RF EXPOSURE EVALUATION REPORT

APPLICANT	**:**	Reliance Communications, LLC
PRODUCT NAME	**:**	Orbic Speed Pro 5G
MODEL NAME	**:**	R575L5
BRAND NAME	**:**	Orbic
FCC ID	**:**	2ABGH-R575L5
STANDARD(S)	**:**	FCC 47 CFR Part 2 (2.1093) IEC TR 63170:2018
RECEIPT DATE	**:**	2024-07-08
TEST DATE	**:**	2024-07-27
ISSUE DATE	**:**	2025-01-27

Edited by : Pang Siyu
Pang Siyu (Rapporteur)

Approved by: Gan Yueming
Gan Yueming (Supervisor)

DIRECTORY

Changed History		
Version	**Date**	**Reason for Change**
1.0	2025-01-27	First edition

1. Power Density Summary

The maximum results of power density found during test as bellows:

<Highest Total Power Density>

Frequency Band		Standalone Transmission	
		Total PD over 4cm^2 (mW/cm^2)	Limit (FCC Part 1.310) (mW/cm^2)
5G NR	n260	0.224	1.0
	n261	0.264	

Highest Simultaneous Transmission with Multiple transmitters	Total Exposure Radio	Limit
SAR & Power Density	0.693	1.0

Note:

1. This device is in compliance with power density for general population or uncontrolled exposure limits (1.0 mW/cm^2 specified in FCC 47 CFR Part 1.310), and had been tested in accordance with the measurement methods and procedures specified in TCBC workshop notes and IEC TR 63170.
2. When the test result is a critical value, we will use the measurement uncertainty give the judgment re sult based on the 95% Confidence intervals.

2. Technical Information

Note: Provide by applicant.

2.1. Applicant and Manufacturer Information

Applicant:	Reliance Communications, LLC
Applicant Address:	555 Wireless Blvd. Hauppauge, NY 11788, USA
Manufacturer:	MeiG Smart Technology Co., Ltd
Manufacturer Address:	2nd Floor,Office Building,No.5 Lingxia Road,Fenghuang,Fuyong Street,Bao'an District,Shenzhen

2.2. Equipment under Test (EUT) Description

Product Name:	Orbic Speed Pro 5G
EUT No.:	11#
Hardware Version:	V1.0
Software Version:	R575L5_v1.0.35_BVZ
Frequency Bands:	5G NR n260(120kHz): 37 GHz ~ 40 GHz 5G NR n261(120kHz): 27.5 GHz ~ 28.35 GHz
Modulation Mode:	5G NR: DFT-s-OFDM/CP-OFDM, PI/2 BPSK QPSK, 16QAM, 64QAM
Channel Bandwidth:	50MHz, 100MHz
Maximum Number of Contiguous Component Carriers:	8CC
SCS	120kHz
5G NR Operation:	NSA
Antenna Information:	PIFA Antenna

Note: For a more detailed description, please refer to specification or user manual supplied by the applicant and/or manufacturer.

2.3. Environment of Test Site/Conditions

Normal Temperature (NT):	20-25 °C
Relative Humidity:	30-75 %

Test Frequency:	5G NR n260/261
Operation Mode:	Call established
Power Level:	TDD 5G NR n260/261(Maximum output power)

During SAR test, EUT is in Traffic Mode (Channel Allocated) at Normal Voltage Condition. A communication link is set up with a System Simulator (SS) by air link, and a call is established.

The EUT shall use its internal transmitter. The antenna(s), battery and accessories shall be those specified by the Factory. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. If a wireless link is used, the antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the handset.
The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the handset by at least 35 Db.

3. RF Exposure Limits

3.1. 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.

Limits for Maximum Permissible Exposure (MPE)

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

3.2. 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.

4. Applied Reference Documents

Leading reference documents for testing:

Identity	Document Title	Method Determination /Remark
FCC 47 CFR Part 2(2.1093)	Radio Frequency Radiation Exposure Evaluation: Portable Devices	No deviation
KDB 447498 D01v06	General RF Exposure Guidance	No deviation
KDB 865664 D02v01r02	RF Exposure Reporting	No deviation
IEC TR 63170:2018	Measurement procedure for the evaluation of power density related to human exposure to radio frequency fields from wireless communication devices operating between 6 GHz and 100 GHz	No deviation
The November 2019, TCB Workshop presentation	RF Exposure Procedures	No deviation
Note: Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.		

5. Power Density Measurement System

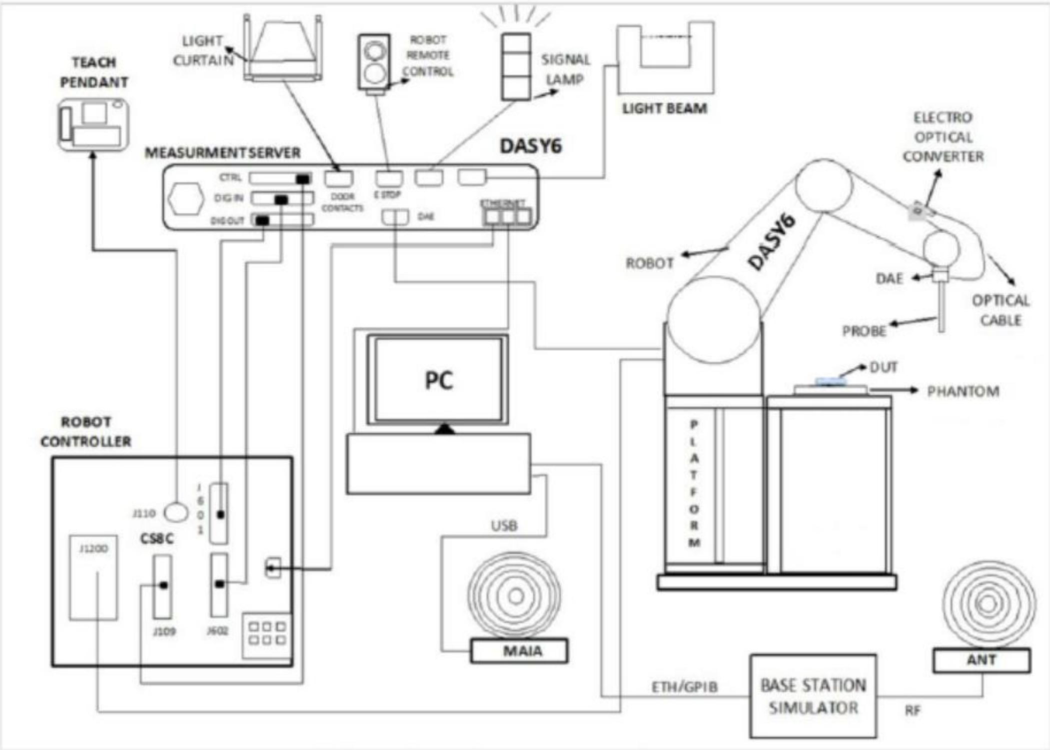


Fig 5.1 SPEAG DASY System Configurations

The DASY system for performance compliance tests is illustrated above graphically. This system consists of the following items:

- A standard high precision 6-axis robot with controller, a teach pendant and software.
- A data acquisition electronic (DAE) attached to the robot arm extension.
- A dosimetric probe equipped with an optical surface detector system.
- The electro-optical converter (ECO) performs the conversion between optical and electrical signals
- A measurement server performs the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the accuracy of the probe positioning.
- A computer operating Windows XP.
- DASY software.
- Remove control with teach pendant and additional circuitry for robot safety such as warming lamps, etc.
- The SAM twin phantom.
- A device holder.
- Tissue simulating liquid.
- Dipole for evaluating the proper functioning of the system.
- Some of the components are described in details in the following sub-sections.

5.1. EUmmWave Probe

The probe designed allows measurement at distances as small as 2mm from the sensor to the surface of EUT. The typical senor to the tip of probe is 1.5mm.

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
Two dipoles' Length of Probe	0.9 mm – Diode located
Dynamic Range	＜20 V/m – 10000 V/m with PRE-10 (min ＜50 V/m – 3000 V/m)
Linearity	＜0.2 dB
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 measurement of mm-Wave transmitters operating above 10 GHz in ＜ 2mm distance from device (free-space) power density H-field and far-field analysis using total field reconstruction.
Compatibility	cDASY 6 + 5G Module SW1.0 and higher

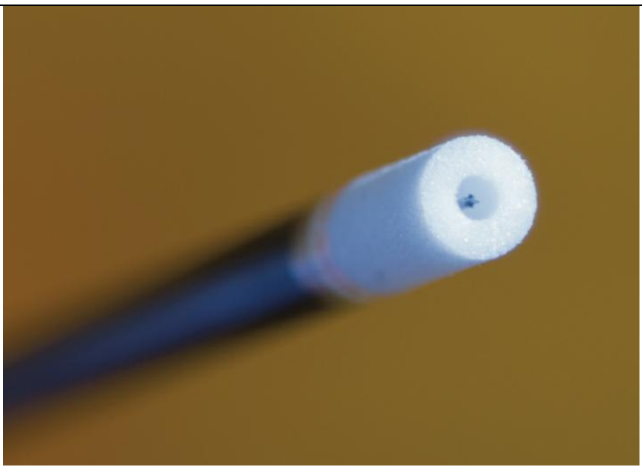
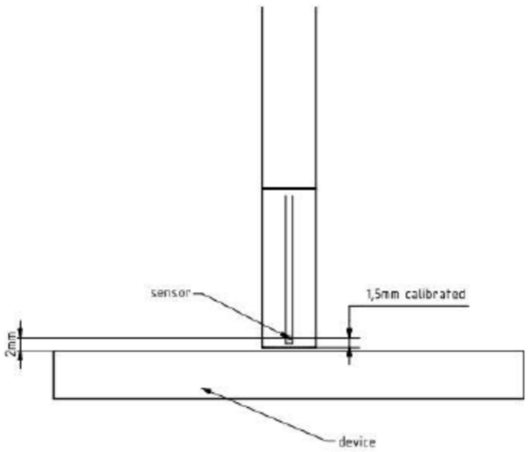


