FCC 47 CFR § 2.1093
Std IEC 62232 :2022

POWER DENSITY EVALUATION REPORT
(Part 1 : Test in Static Transmission Condition)

FOR

GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, NFC, WPT

MODEL NUMBER: SM-S921U, SM-S921U1

FCC ID: A3LSMS921U

REPORT NUMBER: 4790976523-S3V2

ISSUE DATE: 11/21/2023

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Testing Laboratory

TL-637

Revision History

Rev.	Date	Revisions	Revised By
V1	10/27/2023	Initial Issue	--
V2	11/21/2023	Revised typo error in the Section 10.2	Jeongyeon Won

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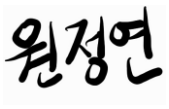
1. Attestation of Test Results

Applicant Name	SAMSUNG ELECTRONICS CO.,LTD.	
FCC ID	A3LSMS921U	
Model Name	SM-S921U, SM-S921U1	
Applicable Standards	FCC 47 CFR § 2.1093 Std IEC 62232 :2022	
Exposure Category	RADIOFREQUENCY RADIATION EXPOSURE (above 6GHz)	
	Power density Uncontrol (mW/cm^2 over 4cm^2) for 30min average	
fGeneral population / Uncontrolled exposure	1.0	
Applicable limit	☒ Uncontrol	
	Measured psPD	Reported psPD
n258 Result (mW/cm^2 over 4cm^2)	*0.66*	*0.76*
n261 Result (mW/cm^2 over 4cm^2)	*0.66*	*0.76*
n260 Result (mW/cm^2 over 4cm^2)	*0.66*	*0.76*
TER (Total Exposure Ratio)	*0.99*	
Date Tested	9/15/2023 to 10/22/2023	
Test Results	Pass	

UL Korea, Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Korea, Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government. This report is written to support regulatory compliance of the applicable standards stated above.

Approved & Released By:	Prepared By:
	
Justin Park Operations Leader UL Korea, Ltd. Suwon Laboratory	Jeongyeon Won Laboratory Engineer UL Korea, Ltd. Suwon Laboratory

2. Introduction

The equipment under test (EUT) is a Phone, model SM-S921U,SM-S921U1 (FCC ID: A3LSMS921U), it contains Qualcomm modems supporting 2G/3G/4/5G technologies and WLAN bands(with BT). These WWAN and WLAN(with BT) modems enable Qualcomm Smart Transmit features with algorithms to control and manage transmitting power in real time and to ensure at all times the time-averaged RF exposure from WWAN and WLAN(with BT) is in compliance with FCC requirements.

The purpose of this Part 1 report is to demonstrate that this EUT complies with FCC RF exposure limits at maximum time-averaged transmit power limits for WWAN technologies, and at maximum time-averaged transmit power limits for WLAN(with BT) technologies.

- Power density (PD) compliance for all WWAN radios (4G + 5G mmW NR) is assessed based on maximum time-averaged transmit power (static transmission condition). Relevant FCC KDBs and exclusion criteria are applied on a time-average power basis for WWAN technologies. The maximum time-averaged transmit power limits for supported WWAN technologies, bands, and antennas in this report are derived in Part 0 report.
- The validation of the Qualcomm Smart Transmit time-averaging algorithm and compliance under the Tx varying transmission scenario for WWAN and WLAN(with BT) technologies are reported in Part 2 report.
- Demonstrate compliance in simultaneous transmission scenarios involving both WWAN and WLAN(with BT) transmissions, where WWAN and WLAN(with BT) exposure is assessed based on time-averaged transmit power limits, and UWB and NFC exposure is assessed separately.

By following the above steps, this report demonstrates that this EUT complies with FCC RF exposure limits for FCC equipment authorization of FCC ID: A3LSMS921U.

The *input.power.limit* used in this report are determined and listed in Part 0 report.

Refer to compliance Summary report for product description and terminology used in this report.

3. Measurement setup and General Information

The SAR measurement are recorded in UL FCC Report_SAR_Part.1 (Report No. 4790976523-S1). This section provides the detail of the test setup used for PD measurement.

3.1. Power density measurement system

The power density measurement system is constructed based on the DASY6 platform by SPEAG. The DASY6 with EummWV2 and 5G software module can measure the RF exposure (power density) up to 110GHz as close as 2mm from any transmitter.

3.1.1. Power density probe

The EummWV2 probe is used in the power density measurement. It is designed for precise near-field measurements in the mm-wave range by Schmid & Partner Engineering AG of Zurich, Switzerland. The specifications are:

- Frequency range: 0.75 ~ 110 GHz
- Dynamic range: <50 – 3000 V/m (up to 10000 V/m with additional PRE-10 voltage divider)
- Linearity: < ±0.2 dB
- Supports sensor model calibration (SMC)
- ISO 17025 accredited calibration

3.1.2. Power density measurement system verification

The power density system verification is performed using the SPEAG verification device. It consists of a ka-band horn antenna with a corresponding gun oscillator packaged within a cube-shaped housing.

The specification of the verification device is:

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

Table 2-1 shows the verification test results. The measured power density (PD) value is within 10% of target level. Note that the uncertainty of 5G verification source is 1.4dB (k=2).

3.2. Test Specification, Methods and Procedures

Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1093, the following FCC Published RF exposure KDB procedures:

- 447498 D01 General RF Exposure Guidance v06
- 447498 D03 Supplement C Cross-Reference v01
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- 865664 D02 RF Exposure Reporting v01r02
- SPEAG, 5G Module V1.2 Application Note: 5G Compliance Testing, August 2018
- IEC 62232 Edition 3.0 2022-10

In addition to the above, TCB workshop information was used.

- TCB workshop November, 2017; Page 19 - 25, RF Exposure Procedures (Power Density Evaluation)
- TCB workshop October, 2018; Page 3, RF Exposure Procedures (Millimeter Wave Assessment)
- TCB workshop October, 2018; Page 5, RF Exposure Procedures (Millimeter Wave Measurement)
- TCB workshop April, 2019; Page 3, RF Exposure Procedures (Millimeter Wave RF Exposure Evaluation)
- TCB workshop November, 2019; Page 14, RF Exposure Procedures (Millimeter Wave Scan Requirements)

3.3. Test Specification, Methods and Procedures

The test sites and measurement facilities used to collect data are located at

Suwon
SAR 1
SAR 9

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637.
The full scope of accreditation can be viewed at :
https://www.iasonline.org/wp-content/uploads/2017/05/TL-637 -cert-New.pdf.

4. Test Condition, Configuration, and Assessment

4.1. Qualcomm Smart Transmit parameters

The input parameters described are required for functionality of Qualcomm Smart Transmit algorithm.

These parameters are entered through the *Embedded File System* (EFS) and cannot be accessed by the end-user.

Part 0 report documents determination of P_{limit} for sub-6 WWAN bands, and *input.power.limit* for 5G mmW NR bands using the below design targets and device related uncertainty:

- *SAR_design_target* of 1.0 W/kg for 1g SAR and sub-6 WWAN device design related uncertainty of 1.0 dB.
- *PD_design_target* of 0.631 mW/cm^2 4cm^{2}PD and mmW device design related uncertainty of 1.4 dB.

