



REPORT No.: SZ25040205S01

TEST REPORT

APPLICANT : Shenzhen Chainway Information
Technology Co., Ltd

PRODUCT NAME : Mobile Data Terminal

MODEL NAME : MC51

BRAND NAME : CHAINWAY

FCC ID : 2AC6AMC51

STANDARD(S) : FCC 47 CFR Part 2(2.1093)
IEC/IEEE 62209-1528:2020
IEC TR 63170:2018

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Changed History		
Version	Date	Reason for Change
1.0	2025-11-27	First edition



1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during test as bellows:

<Highest RF Exposure Summary>

Frequency Band		Highest SAR Summary			
		Head (Gap 0 mm)	Body-worn (Gap 10 mm)	Hotspot (Gap 10 mm)	Extremity (Gap 0 mm)
		1g SAR (W/kg)			10g SAR (W/kg)
GSM	GSM 850	0.437	0.465	0.465	N/A
	GSM 1900	0.241	0.529	0.529	N/A
WCDMA	Band II	0.248	0.593	0.593	N/A
	Band IV	0.436	0.765	0.765	N/A
	Band V	0.403	0.639	0.639	N/A
LTE	Band 4	0.503	0.515	0.515	N/A
	Band 7	0.586	0.583	0.583	N/A
	Band 12	0.214	0.333	0.333	N/A
	Band 13	0.294	0.466	0.466	N/A
	Band 25/2	0.608	0.751	0.751	N/A
	Band 26/5	0.272	0.535	0.535	N/A
	Band 41/38	0.358	0.636	0.636	N/A
5G NR	n2	0.478	0.710	0.710	N/A
	n5	0.268	0.482	0.482	N/A
	n7	0.315	0.649	0.551	N/A
	n12	0.153	0.440	0.440	N/A
	n13	0.197	0.499	0.499	N/A
	n25	0.557	0.792	0.792	N/A
	n26	0.270	0.611	0.611	N/A
	n38	0.739	0.698	0.698	N/A
	n41	0.685	0.789	0.694	N/A
	n77	0.609	0.748	0.748	N/A
	n78	0.762	0.785	0.785	N/A
WLAN	2.4GHz WLAN	0.651	0.247	0.247	N/A
WLAN	5GHz WLAN	0.782	0.695	0.620	0.851
WLAN	6GHz WLAN	0.083	0.272	0.272	N/A
2.4GHz	Bluetooth	N/A	0.171	0.171	N/A



Frequency Band		APD	Scaled iPD
		4cm ² (mW/cm ²)	4cm ² psPD (mW/cm ²)
WLAN	6GHz WLAN	0.157	0.325

Highest Simultaneous Transmission 1g SAR (W/kg)	1.593	Limit (W/kg): 1.6
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Highest Simultaneous Transmission with Multiple transmitters	Total Exposure Radio	Limit
SAR & Power Density	0.927	1.0

Note:

1. This device is compliance with Specific Absorption Rate (SAR) for general population or uncontrolled exposure limits (1.6 W/kg for 1g SAR, 1.0 mW/cm² for iPD and APD in 4cm²) specified in FCC 47 CFR Part 1 (1.1310) and IEEE C95.1-1991), and had been tested in accordance with the measurement methods and procedures specified in IEC/IEEE 62209-1528, TCBC workshop notes, IEC TR 63170 and FCC KDB publications.
2. For LTE Bands 2/5/38 are fully covered by LTE Bands 25/26/41, therefore only LTE Bands 25/26/41 were tested.
3. The declarations of EUT presented in the report are provided by applicant and/or manufacturer, and the test laboratory is not responsible for the accuracy of the information.



2. Technical Information

Note: Provide by applicant.

2.1. Applicant and Manufacturer Information

Applicant:	Shenzhen Chainway Information Technology Co., Ltd
Applicant Address:	9F Building 2, Daqian Industrial Park, District 67, XingDong Community, Xin'an Street, Bao'an District, Shenzhen, Guangdong, China
Manufacturer:	Shenzhen Chainway Information Technology Co., Ltd
Manufacturer Address:	9F Building 2, Daqian Industrial Park, District 67, XingDong Community, Xin'an Street, Bao'an District, Shenzhen, Guangdong, China

2.2. Equipment under Test (EUT) Description

Product Name:	Mobile Data Terminal
EUT No.:	11#
Hardware Version:	MC51_Hardware_version
Software Version:	MC51_Software_version
Frequency Bands:	GSM 850: 824 MHz ~ 849 MHz GSM 1900: 1850 MHz ~ 1910 MHz WCDMA II: 1850 MHz ~ 1910 MHz WCDMA IV: 1710 MHz ~ 1755 MHz WCDMA V: 824 MHz ~ 849 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz 5G NR n2: 1850 MHz ~ 1910 MHz 5G NR n5: 824 MHz ~ 849 MHz 5G NR n7: 2500 MHz ~ 2570 MHz 5G NR n12: 699 MHz ~ 716 MHz



	5G NR n13: 777 MHz ~ 786.9 MHz 5G NR n25: 1850 MHz ~ 1915 MHz 5G NR n26: 814 MHz ~ 848.9 MHz 5G NR n38: 2570 MHz ~ 2620 MHz 5G NR n41: 2496 MHz ~ 2690 MHz 5G NR n77: 3300 MHz ~ 4200 MHz 5G NR n78: 3300 MHz ~ 3800 MHz WLAN 2.4GHz: 2412 MHz ~ 2462 MHz WLAN 5.2GHz: 5180 MHz ~ 5240 MHz WLAN 5.3GHz: 5260 MHz ~ 5320 MHz WLAN 5.5GHz: 5500 MHz ~ 5720 MHz WLAN 5.8GHz: 5745 MHz ~ 5825 MHz WLAN 6.2GHz: 5925 MHz ~ 6425 MHz WLAN 6.5GHz: 6425 MHz ~ 6525 MHz WLAN 6.7GHz: 6525 MHz ~ 6875 MHz WLAN 7.0GHz: 6875 MHz ~ 7125 MHz Bluetooth: 2402 MHz ~ 2480 MHz	
Modulation Mode:	GSM/GPRS: GMSK EDGE: 8PSK WCDMA: QPSK, 16QAM, 64QAM LTE: QPSK, 16QAM, 64QAM 5G NR: DFT-s-OFDM/CP-OFDM, PI/2 BPSK QPSK, 16QAM, 64QAM, 256QAM 802.11b: DSSS 802.11a/g: OFDM 802.11n-HT20/HT40: OFDM 802.11ac-VHT20/40/80: OFDM 802.11ax-HEW20/40/80: OFDMA BR+EDR: GFSK (1Mbps), $\pi/4$ -DQPSK (2Mbps), 8-DPSK (3Mbps) BLE: GFSK (1Mbps, 2Mbps) NFC: 13.56 MHz	
Carrier Aggregation:	Not Support	
VoLTE Mode:	Support	
Hotspot Mode:	Support (WLAN 5GHz Band 1 & 4)	
Antenna Type:	WWAN: PIFA Antenna WLAN: PIFA Antenna NFC: Loop Antenna	
SIM Cards Description:	SIM 1	GSM+WCDMA+LTE+5G NR
	SIM 2	GSM+WCDMA+LTE+5G NR



2.3. Accessories Information

Battery Type 1:	Manufacturer:	Dongguan Bob Electronics Co., Ltd
	Brand Name:	BOB
	Model:	MC51
	Capacity:	4800 mAh
	Rated Voltage:	3.85 V
Battery Type 2:	Manufacturer:	Dongguan Bob Electronics Co., Ltd
	Brand Name:	BOB
	Model:	BOB 471120
	Capacity:	50 mAh
	Rated Voltage:	3.7 V
Battery Type 3:	Manufacturer:	SHEN ZHEN UTILITY ENERGY CO.,LTD.
	Brand Name:	UTILITY
	Model:	MC51
	Capacity:	4800 mAh
	Rated Voltage:	3.85 V

Note:

1. Battery Type 1 is the large battery, and Battery Type 2 is the small battery in the product. All of the testing used Battery Type 1 & 2 as the reference battery, while Battery Type 3 was validated the worst-case condition.
2. For more detailed description, please refer to specification or user manual supplied by the applicant and/or manufacturer.



