

# Power Density Evaluation Report

FCC ID : A4RGB62Z  
Equipment : Phone  
Model Name : GB62Z  
Applicant : Google LLC  
1600 Amphitheatre Parkway,  
Mountain View, California, 94043 USA  
Standard : FCC 47 CFR Part 2 (2.1093)

The product was received on Oct. 14, 2021 and testing was started from Nov. 17, 2021 and completed on Nov. 21, 2021. We, SPORTON INTERNATIONAL INC have been evaluated in accordance with 47 CFR Part 2.1093 for the device and pass the limit.

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



Approved by: Cona Huang / Deputy Manager



**Sporton International Inc. Wensan Laboratory**

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### History of this test report

Report No.	Version	Description	Issued Date
FA161608-03B	01	Initial issue of report	Jan. 25, 2022



### 1. Summary

The maximum measured average power density found during testing for Google LLC, Phone, are as follows.

Standalone transmission			Simultaneous transmission with other transmitters
RF Transmitter		Measured PD (mW/cm <sup>2</sup> )	Reported PD (mW/cm <sup>2</sup> )
		Summation of Exposure Ratio	
5G FR2	n260	0.466	0.75
	n261	0.402	0.75
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	Phone
Model Name	GB62Z
FCC ID	A4RGB62Z
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 14: 788 MHz ~ 798 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz 5G NR n2 : 1850 MHz ~ 1910 MHz 5G NR n5 : 824 MHz ~ 849 MHz 5G NR n7 : 2500 MHz ~ 2570 MHz 5G NR n12 : 699 MHz ~ 716 MHz 5G NR n25 : 1850 MHz ~ 1915 MHz 5G NR n30 : 2305 MHz ~ 2315 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n71 : 663 MHz ~ 698 MHz 5G NR n77: 3700 MHz ~ 3980 MHz, 3450MHz ~ 3550MHz 5G NR n260 : 37 GHz~40 GHz 5G NR n261 : 27.5 GHz~28.35 GHz WLAN 2.4GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5.2G Band: 5150 MHz ~ 5250 MHz WLAN 5.3G Band: 5250 MHz ~ 5350 MHz WLAN 5.5G Band: 5470 MHz ~ 5725 MHz WLAN 5.8G Band: 5725 MHz ~ 5850 MHz WLAN 5.8G UNII4 Band: 5845 MHz ~ 5885 MHz WLAN 6E: 5925 MHz ~ 6425 MHz, 6425 MHz ~ 6525 MHz, 6525 MHz ~ 6875 MHz, 6875 MHz ~ 7125 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz NFC : 13.56 MHz
Mode	GSM/GPRS/EGPRS RMC 12.2Kbps HSDPA HSUPA 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 NFC:ASK



## 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<sup>2</sup> = 10 W/m<sup>2</sup>

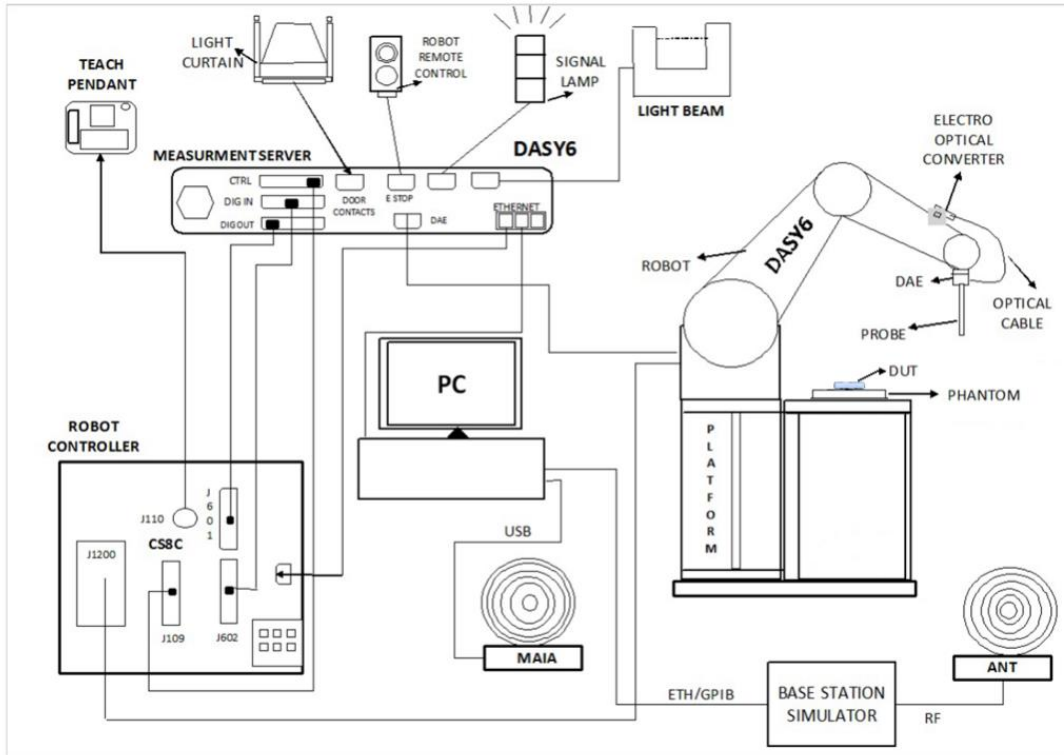
Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30-300	61.4	0.163	1.0	6
300-1500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

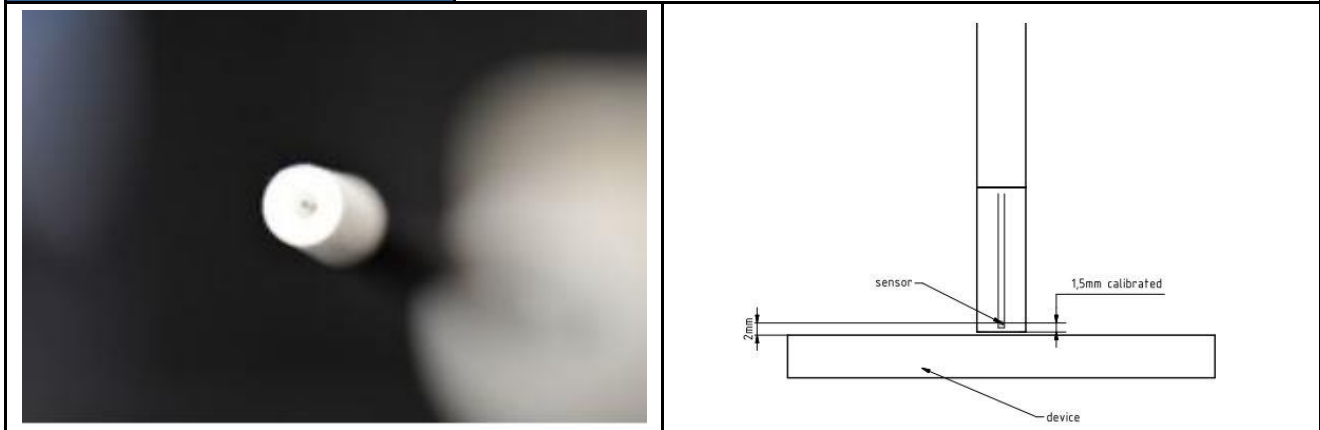
The SAR measurement facilities used to collect data are within both Sporton Lab list below test site location are accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 3786) and the FCC designation No. TW3786 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test.