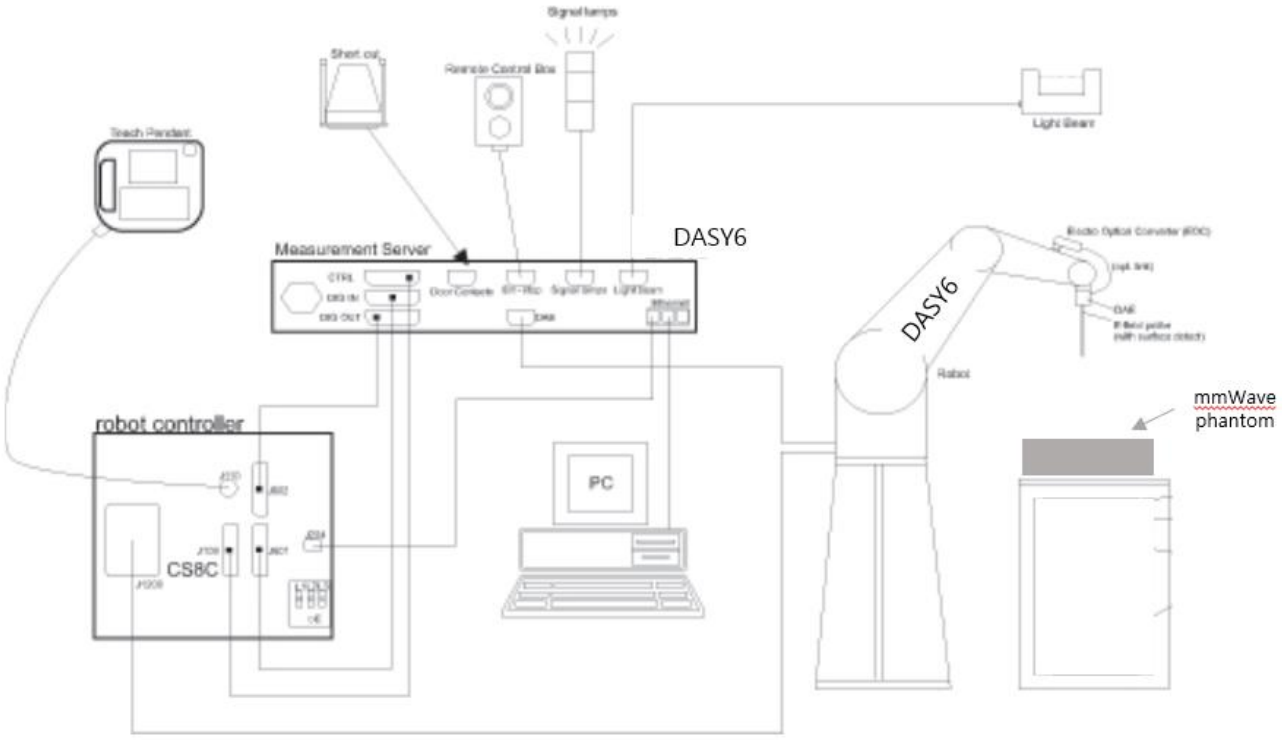
4.2. Qualcomm Smart Transmit parameters for the 5G mmW NR

The input.power.limit parameter for 5G mmW NR radio determined in Section 8.5 of this report are populated via EFS entry into the EUT.

5. Measurement System & Test Equipment

5.1. Measurement System

The DASY6 & 8 system used for performing compliance tests consists of the following items:



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- The EUmmWVx probe is based on the pseudo-vector probe design, which not only measures the field magnitude but also derives its polarization ellipse.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running Win10 and the DASY6 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom which is specialized for 5G other accessories according to the targeted measurement.

5.2. EUmmWVx / 5G Probe
E-Field mm-Wave Probe for General Near-Field Measurements

Two dipoles optimally arranged to obtain pseudo-vector information
Minimum 3 measurements/point, 120º rotated around probe axis
Sensors (0.8mm length) printed on glass substrate protected by high density foam
Low perturbation of the measured field
Requires positioner which can do accurate probe rotation

Frequency Range	750 MHz – 110 GHz
Dynamic Range	< 20 V/m - 10'000 V/m with PRE-10 (min < 50 V/m - 3000 V/m)
Position Precision	< 0.2 mm (DASY6)
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: encapsulation 8 mm (internal sensor < 1mm) Distance from probe tip to dipole centers: < 2 mm Sensor displacement to probe's calibration point: < 0.3 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 (cDASY6 5G or ICEy-mmW module required)
Compatibility	cDASY6 + 5G-Module SW1.0 and higher

5.3. Data Acquisition Electronics(DAE)

Serial optical link for communication with DASY4/5 embedded system (fully remote controlled) Two-step probe touch detector for mechanical surface detection and emergency robsot stop

Measurement Range	−100 – +300 mV (16 bit resolution and two range settings: 4 mV, 400 mV)
Input Offset Voltage	<5 µV (with auto zero)
Input Resistance	200 Mohm
Input Bias Current	<50 fA
Battery Power	>10 hours of operation (with two 9.6 V NiMH batteries)
Dimensions (L × W × H)	60 × 60 × 68 mm

6. Measurement Procedures

6.1. System Verification Scan Procedures

cDASY6 5G Module V1.2 supports “5G Scan”, a fine resolution scan performed on two different planes which is used to reconstruct the E- and H-fields as well as the power density; the average power density is derived from this measurement.

Step 1: Power Reference Measurement
The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to devise under test.

Step 2: 5G Scan
The steps in the X, Y, and Z directions are specified in terms of fractions of the signal wavelength ,lambda.
Area Scan Parameters extracted from SPEAG, 5G Module V1.2 Application Note.

Recommended settings for measurement of verification sources

Frequency [GHz]	Grid step	Grid extent X/Y [mm]	Measurement points
10	0.125 ($\frac{\lambda}{8}$)	60/60	18 × 18
30	0.25 ($\frac{\lambda}{4}$)	60/60	26 × 26
45	0.25 ($\frac{\lambda}{4}$)	42/42	28 × 28
60	0.25 ($\frac{\lambda}{4}$)	32.5/32.5	28 × 28
90	0.25 ($\frac{\lambda}{4}$)	30/30	38 × 38

The minimum distance of probe sensors to verification source surface, horn antenna, is 10 mm.
In other case, distance is determined as λ / 5, details are shown in section 6.3.

Step 3: Power drift measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.
When the drift is larger than ± 5 %, test is repeated from step1.

6.2. Scan Procedures

Step 1: Power Reference Measurement
Same as System Verification Scan Procedures step 1.