Fig 5.2 Photo of EUmmWave Probe



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 fast16 bit AD-converter and a command decoder and control logic unit. 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 200MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Fig 5.3 Photo of DAE

5.3. Robot

The SPEAG DASY system uses the high precision robots (DASY6: TX90XL) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY6: CS8c) from Stäubli is used. The Stäubli robot series have many features that are important for our application:

High precision (repeatability ±0.035 mm)

High reliability (industrial design)

Jerk-free straight movements

Low ELF interference (the closed metallic construction shields against motor control fields)

Fig 5.4 Photo of DASY6

5.4. Measurement Server

The measurement server is based on a PC/104 CPU board with CPU (DASY4: 166 MHz, Intel Pentium; DASY5: 400 MHz, Intel Celeron), chip disk (DASY4: 32 MB; DASY5: 128 MB), RAM (DASY4: 64 MB, DASY5: 128 MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O board, which is directly connected to the PC/104 bus of the CPU board.

The measurement server performs all the real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operations.

5.5. Data Storage and Evaluation

➢ **Data Storage**

The DASY software stores the assessed data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all the necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files. The post-processing software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of erroneous parameter settings. For example, if a measurement has been performed with an incorrect crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be reevaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type (e.g., [V/m], [A/m], [mW/g]). Some of these units are not available in certain situations or give meaningless results, e.g., a SAR-output in a non-lose media, will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

➢ **Data Evaluation**

The DASY post-processing software (SEMCAD) automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software.

Probe parameters:	- Sensitivity	$Norm_i$, a_{i0}, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$
	- Diode compression point	dcpi
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	σ
	- Density	ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY components. In the direct measuring mode of the multi-meter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power.

The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \times \frac{cf}{dcp_i}$$

With Vi = compensated signal of channel i, (i = x, y, z)
Ui = input signal of channel i, (i = x, y, z)
cf = crest factor of exciting field (DASY parameter)
dcpi = diode compression point (DASY parameter)

From the compensated input signals, the primary field data for each channel can be evaluated:

$$\text{E-field Probes:} E_i = \sqrt{\frac{V_i}{Norm_i \times ConvF}}$$

$$\text{H-field Probes:} H_i = \sqrt{V_i} \times \frac{a_{i0} + a_{i1} + a_{i2} f^2}{f}$$

With V_i = compensated signal of channel i, (i = x, y, z)
$Norm_i$ = sensor sensitivity of channel i, (i = x, y, z), $\mu V/(V/m)^2$ forE-field Probes
ConvF = sensitivity enhancement in solution
a_{ij} = sensor sensitivity factors for H-field probes
f = carrier frequency [GHz]
E_i = electric field strength of channel i in V/m
H_i = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

The primary field data are used to calculate the derived field units.

$$SAR = E_{tot}^2 \times \frac{\sigma}{\rho \times 1000}$$

with SAR = local specific absorption rate in mW/g
E_{tot} = total field strength in V/m
σ = conductivity in [mho/m] or [Siemens/m]
ρ = equivalent tissue density in g/cm^3

Note that the density is set to 1, to account for actual head tissue density rather than the density of the tissue simulating liquid.

5.6. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial No./ SW Version	Calibration	
				Last Cal.	Due Date
SPEAG	DOSIMETRIC ASSESSMENT SYSTEM Software	cDASY6 mmWave	V2.4.2.62	N/A	N/A
SPEAG	5G Validation Source	30GHz	1077	2023.12.02	2026.12.01
SPEAG	EUmmMV Probe	EUmmMV4	9602	2024.03.12	2025.03.11
SPEAG	Data Acquisition Electronics	DAE4	480	2023.09.19	2024.09.18
R&S	Spectrum Analyzer	N9030A	MY54170556	2023.10.07	2024.10.06
KTJ	Thermo meter	TA298	N/A	2023.11.22	2024.11.21

Note:

The calibration certificate of DASY can be referred to appendix E of this report.

6. System Verification Source

The system verification sources at 30GHz and above comprise born-antennas and very stable signal generators.

Model	Ka-band born antenna
Calibrated Frequency	30GHz and above at 10mm from the case surface
Frequency Accuracy	±100 MHz
E-field Polarization	Linear
Harmonics	-20dBc
Total Radio Power	14dBm
Power Stability	0.05 dB
Power Consumption	5W
Size	100 x 100 x 100 mm
Weight	1 kg

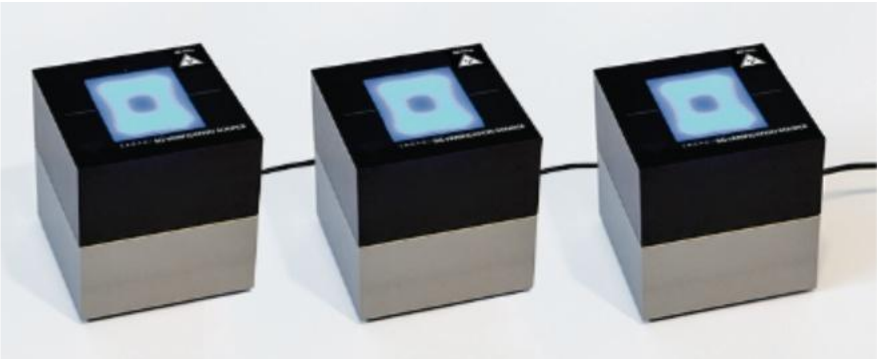


Fig 6.1 Photos of Verification Sources

7. Power Density System Verification

➢ **General description**

The EUT is replaced by a calibrated source, the same spatial resolution, measurement region and test separation used in the calibration was applied to system check. Through visual inspection into the measured power density distribution, both the spatially (shape) and numerically (level) have no noticeable difference. The measurement results should be within ±10% 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

Setting for measurement of verification sources

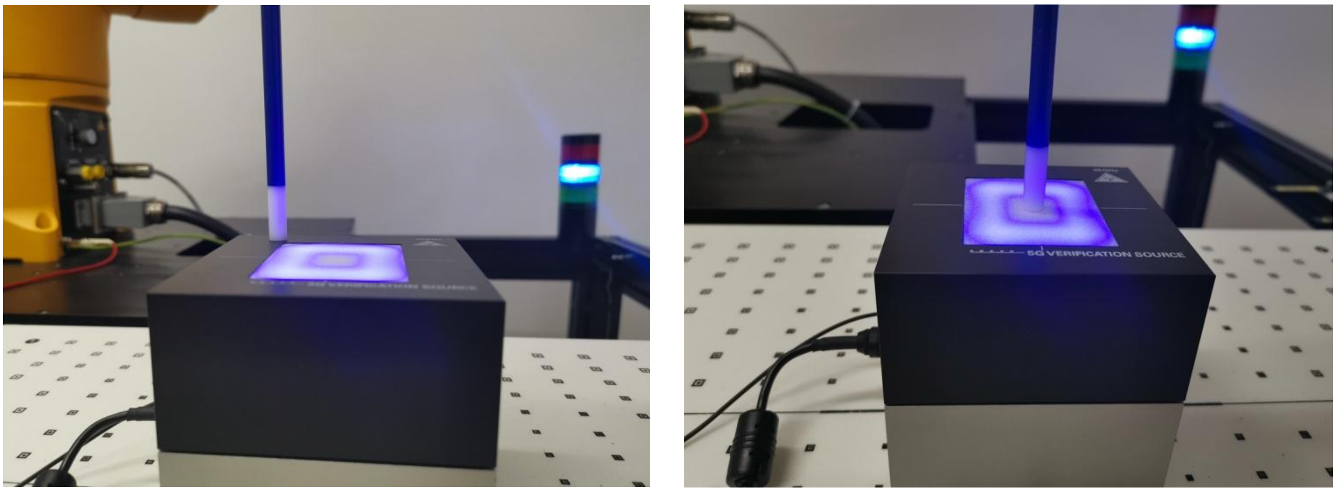


Fig 7.1 Photos of Verification Setup

➢ **Validation Results**

After system check testing, the results of power density will be compared with the reference value derived from the certificate report. The deviation of system check should be within ±10%.

<Validation Setup>

Frequency (GHz)	5G Verification Source	Probe S/N	DAE S/N
30	30GHz-SN 1077	9602	480

<Validation Results>

Date	Frequency (GHz)	Test Distance (mm)	Measured 4cm² (W/m²)	Targeted 4cm² (W/m²)	Deviation (%)
2024.07.27	30	5.5	26.9	28.4	-5.3

Note: System checks the specific test data please refer to Annex C.

- **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 (ϕ, 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, ϕ and θ) are sufficient for the description of the incident field.