Test Site	Wensan Laboratory
Test Site Location	TW3786 No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan
Test Site No.	SAR13-HY

**5.2 E UmmWave 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.

<b>Frequency</b>	750 MHz – 110 GHz
<b>Probe Overall Length</b>	320 mm
<b>Probe Body Diameter</b>	8.0 mm
<b>Tip Length</b>	23.0 mm
<b>Tip Diameter</b>	8.0 mm
<b>Probe's two dipoles length</b>	0.9 mm – Diode loaded
<b>Dynamic Range</b>	< 20 V/m - 10000 V/m with PRE-10 (min < 50 V/m - 3000 V/m)
<b>Position Precision</b>	< 0.2 mm
<b>Distance between diode sensors and probe's tip</b>	1.5 mm
<b>Minimum Mechanical separation between probe tip and a Surface</b>	0.5 mm
<b>Applications</b>	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.
<b>Compatibility</b>	cDASY6 + 5G-Module SW1.0 and higher

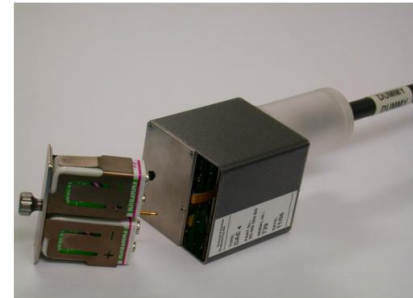




**5.3 Data Acquisition Electronics (DAE)**

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.



**5.4 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.

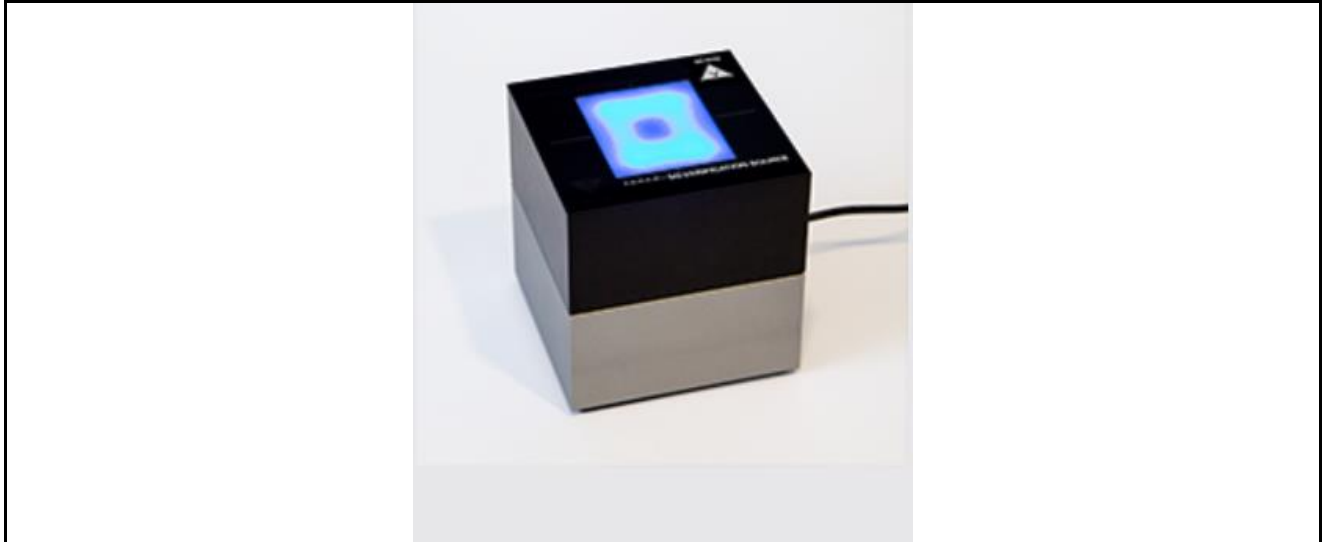
**6. Test Equipment List**

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	EUmmWV3	9424	Mar. 23, 2021	Mar. 22, 2022
SPEAG	Data Acquisition Electronics	DAE4	656	Jan. 22, 2021	Jan. 21, 2022
Testo	Hygro meter	608-H1	45207528	Oct. 22, 2021	Oct. 21, 2022
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.

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



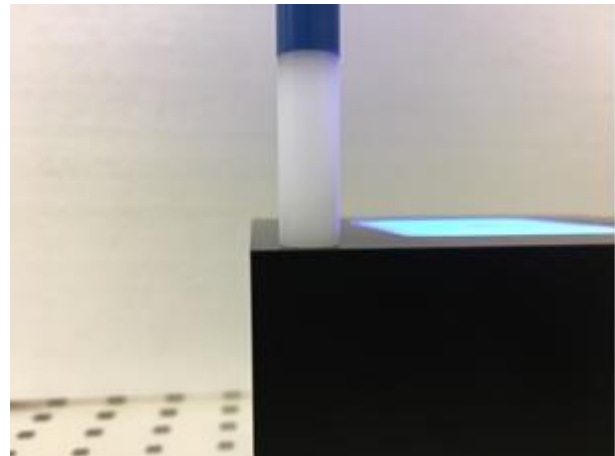
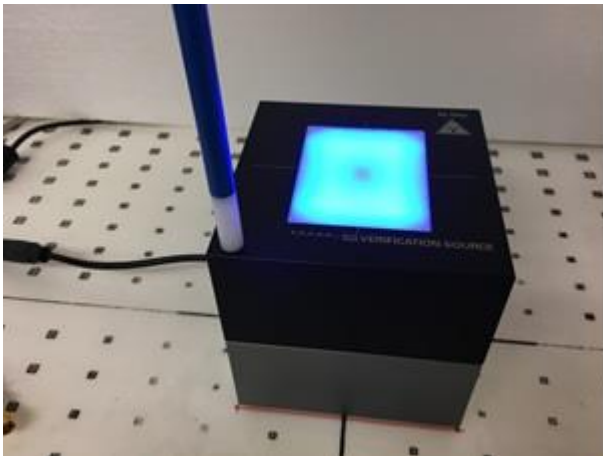
### 8. Power Density System Verification