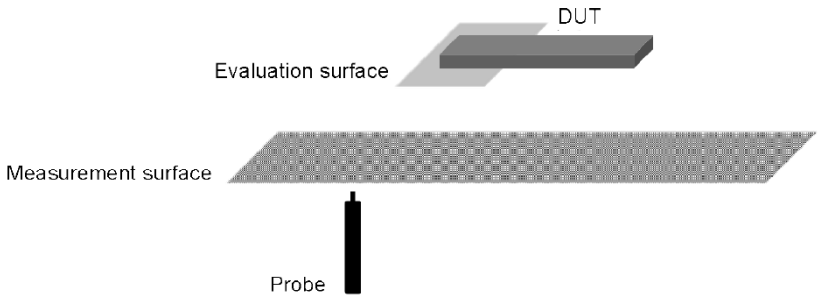
Step 2: 5G Scan
Same as System Verification Scan Procedures step 2. But measurement area is defined based on TCB workshop “A sufficiently large measurement region and proper measurement spatial resolution are required to maintain field reconstruction accuracy”.

Step 3: Power drift measurement
Same as System Verification Scan Procedures step 3.
When the drift is smaller than ± 5 %, it is considered in the uncertainty budget if drifts larger than 5%, uncertainty is re-calculate.

6.3. Total Field and Power Flux Density Reconstruction(measurement distance)

Reconstruction algorithms are used to project or transform the measured fields from the measurement surface to the evaluation surface (below fig) in order to determine power density or to compute spatial-average and/or local power density with known uncertainty.

Manufacture has 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 EUmmWVx probe. This reconstruction algorithm, together with the ability of the probe to measure extremely close to the source without perturbing the field, permits reconstruction of the E- and H-fields, as well as of the power density, on measurement planes located as near as λ / 5 away.



6.4. Test Equipment

The measuring equipment used to perform the tests documented in this report has been calibrated in accordance with the manufacturers' recommendations, and is traceable to recognized national standards.

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
5G probe	SPEAG	EummWV4	9559	2-16-2024
5G probe	SPEAG	EummWV4	9536	2-16-2024
Data Acquisition Electronics	SPEAG	DAE4	1468	8-18-2024
Data Acquisition Electronics	SPEAG	DAE4	1343	6-30-2024
Data Acquisition Electronics	SPEAG	DAE4	1671	5-23-2024
Verification kit	SPEAG	5G verification source_30GHz	1082	2-21-2024
Thermometer	Lutron	MHB-382SD	AH.91463	1-11-2024
Thermometer	Lutron	MHB-382SD	AK.12102	7-26-2024

6.5. Measurement Uncertainty

Measurement Uncertainty for cDASY6 Module mmWave						
Error Description	Uncertainty value (±dB)	Probe Dist.	Divisor	(Ci)	Std. Unc. (±dB)	(Vi)
Uncertainty terms dependent on the measurement system						
1.Probe Calibration	**0.49**	Normal	1	1	0.49	Infinity
2.Probe correction	**0.00**	Rectangular	1.73	1	0.00	Infinity
3.Frequency response (BW =< 1 GHz)	**0.20**	Rectangular	1.73	1	0.12	Infinity
4.Sensor cross coupling	**0.00**	Rectangular	1.73	1	0.00	Infinity
5.Isotropy	**0.50**	Rectangular	1.73	1	0.29	Infinity
6.Linearity	**0.20**	Rectangular	1.73	1	0.12	Infinity
7.Probe scattering	**0.00**	Rectangular	1.73	1	0.00	Infinity
8.Probe positioning offset	**0.30**	Rectangular	1.73	1	0.17	Infinity
9.Probe positioning repeatability	**0.04**	Rectangular	1.73	1	0.02	Infinity
10.Sensor mechanical offset	**0.00**	Rectangular	1.73	1	0.00	Infinity
11.Probe spatial resolution	**0.00**	Rectangular	1.73	1	0.00	Infinity
12.Field impedance dependance	**0.00**	Rectangular	1.73	1	0.00	Infinity
13.Amplitude and phase drift	**0.00**	Rectangular	1.73	1	0.00	Infinity
14.Amplitude and phase noise	**0.04**	Rectangular	1.73	1	0.02	Infinity
15.Measurement area truncation	**0.10**	Rectangular	1.73	1	0.06	Infinity
16.Data acquisition	**0.03**	Normal	1.00	1	0.03	Infinity
17.Sampling	**0.00**	Rectangular	1.73	1	0.00	Infinity
18.Field reconstruction	**0.60**	Rectangular	1.73	1	0.35	Infinity
19.Forward transformation	**0.00**	Rectangular	1.73	1	0.00	Infinity
20.Power density scaling	**-**	Rectangular	1.73	1	-	Infinity
21.Spatial averaging	**0.10**	Rectangular	1.73	1	0.06	Infinity
22.System detection limit	**0.04**	Rectangular	1.73	1	0.02	Infinity
Uncertainty terms dependent on the DUT and environmental factors						
23.Probe coupling with DUT	**0.00**	Rectangular	1.73	1	0.00	Infinity
24.Modulation response	**0.40**	Rectangular	1.73	1	0.23	Infinity
25.Integration time	**0.00**	Rectangular	1.73	1	0.00	Infinity
26.Response time	**0.00**	Rectangular	1.73	1	0.00	Infinity
27.Device holder influence	**0.10**	Rectangular	1.73	1	0.06	Infinity
28.DUT alignment	**0.00**	Rectangular	1.73	1	0.00	Infinity
29.RF ambient conditions	**0.04**	Rectangular	1.73	1	0.02	Infinity
30.Ambient reflections	**0.04**	Rectangular	1.73	1	0.02	Infinity
31.Immunity / secondary reception	**0.00**	Rectangular	1.73	1	0.00	Infinity
32.Drift of the DUT	**0.22**	Rectangular	1.73	1	0.13	Infinity
Combined Std. Uncertainty					0.76	Infinity
Expanded Standard Uncertainty (95%)					**1.53**	

6.6. DECISION RULE

Decision rule for statement(s) of conformity is based on Procedure 2, Clause 4.4.3 in IEC Guide 115:2021.

7. DUT Information

7.1. DUT Description

Device Dimension	Refer to Appendix A.		
Back Cover	The Back Cover is not removable		
Battery Options	The rechargeable battery is not user accessible.		
Test sample information	**No.**	**S/N**	**Notes**
	1	R3CW80J5CWN	mmWave Radiated
	2	R3CW80J5BHJ	mmWave Radiated

7.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode	Duty Cycle used for SAR testing
5G NR mmW	NR Band 258 (50MHz & 100MHz) NR Band 261 (50MHz & 100MHz) NR Band 260 (50MHz & 100MHz)	DFT-s-ODFM : QPSK, 16QAM, 64QAM CP-ODFM : QPSK, 16QAM, 64QAM	100%