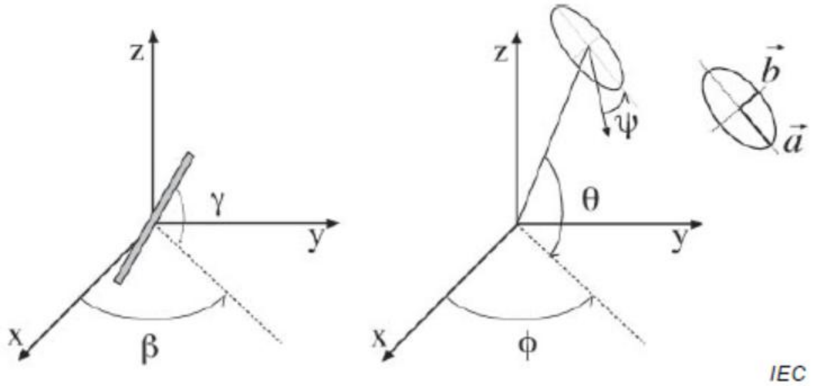


Fig 9.1 Illustration of the angles used for the numerical description of the sensor and the orientation of an ellipse in 3-D space

For the construction 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 express as functions of the three angles (ϕ, 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 numbers of three parameters is reduced from five to three, which means that least three sensors readings are necessary to gain sufficient information for the reconstruction of ellipse parameters. However, to suppress the noise and increase the reconstruction accuracy, it is desirable to have an over determined system of equations. The solution to use a probe consisting of two sensors angled by γ_1 and γ_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 determination of two. If there is a need for more information or increased accuracy, more rotation angles can be added.

The reconstruction of 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 90° shift ($\gamma_1 = \gamma_2 + 90°$), and, to simplify, the first rotation angle of the probe (β_1) can be set to 0°.

Total Field and Power 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.

8. Antenna Information

8.1. Antenna Location

The location of antenna was recorded in annex B
ANT 0: TRX (0): WCDMA Band II/V, LTE Band 2/4/5/7/12/13/66, 5G NR n2/5/66 ANT 1: DRX: WCDMA Band II/V, LTE Band 2/4/5/7/12/13, 5G NR n2/5 ANT 2: TRX1/PRX MIMO: LTE Band 48, 5G NR n48/77/78 PRX: WCDMA Band II, LTE Band 2/4/7/66, 5G NR n2/66 ANT 3: DRX MIMO: LTE Band 48, 5G NR n48/77/78 ANT 4: TRX1: WCDMA Band II, LTE Band 2/4/7/66, 5G NR n2/66 ANT 5: TRX0: LTE Band 48, 5G NR n48/77/78 ANT 6: DRX (1): WCDMA Band II, LTE Band 2/4/7/48/66, 5G NR n2/48/66/77/78 WIFI 0: WLAN 2.4GHz/5GHz WIFI 1: WLAN 2.4GHz/5GHz Module: 5G n260/n261

8.2. Test Positions

➢ **Exclusion Evaluation for PD**

Exposure Positions	Measurement Plane					
	Front 2mm	Back 2mm	Left 2mm	Right 2mm	Top 2mm	Bottom 2mm
Module	Yes	Yes	Yes	Yes	Yes	Yes

Note:

1. From the Part0 report, beam IDs with the highest PD and corresponding input. power. limit were selected to be tested for each antenna module and frequency bands.
2. Referring to KDB 941225 D06, RF exposure must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.

9. Power Density Assessment

- **General Description**

1. The 5G NR mmWave signal under testing was configured by the test tool of Qualcomm Software, and it is only limited to operate at EN-DC for 5G NR implementation according to the character of the device.
2. This device would be configured to maximum power when transmitting and tested at the maximum duty cycle for each RB configuration, modulation, bandwidth, and channel.
3. According to the manufacturer that summation for different antenna modules and exposure planes, the worst case would be selected for power density measurement.

- **mmWave CA Combination**

Sub-Category	EN-DC Combination	mmWave (FR2) 4G DL 4x4 MIMO	5G-NR DL 4x4 MIMO	ENDC UL	5G UL
FR2	CA_n260I	.	.	.	n260I
FR2	CA_n260M	.	.	.	n260I
FR2	CA_n261I	.	.	.	n261I
FR2	CA_n261M	.	.	.	n261I

- **mmWave EN-DC/SA-DC Combination**

Sub-Category	EN-DC Combination	mmWave (FR2) 4G DL 4x4 MIMO	5G-NR DL 4x4 MIMO	ENDC UL	5G UL
1DL+FR2	DC_2A_n261A	2A	.	2A-n261A	.
1DL+FR2	DC_2A_n261I	2A	.	2A-n261I	.
1DL+FR2	DC_2A_n261M	2A	.	2A-n261I	.
1DL+FR2	DC_2A_n261(2H)	2A	.	2A-n261H	.
1DL+FR2	DC_2A_n261(A-G-H)	2A	.	2A-n261A, 2A-n261G, 2A-n261H	.
1DL+FR2	DC_2A_n261(A-G-I)	2A	.	2A-n261A, 2A-n261G, 2A-n261I	.
1DL+FR2	DC_2A_n261(G-H)	2A	.	2A-n261G, 2A-n261H	.
1DL+FR2	DC_2A_n261(H-I)	2A	.	2A-n261H, 2A-n261I	.
1DL+FR2	DC_5A_n261A	.	.	5A-n261A	.
1DL+FR2	DC_5A_n261I	.	.	5A-n261I	.

1DL+FR2	DC_5A_n261M	.	.	5A-n261I	.
1DL+FR2	DC_5A_n261(2H)	.	.	5A-n261H	.
1DL+FR2	DC_5A_n261(A-G-H)	.	.	5A-n261A, 5A-n261G, 5A-n261H	.
1DL+FR2	DC_5A_n261(A-G-I)	.	.	5A-n261A, 5A-n261G, 5A-n261I	.
1DL+FR2	DC_5A_n261(G-H)	.	.	5A-n261G, 5A-n261H	.
1DL+FR2	DC_5A_n261(H-I)	.	.	5A-n261H, 5A-n261I	.
1DL+FR2	DC_13A_n261A	.	.	13A-n261A	.
1DL+FR2	DC_13A_n261I	.	.	13A-n261I	.
1DL+FR2	DC_13A_n261M	.	.	13A-n261I	.
1DL+FR2	DC_13A_n261(2H)	.	.	13A-n261H	.
1DL+FR2	DC_13A_n261(A-G-H)	.	.	13A-n261A, 13A-n261G, 13A-n261H	.
1DL+FR2	DC_13A_n261(A-G-I)	.	.	13A-n261A, 13A-n261G, 13A-n261I	.
1DL+FR2	DC_13A_n261(G-H)	.	.	13A-n261G, 13A-n261H	.
1DL+FR2	DC_13A_n261(H-I)	.	.	13A-n261H, 13A-n261I	.
1DL+FR2	DC_66A_n261A	66A	.	66A-n261A	.
1DL+FR2	DC_66A_n261I	66A	.	66A-n261I	.
1DL+FR2	DC_66A_n261M	66A	.	66A-n261I	.
1DL+FR2	DC_66A_n261(2H)	66A	.	66A-n261H	.
1DL+FR2	DC_66A_n261(A-G-H)	66A	.	66A-n261A, 66A-n261G, 66A-n261H	.
1DL+FR2	DC_66A_n261(A-G-I)	66A	.	66A-n261A, 66A-n261G, 66A-n261I	.
1DL+FR2	DC_66A_n261(G-H)	66A	.	66A-n261G, 66A-n261H	.
1DL+FR2	DC_66A_n261(H-I)	66A	.	66A-n261H, 66A-n261I	.
2DL+FR2	DC_2A-2A_n261A	2A-2A	.	2A-n261A	.
2DL+FR2	DC_2A-2A_n261I	2A-2A	.	2A-n261I	.
2DL+FR2	DC_2A-2A_n261M	2A-2A	.	2A-n261I	.
2DL+FR2	DC_2A-5A_n261A	2A	.	2A-n261A, 5A-n261A	.
2DL+FR2	DC_2A-5A_n261I	2A	.	2A-n261I, 5A-n261I	.
2DL+FR2	DC_2A-5A_n261M	2A	.	2A-n261I,	.

				5A-n261I	
2DL+FR2	DC_2A-5A_n261(2H)	2A	.	2A-n261H, 5A-n261H	.
2DL+FR2	DC_2A-5A_n261(A-G-H)	2A	.	2A-n261A, 2A-n261G, 2A-n261H, 5A-n261A, 5A-n261G, 5A-n261H	.
2DL+FR2	DC_2A-5A_n261(A-G-I)	2A	.	2A-n261A, 2A-n261G, 2A-n261I, 5A-n261A, 5A-n261G, 5A-n261I	.
2DL+FR2	DC_2A-5A_n261(G-H)	2A	.	2A-n261G, 2A-n261H, 5A-n261G, 5A-n261H	.
2DL+FR2	DC_2A-5A_n261(H-I)	2A	.	2A-n261H, 2A-n261I, 5A-n261H, 5A-n261I	.
2DL+FR2	DC_2A-13A_n261A	2A	.	2A-n261A, 13A-n261A	.
2DL+FR2	DC_2A-13A_n261I	2A	.	2A-n261I, 13A-n261I	.
2DL+FR2	DC_2A-13A_n261M	2A	.	2A-n261I, 13A-n261I	.
2DL+FR2	DC_2A-13A_n261(2H)	2A	.	2A-n261H, 13A-n261H	.
2DL+FR2	DC_2A-13A_n261(A-G-H)	2A	.	2A-n261A, 2A-n261G, 2A-n261H, 13A-n261A, 13A-n261G, 13A-n261H	.
2DL+FR2	DC_2A-13A_n261(A-G-I)	2A	.	2A-n261A, 2A-n261G, 2A-n261I, 13A-n261A, 13A-n261G, 13A-n261I	.
2DL+FR2	DC_2A-13A_n261(G-H)	2A	.	2A-n261G, 2A-n261H, 13A-n261G, 13A-n261H	.
2DL+FR2	DC_2A-13A_n261(H-I)	2A	.	2A-n261H, 2A-n261I, 13A-n261H, 13A-n261I	.
2DL+FR2	DC_2A-66A_n261A	2A-66A	.	2A-n261A,	.