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

Test Site	Date	Frequency (GHz)	5G Verification Source	Probe S/N	DAE S/N	Distance (mm)	Measured 4 cm <sup>2</sup> (W/m <sup>2</sup> )	Targeted 4 cm <sup>2</sup> (W/m <sup>2</sup> )	Deviation (dB)
SAR13-HY	2021/11/17	30GHz	30GHz_1009	EUmmWV3 - SN9424	DAE4 SN656	10mm	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 ( $\phi$ ,  $\theta$ ), and one angle describing the tilt of the semi-major axis ( $\psi$ ). For the two extreme cases, i.e., circular and linear polarizations, three parameters only ( $a$ ,  $\phi$  and  $\theta$ ) are sufficient for the description of the incident field.

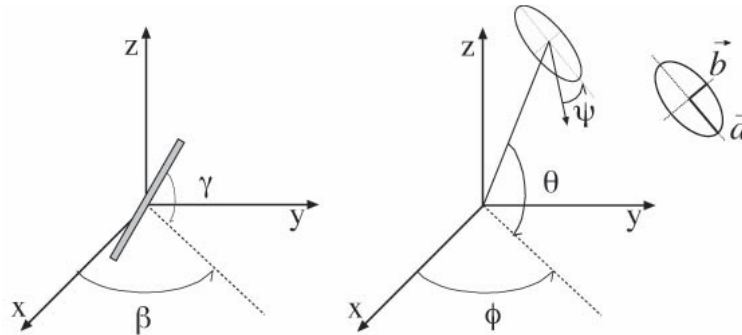


Illustration of the angles used for the numerical description of the sensor and the orientation of an ellipse in 3-D space.

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 ( $\phi$ ,  $\theta$  and  $\psi$ ). 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  $\beta_1$ ,  $\beta_2$  and  $\beta_3$ , 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 ( $\beta_1$ ) 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
- $n \cdot Re\{S\}$  is the normal Poynting 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	Antenna Module	S1 (front)	S2 (back)	S3 (Right)	S4 (Left)	S5 (top)	S6 (bottom)
n260/n261	Plane A sub-module	v	v	v	v	v	x
	Plane B sub-module	v	v	v	v	v	x

From the Part 0 and simulation report, beam IDs with highest PD and corresponding Plimit were selected to be tested for each antenna module and for each frequency band.

10. RF Exposure Evaluation Results

- 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.
- According to TCBC Workshop in October 2018, 4 cm^2 averaging area are used.
- This device is enabled with Samsung S.LSI TAS feature, S.LSI TAS will manage and ensure LTE and 5G simultaneous transmission is compliant. The validation of the time-averaging algorithm and compliance under the Tx varying transmission scenario for WWAN technologies are reported in Part 2 report.
- Pimit parameter for 5G mmW NR radio was calculated in RF Exposure Part 0 test report.
- According the KDB inquiry guidance, the back surface was measured on the camera bump 2 mm surface, and reporting simulation PD at 2 mm from antenna-adjacent housing.
- TAS algorithm makes use of the target power per slot in determining consumed SAR. The EIRP control can maintain the required amount of power for either CW tone or actual waveform to ensure the accuracy of actual transmit power. Plimit derived from CW tone signals can be confirmed to apply irrespective of the waveform ,therefore the device was configured to transmit CW wave signal for testing.
- Run PD test, from the beam ID with the highest simulated for selected side
  - Horizontal polarization (H-only), CW tone signal.
  - Vertical polarization (V-only), CW tone signal.
  - Horizontal + Vertical polarization (H+V) , CW tone signal
  - If step b to c result > 50% limit, then repeat for 2nd highest beam ID. If 2nd beam ID result is also > 50% limit, then repeat for 3rd beam ID
  - For Maximum among 2)-3), test low and high channel
  - For Maximum among 2)-4), test other sides, which is within 2.5 cm from the mmwave antenna module
  - Apply the ratio from simulation to scale PD values@2 mm separation distance to PD values@10 mm separation distance.  
Repeat steps a)-f) for the rest of the bands and plane
- 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 uncertainty of 2.3 dB, as well as PD design target of 4.42 W/m2. Therefore, 5G mmW NR RF exposure for this DUT is evaluated by reported PD calculated as:

$$\text{Reported PD} = \text{PD design target} + 2.3 \text{ dB} = 7.5 \text{ W/m}^2 = 0.75 \text{ mW/cm}^2$$