7.3. 5G NR mmWave Test and Reporting Considerations

Item	Description		
Frequency range, Channel Bandwidth, Numbers and Frequencies	Band 258	Frequency range: 24250 – 27500 MHz	
		Channel Bandwidth	
		100MHz	50MHz
		MHz / Channel	MHz / Channel
	Low	24350.04 / 2018333	24350.04 / 2018333
	Mid	24800.04 / 2025833	24800.04 / 2025833
	High	25200.00 / 2032499	25224.96 / 2032915
	Band 261	Frequency range: 27500 – 28350 MHz	
		Channel Bandwidth	
		100MHz	50MHz
		MHz / Channel	MHz / Channel
	Low	27550.08 / 2071677	27525.00 / 2071249
	Mid	27924.96 / 2077915	27924.96 / 2077915
	High	28299.96 / 2084165	28324.92 / 2084581
	Band 260	Frequency range: 37000 – 40000 MHz	
		Channel Bandwidth	
		100MHz	50MHz
		MHz / Channel	MHz / Channel
	Low	37050.00 / 2229999	37026.00 / 2229599
	Mid	38499.96 / 2254165	38499.96 / 2254165
	High	39949.92 / 2278331	39975.00 / 2278749
Sub carrier Spacing	120 kHz		
Total Number of Supported Uplink CCs (SISO)	4		
Total Number of Supported Uplink CCs (MIMO)	4		
Total Number of Supported DL CCs	8		
LTE Anchor Bands	n258 : B2 / 5 / 12 / 66 / 71, n261 : B2 / 5 / 12 / 13 / 48 / 66, n260 : B2 / 5 / 12 / 13 / 14 / 30 / 48 / 66		
NR FR1 Anchor Bands	n258 : B2 / 12 / 25 / 41 / 66 / 77, n261 : B2 / 5 / 25 / 41 / 48 / 66 / 77 n260 : B2 / 5 / 12 / 25 / 30 / 41 / 48 / 66 / 77		
Duplex Type (mmWave)	TDD		

7.4. Time-Averaging Algorithm for RF Exposure Compliance

The equipment under test(EUT) are supporting 3G/4G/5G NR and WLAN(with BT) technologies through Qualcomm@ modem. Qualcomm@ modem is enabled with Qualcomm@ Smart Transmit 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 feature.

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. 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* listed in Section 8.5.

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.*

7.5. Input Power Limit

All power density measurements for this device were performed at the *input.power.limit* given in below tables. Input power is per antenna element and polarization for each antenna module. When input power limit is calculated to be above the maximum input power, the device is limited to the maximum input power.

5G NR n258 M Patch Input Power Limit

Antenna	Beam ID_1	Beam ID_2	input.power.limit (dBm)
M patch	0		**13.0**
	2		**11.8**
	4		**12.1**
	6		**11.5**
	8		**12.6**
	10		**9.7**
	11		**8.4**
	12		**8.8**
	13		**9.4**
	18		**8.9**
	19		**7.3**
	20		**9.8**
	24		**6.2**
	25		**4.3**
	26		**4.6**
	27		**4.8**
	28		**6.5**
	34		**4.9**
	35		**4.7**
	36		**4.3**
	37		**5.7**
		256	**11.1**
		258	**10.3**
		260	**10.6**
		262	**10.7**
		264	**10.8**
		266	**8.3**
		267	**7.3**
		268	**6.8**
		269	**8.2**
		274	**7.1**
		275	**6.9**
		276	**7.1**
		280	**3.0**
		281	**3.5**
		282	**4.1**
		283	**3.0**
		284	**3.1**
		290	**3.3**
		291	**3.7**
		292	**3.5**
		293	**2.6**
	0	256	**8.7**
	2	258	**7.8**
	4	260	**7.8**
	6	262	**8.0**
	8	264	**8.3**
	10	266	**5.2**
	11	267	**4.5**
	12	268	**4.6**
	13	269	**5.1**
	18	274	**5.0**
	19	275	**3.8**
	20	276	**4.6**
	24	280	**0.4**
	25	281	**0.7**
	26	282	**0.9**
	27	283	**0.6**
	28	284	**0.4**
	34	290	**0.5**
	35	291	**0.9**
	36	292	**0.8**
	37	293	**0.3**

5G NR n258 N Patch Input Power Limit

Antenna	Beam ID_1	Beam ID_2	input.power.limit (dBm)
N patch	1		12.8
	3		11.8
	5		10.8
	7		10.9
	9		11.7
	14		8.3
	15		8.2
	16		7.5
	17		8.4
	21		7.2
	22		7.2
	23		10.1
	29		3.7
	30		3.6
	31		4.0
	32		3.5
	33		5.1
	38		3.5
	39		3.8
	40		4.0
	41		3.9
		257	14.1
		259	14.3
		261	14.3
		263	14.2
		265	14.0
		270	11.0
		271	10.1
		272	10.3
		273	12.6
		277	10.6
		278	9.8
		279	10.9
		285	6.7
		286	4.9
		287	5.3
		288	6.3
		289	7.2
		294	5.2
		295	5.0
		296	5.8
		297	7.2
	1	257	9.9
	3	259	9.2
	5	261	8.7
	7	263	8.7
	9	265	9.2
	14	270	5.9
	15	271	5.6
	16	272	5.5
	17	273	6.5
	21	277	5.3
	22	278	5.0
	23	279	7.6
	29	285	1.1
	30	286	0.8
	31	287	1.4
	32	288	1.4
	33	289	2.0
	38	294	0.7
	39	295	1.0
	40	296	1.5
	41	297	1.6

5G NR n261 M Patch Input Power Limit

Antenna	Beam ID_1	Beam ID_2	input.power.limit (dBm)
M patch	0		**11.4**
	2		**10.9**
	4		**10.6**
	6		**10.0**
	8		**10.3**
	10		**8.0**
	11		**6.6**
	12		**7.6**
	13		**8.1**
	18		**6.9**
	19		**6.6**
	20		**7.5**
	24		**4.8**
	25		**3.6**
	26		**3.2**
	27		**3.2**
	28		**4.6**
	34		**4.3**
	35		**3.1**
	36		**3.0**
	37		**3.8**
		256	**9.6**
		258	**9.1**
		260	**9.1**
		262	**9.1**
		264	**10.0**
		266	**6.4**
		267	**5.8**
		268	**5.7**
		269	**6.4**
		274	**6.1**
		275	**5.8**
		276	**5.8**
		280	**1.5**
		281	**1.9**
		282	**2.3**
		283	**2.1**
		294	**1.4**
		290	**1.9**
		291	**2.1**
		292	**2.0**
		293	**1.5**
	0	256	**7.3**
	2	258	**6.5**
	4	260	**6.6**
	6	262	**6.2**
	8	264	**6.8**
	10	266	**3.7**
	11	267	**3.0**
	12	268	**3.2**
	13	269	**3.9**
	18	274	**3.7**
	19	275	**3.0**
	20	276	**3.6**
	24	280	**-1.1**
	25	281	**-0.3**
	26	282	**-0.2**
	27	283	**-0.5**
	28	284	**-0.6**
	34	290	**-0.6**
	35	291	**-0.4**
	36	292	**-0.4**
	37	293	**-0.8**