				66A-n261A	
2DL+FR2	DC_2A-66A_n261I	2A-66A	.	2A-n261I, 66A-n261I	.
2DL+FR2	DC_2A-66A_n261M	2A-66A	.	2A-n261I, 66A-n261I	.
2DL+FR2	DC_2A-66A_n261(2H)	2A-66A	.	2A-n261H, 66A-n261H	.
2DL+FR2	DC_2A-66A_n261(A-G-H)	2A-66A	.	2A-n261A, 2A-n261G, 2A-n261H, 66A-n261A, 66A-n261G, 66A-n261H	.
2DL+FR2	DC_2A-66A_n261(A-G-I)	2A-66A	.	2A-n261A, 2A-n261G, 2A-n261I, 66A-n261A, 66A-n261G, 66A-n261I	.
2DL+FR2	DC_2A-66A_n261(G-H)	2A-66A	.	2A-n261G, 2A-n261H, 66A-n261G, 66A-n261H	.
2DL+FR2	DC_2A-66A_n261(H-I)	2A-66A	.	2A-n261H, 2A-n261I, 66A-n261H, 66A-n261I	.
2DL+FR2	DC_5A-66A_n261A	66A	.	5A-n261A, 66A-n261A	.
2DL+FR2	DC_5A-66A_n261I	66A	.	5A-n261I, 66A-n261I	.
2DL+FR2	DC_5A-66A_n261M	66A	.	5A-n261I, 66A-n261I	.
2DL+FR2	DC_5A-66A_n261(2H)	66A	.	5A-n261H, 66A-n261H	.
2DL+FR2	DC_5A-66A_n261(A-G-H)	66A	.	5A-n261A, 5A-n261G, 5A-n261H, 66A-n261A, 66A-n261G, 66A-n261H	.
2DL+FR2	DC_5A-66A_n261(A-G-I)	66A	.	5A-n261A, 5A-n261G, 5A-n261I, 66A-n261A, 66A-n261G, 66A-n261I	.
2DL+FR2	DC_5A-66A_n261(G-H)	66A	.	5A-n261G, 5A-n261H, 66A-n261G, 66A-n261H	.
2DL+FR2	DC_5A-66A_n261(H-I)	66A	.	5A-n261H,	.

				5A-n261I, 66A-n261H, 66A-n261I	
2DL+FR2	DC_13A-66A_n261A	66A	.	13A-n261A, 66A-n261A	.
2DL+FR2	DC_13A-66A_n261I	66A	.	13A-n261I, 66A-n261I	.
2DL+FR2	DC_13A-66A_n261M	66A	.	13A-n261I, 66A-n261I	.
2DL+FR2	DC_13A-66A_n261(2H)	66A	.	13A-n261H, 66A-n261H	.
2DL+FR2	DC_13A-66A_n261(A-G-H)	66A	.	13A-n261A, 13A-n261G, 13A-n261H, 66A-n261A, 66A-n261G, 66A-n261H	.
2DL+FR2	DC_13A-66A_n261(A-G-I)	66A	.	13A-n261A, 13A-n261G, 13A-n261I, 66A-n261A, 66A-n261G, 66A-n261I	.
2DL+FR2	DC_13A-66A_n261(G-H)	66A	.	13A-n261G, 13A-n261H, 66A-n261G, 66A-n261H	.
2DL+FR2	DC_13A-66A_n261(H-I)	66A	.	13A-n261H, 13A-n261I, 66A-n261H, 66A-n261I	.
2DL+FR2	DC_66A-66A_n261A	66A-66A	.	66A-n261A	.
2DL+FR2	DC_66A-66A_n261I	66A-66A	.	66A-n261I	.
2DL+FR2	DC_66A-66A_n261M	66A-66A	.	66A-n261I	.
2DL+FR2	DC_66A-66A_n261(2H)	66A-66A	.	66A-n261H	.
2DL+FR2	DC_66A-66A_n261(A-G-H)	66A-66A	.	66A-n261A, 66A-n261G, 66A-n261H	.
2DL+FR2	DC_66A-66A_n261(A-G-I)	66A-66A	.	66A-n261A, 66A-n261G, 66A-n261I	.
2DL+FR2	DC_66A-66A_n261(G-H)	66A-66A	.	66A-n261G, 66A-n261H	.
2DL+FR2	DC_66A-66A_n261(H-I)	66A-66A	.	66A-n261H, 66A-n261I	.
1DL+FR2	DC_2A_n260A	2A	.	2A-n260A	.
1DL+FR2	DC_2A_n260I	2A	.	2A-n260I	.
1DL+FR2	DC_2A_n260M	2A	.	2A-n260I	.
1DL+FR2	DC_5A_n260A	.	.	5A-n260A	.
1DL+FR2	DC_5A_n260I	.	.	5A-n260I	.

1DL+FR2	DC_5A_n260M	.	.	5A-n260I	.
1DL+FR2	DC_13A_n260A	.	.	13A-n260A	.
1DL+FR2	DC_13A_n260I	.	.	13A-n260I	.
1DL+FR2	DC_13A_n260M	.	.	13A-n260I	.
1DL+FR2	DC_66A_n260A	66A	.	66A-n260A	.
1DL+FR2	DC_66A_n260I	66A	.	66A-n260I	.
1DL+FR2	DC_66A_n260M	66A	.	66A-n260I	.
2DL+FR2	DC_2A-5A_n260A	2A	.	2A-n260A, 5A-n260A	.
2DL+FR2	DC_2A-5A_n260I	2A	.	2A-n260I, 5A-n260I	.
2DL+FR2	DC_2A-5A_n260M	2A	.	2A-n260I, 5A-n260I	.
2DL+FR2	DC_2A-13A_n260A	2A	.	2A-n260A, 13A-n260A	.
2DL+FR2	DC_2A-13A_n260I	2A	.	2A-n260I, 13A-n260I	.
2DL+FR2	DC_2A-13A_n260M	2A	.	2A-n260I, 13A-n260I	.
2DL+FR2	DC_2A-66A_n260A	2A-66A	.	2A-n260A, 66A-n260A	.
2DL+FR2	DC_2A-66A_n260I	2A-66A	.	2A-n260I, 66A-n260I	.
2DL+FR2	DC_2A-66A_n260M	2A-66A	.	2A-n260I, 66A-n260I	.
2DL+FR2	DC_5A-66A_n260A	66A	.	5A-n260A, 66A-n260A	.
2DL+FR2	DC_5A-66A_n260I	66A	.	5A-n260I, 66A-n260I	.
2DL+FR2	DC_5A-66A_n260M	66A	.	5A-n260I, 66A-n260I	.
2DL+FR2	DC_13A-66A_n260A	66A	.	13A-n260A, 66A-n260A	.
2DL+FR2	DC_13A-66A_n260I	66A	.	13A-n260I, 66A-n260I	.
2DL+FR2	DC_13A-66A_n260M	66A	.	13A-n260I, 66A-n260I	.
2DL+FR2	DC_66A-66A_n260A	66A-66A	.	66A-n260A	.
2DL+FR2	DC_66A-66A_n260I	66A-66A	.	66A-n260I	.
2DL+FR2	DC_66A-66A_n260M	66A-66A	.	66A-n260I	.
3DL+FR2	DC_2A-2A-66A_n260A	2A, 66A, 2A-2A-66A	.	2A-n260A, 66A-n260A	.
3DL+FR2	DC_2A-2A-66A_n260G	2A, 66A, 2A-2A-66A	.	2A-n260G, 66A-n260G	.
3DL+FR2	DC_2A-2A-66A_n260I	2A, 66A, 2A-2A-66A	.	2A-n260I, 66A-n260I	.
3DL+FR2	DC_2A-2A-66A_n260M	2A, 66A	.	2A-n260I, 66A-n260I	.
3DL+FR2	DC_2A-5A-66A_n260A	2A-66A, 2A,	.	2A-n260A,	.

