^2 (W/m^2)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)			
n260 Module 1	Long Edge at 0mm	5.7	0.105	0.198	0.054	0.001	**0.759**	**0.669**	**0.604**
	Inner Surface at 0mm	5.7	0.224	0.46	0.108	0.02	**0.998**	**0.778**	**0.65**
n261 Module 1	Long Edge at 0mm	5.7	0.105	0.198	0.054	0.001	**0.759**	**0.669**	**0.604**
	Inner Surface at 0mm	5.7	0.224	0.46	0.108	0.02	**0.998**	**0.778**	**0.65**

Test Engineer： Mood Huang and Carter Jhuang

13. Uncertainty Assessment

The budget is valid for evaluation distances > λ/2π. For specific tests and configurations, the Uncertainty could be considerably smaller.

Preliminary Module mmWave Uncertainty Budget Evaluation Distances to the Antennas > λ / 2π						
Error Description	**Uncertainty Value (± dB)**	**Probability**	**Divisor**	**(Ci)**	**Standard Uncertainty (±dB)**	**(Vi) Veff**
Measurement System						
Probe Calibration	0.49	N	1	1	0.49	∞
Hemispherical Isotropy	0.50	R	1.732	1	0.29	∞
Linearity	0.20	R	1.732	0	0.12	∞
System Detection Limits	0.04	R	1.732	1	0.02	∞
Modulation Response	0.40	R	1.732	1	0.23	∞
Readout Electronics	0.03	N	1	1	0.03	∞
Response Time	0.00	R	1.732	1	0.00	∞
Integration Time	0.00	R	1.732	1	0.00	∞
RF Ambient Noise	0.2	R	1.732	1	0.12	∞
RF Ambient Reflections	0.21	R	1.732	1	0.12	∞
Probe Positioner	0.04	R	1.732	1	0.02	∞
Probe Positioning	0.30	R	1.732	1	0.17	∞
S_{avg} Reconstruction	0.60	R	1.732	1	0.35	∞
Test Sample Related						
Power Drift	0.2	R	1.732	1	0.12	∞
Input Power	0	N	1	0	0.00	∞
Combined Std. Uncertainty					0.76 dB	∞
Coverage Factor for 95 %					K=2	
Expanded STD Uncertainty					1.52 dB	

14. References

[1] FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”

[2] FCC KDB 447498 D01 v06, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, Oct 2015

[3] FCC KDB 865664 D02 v01r02, “RF Exposure Compliance Reporting and Documentation Considerations” Oct 2015.

[4] FCC KDB 648474 D04 v01r03, “SAR Evaluation Considerations for Wireless Handsets”, Oct 2015.