5G NR n261 N Patch Input Power Limit

Antenna	Beam ID_1	Beam ID_2	input.power.limit (dBm)
N patch	1		**10.7**
	3		**11.0**
	5		**12.3**
	7		**11.2**
	9		**11.6**
	14		**7.9**
	15		**7.6**
	16		**8.6**
	17		**10.0**
	21		**7.9**
	22		**8.2**
	23		**8.2**
	29		**4.7**
	30		**4.0**
	31		**3.4**
	32		**5.0**
	33		**5.5**
	38		**4.7**
	39		**3.4**
	40		**4.1**
	41		**5.5**
		257	**10.8**
		259	**10.3**
		261	**10.2**
		263	**10.2**
		265	**11.5**
		270	**7.7**
		271	**6.7**
		272	**6.7**
		273	**9.2**
		277	**7.2**
		278	**6.4**
		279	**7.0**
		285	**3.3**
		286	**2.8**
		287	**2.0**
		288	**2.9**
		289	**3.9**
		294	**2.9**
		295	**2.0**
		296	**2.3**
		297	**3.1**
	1	257	**7.3**
	3	259	**7.4**
	5	261	**7.8**
	7	263	**7.1**
	9	265	**8.0**
	14	270	**4.3**
	15	271	**3.4**
	16	272	**4.3**
	17	273	**6.4**
	21	277	**4.5**
	22	278	**3.9**
	23	279	**4.6**
	29	285	**0.8**
	30	286	**0.1**
	31	287	**-0.4**
	32	288	**0.2**
	33	289	**1.2**
	38	294	**0.3**
	39	295	**-0.4**
	40	296	**0.1**
	41	297	**1.0**

5G NR n260 M Patch Input Power Limit

Antenna	Beam ID_1	Beam ID_2	input.power.limit (dBm)
M patch	0		**11.6**
	2		**11.1**
	4		**10.8**
	6		**11.1**
	8		**11.5**
	10		**7.4**
	11		**7.6**
	12		**9.0**
	13		**8.0**
	18		**7.9**
	19		**9.0**
	20		**8.0**
	24		**4.6**
	25		**4.9**
	26		**6.0**
	27		**4.3**
	28		**4.3**
	34		**4.3**
	35		**5.6**
	36		**5.4**
	37		**4.7**
		256	**11.5**
		258	**10.7**
		260	**10.1**
		262	**10.2**
		264	**11.1**
		266	**7.4**
		267	**7.8**
		268	**8.2**
		269	**8.0**
		274	**6.9**
		275	**8.4**
		276	**7.6**
		280	**5.0**
		281	**4.0**
		282	**4.1**
		283	**4.1**
		284	**5.0**
		290	**5.0**
		291	**3.9**
		292	**4.5**
		293	**4.5**
	0	256	**8.5**
	2	258	**7.7**
	4	260	**6.8**
	6	262	**7.3**
	8	264	**7.8**
	10	266	**4.9**
	11	267	**4.6**
	12	268	**5.2**
	13	269	**5.0**
	18	274	**4.0**
	19	275	**6.0**
	20	276	**4.8**
	24	280	**1.3**
	25	281	**0.9**
	26	282	**1.5**
	27	283	**1.0**
	28	284	**1.0**
	34	290	**1.1**
	35	291	**1.2**
	36	292	**1.2**
	37	293	**1.2**

5G NR n260 N Patch Input Power Limit

Antenna	Beam ID_1	Beam ID_2	input.power.limit (dBm)
N patch	1		**11.0**
	3		**10.4**
	5		**9.9**
	7		**10.2**
	9		**10.9**
	14		**6.9**
	15		**7.9**
	16		**7.5**
	17		**6.4**
	21		**8.0**
	22		**8.2**
	23		**6.8**
	29		**3.4**
	30		**4.3**
	31		**4.3**
	32		**5.1**
	33		**3.2**
	38		**4.0**
	39		**4.2**
	40		**5.3**
	41		**4.1**
		257	**12.1**
		259	**10.6**
		261	**10.3**
		263	**10.0**
		265	**11.1**
		270	**8.0**
		271	**7.6**
		272	**7.2**
		273	**7.5**
		277	**8.0**
		278	**7.8**
		279	**7.3**
		285	**5.3**
		286	**3.9**
		287	**4.0**
		288	**4.2**
		289	**5.2**
		294	**4.4**
		295	**3.9**
		296	**4.1**
		297	**4.9**
	1	257	**7.7**
	3	259	**7.0**
	5	261	**6.7**
	7	263	**6.8**
	9	265	**7.5**
	14	270	**4.1**
	15	271	**4.1**
	16	272	**4.1**
	17	273	**3.6**
	21	277	**5.3**
	22	278	**4.7**
	23	279	**3.7**
	29	285	**0.4**
	30	286	**0.3**
	31	287	**0.5**
	32	288	**0.6**
	33	289	**0.6**
	38	294	**0.3**
	39	295	**0.3**
	40	296	**0.4**
	41	297	**0.4**

8. RF Exposure Conditions (Test Configurations)

8.1. Operating mode(s)

DUTs can transmit in operating modes and frequency bands using different signal characteristics (e.g. modulation, source coding, channel bandwidth, etc.) that require power density tests. The appropriate operating modes should be selected for testing taking into consideration differences in maximum output power and production variations, to ensure maximum power density is assessed.

Supported mode:

☒ CW
☐ AM
☐ FMCW
☐ FM
☐ pi/2-BPSK
☐ pi/2-QPSK
☐ D-QPSK
☐ QPSK
☐ Up to 16QAM
☐ Up to 64QAM
☐ Up to 256QAM
☐ pi/2-16QAM

8.2. Measurement position(s)

Power density evaluated at worst-surfaces according to test results of Power density Part.0 report.

Band	Antenna	Back Rear	Front	Top Edge 1	Bottom Edge 3	R/Right Edge 4	R/Left Edge 2
n258	M Patch	Yes	No	No	No	Yes	No
n258	N Patch	Yes	Yes	No	No	No	Yes
n261	M Patch	Yes	No	No	No	Yes	No
n261	N Patch	Yes	Yes	No	No	No	Yes
n260	M Patch	Yes	No	No	No	Yes	No
n260	N Patch	Yes	Yes	No	No	No	Yes

Please refer to Appendix A for Antenna's location.

9. Dielectric Property & System Check

9.1. Dielectric Property

Media is air so Relative Permittivity (εr) and Conductivity (σ) is 1.

9.2. System Check

Per Nov 2017,TCB Workshop

System validation is required before a system is deployed for measurement
System check is also required before each series of continuous measurement and, as applicable, repeated at least weekly
Peak and spatially averaged power density at the peak location(s) must be compared to calibrated results according to the defined test conditions

- the same spatial resolution and measurement region used in the waveguide calibration should be applied to system validation and system check
- 4 cm^2 spatial averaging have been used according to FCC requirement.
- power density distribution should also be verified, both spatially (shape) and numerically (level) through visual inspection for noticeable differences
- the measured results should be within 10% of the calibrated targets