2.4. Environment of Test Site/Conditions

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

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. Specific Absorption Rate (SAR)

3.1. Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational or controlled and general population or uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational or controlled exposure limits are Middle than the limits for general population or uncontrolled.

3.2. SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

$$SAR = \frac{d}{dt} \left(\frac{dW}{dm} \right) = \frac{d}{dt} \left(\frac{dW}{\rho dv} \right)$$

SAR is expressed in units of Watts per kilogram (W/kg).

SAR measurement can be either related to the temperature elevation in tissue by,

$$SAR = C \left(\frac{\delta T}{\delta t} \right)$$

Where C is the specific head capacity, δT is the temperature rise and δt the exposure duration, or related to the electrical field in the tissue by

$$SAR = \frac{\sigma |E|^2}{\rho}$$

Where σ is the conductivity of the tissue, ρ is the mass density of the tissue and |E| is the rmselectrical field strength.

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

4. RF Exposure Limits

4.1. Uncontrolled Environment

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

Limits for General Population/Uncontrolled Exposure (W/kg)

Type Exposure	Uncontrolled Environment Limit
Spatial Peak SAR (1g cube tissue for head and trunk)	1.6 W/kg
Spatial Peak SAR (10g cube tissue for limbs)	4.0 W/kg
Spatial Peak SAR (1g cube tissue for whole body)	0.08 W/kg

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/f ²)	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/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

Note:

- Occupational/Uncontrolled Environments are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure (i.e. as a result of employment or occupation).
- Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.



4.2. Controlled Environment

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

5. Applied Reference Documents

Leading reference documents for testing:

Identity	Document Title	Remark
FCC 47 CFR Part 2 (2.1093)	Radio Frequency Radiation Exposure Evaluation: Portable Devices	/
IEC/IEEE 62209-1528:2020	Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices –Part 1528: Human models, instrumentation, and procedures (Frequency range of 4 MHz to 10 GHz)	/
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	/
KDB 447498 D01v06	General RF Exposure Guidance	/
KDB 248227 D01v02r02	SAR Measurement Procedures for 802.11 Transmitters	/
KDB 865664 D01v01r04	SAR Measurement 100 MHz to 6 GHz	/
KDB 865664 D02v01r02	RF Exposure Reporting	/
KDB 648474 D04v01r03	Handset SAR	/
KDB 941225 D06v02r01	SAR Evaluation Procedures for Portable Devices With Wireless Router Capabilities	/
Note: Any additions, deviation, or exclusions from the method shall be noted in the “Remark”.		

6. SAR Measurement System

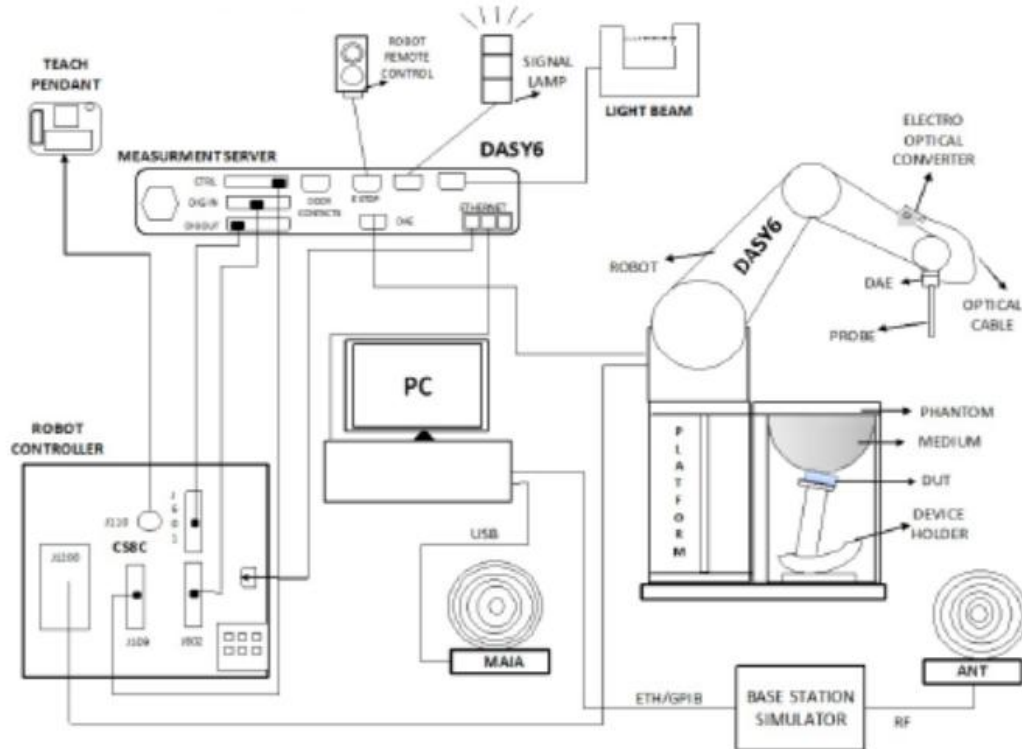


Fig 6.1 SPEAG DASY System Configurations

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 warning 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.

6.1. E-Field Probe

The SAR measurement is conducted with the dosimetric probe (manufactured by SPEAG). The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. This probe has a built in optical surface detection system to prevent from collision with phantom.

➤ E-Field Probe Specification

<ES3DV3 Probe>

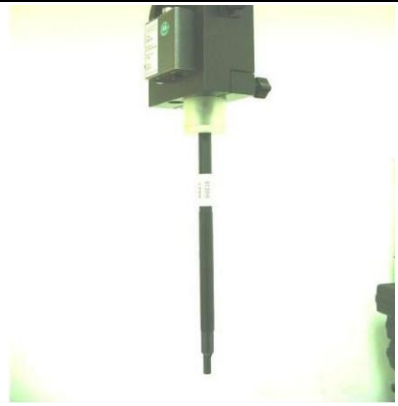
Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection system. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz to 3 GHz; Linearity: ± 0.2 dB	
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.4 dB in HSL (rotation normal to probe axis)	
Dynamic Range	5 μ W/g to 100 mW/g; Linearity: ± 0.2 dB	
Dimensions	Overall length: 330 mm (Tip: 16 mm) Tip diameter: 6.8 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.7 mm	

Fig 6.2 Photo of ES3DV3

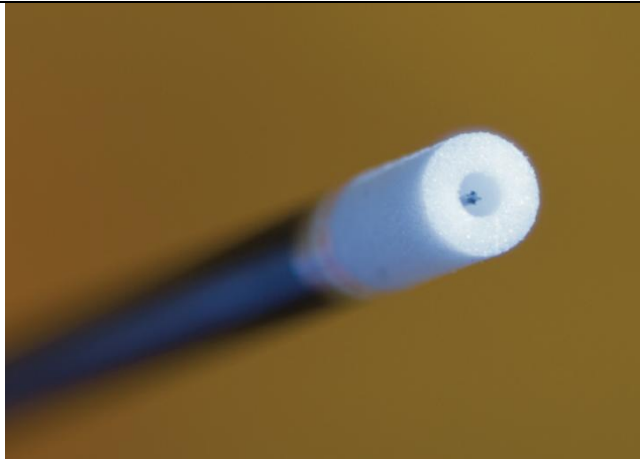
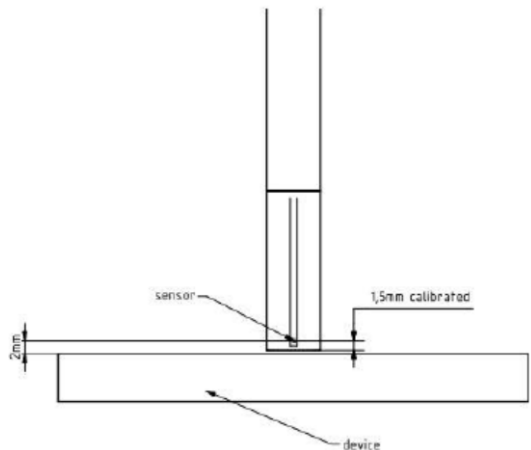
<EX3DV4 Probe>