		66A		5A-n260A, 66A-n260A	
3DL+FR2	DC_2A-5A-66A_n260I	2A-66A, 2A, 66A	.	2A-n260I, 5A-n260I, 66A-n260I	.
3DL+FR2	DC_2A-5A-66A_n260M	2A, 66A	.	2A-n260I, 5A-n260I, 66A-n260I	.
3DL+FR2	DC_2A-66A-66A_n260A	2A, 66A, 2A-66A-66A	.	2A-n260A, 66A-n260A	.
3DL+FR2	DC_2A-66A-66A_n260I	2A, 66A, 2A-66A-66A	.	2A-n260I, 66A-n260I	.
3DL+FR2	DC_2A-66A-66A_n260M	2A, 66A	.	2A-n260I, 66A-n260I	.
3DL+FR2	DC_5A-66A-66A_n260A	66A, 66A-66A	.	5A-n260A, 66A-n260A	.
3DL+FR2	DC_5A-66A-66A_n260I	66A, 66A-66A	.	5A-n260I, 66A-n260I	.
3DL+FR2	DC_5A-66A-66A_n260M	66A	.	5A-n260I, 66A-n260I	.
4DL+FR2	DC_2A-2A-5A-66A_n260A	2A-2A-66A	.	2A-n260A, 5A-n260A, 66A-n260A	.
4DL+FR2	DC_2A-5A-66A-66A_n260A	2A-66A-66A	.	2A-n260A, 5A-n260A, 66A-n260A	.
4DL+FR2	DC_2A-5A-66A-66A_n260I	2A-66A-66A	.	2A-n260I, 5A-n260I, 66A-n260I	.
4DL+FR2	DC_2A-5A-66A-66A_n260M	.	.	2A-n260I, 5A-n260I, 66A-n260I	.
1DL+FR2	DC_2A_n261(2G)	2A	.	2A-n261G	.
1DL+FR2	DC_5A_n261(2G)	.	.	5A-n261G	.
1DL+FR2	DC_13A_n261(2G)	.	.	13A-n261G	.
1DL+FR2	DC_48A_n261A	48A	.	48A-n261A	.
1DL+FR2	DC_48A_n261I	48A	.	48A-n261I	.
1DL+FR2	DC_48A_n261M	48A	.	48A-n261I	.
1DL+FR2	DC_48A_n261(2G)	48A	.	48A-n261G	.
1DL+FR2	DC_48A_n261(2H)	48A	.	48A-n261H	.
1DL+FR2	DC_48A_n261(A-G-H)	48A	.	48A-n261A, 48A-n261G, 48A-n261H	.
1DL+FR2	DC_48A_n261(A-G-I)	48A	.	48A-n261A, 48A-n261G, 48A-n261I	.
1DL+FR2	DC_48A_n261(G-H)	48A	.	48A-n261G, 48A-n261H	.
1DL+FR2	DC_48A_n261(H-I)	48A	.	48A-n261H, 48A-n261I	.

1DL+FR2	DC_48A_n260A	48A	.	48A-n260A	.
1DL+FR2	DC_48A_n260I	48A	.	48A-n260I	.
1DL+FR2	DC_66A_n261(G-I)	66A	.	66A-n261G, 66A-n261I	.
1DL+FR2	DC_66A_n261(2G)	66A	.	66A-n261G	.
1DL+FR2	DC_2A_n261(G-I)	2A	.	2A-n261G, 2A-n261I	.
1DL+FR2	DC_5A_n261(G-I)	.	.	5A-n261G, 5A-n261I	.
1DL+FR2	DC_13A_n261(G-I)	.	.	13A-n261G, 13A-n261I	.
1DL+FR2	DC_48A_n261(G-I)	48A	.	48A-n261G, 48A-n261I	.
1DL+FR2	DC_48A_n260M	48A	.	48A-n260I	.
2DL+FR2	DC_13A-66A_n261(G-I)	66A	.	13A-n261G, 13A-n261I, 66A-n261G, 66A-n261I	.
2DL+FR2	DC_13A-66A_n261(2G)	66A	.	13A-n261G, 66A-n261G	.
2DL+FR2	DC_2A-66A_n261(G-I)	2A-66A	.	2A-n261G, 2A-n261I, 66A-n261G, 66A-n261I	.
2DL+FR2	DC_2A-66A_n261(2G)	2A-66A	.	2A-n261G, 66A-n261G	.
2DL+FR2	DC_2A-13A_n261(G-I)	2A	.	2A-n261G, 2A-n261I, 13A-n261G, 13A-n261I	.
2DL+FR2	DC_2A-13A_n261(2G)	2A	.	2A-n261G, 13A-n261G	.
2DL+FR2	DC_5A-66A_n261(G-I)	66A	.	5A-n261G, 5A-n261I, 66A-n261G, 66A-n261I	.
2DL+FR2	DC_5A-66A_n261(2G)	66A	.	5A-n261G, 66A-n261G	.
2DL+FR2	DC_2A-5A_n261(G-I)	2A	.	2A-n261G, 2A-n261I, 5A-n261G, 5A-n261I	.
2DL+FR2	DC_2A-5A_n261(2G)	2A	.	2A-n261G, 5A-n261G	.
2DL+FR2	DC_66A-66A_n261(G-I)	66A-66A	.	66A-n261G, 66A-n261I	.
2DL+FR2	DC_66A-66A_n261(2G)	66A-66A	.	66A-n261G	.
3DL+FR2	DC_2A-13A-66A_n261A	2A-66A, 2A, 66A	.	2A-n261A, 13A-n261A, 66A-n261A	.

3DL+FR2	DC_2A-13A-66A_n261I	2A-66A, 2A, 66A	.	2A-n261I, 13A-n261I, 66A-n261I	.
3DL+FR2	DC_2A-13A-66A_n261M	2A, 66A	.	2A-n261I, 13A-n261I, 66A-n261I	.
3DL+FR2	DC_2A-13A-66A_n261(G-H)	2A, 66A	.	2A-n261G, 2A-n261H, 13A-n261G, 13A-n261H, 66A-n261G, 66A-n261H	.
3DL+FR2	DC_2A-13A-66A_n261(2H)	2A, 66A	.	2A-n261H, 13A-n261H, 66A-n261H	.
3DL+FR2	DC_2A-13A-66A_n261(A-G-H)	2A, 66A	.	2A-n261A, 2A-n261G, 2A-n261H, 13A-n261A, 13A-n261G, 13A-n261H, 66A-n261A, 66A-n261G, 66A-n261H	.
3DL+FR2	DC_2A-13A-66A_n261(A-G-I)	2A, 66A	.	2A-n261A, 2A-n261G, 2A-n261I, 13A-n261A, 13A-n261G, 13A-n261I, 66A-n261A, 66A-n261G, 66A-n261I	.
3DL+FR2	DC_2A-13A-66A_n261(H-I)	2A, 66A	.	2A-n261H, 2A-n261I, 13A-n261H, 13A-n261I, 66A-n261H, 66A-n261I	.
3DL+FR2	DC_2A-13A-66A_n261(G-I)	2A, 66A	.	2A-n261G, 2A-n261I, 13A-n261G, 13A-n261I, 66A-n261G, 66A-n261I	.
3DL+FR2	DC_2A-13A-66A_n261(2G)	2A-66A, 2A, 66A	.	2A-n261G, 13A-n261G, 66A-n261G	.
3DL+FR2	DC_13A-66A-66A_n261A	66A, 66A-66A	.	13A-n261A, 66A-n261A	.
3DL+FR2	DC_13A-66A-66A_n261I	66A, 66A-66A	.	13A-n261I, 66A-n261I	.

3DL+FR2	DC_13A-66A-66A_n261M	66A	.	13A-n261I, 66A-n261I	.
3DL+FR2	DC_13A-66A-66A_n261(G-H)	66A	.	13A-n261G, 13A-n261H, 66A-n261G, 66A-n261H	.
3DL+FR2	DC_13A-66A-66A_n261(2H)	66A	.	13A-n261H, 66A-n261H	.
3DL+FR2	DC_13A-66A-66A_n261(A-G-H)	66A	.	13A-n261A, 13A-n261G, 13A-n261H, 66A-n261A, 66A-n261G, 66A-n261H	.
3DL+FR2	DC_13A-66A-66A_n261(A-G-I)	66A	.	13A-n261A, 13A-n261G, 13A-n261I, 66A-n261A, 66A-n261G, 66A-n261I	.
3DL+FR2	DC_13A-66A-66A_n261(H-I)	66A	.	13A-n261H, 13A-n261I, 66A-n261H, 66A-n261I	.
3DL+FR2	DC_13A-66A-66A_n261(G-I)	66A	.	13A-n261G, 13A-n261I, 66A-n261G, 66A-n261I	.
3DL+FR2	DC_13A-66A-66A_n261(2G)	66A, 66A-66A	.	13A-n261G, 66A-n261G	.
3DL+FR2	DC_2A-66A-66A_n261A	2A, 66A, 2A-66A-66A	.	2A-n261A, 66A-n261A	.
3DL+FR2	DC_2A-66A-66A_n261I	2A, 66A, 2A-66A-66A	.	2A-n261I, 66A-n261I	.
3DL+FR2	DC_2A-66A-66A_n261M	2A, 66A	.	2A-n261I, 66A-n261I	.
3DL+FR2	DC_2A-66A-66A_n261(G-H)	2A, 66A	.	2A-n261G, 2A-n261H, 66A-n261G, 66A-n261H	.
3DL+FR2	DC_2A-66A-66A_n261(2H)	2A, 66A	.	2A-n261H, 66A-n261H	.
3DL+FR2	DC_2A-66A-66A_n261(A-G-H)	2A, 66A	.	2A-n261A, 2A-n261G, 2A-n261H, 66A-n261A, 66A-n261G, 66A-n261H	.
3DL+FR2	DC_2A-66A-66A_n261(A-G-I)	2A, 66A	.	2A-n261A, 2A-n261G, 2A-n261I, 66A-n261A,	.