SAR 1 Room

SAR Lab	Date	Sorce SN	Sorce Cal. Due Data	Measured Total psPD for 4cm^2 (W/m2)	**Target (Ref. Value)** (W/m2)	**Delta ±10 %**	visual inspection	Plot No.
SAR 1	9-15-2023	1082	2-21-2024	49.9	46.8	6.62	confirmed	
SAR 1	9-18-2023	1082	2-21-2024	49.1	46.8	4.91	confirmed	
SAR 1	9-19-2023	1082	2-21-2024	49.8	46.8	6.41	confirmed	
SAR 1	10-4-2023	1082	2-21-2024	49.6	46.8	5.98	confirmed	
SAR 1	10-5-2023	1082	2-21-2024	49.7	46.8	6.20	confirmed	
SAR 1	10-6-2023	1082	2-21-2024	50.4	46.8	7.69	confirmed	
SAR 1	10-7-2023	1082	2-21-2024	50.0	46.8	6.84	confirmed	
SAR 1	10-8-2023	1082	2-21-2024	50.2	46.8	7.26	confirmed	
SAR 1	10-10-2023	1082	2-21-2024	49.9	46.8	6.62	confirmed	
SAR 1	10-11-2023	1082	2-21-2024	50.7	46.8	8.33	confirmed	1
SAR 1	10-16-2023	1082	2-21-2024	50.1	46.8	7.05	confirmed	
SAR 1	10-20-2023	1082	2-21-2024	50.3	46.8	7.48	confirmed	
SAR 1	10-22-2023	1082	2-21-2024	50.3	46.8	7.48	confirmed	

SAR 9 Room

SAR Lab	Date	Sorce SN	Sorce Cal. Due Data	Measured Total psPD for 4cm^2 (W/m2)	**Target (Ref. Value)** (W/m2)	**Delta ±10 %**	visual inspection	Plot No.
SAR 9	9-20-2023	1082	2-21-2024	51.3	47.5	8.00	confirmed	2

Note(s):

psPD value used the pS_{tot} avg value of test result plot.

10. Measured and Reported (Scaled) Results

Both Normal psPD and Total psPD are record in test results according to TCB workshop October 2018 note . But Only Total psPD level are considered according to FCC requirement.

10.1. NR Band n258 Test Results

Antenna	Dist. (mm)	Test Position	Freq. (MHz)	Ch.	Beam ID1	Beam ID2	input.power. limit (dBm)	Tested Power (dBm)	Tested Signal	Duty Cycle	Power Drift	Normal psPD (mW/cm^2)	Total psPD (mW/cm^2)	Plot No.
					V	H						Meas.	Meas.	
M patch	2 mm	Back	24800.04	Mid	25		4.3	4.3	CW	100.0%	-0.05	0.470	0.607	
	2 mm	Back	25200.00	High		293	2.6	2.6	CW	100.0%	-0.01	0.464	0.619	1
	2 mm	Back	25200.00	High	37	293	0.3	0.3	CW	100.0%	0.02	0.400	0.540	
	2 mm	R/Right	25200.00	High	26		4.6	5.2	CW	100.0%	0.00	0.167	0.278	
	2 mm	R/Right	24800.04	Mid		293	2.6	3.2	CW	100.0%	-0.04	0.215	0.223	
	2 mm	R/Right	25200.00	High	26	282	0.9	0.9	CW	100.0%	-0.16	0.150	0.157	
N patch	2 mm	Back	24800.04	Mid	32		3.5	4.1	CW	100.0%	-0.11	0.393	0.482	
	2 mm	Back	24350.04	Low		289	7.2	7.8	CW	100.0%	0.03	0.388	0.660	2
	2 mm	Back	25200.00	High	30	286	0.8	0.8	CW	100.0%	-0.10	0.271	0.373	
	2 mm	Front	24350.04	Low	38		3.5	3.5	CW	100.0%	-0.08	0.081	0.126	
	2 mm	Front	25200.00	High		296	5.8	5.8	CW	100.0%	-0.03	0.259	0.315	
	2 mm	Front	24800.04	Mid	38	294	0.7	0.7	CW	100.0%	0.00	0.140	0.194	
	2 mm	R/Left	24350.04	Low	38		3.5	3.5	CW	100.0%	0.09	0.264	0.368	
	2 mm	R/Left	25200.00	High		296	5.8	5.8	CW	100.0%	-0.01	0.537	0.628	
	2 mm	R/Left	24800.04	Mid	38	294	0.7	0.7	CW	100.0%	-0.04	0.288	0.379	

(10 W/m^2 = 1.0 mW/cm^2)

NR Band n258 Additional Surfaces

Antenna	Dist. (mm)	Test Position	Freq. (MHz)	Ch.	Beam ID1	Beam ID2	input.power. limit (dBm)	Tested Power (dBm)	Tested Signal	Duty Cycle	Power Drift	Normal psPD (mW/cm^2)	Total psPD (mW/cm^2)	Plot No.
					V	H						Meas.	Meas.	
M patch	10 mm	Back	25200.00	High		281	3.5	3.5	CW	100.0%	0.11	0.352	0.421	
N patch	10 mm	R/Left	25200.00	High	30		3.6	3.6	CW	100.0%	0.01	0.295	0.336	

(10 W/m^2 = 1.0 mW/cm^2)

Note(s):

1. This device utilizes power reduction for some WLAN wireless modes and technologies for simultaneous transmission compliance. These mechanisms are assessed In the SAR Test Report.
2. *PD_design_target* of 0.631 mW/cm^2 was used with mmW device design related uncertainty of 1.4 dB.
3. *Input.power.limit* parameter for 5G mmW NR radio was calculated in RF Exposure Part 0 test report.
4. The measurement was tested by setting it to a higher Tested Power than *Input.power.limit*.
5. The device was configured to transmit CW wave signal for testing. Additional testing was not evaluated for different modulations, RB configurations, component carriers, channel configurations since the smart transmit algorithm monitors powers on a per symbol basis, which is independent of these signal characteristics.

10.2. NR Band n261 Test Results

Antenna	Dist. (mm)	Test Position	Freq. (MHz)	Ch.	Beam ID1	Beam ID2	input.power. limit (dBm)	Tested Power (dBm)	Tested Signal	Duty Cycle	Power Drift	Normal psPD (mW/cm^2)	Total psPD (mW/cm^2)	Plot No.
					V	H						Meas.	Meas.	
M patch	2 mm	Back	28299.96	High	36		3.0	3.0	CW	100.0%	0.01	0.364	0.459	
	2 mm	Back	28299.96	High		282	2.3	2.3	CW	100.0%	0.06	0.617	0.662	3
	2 mm	Back	28299.96	High	24	280	-1.1	-1.1	CW	100.0%	0.02	0.259	0.342	
	2 mm	R/Right	27924.96	Mid	35		3.1	4.6	CW	100.0%	-0.06	0.203	0.315	
	2 mm	R/Right	27924.96	Mid		280	1.5	3.0	CW	100.0%	-0.16	0.292	0.313	
	2 mm	R/Right	28299.96	High	28	284	-0.6	0.3	CW	100.0%	0.01	0.245	0.311	
N patch	2 mm	Back	27550.08	Low	41		5.5	6.1	CW	100.0%	0.12	0.318	0.414	
	2 mm	Back	27924.96	Mid		289	3.9	4.5	CW	100.0%	-0.10	0.259	0.344	
	2 mm	Back	27550.08	Low	30	286	0.1	0.1	CW	100.0%	0.02	0.168	0.185	
	2 mm	Front	28299.96	High	39		3.4	3.4	CW	100.0%	-0.08	0.164	0.218	
	2 mm	Front	28299.96	High		295	2.0	2.5	CW	100.0%	-0.04	0.368	0.397	
	2 mm	Front	27924.96	Mid	39	295	-0.4	-0.4	CW	100.0%	0.11	0.159	0.233	
	2 mm	R/Left	28299.96	High	31		3.4	3.4	CW	100.0%	0.03	0.460	0.542	
	2 mm	R/Left	27550.08	Low		286	2.8	2.8	CW	100.0%	-0.02	0.475	0.543	
	2 mm	R/Left	28299.96	High	39	295	-0.4	-0.4	CW	100.0%	0.00	0.587	0.651	4