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz to 10 GHz; Linearity: ± 0.2 dB	
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)	
Dynamic Range	10 μ W/g to 100 mW/g; Linearity: ± 0.2 dB	
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	

Fig 6.3 Photo of EX3DV4

6.2. EUmmWave Probe

The probe designed allows measurement at distances as small as 2mm from the sensor to the surface of EUT. The typical sensor 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 6.4 Photo of EUmmWave Probe	

➤ E-Field Probe Calibration

Each probe needs to be calibrated according to a dosimetric assessment procedure with accuracy better than $\pm 10\%$. The spherical isotropy shall be evaluated and within ± 0.25 dB. The sensitivity parameters (NormX, NormY, and NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested. The calibration data can be referred to annex G of this report.

6.3. Data Acquisition Electronics (DAE)

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



Fig 6.5 Photo of DAE

6.4. Robot

The SPEAG DASY system uses the high precision robots (DASY4: RX90BL; DASY5: TX90XL) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY4: CS7MB; DASY5: 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 6.6 Photo of DASY5

6.5. 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 bits 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.



Fig 6.7 Photo of Server for DASY5

6.6. Light Beam Unit

The light beam switch allows automatic "tooling" of the probe. During the process, the actual position of the probe tip with respect to the robot arm is measured, as well as the probe length and the horizontal probe offset. The software then corrects all movements, such that the robot coordinates are valid for the probe tip.

The repeatability of this process is better than 0.1 mm. If a position has been taught with an aligned probe, the same position will be reached with another aligned probe within 0.1 mm, even if the other probe has different dimensions. During probe rotations, the probe tip will keep its actual position.



Fig. 6.8 Photo of Light Beam

6.7. Phantom

<SAM Twin Phantom>

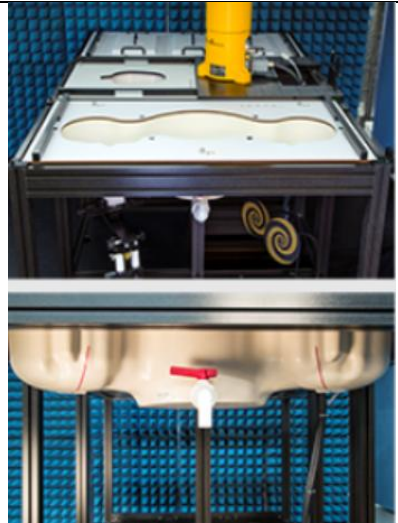
Shell Thickness	2 ± 0.2 mm (sagging: <1%) Center ear point: 6 ± 0.2 mm	
Filling Volume	Approx. 25 liters	
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet	
Measurement Areas	Left Head, Right Head, Flat Phantom	

Fig. 6.9 Photo of SAM Phantom

The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

6.8. Device Holder

<Device Holder for SAM Twin Phantom>

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5 mm distance, a positioning uncertainty of ± 0.5 mm would produce a SAR uncertainty of ± 20 %. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (EPR). Thus the device needs no repositioning when changing the angles.

The DASY device holder is constructed of low-loss POM material having the following dielectric parameters: relative permittivity $\epsilon = 3$ and loss tangent $\delta = 0.02$. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

<Laptop Extension Kit>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the mounting device in place of the phone positioned. The extension is fully compatible with the SAM Twin and ELI phantoms.



Fig 6.10 Device Holder



Fig 6.11 Laptop Extension Kit

6.9. 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 $\text{Norm}_i, a_{i0}, a_{i1}, a_{i2}$



	- 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:

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

With V_i = compensated signal of channel i, (i = x, y, z)
 U_i = 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:

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

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

With V_i = compensated signal of channel i, (i = x, y, z)
 Norm_i = sensor sensitivity of channel i, (i = x, y, z), $\mu\text{V}/(\text{V/m})^2$ for E-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):

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

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

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

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/cm³

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



6.10. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial No./ SW Version	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1223	2022.08.22	2025.08.21
SPEAG	900MHz System Validation Kit	D900V2	1d064	2024.10.21	2027.10.20
SPEAG	1800MHz System Validation Kit	D1800V2	2d158	2024.10.21	2027.10.20
SPEAG	2000MHz System Validation Kit	D2000V2	1050	2024.10.22	2027.10.21
SPEAG	2450MHz System Validation Kit	D2450V2	805	2024.10.22	2027.10.21
SPEAG	2600MHz System Validation Kit	D2600V2	1198	2024.10.23	2027.10.22
SPEAG	3500MHz System Validation Kit	D3500V2	1104	2024.10.21	2027.10.20
SPEAG	3700MHz System Validation Kit	D3700V2	1076	2024.10.23	2027.10.22
SPEAG	3900MHz System Validation Kit	D3900V2	1046	2024.10.21	2027.10.20
SPEAG	5000MHz System Validation Kit	D5GHzV2	1176	2024.10.22	2027.10.21
SPEAG	D6.5GHz System Validation Kit	D6.5GHzV2	1054	2022.11.01	2025.10.31
SPEAG	5G Verification Source	10GHz	1019	2023.12.03	2026.12.02
SPEAG	DOSIMETRIC ASSESSMENT SYSTEM	DASY6	52.10.4.1527	NCR	NCR
SPEAG	DOSIMETRIC ASSESSMENT SYSTEM Software	cDASY6	16.0.0.116	NCR	NCR
SPEAG	DOSIMETRIC ASSESSMENT SYSTEM Software	cDASY6 mmWave	V2.4.2.62	NCR	NCR
SPEAG	EUmmWave Probe	EUmmWV4	9602	2025.03.19	2026.03.18
SPEAG	Dosimetric E-Field Probe	EX3DV4	7608	2025.03.20	2026.03.19
SPEAG	Data Acquisition Electronics	DAE4	1643	2025.03.21	2026.03.20
SPEAG	Twin-SAM	QD 000 P41 Ax	2020	NCR	NCR
SPEAG	mmWave	N/A	N/A	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
R&S	Network Emulator	CMW500	165755	2025.01.06	2026.01.05
Anritsu	Network Emulator	MT8820C	6201274521	2025.01.06	2026.01.05
Agilent	Network Analyzer	E5071B	MY42404762	2025.01.06	2026.01.05
SPEAG	Dielectric Assessment KIT	DAK-3.5	1279	2025.03.18	2026.03.17
mini-circuits	Amplifier	ZHL-42W+	608501717	NCR	NCR
mini-circuits	Amplifier	ZVE-8G+	754401735	NCR	NCR
Agilent	Signal Generator	N5182B	MY53050509	2024.09.11	2025.09.10



R&S	Power Sensor	NRP8S	103215	2025.01.06	2026.01.05
Agilent	Power Meter	E4416A	MY45102093	2024.09.11	2025.09.10
R&S	Power Sensor	NRP8S	103240	2025.01.06	2026.01.05
Anritsu	Power Meter	E4418B	GB43318055	2025.05.15	2026.05.14
Agilent	Dual Directional Coupler	778D	50422	NA	NA
MCL	Attenuation	351-218-010	N/A	NA	NA
R&S	Spectrum Analyzer	N9030A	MY54170556	2024.09.18	2025.09.17
KTJ	Thermo meter	TA298	N/A	2024.11.20	2025.11.19
SPEAG	Tissue Simulating Liquids	HBBL600-10000V6		24H	

Note:

1. The calibration certificate of DASY can be referred to annex G of this report.
2. The Insertion Loss calibration of Dual Directional Coupler and Attenuator were characterized via the network analyzer and compensated during system check.
3. The dielectric probe kit was calibrated via the network analyzer, with the specified procedure (calibrated in pure water) and calibration kit (standard) short circuit, before the dielectric measurement. The specific procedure and calibration kit are provided by SPEAG.
4. In system check we need to monitor the level on the power meter, and adjust the power amplifier level to have precise power level to the dipole; the measured SAR will be normalized to 1 W input power according to the ratio of 1 W to the input power to the dipole. For system check, the calibration of the power amplifier is deemed not critically required for correct measurement; the power meter is critical and we do have calibration for it.
5. Attenuator insertion loss is calibrated by the network Analyzer, which the calibration is valid, before system check.
6. N.C.R means No Calibration Requirement.