				66A-n261G, 66A-n261I	
3DL+FR2	DC_2A-66A-66A_n261(H-I)	2A, 66A	.	2A-n261H, 2A-n261I, 66A-n261H, 66A-n261I	.
3DL+FR2	DC_2A-66A-66A_n261(G-I)	2A, 66A	.	2A-n261G, 2A-n261I, 66A-n261G, 66A-n261I	.
3DL+FR2	DC_2A-66A-66A_n261(2G)	2A, 66A, 2A-66A-66A	.	2A-n261G, 66A-n261G	.
3DL+FR2	DC_5A-66A-66A_n261A	66A, 66A-66A	.	5A-n261A, 66A-n261A	.
3DL+FR2	DC_5A-66A-66A_n261I	66A, 66A-66A	.	5A-n261I, 66A-n261I	.
3DL+FR2	DC_5A-66A-66A_n261M	66A	.	5A-n261I, 66A-n261I	.
3DL+FR2	DC_5A-66A-66A_n261(G-H)	66A	.	5A-n261G, 5A-n261H, 66A-n261G, 66A-n261H	.
3DL+FR2	DC_5A-66A-66A_n261(2H)	66A	.	5A-n261H, 66A-n261H	.
3DL+FR2	DC_5A-66A-66A_n261(A-G-H)	66A	.	5A-n261A, 5A-n261G, 5A-n261H, 66A-n261A, 66A-n261G, 66A-n261H	.
3DL+FR2	DC_5A-66A-66A_n261(A-G-I)	66A	.	5A-n261A, 5A-n261G, 5A-n261I, 66A-n261A, 66A-n261G, 66A-n261I	.
3DL+FR2	DC_5A-66A-66A_n261(H-I)	66A	.	5A-n261H, 5A-n261I, 66A-n261H, 66A-n261I	.
3DL+FR2	DC_5A-66A-66A_n261(G-I)	66A	.	5A-n261G, 5A-n261I, 66A-n261G, 66A-n261I	.
3DL+FR2	DC_5A-66A-66A_n261(2G)	66A, 66A-66A	.	5A-n261G, 66A-n261G	.
3DL+FR2	DC_2A-13A-66A_n260A	2A-66A, 2A, 66A	.	2A-n260A, 13A-n260A, 66A-n260A	.
3DL+FR2	DC_2A-13A-66A_n260I	2A-66A, 2A, 66A	.	2A-n260I, 13A-n260I, 66A-n260I	.

3DL+FR2	DC_2A-13A-66A_n260M	2A, 66A	.	2A-n260I, 13A-n260I, 66A-n260I	.
3DL+FR2	DC_13A-66A-66A_n260A	66A, 66A-66A	.	13A-n260A, 66A-n260A	.
3DL+FR2	DC_13A-66A-66A_n260I	66A, 66A-66A	.	13A-n260I, 66A-n260I	.
3DL+FR2	DC_13A-66A-66A_n260M	66A	.	13A-n260I, 66A-n260I	.
FR1+FR2	DC_n77A-n260A	.	n77A	.	n77A-n260A
FR1+FR2	DC_n77A-n260G	.	n77A	.	n77A-n260G
FR1+FR2	DC_n77A-n260I	.	n77A	.	n77A-n260I
FR1+FR2	DC_n77A-n260M	.	n77A	.	n77A-n260I
FR1+FR2	DC_n77A-n261A	.	n77A	.	n77A-n261A
FR1+FR2	DC_n77A-n261G	.	n77A	.	n77A-n261G
FR1+FR2	DC_n77A-n261I	.	n77A	.	n77A-n261I
FR1+FR2	DC_n77A-n261M	.	n77A	.	n77A-n261I
FR1+FR2	DC_n77A-n261(2A)	.	n77A	.	n77A-n261A
FR1+FR2	DC_n77A-n261(2G)	.	n77A	.	n77A-n261G
FR1+FR2	DC_n77A-n261(G-H)	.	n77A	.	n77A-n261G, n77A-n261H
FR1+FR2	DC_n77A-n261(2H)	.	n77A	.	n77A-n261H
FR1+FR2	DC_n77A-n261(H-I)	.	n77A	.	n77A-n261H, n77A-n261I
FR1+FR2	DC_n77A-n261(G-I)	.	n77A	.	n77A-n261G, n77A-n261I
FR1+FR2	DC_n77A-n261(A-L)	.	n77A	.	n77A-n261A, n77A-n261I
FR1+FR2	DC_n77A-n261(A-G-H)	.	n77A	.	n77A-n261A, n77A-n261G, n77A-n261H
FR1+FR2	DC_n77A-n261(A-G-I)	.	n77A	.	n77A-n261A, n77A-n261G, n77A-n261I
FR1+FR2	DC_n2A-n260A	.	n2A	.	n2A-n260A
FR1+FR2	DC_n2A-n260G	.	n2A	.	n2A-n260G
FR1+FR2	DC_n2A-n260I	.	n2A	.	n2A-n260I
FR1+FR2	DC_n2A-n260M	.	n2A	.	n2A-n260I
FR1+FR2	DC_n2A-n261(2A)	.	n2A	.	n2A-N261a
FR1+FR2	DC_n2A-n261(2H)	.	n2A	.	n2A-n261H
FR1+FR2	DC_n2A-n261(A-G-H)	.	n2A	.	n2A-n261A, n2A-n261G, n2A-n261H
FR1+FR2	DC_n2A-n261(A-G-I)	.	n2A	.	n2A-n261A, n2A-n261G, n2A-n261I
FR1+FR2	DC_n2A-n261(G-H)	.	n2A	.	n2A-n261G,

					n2A-n261H
FR1+FR2	DC_n2A-n261(G-I)	.	n2A	.	n2A-n261G, n2A-n261I
FR1+FR2	DC_n2A-n261(H-I)	.	n2A	.	n2A-n261H, n2A-n261I
FR1+FR2	DC_n2A-n261I	.	n2A	.	n2A-n261I
FR1+FR2	DC_n2A-n261M	.	n2A	.	n2A-n261I
FR1+FR2	DC_n2A-n261A	.	n2A	.	n2A-n261A
FR1+FR2	DC_n5A-n260A	.	.	.	n5A-n260A
FR1+FR2	DC_n5A-n260G	.	.	.	n5A-n260G
FR1+FR2	DC_n5A-n260I	.	.	.	n5A-n260I
FR1+FR2	DC_n5A-n260M	.	.	.	n5A-n260I
FR1+FR2	DC_n5A-n261(2A)	.	.	.	n5A-n261A
FR1+FR2	DC_n5A-n261G	.	.	.	n5A-n261G
FR1+FR2	DC_n5A-n261(2H)	.	.	.	n5A-n261H
FR1+FR2	DC_n5A-n261(A-G-H)	.	.	.	n5A-n261A, n5A-n261G, n5A-n261H
FR1+FR2	DC_n5A-n261(A-G-I)	.	.	.	n5A-n261A, n5A-n261G, n5A-n261I
FR1+FR2	DC_n5A-n261(G-H)	.	.	.	n5A-n261G, n5A-n261H
FR1+FR2	DC_n5A-n261(G-I)	.	.	.	n5A-n261G, n5A-n261I
FR1+FR2	DC_n5A-n261(H-I)	.	.	.	n5A-n261H, n5A-n261I
FR1+FR2	DC_n5A-n261A	.	.	.	n5A-n261A
FR1+FR2	DC_n5A-n261I	.	.	.	n5A-n261I
FR1+FR2	DC_n5A-n261M	.	.	.	n5A-n261I
FR1+FR2	DC_n66A-n260A	.	n66A	.	n66A-n260A
FR1+FR2	DC_n66A-n260G	.	n66A	.	n66A-n260G
FR1+FR2	DC_n66A-n260I	.	n66A	.	n66A-n260I
FR1+FR2	DC_n66A-n260M	.	n66A	.	n66A-n260I
FR1+FR2	DC_n66A-n261(2A)	.	n66A	.	n66A-n261A
FR1+FR2	DC_n66A-n261G	.	n66A	.	n66A-n261G
FR1+FR2	DC_n66A-n261(2H)	.	n66A	.	n66A-n261H
FR1+FR2	DC_n66A-n261(A-G-H)	.	n66A	.	n66A-n261A, n66A-n261G, n66A-n261H
FR1+FR2	DC_n66A-n261(A-G-I)	.	n66A	.	n66A-n261A, n66A-n261G, n66A-n261I
FR1+FR2	DC_n66A-n261(G-H)	.	n66A	.	n66A-n261G, n66A-n261H