(10 W/m^2 = 1.0 mW/cm^2)

NR Band n261 Additional Surfaces

Antenna	Dist. (mm)	Test Position	Freq. (MHz)	Ch.	Beam ID1	Beam ID2	input.power. limit (dBm)	Tested Power (dBm)	Tested Signal	Duty Cycle	Power Drift	Normal psPD (mW/cm^2)	Total psPD (mW/cm^2)	Plot No.
					V	H						Meas.	Meas.	
M patch	10 mm	Back	28299.96	High		282	2.3	2.3	CW	100.0%	0.05	0.386	0.406	
N patch	10 mm	R/Left	28299.96	High		295	2.0	2.0	CW	100.0%	0.13	0.439	0.461	

(10 W/m^2 = 1.0 mW/cm^2)

Note(s):

1. This device utilizes power reduction for some WLAN wireless modes and technologies for simultaneous transmission compliance. These mechanisms are assessed In the SAR Test Report.
2. *PD_design_target* of 0.631 mW/cm^2 was used with mmW device design related uncertainty of 1.4 dB.
3. *Input.power.limit* parameter for 5G mmW NR radio was calculated in RF Exposure Part 0 test report.
4. The measurement was tested by setting it to a higher Tested Power than *Input.power.limit*..
5. The device was configured to transmit CW wave signal for testing. Additional testing was not evaluated for different modulations, RB configurations, component carriers, channel configurations since the smart transmit algorithm monitors powers on a per symbol basis, which is independent of these signal characteristics.

10.3. NR Band n260 Test Results

Antenna	Dist. (mm)	Test Position	Freq. (MHz)	Ch.	Beam ID1	Beam ID2	input.power. limit (dBm)	Tested Power (dBm)	Tested Signal	Duty Cycle	Power Drift	Normal psPD (mW/cm^2)	Total psPD (mW/cm^2)	Plot No.
					V	H						Meas.	Meas.	
M patch	2 mm	Back	39949.92	High	28		4.3	4.9	CW	100.0%	-0.02	0.437	0.628	5
	2 mm	Back	39949.92	High		291	3.9	4.5	CW	100.0%	0.08	0.450	0.584	
	2 mm	Back	39949.92	High	25	281	0.9	0.9	CW	100.0%	0.05	0.293	0.387	
	2 mm	R/Right	39949.92	High	28		4.3	4.9	CW	100.0%	-0.05	0.292	0.322	
	2 mm	R/Right	39949.92	High		281	4.0	4.0	CW	100.0%	0.05	0.173	0.285	
	2 mm	R/Right	39949.92	High	37	293	1.2	1.2	CW	100.0%	0.04	0.320	0.375	
N patch	2 mm	Back	38499.96	Mid	29		3.4	4.0	CW	100.0%	-0.09	0.349	0.358	
	2 mm	Back	38499.96	Mid		286	3.9	4.5	CW	100.0%	-0.05	0.188	0.251	
	2 mm	Back	39949.92	High	32	288	0.6	0.6	CW	100.0%	0.11	0.202	0.230	
	2 mm	Front	38499.96	Mid	31		4.3	4.3	CW	100.0%	0.06	0.376	0.384	
	2 mm	Front	38499.96	Mid		295	3.9	3.9	CW	100.0%	0.06	0.305	0.420	
	2 mm	Front	38499.96	Mid	39	295	0.3	0.3	CW	100.0%	-0.01	0.207	0.251	
	2 mm	R/Left	38499.96	Mid	33		3.2	3.2	CW	100.0%	-0.05	0.406	0.560	
	2 mm	R/Left	38499.96	Mid		295	3.9	3.9	CW	100.0%	-0.05	0.521	0.656	6
	2 mm	R/Left	38499.96	Mid	30	286	0.3	0.3	CW	100.0%	0.08	0.464	0.568	

(10 W/m^2 = 1.0 mW/cm^2)

NR Band n260 Additional Surfaces

Antenna	Dist. (mm)	Test Position	Freq. (MHz)	Ch.	Beam ID1	Beam ID2	input.power. limit (dBm)	Tested Power (dBm)	Tested Signal	Duty Cycle	Power Drift	Normal psPD (mW/cm^2)	Total psPD (mW/cm^2)	Plot No.
					V	H						Meas.	Meas.	
M patch	10 mm	Back	39949.92	High	12		9.0	9.0	CW	100.0%	-0.05	0.364	0.392	
N patch	10 mm	R/Left	39949.92	High	39		4.2	4.2	CW	100.0%	0.03	0.476	0.501	

(10 W/m^2 = 1.0 mW/cm^2)

Note(s):

1. This device utilizes power reduction for some WLAN wireless modes and technologies for simultaneous transmission compliance. These mechanisms are assessed In the SAR Test Report.
2. *PD_design_target* of 0.631 mW/cm^2 was used with mmW device design related uncertainty of 1.4 dB.
3. *Input.power.limit* parameter for 5G mmW NR radio was calculated in RF Exposure Part 0 test report.
4. The measurement was tested by setting it to a higher Tested Power than *Input.power.limit*.
5. The device was configured to transmit CW wave signal for testing. Additional testing was not evaluated for different modulations, RB configurations, component carriers, channel configurations since the smart transmit algorithm monitors powers on a per symbol basis, which is independent of these signal characteristics.

11. Simultaneous Transmission Conditions

Total exposure ratio calculated by taking ratio of reported SAR divided by SAR limit and adding it to measured power density divided by power density limit. Numerical sum of the two ratios should be less than 1

$$TER = \sum_{a=1}^{A} \frac{SAR_a}{SAR_a, limit} + \sum_{b=1}^{B} \frac{psPD_b}{psPD_b, limit} < 1$$

The Total exposure ratio shall be less than unity to ensure compliance with the limits.

$$\sum_{n=1}^{N} \frac{4G\ SAR_n}{4G\ SAR_n, limit} + \sum_{m=1}^{M} \frac{5G\ mmW\ NR\ psPD_m}{5G\ mmW\ NR\ psPD_m, limit} + \sum_{p=1}^{P} \frac{WLAN\ SAR_p}{WLAN\ SAR_p, limit} < 1$$

Qualcomm Smart Transmit algorithm for WWAN adds directly the time-averaged RF exposure from 4G and time-averaged RF exposure from 5G mmW NR. Smart Transmit algorithm controls the total RF exposure from both 4G and 5G mmW NR to not exceed FCC limit. Therefore, per FCC guidance, Total Exposure Ratio does not need to be evaluated directly for the 4G and 5G simultaneous compliance via summation. The validation of the time-averaging algorithm and compliance under the Tx varying transmission scenario for WWAN technologies are reported in Part 2 report.