Test No.	Antenna Module	H	V	Band	Frequency (GHz)	Exposure Surface	Input Power limit (dBm)	Test Separation	Modulation	Epeak [V/m]	Hpeak [A/m]	Measured results Savg inc 4cm <sup>2</sup> (W/m <sup>2</sup> )	Measured results Savg tot 4cm <sup>2</sup> (W/m <sup>2</sup> )
	Plane A	6	-	n260	38.50	Top (S5)	11.61	2mm	CW	64.20	0.252	1.77	2.11
	Plane A	-	2	n260	38.50	Top (S5)	11.61	2mm	CW	65.20	0.185	2.36	2.72
	Plane A	2	2	n260	38.50	Top (S5)	11.61	2mm	CW	66.30	0.191	2.44	2.76
	Plane A	2	2	n260	37.00	Top (S5)	11.61	2mm	CW	62.30	0.157	2.00	2.31
	Plane A	6	6	n260	40.00	Top (S5)	11.61	2mm	CW	70.40	0.197	2.07	2.61
	Plane A	2	2	n260	38.50	Front (S1)	11.61	2mm	CW	44.10	0.114	1.57	1.75
	Plane A	3	3	n260	38.50	Back (S2)	11.61	2mm	CW	21.40	0.048	0.335	0.432
	Plane A	4	4	n260	38.50	Left (S4)	11.61	2mm	CW	8.57	0.022	0.054	0.065
	Plane A	6	6	n260	38.50	Right (S3)	11.61	2mm	CW	21.20	0.057	0.569	0.685
	Plane B	4	-	n260	38.50	Back (S2)	11.46	2mm	CW	58.80	0.147	1.79	2.01
	Plane B	-	1	n260	38.50	Back (S2)	11.46	2mm	CW	72.30	0.182	1.84	2.29
1	Plane B	1	1	n260	38.50	Back (S2)	11.46	2mm	CW	101.00	0.270	4.00	4.66
	Plane B	3	3	n260	37.00	Back (S2)	11.46	2mm	CW	66.10	0.192	2.66	3.14
	Plane B	6	6	n260	40.00	Back (S2)	11.46	2mm	CW	87.20	0.225	3.41	3.86
	Plane B	4	4	n260	38.50	Front (S1)	11.46	2mm	CW	20.40	0.049	0.215	0.27
	Plane B	4	4	n260	38.50	Left (S4)	11.46	2mm	CW	8.07	0.177	0.057	0.08
	Plane B	4	4	n260	38.50	Right (S3)	11.46	2mm	CW	32.30	0.106	0.612	0.669
	Plane B	1	1	n260	38.50	Top (S5)	11.46	2mm	CW	35.40	0.104	1.28	1.4
	Plane A	0	-	n261	27.925	Top (S5)	10.7	2mm	CW	56.80	0.159	1.38	1.84
	Plane A	-	3	n261	27.925	Top (S5)	10.7	2mm	CW	56.70	0.141	2.04	2.23
	Plane A	0	0	n261	27.925	Top (S5)	10.7	2mm	CW	69.10	0.210	2.09	2.68
	Plane A	0	0	n261	27.500	Top (S5)	10.7	2mm	CW	65.60	0.223	1.88	2.59
	Plane A	3	3	n261	28.350	Top (S5)	10.7	2mm	CW	74.40	0.214	2.97	3.43
	Plane A	0	0	n261	28.350	Front (S1)	10.7	2mm	CW	33.50	0.093	0.732	0.834
	Plane A	0	0	n261	28.350	Back (S2)	10.7	2mm	CW	33.60	0.085	0.886	1.06
	Plane A	3	3	n261	28.350	Left (S4)	10.7	2mm	CW	6.83	0.023	0.034	0.041
	Plane A	4	4	n261	28.350	Right (S3)	10.7	2mm	CW	24.70	0.059	0.316	0.396
	Plane B	3	-	n261	27.925	Back (S2)	10.33	2mm	CW	57.20	0.192	1.85	2.16
	Plane B	-	5	n261	27.925	Back (S2)	10.33	2mm	CW	47.10	0.128	1.78	1.89
2	Plane B	0	0	n261	27.925	Back (S2)	10.33	2mm	CW	80.80	0.228	3.50	4.02
	Plane B	0	0	n261	27.500	Back (S2)	10.33	2mm	CW	67.50	0.248	2.79	3.45
	Plane B	0	0	n261	28.350	Back (S2)	10.33	2mm	CW	82.70	0.216	3.24	3.79
	Plane B	6	6	n261	27.925	Front (S1)	10.33	2mm	CW	28.90	0.072	0.493	0.573
	Plane B	2	2	n261	27.925	Left (S4)	10.33	2mm	CW	7.26	0.021	0.056	0.058
	Plane B	3	3	n261	27.925	Right (S3)	10.33	2mm	CW	18.40	0.052	0.317	0.397
	Plane B	6	6	n261	27.925	Top (S5)	10.33	2mm	CW	35.10	0.105	1.05	1.52



## **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 Samsung S.LSI TAS feature, 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.

### **TAS managed and controlled for Multi-RATs (5GNR + LTE)**

The power ratio factors are  $g_1$  and  $g_2$  for LTE and NR respectively. The main purpose of these power ratio factors is to split the available SAR budget among different RATs, so  $g_1 + g_2 \leq 1$ . The value of  $g_1$  is computed based on the need of the anchor (LTE) and can be changed if the anchor changes its power request. Based on the SAR Budget portion allocated to the anchor, the value of  $g_2$  will be computed. At steady state (where all RATs are being on for a while), the allocated power ratio factors will guarantee that the total exposure ratio never exceeds the highest exposure of either one.

The reported time-averaged PD is applicable for the worst-surface of the device, and for other surfaces the reported PD is determined as below

1. Calculate ratio of simulated PD for desired surface to simulated PD of worst surface for a given beam
  2. Repeat 1 to obtain ratios for all supported beams, and determine maximum ratio
  3. Repeat 1~2 to obtain the corresponding worst-case PD for other surfaces which are needed for TER analysis.
- *For body-worn and hotspot scenario, if SAR was measured at 15mm and 10mm, respectively, then the worst-case PD at 15mm and 10mm separation distance should be determined per surface as*
    - $15mm\_worst\_case\_PD = PD\_ratio\_15mm\_to\_2mm * reported\ time-averaged\ PD$
    - $10mm\_worst\_case\_PD = PD\_ratio\_10mm\_to\_2mm * reported\ time-averaged\ PD$

**12. Simultaneous-Tx analysis**

Config	TX Mode	Capable simultaneous TX Configurations
1	WWAN ON + FR2 (Cellular on)	Bluetooth(Ant 4) (BDR/EDR/BLE)
2		Bluetooth(Ant 3) (BDR/EDR/BLE)
3		Bluetooth(Ant 3+4) (BDR/EDR)
4		WiFi 5GHz/6E MIMO (Ant 3+Ant 4) + Bluetooth(Ant 4)
5		WiFi 5GHz/6E MIMO (Ant 3+Ant 4) + Bluetooth(Ant 3)
6		WiFi 5GHz/6E MIMO (Ant 3+Ant 4) + Bluetooth(Ant 3+4)
7		WiFi 5GHz/6E MIMO (Ant 3+Ant 4)
8		WiFi 2.4GHz 11b SISO (Ant 3)
9		WiFi 2.4GHz 11b SISO (Ant 4)
10		WiFi 2.4GHz MIMO/CDD (Ant 3+4)
11		WiFi 2.4GHz 11b SISO (Ant 3) + WiFi 5GHz/6E MIMO (Ant 3+Ant 4)
12		WiFi 2.4GHz 11b SISO (Ant 4) + WiFi 5GHz/6E MIMO (Ant 3+Ant 4)
13		WiFi 2.4GHz MIMO (Ant 3+4) + WiFi 5GHz/6E MIMO (Ant 3+Ant 4)

**General Note:**

1. The WLAN and Bluetooth SAR test results, referenced from the report of FCC ID: A4RGB62Z (Sporton SAR Report No. FA161608-03C).
2. The Sim-Tx configuration combination include in operation description will be match the title in the below Sum-Tx evaluation table
3. For LTE+5G NR+WiFi+BT, due to the TAS control, simultaneous transmission compliance can be assessed on LTE+WiFi/BT and 5G NR+WiFi/BT, and the validation of the time-averaging algorithm and compliance under the Tx varying transmission scenario for WWAN technologies are reported in Part 2 report. For 5G NR FR2 with WiFi, total exposure ration is calculated

The  $[\sum \text{ of (the highest measured or estimated SAR for each standalone antenna configuration, adjusted for maximum tune-up tolerance) / 1.6 W/kg}] + [\sum \text{ of MPE ratios}] \leq 1.0$ .