FR1+FR2	DC_n66A-n261(G-I)	.	n66A	.	n66A-n261G, n66A-n261I
FR1+FR2	DC_n66A-n261(H-I)	.	n66A	.	n66A-n261H, n66A-n261I
FR1+FR2	DC_n66A-n261A	.	n66A	.	n66A-n261A
FR1+FR2	DC_n66A-n261I	.	n66A	.	n66A-n261I
FR1+FR2	DC_n66A-n261M	.	n66A	.	n66A-n261I
FR1+FR2	DC_n48A-n261(2H)	.	n48A	.	n48A-n261H
FR1+FR2	DC_n48A-n261(G-H)	.	n48A	.	n48A-n261G, n48A-n261H
FR1+FR2	DC_n48A-n261(H-I)	.	n48A	.	n48A-n261H, n48A-n261I
FR1+FR2	DC_n48A-n261A	.	n48A	.	n48A-n261A
FR1+FR2	DC_n48A-n261G	.	n48A	.	n48A-n261G
FR1+FR2	DC_n48A-n261I	.	n48A	.	n48A-n261I
FR1+FR2	DC_n48A-n261M	.	n48A	.	n48A-n261I
FR1+FR2	DC_n66A-n260(2A)	.	n66A	.	n66A-n260A
FR1+FR2	DC_n2A-n261(2G)	.	n2A	.	n2A-n261G
FR1+FR2	DC_n5A-n261(2G)	.	.	.	n5A-n261G
FR1+FR2	DC_n66A-n261(2G)	.	n66A	.	n66A-n261G
3DL+FR2	DC_2A-2A-13A_n261A	2A, 2A-2A	.	2A-n261A, 13A-n261A	.
3DL+FR2	DC_2A-2A-13A_n261I	2A, 2A-2A	.	2A-n261I, 13A-n261I	.
3DL+FR2	DC_2A-2A-13A_n261M	2A	.	2A-n261I, 13A-n261I	.
3DL+FR2	DC_2A-2A-66A_n261A	2A, 66A, 2A-2A-66A	.	2A-n261A, 66A-n261A	.
3DL+FR2	DC_2A-2A-66A_n261I	2A, 66A, 2A-2A-66A	.	2A-n261I, 66A-n261I	.
3DL+FR2	DC_2A-2A-66A_n261M	2A, 66A	.	2A-n261I, 66A-n261I	.
FR1+FR2	DC_n48A-n260A	.	n48A	.	n48A-n260A
FR1+FR2	DC_n48A-n260I	.	n48A	.	n48A-n260I
FR1+FR2	DC_n48A-n260M	.	n48A	.	n48A-n260I
FR1+FR2	DC_n2A-n261G	.	n2A	.	n2A-n261G
FR1+FR2	DC_n48A-n260G	.	n48A	.	n48A-n260G
FR1+FR2	DC_n48A-n261(A-G-H)	.	n48A	.	n48A-n261A, n48A-n261G, n48A-n261H
FR1+FR2	DC_n48A-n261(A-G-I)	.	n48A	.	n48A-n261A, n48A-n261G, n48A-n261I
FR1+FR2	DC_n48A-n261(2A)	.	n48A	.	n48A-N261A

➢ PD Measurement Plan

<n260>

Antenna Module	Channel	Beam ID		BW (MHz)	RB offset	Exposure Position	Input Power Limit (dBm)
		AG0(V)	AG1(H)				
QTM0	2254166	13	-	100	1#0	Front face	0.13
	2254166	13	-	100	1#0	Back face	
	2254166	13	-	100	1#0	Left face	
	2254166	13	-	100	1#0	Right face	
	2254166	13	-	100	1#0	Top face	
	2254166	13	-	100	1#0	Bottom face	
	2254166	-	269	100	1#0	Front face	-0.10
	2254166	-	269	100	1#0	Back face	
	2254166	-	269	100	1#0	Left face	
	2254166	-	269	100	1#0	Right face	
	2254166	-	269	100	1#0	Top face	
	2254166	-	269	100	1#0	Bottom face	

<n261>

Antenna Module	Channel	Beam ID		BW (MHz)	RB offset	Exposure Position	Input Power Limit (dBm)
		AG0(V)	AG1(H)				
QTM0	2077915	17	-	100	1#0	Front face	1.80
	2077915	17	-	100	1#0	Back face	
	2077915	17	-	100	1#0	Left face	
	2077915	17	-	100	1#0	Right face	
	2077915	17	-	100	1#0	Top face	
	2077915	17	-	100	1#0	Bottom face	
	2077915	-	273	100	1#0	Front face	0.75
	2077915	-	273	100	1#0	Back face	
	2077915	-	273	100	1#0	Left face	
	2077915	-	273	100	1#0	Right face	
	2077915	-	273	100	1#0	Top face	
	2077915	-	273	100	1#0	Bottom face	

10. Test Results of RF Exposure

➢ **General Note**

1. The worst beam ID from Part 0 would be selected for power density testing according to the antenna information.
2. This device is enabled with Qualcomm Smart Transmit feature, it will manage and ensure LTE and 5G NR simultaneous transmission is compliant. The validation of the time-averaging algorithm and compliance under the TX varying transmission scenario for WWAN technologies are recorded in Part 2.

➢ **Test Results**

<n260>

Antenna Module	Channel	Beam ID		BW (MHz)	Signal Type	Exposure Position	Measured psPDtot+ over 4cm² (W/m²)
		AG0(V)	AG1(H)				
QTM0	2254166	13	-	100	QPSK	Front face	2.240
	2254166	13	-	100	QPSK	Back face	1.012
	2254166	13	-	100	QPSK	Left face	0.308
	2254166	13	-	100	QPSK	Right face	0.219
	2254166	13	-	100	QPSK	Top face	0.118
	2254166	13	-	100	QPSK	Bottom face	0.053
	2254166	-	269	100	QPSK	Front face	2.240
	2254166	-	269	100	QPSK	Back face	0.986
	2254166	-	269	100	QPSK	Left face	0.344
	2254166	-	269	100	QPSK	Right face	0.205
	2254166	-	269	100	QPSK	Top face	0.106
	2254166	-	269	100	QPSK	Bottom face	0.082

<n261>

Antenna Module	Channel	Beam ID		BW (MHz)	Signal Type	Exposure Position	Measured psPDtot+ over 4cm² (W/m²)
		AG0(V)	AG1(H)				
QTM0	2077915	17	-	100	QPSK	Front face	2.640
	2077915	17	-	100	QPSK	Back face	0.821
	2077915	17	-	100	QPSK	Left face	0.534
	2077915	17	-	100	QPSK	Right face	0.312
	2077915	17	-	100	QPSK	Top face	0.490
	2077915	17	-	100	QPSK	Bottom face	0.490
	2077915	-	273	100	QPSK	Front face	2.600
	2077915	-	273	100	QPSK	Back face	0.749
	2077915	-	273	100	QPSK	Left face	0.092
	2077915	-	273	100	QPSK	Right face	0.106
	2077915	-	273	100	QPSK	Top face	0.217
	2077915	-	273	100	QPSK	Bottom face	0.037

11. Simultaneous Transmission Assessment

11.1. Simultaneous Transmission Consideration

No.	Simultaneous Transmission Consideration	Body
1	WWAN(3G/4G/5G SA)+WLAN 2.4GHz/5GHz (SISO/MIMO)	Yes
2	WWAN(3G/4G/5G SA)+WLAN 2.4GHz (SISO/MIMO)+WLAN 5GHz (SISO/MIMO)	Yes
3	WWAN(5G FR1 NSA)+WLAN 2.4GHz/5GHz (SISO/MIMO)	Yes
4	WWAN(5G FR1 NSA)+WLAN 2.4GHz (SISO/MIMO)+WLAN 5GHz (SISO/MIMO)	Yes
5	WWAN(5G FR2 NSA)+WLAN 2.4GHz/5GHz (SISO/MIMO)	Yes
6	WWAN(5G FR2 NSA)+WLAN 2.4GHz (SISO/MIMO)+WLAN 5GHz (SISO/MIMO)	Yes

Note: The co-location of WWAN+WLAN 2.4GHz/5GHz (SISO/MIMO) would not be recorded since it is less than the combination of WWAN+WLAN 2.4GHz (SISO/MIMO)+WLAN 5GHz (SISO/MIMO).

11.2. Simultaneous Transmission Analysis

The EUT supports simultaneous transmission of multiple radios. RF exposure compliance in simultaneous transmission scenarios is evaluated in this section.

It must be noted here that Qualcomm Smart Transmit time-averaging algorithm was applied to only WWAN, where the time-averaged power level is controlled so that RF exposure is ≤ SAR_design_target for sub-6 WWAN and ≤ PD_design_target 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 uncertainty in the corresponding design target, thus, with 1dB of device uncertainty for sub-6 WWAN and 1.4 dB of device uncertainty for 5G mmW. Therefore, the worst-case RF exposure for this EUT is:

Worst-case Time-averaged RF Exposure for WWAN

Title	WWAN Wireless System	
	Sub-6G	5G mmWave
Maximum time-averaged power level	P_{limit}	*input.power.limit*
Maximum time-averaged exposure	SAR_design_target = 0.8 W/kg (1gSAR)	PD_design_target = 2.72 W/m^2
Maximum Design-related uncertainty	1.0 dB	1.4 dB
Worst-case time-averaged RF exposure	Reported SAR = 1.0 W/kg (1g)	reported PD* = 75% × PD_design_target + 1.4 dB = 3.44 W/m^2

Note:

1. The highest SAR value obtained from UL FCC SAR Test Report (Report No. SZ24060193S01). For scenarios where (P_{limit} + 1.0dB uncertainty) ≥ P_{max} (maximum RF tune-up output power), time-averaged SAR exposure from Smart Transmit enabled EUT (at P_{limit}) cannot exceed reported SAR corresponding to P_{max}.
2. Smart Transmit allows only 75% of maximum PD exposure for this EUT using EFS entries listed in R562L5 sub6_mmw power density simulation report_Part 0.