$$\sum_{n=1}^{N} \frac{4G\ SAR_n}{4G\ SAR_n, limit} + \sum_{p=1}^{P} \frac{WLAN\ SAR_p}{WLAN\ SAR_p, limit} < 1$$

$$\sum_{m=1}^{M} \frac{5G\ mmW\ NR\ psPD_m}{5G\ mmW\ NR\ psPD_m, limit} + \sum_{p=1}^{P} \frac{WLAN\ SAR_p}{WLAN\ SAR_p, limit} < 1$$

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 1.4 dB. For this device, the manufacturer has added an additional permanent back-off for every beam in the calculations for input.power.limits used in the EFS files. The back-off levels can be found in the Part 0 Test report. Therefore, 5G mmW NR RF exposure for this DUT is evaluated by reported psPD calculated as;

$$Reported\_psPD = (PD\_design\_target + 1.4\ dB) \times 10^{(-\text{WWAN back-off in dB}/10)}$$

Note that since not all the beams supported by this EUT are measured, reported_psPD cannot be computed based on limited measured_psPD data. Alternatively, since measured psPD for all the beams will be PD_design_target + 1.4 dB, reported_psPD is computed based on this worst-case psPD as shown above.

The compliance analysis for simultaneous transmission scenarios of WWAN with Smart Transmit and 4G & WLAN can be found in two reports indicated in the table below.

	Simultaneous Scenario	Evaluation Report
1.	4G LTE WWAN + WLAN	FCC SAR Evaluation Report (Part 1)
2.	4G LTE WWAN + 5G mmW NR WWAN	RF Exposure Part 2 Test Report

11.1. 5G mmW NR psPD for TER Ratio analysis

Antenna	NR Band	Surface	Evaluation Distance (mm)	Adjustment Factor due to Simulation	Adjusted Reported psPD (mW/cm2)	Measured psPD (mW/cm2)	Final Reported psPD (mW/cm2)
M-patch	n258	Rear	2	1.000	0.759	0.619	**0.759**
	n258	Front	2	0.244	0.185	-	0.185
	n258	Top	2	0.228	0.173	-	0.173
	n258	R/Right	2	0.733	0.556	0.278	0.556
	n258	Bottome	2	0.056	0.042	-	0.042
	n258	R/Left	2	0.058	0.044	-	0.044
	n261	Rear	2	1.000	0.759	0.662	0.759
	n261	Front	2	0.165	0.125	-	0.125
	n261	Top	2	0.188	0.143	-	0.143
	n261	R/Right	2	0.791	0.600	0.315	0.600
	n261	Bottome	2	0.029	0.022	-	0.022
	n261	R/Left	2	0.053	0.040	-	0.040
	n260	Rear	2	1.000	0.759	0.628	**0.759**
	n260	Front	2	0.397	0.301	-	0.301
	n260	Top	2	0.266	0.202	-	**0.202**
	n260	R/Right	2	0.762	0.578	0.375	**0.578**
	n260	Bottome	2	0.031	0.024	-	0.024
	n260	R/Left	2	0.061	0.046	-	0.046
N-patch	n258	Rear	2	1.000	0.759	0.660	**0.759**
	n258	Front	2	0.468	0.355	0.315	0.355
	n258	Top	2	0.041	0.031	-	0.031
	n258	R/Right	2	0.066	0.050	-	0.050
	n258	Bottome	2	0.076	0.058	-	0.058
	n258	R/Left	2	1.000	0.759	0.628	**0.759**
	n261	Rear	2	1.000	0.759	0.414	**0.759**
	n261	Front	2	0.598	0.454	0.397	0.454
	n261	Top	2	0.027	0.020	-	0.020
	n261	R/Right	2	0.069	0.052	-	0.052
	n261	Bottome	2	0.072	0.055	-	0.055
	n261	R/Left	2	1.000	0.759	0.651	**0.759**
	n260	Rear	2	0.549	0.416	0.358	0.416
	n260	Front	2	0.740	0.561	0.420	**0.561**
	n260	Top	2	0.038	0.029	-	0.029
	n260	R/Right	2	0.037	0.028	-	0.028
	n260	Bottome	2	0.125	0.095	-	**0.095**
	n260	R/Left	2	1.000	0.759	0.656	**0.759**

Antenna	NR Band	Surface	Evaluation Distance (mm)	Adjustment Factor due to Simulation	Adjusted Reported psPD (mW/cm2)	Measured psPD (mW/cm2)	Final Reported psPD (mW/cm2)
M-patch	n258	Rear	10	0.657	0.498	0.421	0.498
	n258	Front	10	0.079	0.060	-	0.060
	n258	Top	10	0.134	0.102	-	0.102
	n258	R/Right	10	0.376	0.285	-	0.285
	n258	Bottome	10	0.046	0.035	-	0.035
	n258	R/Left	10	0.032	0.024	-	0.024
	n261	Rear	10	0.696	0.528	0.406	0.528
	n261	Front	10	0.051	0.039	-	0.039
	n261	Top	10	0.138	0.105	-	0.105
	n261	R/Right	10	0.331	0.251	-	0.251
	n261	Bottome	10	0.024	0.018	-	0.018
	n261	R/Left	10	0.045	0.034	-	0.034
	n260	Rear	10	0.622	0.472	0.392	0.472
	n260	Front	10	0.080	0.061	-	0.061
	n260	Top	10	0.185	0.140	-	0.140
	n260	R/Right	10	0.387	0.294	-	0.294
	n260	Bottome	10	0.020	0.015	-	0.015
	n260	R/Left	10	0.047	0.036	-	0.036
N-patch	n258	Rear	10	0.534	0.405	-	0.405
	n258	Front	10	0.208	0.158	-	0.158
	n258	Top	10	0.032	0.024	-	0.024
	n258	R/Right	10	0.047	0.036	-	0.036
	n258	Bottome	10	0.055	0.042	-	0.042
	n258	R/Left	10	0.653	0.495	0.336	0.495
	n261	Rear	10	0.494	0.375	-	0.375
	n261	Front	10	0.277	0.210	-	0.210
	n261	Top	10	0.022	0.017	-	0.017
	n261	R/Right	10	0.047	0.036	-	0.036
	n261	Bottome	10	0.050	0.038	-	0.038
	n261	R/Left	10	0.647	0.491	0.461	0.491
	n260	Rear	10	0.324	0.246	-	0.246
	n260	Front	10	0.357	0.271	-	0.271
	n260	Top	10	0.029	0.022	-	0.022
	n260	R/Right	10	0.026	0.020	-	0.020
	n260	Bottome	10	0.096	0.073	-	0.073
	n260	R/Left	10	0.746	0.566	0.501	0.566

Note(s):

PD TER calculation performed with Sub6 antennas of each Antenna groups in SAR part.1 report.
So please refer to section.12 in SAR part.1 report.

Appendixes

Refer to separated files for the following appendixes.

4790976523-S3 FCC Report PD_App A_Setup Photos

4790976523-S3 FCC Report PD_App B_System Check Plots

4790976523-S3 FCC Report PD_App C_Highest Test Plots

4790976523-S3 FCC Report PD_App D_Probe Calibration Certificates

4790976523-S3 FCC Report PD_App E_Verification source Calibration Certificates

END OF REPORT