7. Tissue Simulating Liquids

➤ Description of Tissue Simulation Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 7.1, for body SAR testing, the liquid height from the centre of the flat phantom to liquid top surface is larger than 15 cm, which is shown in Fig. 7.2.

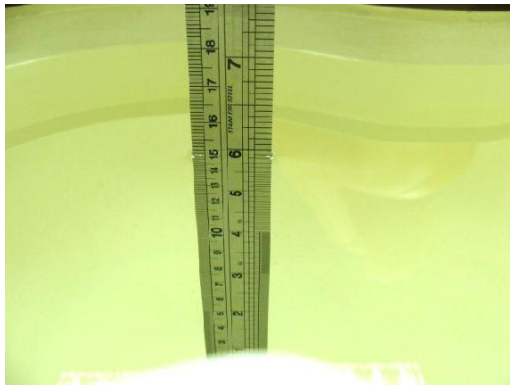


Fig 7.1 Photo of Liquid Height for Head SAR



Fig 7.2 Photo of Liquid Height for Body SAR

➤ Target Dielectric Properties of the Tissue-equivalent Liquid Material

The relative permittivity and conductivity of the tissue material should be within $\pm 5\%$ of the values given in the table below recommended by the FCC OET 65 supplement C.

Frequency	Head Tissue Simulating Media	
(MHz)	ϵ_r (F/m)	σ (S/m)
6000	35.07	5.48
6500	34.46	6.07
7000	33.88	6.65

(ϵ_r = relative permittivity, σ = conductivity and $\rho = 1000 \text{ kg/m}^3$)

The dielectric parameters of liquids were verified prior to the SAR evaluation using a Speag Dielectric Probe Kit and an Agilent Network Analyzer.

The following table shows the measuring results for simulating liquid.



Table 1: Dielectric Performance of Tissue Simulating Liquid

Frequency (MHz)	Tissue Type	Liquid Temp. (°C)	Conductivity (σ)	Conductivity Target (σ)	Delta (σ) (%)	Limit (%)	Date
750	HSL	22.1	0.915	0.89	2.81	±5	2025/5/25
750	HSL	22.2	0.920	0.89	3.37	±5	2025/5/26
900	HSL	22.3	0.976	0.97	0.62	±5	2025/5/27
900	HSL	22.1	0.963	0.97	-0.72	±5	2025/5/28
1800	HSL	22.1	1.385	1.40	-1.07	±5	2025/5/29
1800	HSL	22.2	1.389	1.40	-0.79	±5	2025/5/30
1800	HSL	22.3	1.378	1.40	-1.57	±5	2025/5/31
1800	HSL	22.1	1.381	1.40	-1.36	±5	2025/6/1
2000	HSL	22.1	1.424	1.40	1.71	±5	2025/6/2
2450	HSL	22.1	1.852	1.80	2.89	±5	2025/6/3
2600	HSL	22.2	1.947	1.96	-0.66	±5	2025/6/4
2600	HSL	22.1	1.955	1.96	-0.26	±5	2025/6/6
2600	HSL	22.1	1.945	1.96	-0.77	±5	2025/6/7
2600	HSL	22.3	1.943	1.96	-0.87	±5	2025/6/10
2600	HSL	22.1	1.962	1.96	0.10	±5	2025/6/11
3500	HSL	22.2	2.852	2.91	-1.99	±5	2025/6/9
3500	HSL	22.2	2.870	2.91	-1.37	±5	2025/6/12
3700	HSL	22.1	2.938	3.05	-3.67	±5	2025/6/13
3900	HSL	22.2	3.050	3.15	-3.17	±5	2025/6/14
5250	HSL	22.2	4.753	4.71	0.91	±5	2025/6/21
5250	HSL	22.1	4.770	4.71	1.27	±5	2025/6/22
5750	HSL	22.3	5.087	5.22	-2.55	±5	2025/6/23
5750	HSL	22.1	5.105	5.22	-2.20	±5	2025/6/24
6500	HSL	22.1	6.090	6.07	0.33	±5	2025/6/25
6500	HSL	22.1	6.010	6.07	-0.99	±5	2025/6/26
Frequency (MHz)	Tissue Type	Liquid Temp. (°C)	Permittivity (ϵ_r)	Permittivity Target (ϵ_r)	Delta (ϵ_r) (%)	Limit (%)	Date
750	HSL	22.1	41.221	41.90	-1.62	±5	2025/5/25
750	HSL	22.2	41.157	41.90	-1.77	±5	2025/5/26
900	HSL	22.3	40.672	41.50	-2.00	±5	2025/5/27
900	HSL	22.1	40.754	41.50	-1.80	±5	2025/5/28
1800	HSL	22.1	40.365	40.00	0.91	±5	2025/5/29
1800	HSL	22.2	40.357	40.00	0.89	±5	2025/5/30



1800	HSL	22.3	40.468	40.00	1.17	±5	2025/5/31
1800	HSL	22.1	40.402	40.00	1.01	±5	2025/6/1
2000	HSL	22.1	39.762	40.00	-0.59	±5	2025/6/2
2450	HSL	22.1	39.423	39.20	0.57	±5	2025/6/3
2600	HSL	22.2	38.837	39.00	-0.42	±5	2025/6/4
2600	HSL	22.1	38.712	39.00	-0.74	±5	2025/6/6
2600	HSL	22.1	38.851	39.00	-0.38	±5	2025/6/7
2600	HSL	22.3	38.859	39.00	-0.36	±5	2025/6/10
2600	HSL	22.1	38.665	39.00	-0.86	±5	2025/6/11
3500	HSL	22.2	36.982	37.90	-2.42	±5	2025/6/9
3500	HSL	22.2	36.850	37.90	-2.77	±5	2025/6/12
3700	HSL	22.1	37.024	37.70	-1.79	±5	2025/6/13
3900	HSL	22.2	37.014	37.50	-1.30	±5	2025/6/14
5250	HSL	22.2	35.628	35.95	-0.90	±5	2025/6/21
5250	HSL	22.1	35.514	35.95	-1.21	±5	2025/6/22
5750	HSL	22.3	34.312	35.35	-2.94	±5	2025/6/23
5750	HSL	22.1	34.244	35.35	-3.13	±5	2025/6/24
6500	HSL	22.1	34.120	34.460	-0.99	±5	2025/6/25
6500	HSL	22.1	34.300	34.460	-0.46	±5	2025/6/26

Note:

According to April 2019 TCB Workshop that FCC has permitted the use of single head-tissue simulating liquid specified in IEC 62209-1 for all SAR tests.

8. SAR System Verification

Each DASY system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system performance check and system validation. System validation kit includes a dipole, tripod holder to fix it underneath the flat phantom and a corresponding distance holder.