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

NR Band	Antenna Module	Surface		Evaluation Distance (mm)	Ratio*	PD_Design Target +Total uncertainty (W/m <sup>2</sup> )	PD_Design Target +Total uncertainty (W/m <sup>2</sup> )*Ratio	Remark
n260	Plane A	Front	S1	2mm	0.48	7.5	3.6	Head/Extremity
		Back	S2	2mm	0.48	7.5	3.6	Extremity
		Right	S3	2mm	0.68	7.5	5.1	Extremity
		Top	S5	2mm	1.00	7.5	7.5	Extremity
		worst-surface	S5/S5	10mm	0.67	7.5	5.0	Body worn/Hotspot
n260	Plane B	Front	S1	2mm	0.15	7.5	1.1	Head/Extremity
		Back	S2	2mm	1.00	7.5	7.5	Extremity
		Right	S3	2mm	0.44	7.5	3.3	Extremity
		Top	S5	2mm	0.45	7.5	3.4	Extremity
		worst-surface	S2/S2	10mm	0.51	7.5	3.8	Body worn/Hotspot
n261	Plane A	Front	S1	2mm	0.51	7.5	3.8	Head/Extremity
		Back	S2	2mm	0.51	7.5	3.8	Extremity
		Right	S3	2mm	0.57	7.5	4.3	Extremity
		Top	S5	2mm	1.00	7.5	7.5	Extremity
		worst-surface	S5/S5	10mm	0.53	7.5	4.0	Body worn/Hotspot
n261	Plane B	Front	S1	2mm	0.21	7.5	1.6	Head/Extremity
		Back	S2	2mm	1.00	7.5	7.5	Extremity
		Right	S3	2mm	0.43	7.5	3.2	Extremity
		Top	S5	2mm	0.53	7.5	4.0	Extremity
		worst-surface	S2/S2	10mm	0.53	7.5	4.0	Body worn/Hotspot

\*Ratio is highest ratio of (PD on desired exposure plane) / (PD on worst-surface) out of all beams and out of all channels illustrated in Power Density Simulation Report.



<Head Exposure Condition>

<WWAN with WLAN Index 3, BT Index 1>

WWAN Band	Exposure Position	2	3	4	5	6	7	8	9	Reported 1g SAR/1.6 + PD/10 Summation Total Exposure ratio					
		WLAN2.4GHz Ant 4	WLAN2.4GHz Ant 3	WLAN2.4GHz Ant 4+3	WLAN5/6GHz Ant 4+3	Bluetooth Ant 4	Bluetooth Ant 3	Bluetooth Ant 4+3	PD	2+9 Summed Ratio	3+9 Summed Ratio	4+9 Summed Ratio	5+6+9 Summed Ratio	5+7+9 Summed Ratio	5+8+9 Summed Ratio
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	4cm <sup>2</sup> (W/m <sup>2</sup> )					
n260 Plan A	Right Cheek	0.210	0.577	0.587	0.319	0.084	0.275	0.279	3.6	0.491	0.721	0.727	0.612	0.731	0.734
	Right Tilted	0.257	0.146	0.336	0.185	0.097	0.069	0.180	3.6	0.521	0.451	0.570	0.536	0.519	0.588
	Left Cheek	0.467	0.185	0.501	0.441	0.155	0.112	0.130	3.6	0.652	0.476	0.673	0.733	0.706	0.717
	Left Tilted	0.406	0.056	0.436	0.345	0.138	0.028	0.133	3.6	0.614	0.395	0.633	0.662	0.593	0.659
n260 Plan B	Right Cheek	0.210	0.577	0.587	0.319	0.084	0.275	0.279	1.1	0.241	0.471	0.477	0.362	0.481	0.484
	Right Tilted	0.257	0.146	0.336	0.185	0.097	0.069	0.180	1.1	0.271	0.201	0.320	0.286	0.269	0.338
	Left Cheek	0.467	0.185	0.501	0.441	0.155	0.112	0.130	1.1	0.402	0.226	0.423	0.483	0.456	0.467
	Left Tilted	0.406	0.056	0.436	0.345	0.138	0.028	0.133	1.1	0.364	0.145	0.383	0.412	0.343	0.409
n261 Plan A	Right Cheek	0.210	0.577	0.587	0.319	0.084	0.275	0.279	3.8	0.511	0.741	0.747	0.632	0.751	0.754
	Right Tilted	0.257	0.146	0.336	0.185	0.097	0.069	0.180	3.8	0.541	0.471	0.590	0.556	0.539	0.608
	Left Cheek	0.467	0.185	0.501	0.441	0.155	0.112	0.130	3.8	0.672	0.496	0.693	0.753	0.726	0.737
	Left Tilted	0.406	0.056	0.436	0.345	0.138	0.028	0.133	3.8	0.634	0.415	0.653	0.682	0.613	0.679
n261 Plan B	Right Cheek	0.210	0.577	0.587	0.319	0.084	0.275	0.279	1.6	0.291	0.521	0.527	0.412	0.531	0.534
	Right Tilted	0.257	0.146	0.336	0.185	0.097	0.069	0.180	1.6	0.321	0.251	0.370	0.336	0.319	0.388
	Left Cheek	0.467	0.185	0.501	0.441	0.155	0.112	0.130	1.6	0.452	0.276	0.473	0.533	0.506	0.517
	Left Tilted	0.406	0.056	0.436	0.345	0.138	0.028	0.133	1.6	0.414	0.195	0.433	0.462	0.393	0.459