RF exposure compliance with WWAN+WLAN simultaneous transmission scenarios is demonstrated for various radio configurations using below equation:

Total norm. RF exposure = norm. RF exposure from Smart Transmit enabled WWAN (norm. SAR from 4G + norm. PD from 5G mmW) + norm. SAR from WLAN ≤ 1.0 normalized limit (1)

Smart Transmit algorithm in WWAN adds directly the time-averaged RF exposure from 4G and time-averaged RF exposure from 5G mmW, i.e.,

norm. RF exposure from Smart Transmit enabled WWAN: (normalized SAR exposure from 4G) + (normalized PD exposure from 5G mmW) ≤ 1.0 normalized limit (2)

In other words, Smart Transmit algorithm controls the total RF exposure from both 4G radio and 5G mmW NR to not exceed FCC limit. Smart transmit algorithm assumes hotspots are collocated (i.e., ignoring spatial distribution of hotspots) and directly adds normalized RF exposures from 4G and from 5G mmW, i.e.,

If A = max normalized time-averaged SAR exposure from 4G,
B = max normalized time-averaged PD exposure from 5G mmW,

Then, equation (2) can be re-written as below because Smart Transmit assumes 4G hotspots are collocated with 5G mmW hotspot:

Smart Transmit enabled WWAN: x(t) * A + (1-x(t)) * B ≤ 1.0 normalized limit (3)

Here, "*x(t)*A*" represents percentage of normalized time-averaged RF exposure from 4G, and x(t) ranges between [0,1]; "*(1-x(t))*B*" is remaining percentage of RF exposure contribution from 5G mmW. Smart Transmit controls '*x*' in real time such that the sum of these exposures never exceeds 1.0 normalized limit.

Note that mathematically:

$(t) * A$ + (1−(t))$*B$ ≤ $max(A,B)$≤ 1.0 $normalized\ limit$ for x(t) ∈ [0,1] (4)

Therefore, if below equations (5a) and (5b) are proven:

A +$norm.SAR\ from\ WLAN$≤ 1.0 $norm.limit$ (5a),
B +$norm.SAR\ from\ WLAN$ ≤ 1.0 $norm.limit$ (5b),

Then, based on equation (4), below condition is also proved:

[$(t) * A$ + (1−(t))$*B$] +$norm.SAR\ from\ WLAN$ ≤ 1.0 $norm.limit$ (5c)

Which is the same as equation (1), to demonstrate compliance for simultaneous transmission.

Additionally, it should be noted that in the absence of 5G mm, Smart Transmit limits the maximum RF exposure contributed from 4G to 100% normalized exposure (i.e., *x*=1.0 in equation 3), while with 5G mmW active, Smart Transmit limits the maximum RF exposure contributed from 5G mmW to 75% normalized exposure to guarantee at least 25% margin allocated to 4G LTE anchor to maintain the link (i.e., *x*=0.25 in equation 3). Therefore:

Smart Transmit enabled WWAN: A=max (normalized SAR exposure from 4G) ≤ 1.0 normalized limit (6a)

Smart Transmit enabled WWAN: B=max (normalized PD exposure from 5G mmW) ≤ 0.75 normalized limit (6b)

Thus, for compliance demonstration given by equation (1), below equation (7) obtained by combining equations (5a & 5b) and (6a & 6b), should be proven to guarantee simultaneous transmission compliance:

Total normalized RF exposure = norm. SAR from 4G WWAN + norm. SAR from WLAN < 1.0 normalized FCC limit (7a)
*Total normalized RF exposure = 0.75*norm. PD from 5G mmW WWAN + norm. SAR from WLAN < 1.0 normalized FCC limit* (7b)

The compliance for simultaneous transmission scenarios of WWAN (4G/5G mmW) radio enabled with Smart Transmit and WLAN without Smart Transmit is re-evaluated for all transmission scenarios supported by this EUT.

As described in equation (7), simultaneous transmission analysis for WWAN + WLAN is performed in two parts:

4G WWAN + WLAN (i.e., Eq. (7a) with compliance demonstration in SAR report SZ23070206S01 section 22.

5G mmW WWAN + WLAN (i.e., Eq. (7b) with compliance demonstration in section 11.1.

By combining above a. and b., the FCC requirement expressed in Eq. (1), re-written below, is met:

Total norm. RF exposure = norm. RF exposure from Smart Transmit enabled WWAN (norm. SAR from 4G + norm. PD from 5G mmW NR) + norm. SAR from WLAN ≤ 1.0 normalized limit (1)

11.3. Total Exposure Radio Analysis

The fields generated by the antennas can be correlated or uncorrelated. At different frequencies, fields are always uncorrelated, and the aggregate power density contributions can be summed according to spatially averaged values of corresponding sources at any point in space, r, to determine the total exposure ratio (TER). Assuming I sources, the TER at each point in space is equal to

$$\mathrm{TER}^{\mathrm{uncorr}}(\mathrm{r}) = \sum_{\mathrm{i}=1}^{\mathrm{I}} \mathrm{ER}_{\mathrm{i}} = \sum_{\mathrm{i}=1}^{\mathrm{I}} \frac{\mathrm{S}_{\mathrm{av,i}}(\mathrm{r}, \mathrm{f}_{\mathrm{i}})}{\mathrm{S}_{\mathrm{lim}}(\mathrm{f}_{\mathrm{i}})}$$

Where $S_{av,i}$ is the power density for the source I operating at a frequency f_i and S_{lim} is the power density limit as specified by the relevant standard.

Exposure from transmitters operating above and below 6GHz, where 6GHz denotes the transmission frequency where the basic restrictions change from being defined in terms of SAR to being defined in terms of power density, therefore uncorrelated and the TER is determined as

$$\mathrm{TER}^{\mathrm{uncorr}}(\mathrm{r}) = \sum_{\mathrm{i}=1}^{\mathrm{I}} \mathrm{ER}_{\mathrm{i}} = \sum_{\mathrm{i}=1}^{\mathrm{I}} \frac{\mathrm{S}_{\mathrm{av,i}}(\mathrm{r}, \mathrm{f}_{\mathrm{i}})}{\mathrm{S}_{\mathrm{lim}}(\mathrm{f}_{\mathrm{i}})}$$

According to the FCC guidance in TCBC workshop and IEC TR 63170, the total exposure ratio calculated by taking ratio of maximum reported SAR divided by SAR limit and adding it to maximum measured power density by its limit. Numerical sum of the ratios should be less or equal to 1. Therefore the simultaneous transmission should be follows:

$$TER = \sum_{n=1}^{N} \frac{\mathrm{SAR}_n}{\mathrm{SAR}_{n,limit}} + \sum_{n=1}^{N} \frac{\mathrm{S}_{m,avg}}{\mathrm{S}_{m,limit}} < 1$$

- **Total Exposure Ratio**

<WLAN Summary>

Exposure Position	Maximum Reported SAR (W/kg)	
	WLAN 2.4GHz	WLAN 5GHz
Front	0.413	0.273
Back	0.237	0.295
Left	0.109	0.151
Top	0.095	0.532
Bottom	0.196	0.53

<LTE + mmW + WLAN 2.4GHz SISO/MIMO+WLAN 5GHz SISO/MIMO>

Exposure Position	Power Density (W/m^2)		Maximum Reported SAR (W/kg)		Total Exposure Ratio SAR/1.6 + PD/10	
	1	2	3	4	Summation 1+3+4	Summation 2+3+4
	n260	n261	WLAN 2.4GHz	WLAN 5GHz		
Front	2.24	2.64	0.413	0.273	0.653	0.693
Back	1.012	0.821	0.237	0.295	0.434	0.415
Left	0.344	0.534	0.109	0.151	0.197	0.216
Right	0.219	0.312	0.0	0.0	0.022	0.031
Top	0.118	0.217	0.095	0.532	0.404	0.414
Bottom	0.082	0.49	0.196	0.53	0.462	0.503

Note:

1. The SAR results of WLAN were referred to the SAR report SZ24060193S01.
2. The highest simulating psPD of 5G mmW recorded in above table are from the R562L5 sub6_mmw power density simulation report_Part 0.

12. Uncertainty Assessment

The budget is valid for evaluation distance >λ /2π. For specific tests and configurations, the uncertainty can be considered smaller.

Error Description	Uncertainty ± %	Probability	Divisor	*ci*	Standard Uncertainty (±%)	ν_i or ν_{eff}
Uncertainty terms dependent on the measurement system						
Probe calibration	0.43	1	R	1	0.49	∞
Probe correction	0.48	1.732	R	0.7	0.49	∞
Isotropy	0.48	1.732	R	0.7	0.29	∞
Multiple reflections	0.19	1.732	R	1	0.12	∞
System linearity	0.24	1.732	R	1	0.12	∞
Probe positioning	0.28	1.732	R	1	0.17	∞
Sensor location	0.2	1.732	R	1	0.18	∞
Amplitude and phase drift	0.02	1	R	1	0.0	∞
Amplitude and phase noise	0.18	1.732	R	1	0.12	∞
Data point spacing	0.06	1.732	R	1	0.08	∞
Measurement area truncation	0.63	1.732	R	1	0.6	∞
Reconstruction algorithms	0.04	1.732	R	1	0.05	∞
Uncertainty terms dependent on the DUT and environmental factors						
Probe coupling with DUT	0.05	1.732	R	1	0.08	∞
Modulation response	0.34	1.732	R	1	0.23	∞
Integration time	0.01	1	R	1	0.00	∞
DUT alignment	0.12	1.732	R	1	0.3	∞
RF ambient conditions	0.20	1.732	R	1	0.12	∞
Immunity / secondary reception	0.03	1.732	R	1	0.04	∞
Drift of the DUT	0.06	1	R	1	0.01	∞
Combined standard uncertainty					0.71 dB	∞
Coverage Factor for 95%					K=2	N/A
Expanded standard uncertainty					1.52 dB	

Annex A General Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Laboratory Address:	FL.1-3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

3. Facilities and Accreditations

The FCC designation number is CN1192, the test firm registration number is 226174.

Note：

The main report is end here and the other Annex (B,C,D,E) will be submitted separately.

****** END OF MAIN REPORT ******