8.1. Purpose of System Performance Check

The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system performance check uses normal SAR measurements in a simplified setup with a well characterized source. This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

8.2. System Setup

The output power on dipole port must be calibrated to 250 mW or 100 mW before dipole is connected. In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave which comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The system check verifies that the system operates within its specifications. It is performed daily or before every SAR measurement. The system check uses normal SAR measurements in the flat section of the phantom with a matched dipole at a specified distance. The system verification setup is shown as below.



Fig 8.1 Photo of Dipole Setup

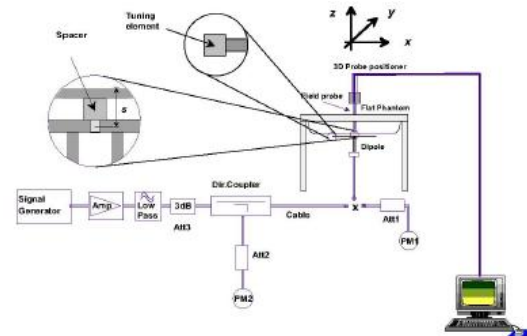


Fig 8.2 System Setup for System Evaluation

8.3. Validation Results

Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10%. Below table shows the target SAR and measured SAR after normalized to 1W input power. The table as below indicates the system performance check can meet the variation criterion and the plots can be referred to annex C of this report.

<Validation Setup>

Frequency (MHz)	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N
750	250	D750V3-1223	7608	1643
900	250	D900V2-1d064	7608	1643
1800	250	D1800V2-2d158	7608	1643
2000	100	D2000V2-1050	7608	1643
2450	100	D2450V2-805	7608	1643
2600	100	D2600V2-1198	7608	1643
3500	100	D3500V2-1104	7608	1643
3700	100	D3700V2-1076	7608	1643
3900	100	D3900V2-1046	7608	1643
5250	100	D5GHzV2-1176-5250	7608	1643
5750	100	D5GHzV2-1176-5750	7608	1643
6500	100	D6.5GHzV2-1176-6500	7608	1643

<System Validation>

Frequency (MHz)	Tissue Type	Conductivity (σ)	Permittivity (ϵ_r)	CW Signal Validation		
				Sensitivity	Probe Linearity	Probe Isotropy
750	HSL	0.851	42.43	PASS	PASS	PASS
835	HSL	0.898	41.88	PASS	PASS	PASS
1750	HSL	1.386	39.91	PASS	PASS	PASS
1800	HSL	1.449	41.26	PASS	PASS	PASS
1900	HSL	1.435	39.65	PASS	PASS	PASS
2000	HSL	1.451	39.42	PASS	PASS	PASS
2300	HSL	1.764	38.99	PASS	PASS	PASS
2450	HSL	1.863	38.85	PASS	PASS	PASS
2600	HSL	1.973	38.58	PASS	PASS	PASS
3400	HSL	2.88	38.10	PASS	PASS	PASS



3500	HSL	2.91	37.90	PASS	PASS	PASS
3700	HSL	3.05	37.70	PASS	PASS	PASS
3900	HSL	3.15	37.50	PASS	PASS	PASS
4100	HSL	3.25	37.20	PASS	PASS	PASS
4200	HSL	3.34	37.00	PASS	PASS	PASS
4400	HSL	3.58	36.70	PASS	PASS	PASS
4600	HSL	3.70	36.60	PASS	PASS	PASS
4800	HSL	3.82	36.40	PASS	PASS	PASS
4900	HSL	3.96	36.20	PASS	PASS	PASS
5250	HSL	4.528	35.32	PASS	PASS	PASS
5600	HSL	4.905	34.89	PASS	PASS	PASS
5750	HSL	5.077	34.28	PASS	PASS	PASS
6500	HSL	6.07	34.46	PASS	PASS	PASS

Frequency (MHz)	Tissue Type	Conductivity (σ)	Permittivity (ϵ_r)	Modulation Signal Validation		
				Mod. Type	Duty Factor	PAR
750	HSL	0.851	42.43	N/A	N/A	N/A
835	HSL	0.898	41.88	GMSK	PASS	N/A
1750	HSL	1.386	39.91	N/A	N/A	N/A
1800	HSL	1.449	41.26	N/A	N/A	N/A
1900	HSL	1.435	39.65	GMSK	PASS	N/A
2000	HSL	1.451	39.42	GMSK	PASS	N/A
2300	HSL	1.764	38.99	OFDM	PASS	PASS
2450	HSL	1.863	38.85	OFDM	PASS	PASS
2600	HSL	1.973	38.58	TDD	PASS	N/A
3400	HSL	2.88	38.10	OFDM	PASS	PASS
3500	HSL	2.91	37.90	OFDM	PASS	PASS
3700	HSL	3.05	37.70	OFDM	PASS	PASS
3900	HSL	3.15	37.50	OFDM	PASS	PASS
4100	HSL	3.25	37.20	OFDM	PASS	PASS
4200	HSL	3.34	37.00	OFDM	PASS	PASS
4400	HSL	3.58	36.70	OFDM	PASS	PASS
4600	HSL	3.70	36.60	OFDM	PASS	PASS
4800	HSL	3.82	36.40	OFDM	PASS	PASS
4900	HSL	3.96	36.20	OFDM	PASS	PASS
5250	HSL	4.528	35.32	OFDM	N/A	PASS
5600	HSL	4.905	34.89	OFDM	N/A	PASS



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5750	HSL	5.077	34.28	OFDM	N/A	PASS
6500	HSL	6.07	34.46	OFDM	N/A	PASS

<Validation Results>

Date	Frequency (MHz)	Tissue Type	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2025/5/25	750	HSL	2.25	8.54	9	5.39
2025/5/26	750	HSL	2.31	8.54	9.24	8.20
2025/5/27	900	HSL	2.83	10.90	11.32	3.85
2025/5/28	900	HSL	2.79	10.90	11.16	2.39
2025/5/29	1800	HSL	9.65	39.20	38.6	-1.53
2025/5/30	1800	HSL	9.74	39.20	38.96	-0.61
2025/5/31	1800	HSL	9.72	39.20	38.88	-0.82
2025/6/1	1800	HSL	9.61	39.20	38.44	-1.94
2025/6/2	2000	HSL	4.26	41.40	42.6	2.90
2025/6/3	2450	HSL	4.93	52.80	49.3	-6.63
2025/6/4	2600	HSL	5.53	55.90	55.3	-1.07
2025/6/6	2600	HSL	5.26	55.90	52.6	-5.90
2025/6/7	2600	HSL	5.44	55.90	54.4	-2.68
2025/6/10	2600	HSL	5.58	55.90	55.8	-0.18
2025/6/11	2600	HSL	5.41	55.90	54.1	-3.22
2025/6/9	3500	HSL	7.26	66.70	72.6	8.85
2025/6/12	3500	HSL	7.18	66.70	71.8	7.65
2025/6/13	3700	HSL	7.25	67.50	72.5	7.41
2025/6/14	3900	HSL	7.04	68.00	70.4	3.53
2025/6/21	5250	HSL	8.27	77.30	82.7	6.99
2025/6/22	5250	HSL	8.18	77.30	81.8	5.82
2025/6/23	5750	HSL	8.34	77.20	83.4	8.03
2025/6/24	5750	HSL	8.41	77.20	84.1	8.94
2025/6/25	6500	HSL	31.30	288.00	313	8.68
2025/6/26	6500	HSL	30.90	288.00	309	7.29