<WWAN with WLAN Index 4>

WWAN Band	Exposure Position	2	3	4	5	9	Reported 1g SAR/1.6 + PD/10 Summation Total Exposure ratio		
		WLAN2.4GHz Ant 4	WLAN2.4GHz Ant 3	WLAN2.4GHz Ant 4+3	WLAN5/6GHz Ant 4+3	PD	2+5+9 Summed Ratio	3+5+9 Summed Ratio	4+5+9 Summed Ratio
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	4cm <sup>2</sup> (W/m <sup>2</sup> )			
n260 Plan A	Right Cheek	0.050	0.131	0.157	0.388	3.6	0.634	0.684	0.701
	Right Tilted	0.061	0.027	0.065	0.228	3.6	0.541	0.519	0.543
	Left Cheek	0.138	0.036	0.127	0.389	3.6	0.689	0.626	0.683
	Left Tilted	0.108	0.009	0.086	0.341	3.6	0.641	0.579	0.627
n260 Plan B	Right Cheek	0.050	0.131	0.157	0.388	1.1	0.384	0.434	0.451
	Right Tilted	0.061	0.027	0.065	0.228	1.1	0.291	0.269	0.293
	Left Cheek	0.138	0.036	0.127	0.389	1.1	0.439	0.376	0.433
	Left Tilted	0.108	0.009	0.086	0.341	1.1	0.391	0.329	0.377
n261 Plan A	Right Cheek	0.050	0.131	0.157	0.388	3.8	0.654	0.704	0.721
	Right Tilted	0.061	0.027	0.065	0.228	3.8	0.561	0.539	0.563
	Left Cheek	0.138	0.036	0.127	0.389	3.8	0.709	0.646	0.703
	Left Tilted	0.108	0.009	0.086	0.341	3.8	0.661	0.599	0.647
n261 Plan B	Right Cheek	0.050	0.131	0.157	0.388	1.6	0.434	0.484	0.501
	Right Tilted	0.061	0.027	0.065	0.228	1.6	0.341	0.319	0.343
	Left Cheek	0.138	0.036	0.127	0.389	1.6	0.489	0.426	0.483
	Left Tilted	0.108	0.009	0.086	0.341	1.6	0.441	0.379	0.427



<Hotspot Exposure Condition>

<WWAN with WLAN Index 7>

WWAN Band	Exposure Position	2	3	4	5	9	Reported 1g SAR/1.6 + PD/10 Summation Total Exposure ratio			
		WLAN2.4GHz Ant 4	WLAN2.4GHz Ant 3	WLAN2.4GHz Ant 4+3	WLAN5/6GHz Ant 4+3	PD	5+9 Summed Ratio	2+9 Summed Ratio	3+9 Summed Ratio	4+9 Summed Ratio
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	4cm <sup>2</sup> (W/m <sup>2</sup> )				
n260 Plan A	Front	0.139	0.217	0.337	0.501	5.0	0.813	0.587	0.636	0.711
	Back	0.161	0.300	0.410	0.360	5.0	0.725	0.601	0.688	0.756
	Left side	0.026	0.510	0.512	0.244	5.0	0.653	0.516	0.819	0.820
	Right side	0.096	0.003	0.100	0.318	5.0	0.699	0.560	0.502	0.563
	Top side	0.220	0.028	0.199	0.124	5.0	0.578	0.638	0.518	0.624
	Bottom side					5.0	0.500	0.500	0.500	0.500
n260 Plan B	Front	0.139	0.217	0.337	0.501	3.8	0.693	0.467	0.516	0.591
	Back	0.161	0.300	0.410	0.360	3.8	0.605	0.481	0.568	0.636
	Left side	0.026	0.510	0.512	0.244	3.8	0.533	0.396	0.699	0.700
	Right side	0.096	0.003	0.100	0.318	3.8	0.579	0.440	0.382	0.443
	Top side	0.220	0.028	0.199	0.124	3.8	0.458	0.518	0.398	0.504
	Bottom side					3.8	0.380	0.380	0.380	0.380
n261 Plan A	Front	0.139	0.217	0.337	0.501	4.0	0.713	0.487	0.536	0.611
	Back	0.161	0.300	0.410	0.360	4.0	0.625	0.501	0.588	0.656
	Left side	0.026	0.510	0.512	0.244	4.0	0.553	0.416	0.719	0.720
	Right side	0.096	0.003	0.100	0.318	4.0	0.599	0.460	0.402	0.463
	Top side	0.220	0.028	0.199	0.124	4.0	0.478	0.538	0.418	0.524
	Bottom side					4.0	0.400	0.400	0.400	0.400
n261 Plan B	Front	0.139	0.217	0.337	0.501	4.0	0.713	0.487	0.536	0.611
	Back	0.161	0.300	0.410	0.360	4.0	0.625	0.501	0.588	0.656
	Left side	0.026	0.510	0.512	0.244	4.0	0.553	0.416	0.719	0.720
	Right side	0.096	0.003	0.100	0.318	4.0	0.599	0.460	0.402	0.463
	Top side	0.220	0.028	0.199	0.124	4.0	0.478	0.538	0.418	0.524
	Bottom side					4.0	0.400	0.400	0.400	0.400



**<WWAN with WLAN Index 8>**

WWAN Band	Exposure Position	2	3	4	5	9	Reported 1g SAR/1.6 + PD/10 Summation Total Exposure ratio		
		WLAN2.4GHz Ant 4	WLAN2.4GHz Ant 3	WLAN2.4GHz Ant 4+3	WLAN5/6GHz Ant 4+3	PD	2+5+9 Summed Ratio	3+5+9 Summed Ratio	4+5+9 Summed Ratio
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	4cm <sup>2</sup> (W/m <sup>2</sup> )			
n260 Plan A	Front	0.139	0.106	0.181	0.227	5.0	<b>0.729</b>	<b>0.708</b>	<b>0.755</b>
	Back	0.161	0.156	0.226	0.233	5.0	<b>0.746</b>	<b>0.743</b>	<b>0.787</b>
	Left side	0.026	0.262	0.261	0.139	5.0	<b>0.603</b>	<b>0.751</b>	<b>0.750</b>
	Right side	0.096	0.001	0.095	0.166	5.0	<b>0.664</b>	<b>0.604</b>	<b>0.663</b>
	Top side	0.220	0.013	0.199	0.058	5.0	<b>0.674</b>	<b>0.544</b>	<b>0.661</b>
	Bottom side					5.0	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>
n260 Plan B	Front	0.139	0.106	0.181	0.227	3.8	<b>0.609</b>	<b>0.588</b>	<b>0.635</b>
	Back	0.161	0.156	0.226	0.233	3.8	<b>0.626</b>	<b>0.623</b>	<b>0.667</b>
	Left side	0.026	0.262	0.261	0.139	3.8	<b>0.483</b>	<b>0.631</b>	<b>0.630</b>
	Right side	0.096	0.001	0.095	0.166	3.8	<b>0.544</b>	<b>0.484</b>	<b>0.543</b>
	Top side	0.220	0.013	0.199	0.058	3.8	<b>0.554</b>	<b>0.424</b>	<b>0.541</b>
	Bottom side					3.8	<b>0.380</b>	<b>0.380</b>	<b>0.380</b>
n261 Plan A	Front	0.139	0.106	0.181	0.227	4.0	<b>0.629</b>	<b>0.608</b>	<b>0.655</b>
	Back	0.161	0.156	0.226	0.233	4.0	<b>0.646</b>	<b>0.643</b>	<b>0.687</b>
	Left side	0.026	0.262	0.261	0.139	4.0	<b>0.503</b>	<b>0.651</b>	<b>0.650</b>
	Right side	0.096	0.001	0.095	0.166	4.0	<b>0.564</b>	<b>0.504</b>	<b>0.563</b>
	Top side	0.220	0.013	0.199	0.058	4.0	<b>0.574</b>	<b>0.444</b>	<b>0.561</b>
	Bottom side					4.0	<b>0.400</b>	<b>0.400</b>	<b>0.400</b>
n261 Plan B	Front	0.139	0.106	0.181	0.227	4.0	<b>0.629</b>	<b>0.608</b>	<b>0.655</b>
	Back	0.161	0.156	0.226	0.233	4.0	<b>0.646</b>	<b>0.643</b>	<b>0.687</b>
	Left side	0.026	0.262	0.261	0.139	4.0	<b>0.503</b>	<b>0.651</b>	<b>0.650</b>
	Right side	0.096	0.001	0.095	0.166	4.0	<b>0.564</b>	<b>0.504</b>	<b>0.563</b>
	Top side	0.220	0.013	0.199	0.058	4.0	<b>0.574</b>	<b>0.444</b>	<b>0.561</b>
	Bottom side					4.0	<b>0.400</b>	<b>0.400</b>	<b>0.400</b>



**<WWAN with WLAN Index 9, BT Index 3/5>**

WWAN Band	Exposure Position	5	6	7	8	9	Reported 1g SAR/1.6 + PD/10 Summation Total Exposure ratio		
		WLAN5/6GHz Ant 4+3	Bluetooth Ant 4	Bluetooth Ant 3	Bluetooth Ant 4+3	PD	5+6+9 Summed Ratio	5+7+9 Summed Ratio	5+8+9 Summed Ratio
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	4cm <sup>2</sup> (W/m <sup>2</sup> )			
n260 Plan A	Front	0.133	0.052	0.119	0.102	5.0	<b>0.533</b>	<b>0.574</b>	<b>0.564</b>
	Back	0.383	0.062	0.149	0.108	5.0	<b>0.539</b>	<b>0.593</b>	<b>0.568</b>
	Left side	0.102	0.001	0.216	0.171	5.0	<b>0.501</b>	<b>0.635</b>	<b>0.607</b>
	Right side	0.370	0.031	0.004	0.016	5.0	<b>0.519</b>	<b>0.503</b>	<b>0.510</b>
	Top side	0.120	0.072	0.015	0.079	5.0	<b>0.545</b>	<b>0.509</b>	<b>0.549</b>
	Bottom side					5.0	<b>0.500</b>	<b>0.500</b>	<b>0.500</b>
n260 Plan B	Front	0.133	0.052	0.119	0.102	3.8	<b>0.413</b>	<b>0.454</b>	<b>0.444</b>
	Back	0.383	0.062	0.149	0.108	3.8	<b>0.419</b>	<b>0.473</b>	<b>0.448</b>
	Left side	0.102	0.001	0.216	0.171	3.8	<b>0.381</b>	<b>0.515</b>	<b>0.487</b>
	Right side	0.370	0.031	0.004	0.016	3.8	<b>0.399</b>	<b>0.383</b>	<b>0.390</b>
	Top side	0.120	0.072	0.015	0.079	3.8	<b>0.425</b>	<b>0.389</b>	<b>0.429</b>
	Bottom side					3.8	<b>0.380</b>	<b>0.380</b>	<b>0.380</b>
n261 Plan A	Front	0.133	0.052	0.119	0.102	4.0	<b>0.433</b>	<b>0.474</b>	<b>0.464</b>
	Back	0.383	0.062	0.149	0.108	4.0	<b>0.439</b>	<b>0.493</b>	<b>0.468</b>
	Left side	0.102	0.001	0.216	0.171	4.0	<b>0.401</b>	<b>0.535</b>	<b>0.507</b>
	Right side	0.370	0.031	0.004	0.016	4.0	<b>0.419</b>	<b>0.403</b>	<b>0.410</b>
	Top side	0.120	0.072	0.015	0.079	4.0	<b>0.445</b>	<b>0.409</b>	<b>0.449</b>
	Bottom side					4.0	<b>0.400</b>	<b>0.400</b>	<b>0.400</b>
n261 Plan B	Front	0.133	0.052	0.119	0.102	4.0	<b>0.433</b>	<b>0.474</b>	<b>0.464</b>
	Back	0.383	0.062	0.149	0.108	4.0	<b>0.439</b>	<b>0.493</b>	<b>0.468</b>
	Left side	0.102	0.001	0.216	0.171	4.0	<b>0.401</b>	<b>0.535</b>	<b>0.507</b>
	Right side	0.370	0.031	0.004	0.016	4.0	<b>0.419</b>	<b>0.403</b>	<b>0.410</b>
	Top side	0.120	0.072	0.015	0.079	4.0	<b>0.445</b>	<b>0.409</b>	<b>0.449</b>
	Bottom side					4.0	<b>0.400</b>	<b>0.400</b>	<b>0.400</b>



**<Body-Worn Exposure Condition>**

**<WWAN with BT Index 2>**

WWAN Band	Exposure Position	1	6	7	8	9	Reported 1g SAR/1.6 + PD/10 Summation Total Exposure ratio		
		WWAN	Bluetooth Ant 4	Bluetooth Ant 3	Bluetooth Ant 4+3	PD	6+9 Summed Ratio	7+9 Summed Ratio	8+9 Summed Ratio
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	4cm <sup>2</sup> (W/m <sup>2</sup> )			
n260 Plan A	Front	0.476	0.108	0.231	0.125	5.0	0.568	0.644	0.578
	Back	0.710	0.118	0.322	0.171	5.0	0.574	0.701	0.607
n260 Plan B	Front	0.727	0.108	0.231	0.125	3.8	0.448	0.524	0.458
	Back	0.962	0.118	0.322	0.171	3.8	0.454	0.581	0.487
n261 Plan A	Front	0.622	0.108	0.231	0.125	4.0	0.468	0.544	0.478
	Back	0.910	0.118	0.322	0.171	4.0	0.474	0.601	0.507
n261 Plan B	Front	0.683	0.108	0.231	0.125	4.0	0.468	0.544	0.478
	Back	0.980	0.118	0.322	0.171	4.0	0.474	0.601	0.507