Date	Frequency (MHz)	Tissue Type	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
2025/5/25	750	HSL	1.51	5.57	6.04	8.44
2025/5/26	750	HSL	1.48	5.57	5.92	6.28
2025/5/27	900	HSL	1.86	7.00	7.44	6.29
2025/5/28	900	HSL	1.82	7.00	7.28	4.00
2025/5/29	1800	HSL	5.33	20.70	21.32	3.00
2025/5/30	1800	HSL	5.51	20.70	22.04	6.47
2025/5/31	1800	HSL	5.49	20.70	21.96	6.09
2025/6/1	1800	HSL	5.29	20.70	21.16	2.22
2025/6/2	2000	HSL	2.11	21.00	21.1	0.48
2025/6/3	2450	HSL	2.32	24.50	23.2	-5.31
2025/6/4	2600	HSL	2.56	24.90	25.6	2.81
2025/6/6	2600	HSL	2.63	24.90	26.3	5.62
2025/6/7	2600	HSL	2.41	24.90	24.1	-3.21
2025/6/10	2600	HSL	2.37	24.90	23.7	-4.82
2025/6/11	2600	HSL	2.37	24.90	23.7	-4.82
2025/6/9	3500	HSL	2.43	25.30	24.3	-3.95
2025/6/12	3500	HSL	2.59	25.30	25.9	2.37
2025/6/13	3700	HSL	2.42	24.70	24.2	-2.02
2025/6/14	3900	HSL	2.33	23.60	23.3	-1.27
2025/6/21	5250	HSL	2.33	21.50	23.3	8.37
2025/6/22	5250	HSL	2.13	21.50	21.3	-0.93
2025/6/23	5750	HSL	2.28	21.20	22.8	7.55
2025/6/24	5750	HSL	2.19	21.20	21.9	3.30
2025/6/25	6500	HSL	5.37	53.10	53.7	1.13
2025/6/26	6500	HSL	5.31	53.10	53.1	0.00

Date	Frequency (MHz)	Tissue Type	Measured 4cm ² APD (W/m ²)	Targeted 4cm ² APD (W/m ²)	Normalized 4cm ² APD (W/m ²)	Deviation (%)
2025/6/25	6500	HSL	134.0	1310.0	1340	2.29
2025/6/26	6500	HSL	137.0	1310.0	1370	4.58

Note: System checks the specific test data please see annex C.

8.4. PD System Verification Source

➤ 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 $\pm 10\%$ of the calibrated targets.

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

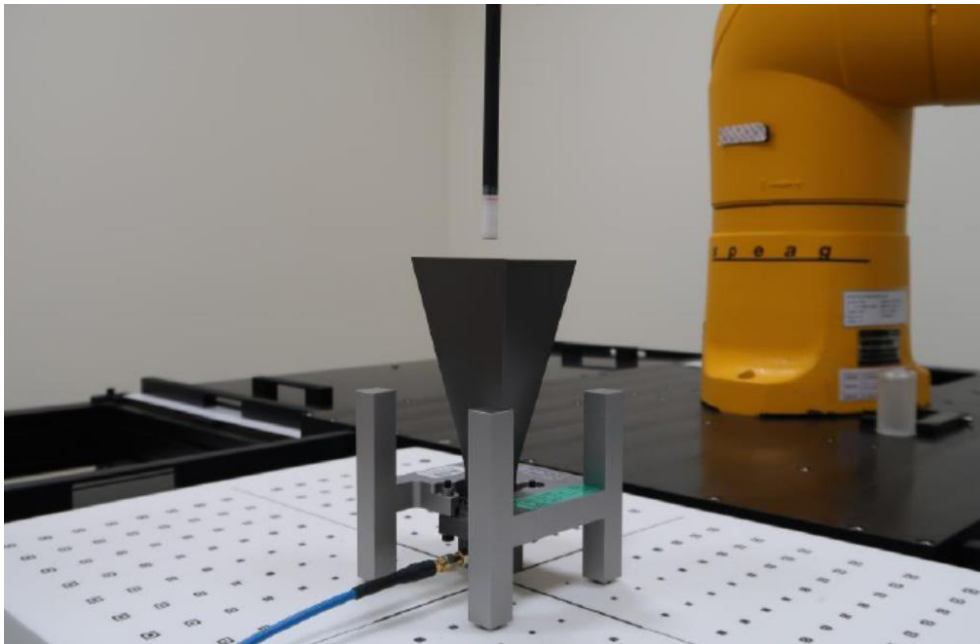


Fig 8.3 Photos of Verification Setup

➤ 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 $\pm 10\%$.

<Validation Setup>

Frequency (GHz)	6.5G Verification Source	Probe S/N	DAE S/N
10	10GHz-SN 1019	9602	1643



<Validation Results>

Date	Frequency (GHz)	Test Distance (mm)	Measured 4cm ² pStotavg (W/m ²)	Targeted 4cm ² pStotavg (W/m ²)	Deviation (%)
2025/06/27	10	10	43.5	44.8	-2.9
2025/06/28	10	10	43.2	44.8	-3.6
2025/06/29	10	10	43.3	44.8	-3.3
2025/06/30	10	10	42.5	44.8	-5.1

Note: System checks the specific test data please see annex C.

9. EUT Testing Position

This EUT was tested in ten different positions. They are right cheek/right tilted/left cheek/left tilted for head, front/back/left/right/top/bottom of the EUT with phantom 10 mm gap, as illustrated below, please refer to annex B for the test setup photos.

9.1. Handset Reference Points

The vertical centre line passes through two points on the front side of the handset – the midpoint of the width w_t of the handset at the level of the acoustic output, and the midpoint of the width w_b of the bottom of the handset.

The horizontal line is perpendicular to the vertical centre line and passes the center of the acoustic output. The horizontal line is also tangential to the handset at point A.

The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centre line is not necessarily parallel to the front face of the handset, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.



Fig. 9.1 Illustration for Cheek Position

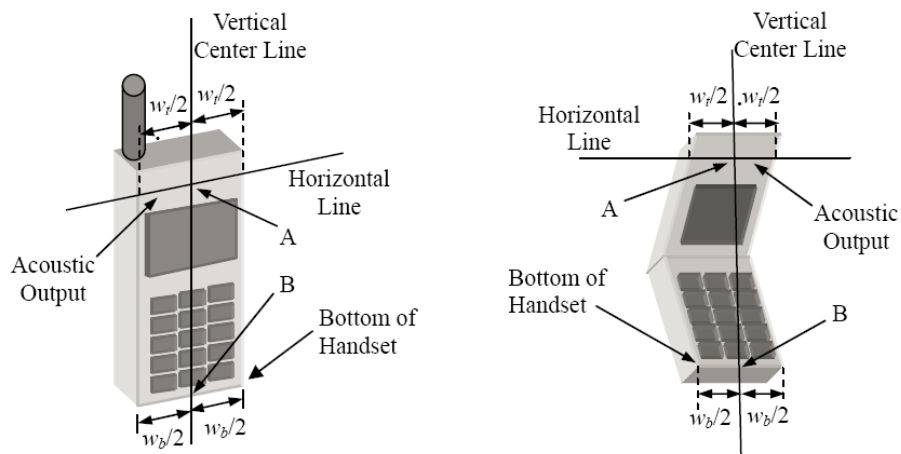


Fig. 9.2 Illustration for Handset Vertical and Horizontal Reference Lines

9.2. Positioning for Cheek / Touch

To position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the three ear and mouth reference point (M: Mouth, RE: Right Ear and LE: Left Ear) and align the center of the ear piece with the line RE-LE.

To move the device towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost (see below figure)

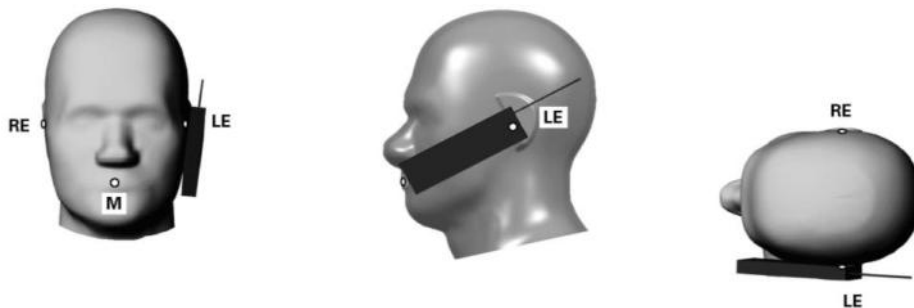


Fig 9.3 Illustration for Cheek Position

9.3. Positioning for Ear / 15° Tilt

To position the device in the “cheek” position described above.