**<WWAN with WLAN Index 7>**

WWAN Band	Exposure Position	2	3	4	5	9	Reported 1g SAR/1.6 + PD/10 Summation Total Exposure ratio			
		WLAN2.4GHz Ant 4	WLAN2.4GHz Ant 3	WLAN2.4GHz Ant 4+3	WLAN5/6GHz Ant 4+3	PD	5+9 Summed Ratio	2+9 Summed Ratio	3+9 Summed Ratio	4+9 Summed Ratio
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	4cm <sup>2</sup> (W/m <sup>2</sup> )				
n260 Plan A	Front	0.139	0.217	0.337	0.501	5.0	0.813	0.587	0.636	0.711
	Back	0.161	0.300	0.410	0.360	5.0	0.725	0.601	0.688	0.756
n260 Plan B	Front	0.139	0.217	0.337	0.501	3.8	0.693	0.467	0.516	0.591
	Back	0.161	0.300	0.410	0.360	3.8	0.605	0.481	0.568	0.636
n261 Plan A	Front	0.139	0.217	0.337	0.501	4.0	0.713	0.487	0.536	0.611
	Back	0.161	0.300	0.410	0.360	4.0	0.625	0.501	0.588	0.656
n261 Plan B	Front	0.139	0.217	0.337	0.501	4.0	0.713	0.487	0.536	0.611
	Back	0.161	0.300	0.410	0.360	4.0	0.625	0.501	0.588	0.656



<WWAN with WLAN Index 8>

WWAN Band	Exposure Position	2	3	4	5	9	Reported 1g SAR/1.6 + PD/10 Summation Total Exposure ratio		
		WLAN2.4GHz Ant 4	WLAN2.4GHz Ant 3	WLAN2.4GHz Ant 4+3	WLAN5/6GHz Ant 4+3	PD	2+5+9 Summed Ratio	3+5+9 Summed Ratio	4+5+9 Summed Ratio
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	4cm <sup>2</sup> (W/m <sup>2</sup> )			
n260 Plan A	Front	0.139	0.106	0.181	0.227	5.0	0.729	0.708	0.755
	Back	0.161	0.156	0.226	0.233	5.0	0.746	0.743	0.787
n260 Plan B	Front	0.139	0.106	0.181	0.227	3.8	0.609	0.588	0.635
	Back	0.161	0.156	0.226	0.233	3.8	0.626	0.623	0.667
n261 Plan A	Front	0.139	0.106	0.181	0.227	4.0	0.629	0.608	0.655
	Back	0.161	0.156	0.226	0.233	4.0	0.646	0.643	0.687
n261 Plan B	Front	0.139	0.106	0.181	0.227	4.0	0.629	0.608	0.655
	Back	0.161	0.156	0.226	0.233	4.0	0.646	0.643	0.687

<WWAN with WLAN Index 9, BT Index 3>

WWAN Band	Exposure Position	5	6	7	8	9	Reported 1g SAR/1.6 + PD/10 Summation Total Exposure ratio		
		WLAN5/6GHz Ant 4+3	Bluetooth Ant 4	Bluetooth Ant 3	Bluetooth Ant 4+3	PD	5+6+9 Summed Ratio	5+7+9 Summed Ratio	5+8+9 Summed Ratio
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	4cm <sup>2</sup> (W/m <sup>2</sup> )			
n260 Plan A	Front	0.133	0.052	0.119	0.102	5.0	0.533	0.574	0.564
	Back	0.383	0.062	0.149	0.108	5.0	0.539	0.593	0.568
n260 Plan B	Front	0.133	0.052	0.119	0.102	3.8	0.413	0.454	0.444
	Back	0.383	0.062	0.149	0.108	3.8	0.419	0.473	0.448
n261 Plan A	Front	0.133	0.052	0.119	0.102	4.0	0.433	0.474	0.464
	Back	0.383	0.062	0.149	0.108	4.0	0.439	0.493	0.468
n261 Plan B	Front	0.133	0.052	0.119	0.102	4.0	0.433	0.474	0.464
	Back	0.383	0.062	0.149	0.108	4.0	0.439	0.493	0.468



<Product Specific Exposure Condition>

WWAN Band	Exposure Position	2	9	Reported 1g SAR/1.6 + PD/10 Summation Total Exposure ratio
		WLAN5/6GHz Ant 4+3	PD	
		10g SAR (W/kg)	4cm <sup>2</sup> (W/m <sup>2</sup> )	2+9 Summed Ratio
n260 Plan A	Front	1.283	3.6	0.681
	Back	0.963	3.6	0.601
	Left side	0.504		0.126
	Right side	0.491	5.1	0.633
	Top side	0.375	7.5	0.844
	Bottom side			0.000
n260 Plan B	Front	1.283	1.1	0.431
	Back	0.963	7.5	0.991
	Left side	0.504		0.126
	Right side	0.491	3.3	0.453
	Top side	0.375	3.4	0.434
	Bottom side			0.000
n261 Plan A	Front	1.283	3.8	0.701
	Back	0.963	3.8	0.621
	Left side	0.504		0.126
	Right side	0.491	4.3	0.553
	Top side	0.375	7.5	0.844
	Bottom side			0.000
n261 Plan B	Front	1.283	1.6	0.481
	Back	0.963	7.5	0.991
	Left side	0.504		0.126
	Right side	0.491	3.2	0.443
	Top side	0.375	4.0	0.494
	Bottom side			0.000

Test Engineer : Mood Huang and Carter Jhuang





### 13. Uncertainty Assessment

The budget is valid for evaluation distances  $> \lambda/2\pi$ . For specific tests and configurations, the Uncertainty could be considerably smaller.

Preliminary Module mmWave Uncertainty Budget Evaluation Distances to the Antennas $> \lambda / 2\pi$						
Error Description	Uncertainty Value ( $\pm$ dB)	Probability	Divisor	(Ci)	Standard Uncertainty ( $\pm$ dB)	(Vi) Veff
<b>Measurement System</b>						
Probe Calibration	0.49	N	1	1	0.49	$\infty$
Hemispherical Isotropy	0.50	R	1.732	1	0.29	$\infty$
Linearity	0.20	R	1.732	0	0.12	$\infty$
System Detection Limits	0.04	R	1.732	1	0.02	$\infty$
Modulation Response	0.40	R	1.732	1	0.23	$\infty$
Readout Electronics	0.03	N	1	1	0.03	$\infty$
Response Time	0.00	R	1.732	1	0.00	$\infty$
Integration Time	0.00	R	1.732	1	0.00	$\infty$
RF Ambient Noise	0.2	R	1.732	1	0.12	$\infty$
RF Ambient Reflections	0.21	R	1.732	1	0.12	$\infty$
Probe Positioner	0.04	R	1.732	1	0.02	$\infty$
Probe Positioning	0.30	R	1.732	1	0.17	$\infty$
S <sub>avg</sub> Reconstruction	0.60	R	1.732	1	0.35	$\infty$
<b>Test Sample Related</b>						
Power Drift	0.2	R	1.732	1	0.12	$\infty$
Input Power	0	N	1	0	0.00	$\infty$
Combined Std. Uncertainty					0.76 dB	$\infty$
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.