While maintaining the device the reference plane described above and pivoting against the ear, moves it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost (see figure below).

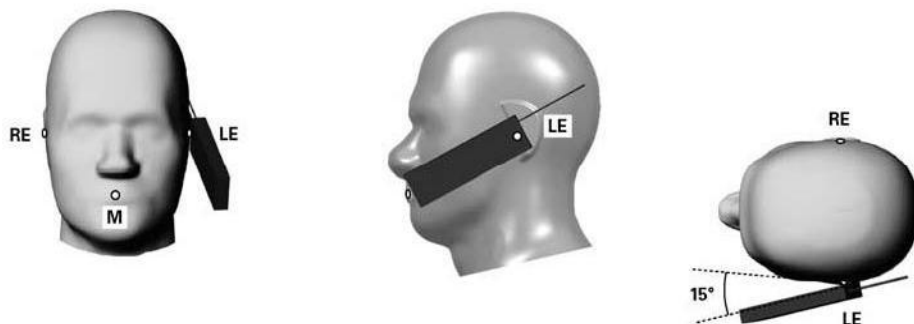


Fig 9.4 Illustration for Tilted Position

9.4. SAR Evaluation near the Mouth/Jaw Regions of the Phantom

Antennas located near the bottom of a phone may require SAR measurements around the mouth and jaw regions of the SAM head phantom. This typically applies to clam-shell style phones that are generally longer in the unfolded normal use positions or to certain older style long rectangular phones.

Under these circumstances, the following procedures apply, adopted from the FCC guidance on SAR handsets document FCC KDB Publication 648474 D04v01r03. The SAR required in these regions of SAM should be measured using a flat phantom. The phone should be positioned with a separation distance of 4 mm between the ear reference point (ERP) and the outer surface of the flat phantom shell. While maintaining this distance at the ERP location, the low (bottom) edge of the phone should be lowered from the phantom to establish the same separation distance between the peak SAR locations identified by the truncated partial SAR distribution measured with the SAM phantom. The distance from the peak SAR location to the phone is determined by the straight line passing perpendicularly through the phantom surface. When it is not feasible to maintain 4 mm separation at the ERP while also establishing the required separation at the peak SAR location, the top edge of the phone will be allowed to touch the phantom with a separation < 4 mm at the ERP. The phone should not be tilted to the left or right while placed in this inclined position to the flat phantom.

9.5. Body-worn Configurations

The body-worn configurations shall be tested with the supplied accessories (belt-clips, holsters, etc.) attached to the device in normal use configuration.

For body-worn and other configurations a flat phantom shall be used which is comprised of material with electrical properties similar to the corresponding tissues.

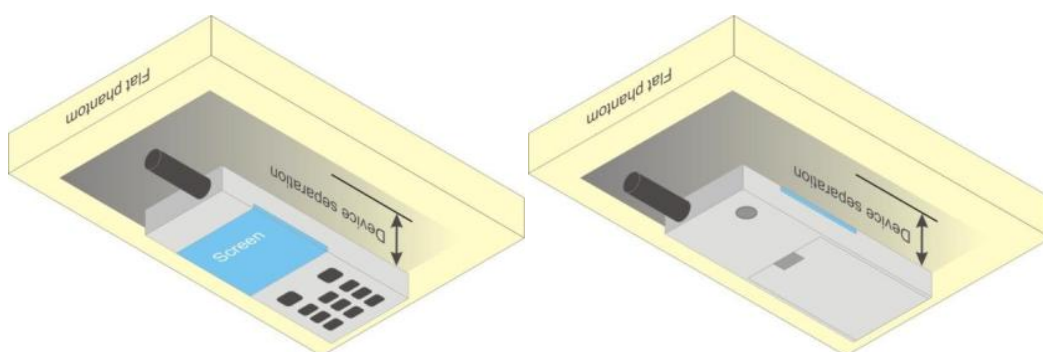


Fig 9.5 Illustration for Body Worn Position

9.6. Hotspot Mode Exposure Position Conditions

For handsets that support hotspot mode operations, with wireless router capabilities and various web browsing functions, the relevant hand and body exposure conditions are tested according to the hotspot SAR procedures in KDB 941225. A test separation distance of 10 mm is required between the phantom and all surfaces and edges with a transmitting antenna located within 25 mm from that surface or edge. When the form factor of a handset is smaller than 9 cm x 5 cm, a test separation distance of 5 mm (instead of 10 mm) is required for testing hotspot mode. When the separation distance required for body-worn accessory testing is larger than or equal to that tested for hotspot mode, in the same wireless mode and for the same surface of the phone, the hotspot mode SAR data may be used to support body-worn accessory SAR compliance for that particular configuration (surface).

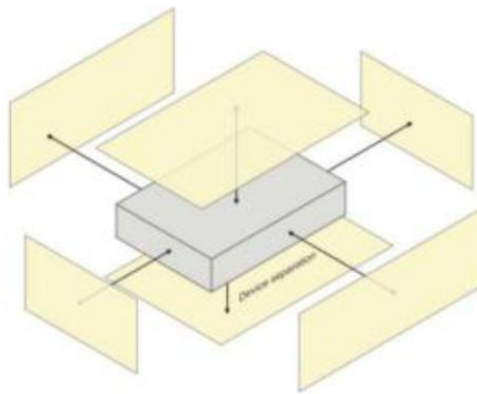


Fig 9.6 Illustration for Hotspot Position

10. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

- (a) For WWAN power measurement, use base station simulator to configure EUT WWAN transmission in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
- (b) Read the WWAN RF power level from the base station simulator.
- (c) For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band.
- (d) Connect EUT RF port through RF cable to the power meter, and measure WLAN/BT output power.

<SAR measurement>

- (a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power, in the highest power channel.
- (b) Place the EUT in the positions as Annex B demonstrates.
- (c) Set scan area, grid size and other setting on the DASY software.
- (d) Measure SAR results for the highest power channel on each testing position.
- (e) Find out the largest SAR result on these testing positions of each band.
- (f) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg.

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

- (a) Power reference measurement.
- (b) Area scan.
- (c) Zoom scan.
- (d) Power drift measurement.



10.1. Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

- (a) Extraction of the measured data (grid and values) from the Zoom Scan.
- (b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters).
- (c) Generation of a high-resolution mesh within the measured volume.
- (d) Interpolation of all measured values from the measurement grid to the high-resolution grid.
- (e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface.
- (f) Calculation of the averaged SAR within masses of 1g and 10g.

10.2. 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 phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.



10.3. SAR Averaged Methods

In DASY, the interpolation and extrapolation are both based on the modified Quadratic Sheppard's method. The interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5 mm.

10.4. Power Drift Monitoring

All SAR testing is under the DUT install full charged battery and transmit maximum output power. In DASY measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of DUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drift more than 5%, the SAR will be retested.

11. Power Density Measurement Procedure

➤ 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.

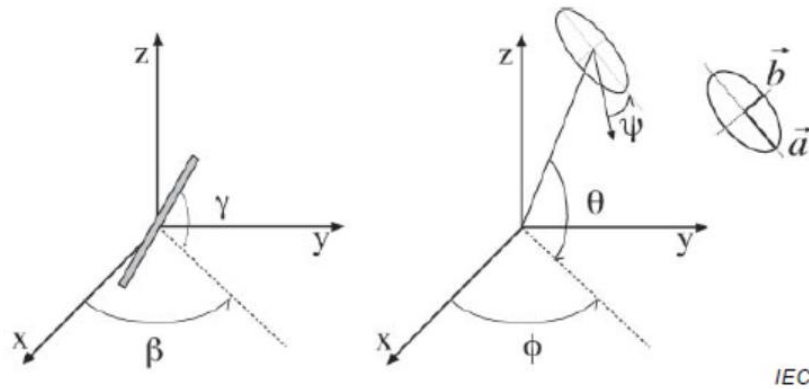


Fig 11.1 Illustration of the angles used for the numerical description of the sensor and the orientation of an ellipse in 3-D space

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



➤ **Total Field and Power Flux Density Reconstruction**

Computation of the power density in general requires knowledge of the electric and magnetic field amplitudes and phases in the plane of incidence. Reconstruction of these quantities from pseudo-vector E-field measurements is feasible, as they are constrained by Maxwell's equations. The 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. 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-field and H-field, as well as of the power density, on measurement planes located as near as $\lambda/5$ away.

➤ **Power Flux Density Averaging**

The average of the reconstructed power density is evaluated over a circular area in each measurement plane. The area of the circle is defined by the user; the default is 1cm². The computed peak average value is displayed in the box at the top right. Note that the average is evaluated only for grid points where the averaging circle is completely filled with values; for points at the edge where the averaging circle is only partly filled with values, the average power density is set to zero. Two average power density values are computed.

12. SAR Measurement Procedure

12.1. Test Procedure

Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEC/IEEE 62209-1528:2020.

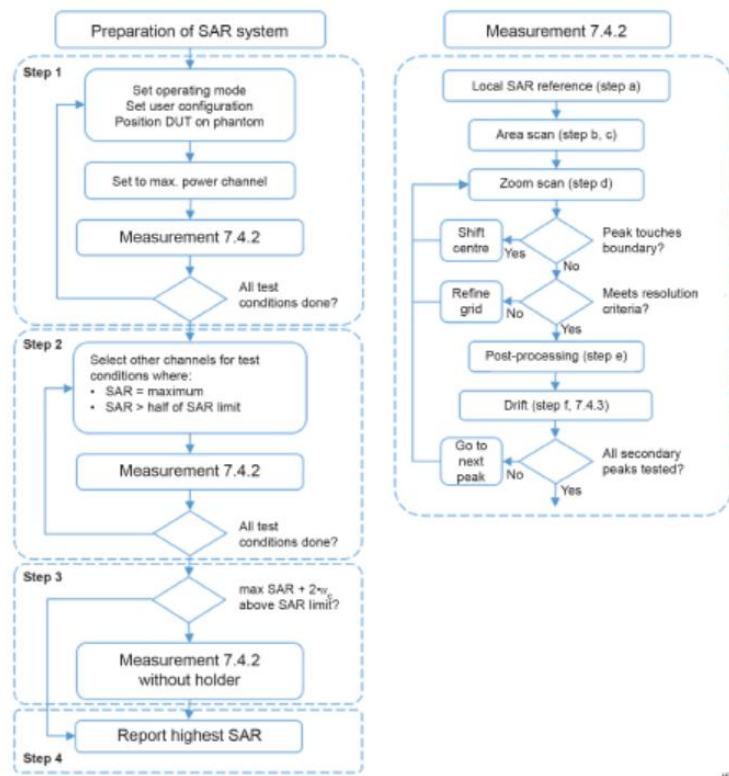


Fig 12.1 Block diagram of the tests to be performed

The SAR test procedure shall be performed for each test configuration should follows the requirements specified in IEC/IEEE 62209-1528. The Following steps are used for each test position shown in fig 12.1:

1. Establish a call with the maximum output power with a base station simulator. The connection between the mobile and the base station simulator is established via air interface.
2. Measurement of the local E-field value at a fixed location. This value serves as a reference value

for calculating a possible power drift.

12.2. Scanning Requirements

➤ Area Scan Parameters

Measure the two-dimensional SAR distribution within the phantom (i.e. the area scan). Table 1 provides the measurement parameters required for the area scan.

Table 1 Area scan parameters

Parameter	DUT transmit frequency being tested	
	$f \leq 3 \text{ GHz}$	$3 \text{ GHz} < f \leq 10 \text{ GHz}$
Maximum distance between the measured points (geometric centre of the sensors) and the inner phantom surface (z_{M1} in Figure 20 in mm)	5 ± 1	$\delta \ln(2)/2 \pm 0,5^a$
Maximum spacing between adjacent measured points in mm (see O.8.3.1) ^b	20, or half of the corresponding zoom scan length, whichever is smaller	$60/f$, or half of the corresponding zoom scan length, whichever is smaller
Maximum angle between the probe axis and the phantom surface normal (α in Figure 20) ^c	5° (flat phantom only) 30° (other phantoms)	5° (flat phantom only) 20° (other phantoms)
Tolerance in the probe angle	1°	1°
^a δ is the penetration depth for a plane-wave incident normally on a planar half-space. ^b See Clause O.8 on how Δx and Δy may be selected for individual area scan requirements. ^c The probe angle relative to the phantom surface normal is restricted due to the degradation in the measurement accuracy in fields with steep spatial gradients. The measurement accuracy decreases with increasing probe angle and increasing frequency. This is the reason for the tighter probe angle restriction at frequencies above 3 GHz.		

1. The area over which the SAR measurement is performed shall cover at least an area larger than the projection of the DUT, including its antenna. For some DUTs, the area projected onto the phantom can be relatively large, such that the probe might not reach all points. In this case, rotated phantoms may be used, and the area may be assessed by multiple overlapping area scans. The measurement resolution and spatial resolution for interpolation shall be selected to allow identification of the local peak locations to within one-half of the linear dimension of the corresponding side of the zoom-scan volume.
2. For the flat phantom, the boundary of the measurement area shall not be closer than 20 mm from the phantom side walls.

➤ Zoom Scan Parameters

Measure the three-dimensional SAR distribution at each of the local maxima locations identified in step c) (i.e. the zoom scan).

Table 2 Zoom scan parameters

Parameter	DUT transmit frequency being tested	
	$f \leq 3 \text{ GHz}$	$3 \text{ GHz} < f \leq 10 \text{ GHz}$
Maximum distance between the closest measured points and the phantom surface (z_{M1} in Figure 20 and Table 3, in mm)	5	$\delta \ln(2)/2^a$
Maximum angle between the probe axis and the phantom surface normal (α in Figure 20)	5° (flat phantom only) 30° (other phantoms)	5° (flat phantom only) 20° (other phantoms)
Maximum spacing between measured points in the x- and y-directions (Δx and Δy , in mm)	8	$24/f^b$
For uniform grids: Maximum spacing between measured points in the direction normal to the phantom shell (Δz_1 in Figure 20, in mm)	5	$10/(f - 1)$
For graded grids: Maximum spacing between the two closest measured points in the direction normal to the phantom shell (Δz_1 in Figure 20, in mm)	4	$12/f$
For graded grids: Maximum incremental increase in the spacing between measured points in the direction normal to the phantom shell ($R_z = \Delta z_2/\Delta z_1$ in Figure 20)	1,5	1,5
Minimum edge length of the zoom scan volume in the x- and y-directions (L_z in O.8.3.2, in mm)	30	22
Minimum edge length of the zoom scan volume in the direction normal to the phantom shell (L_h in O.8.3.2 in mm)	30	22
Tolerance in the probe angle	1°	1°
^a δ is the penetration depth for a plane-wave incident normally on a planar half-space.		
^b This is the maximum spacing allowed, which might not work for all circumstances.		

1. For frequencies at or below 3 GHz, the following procedure shall be applied (see Table 2).
 - 1) The minimum size of the zoom scan volume shall be 30 mm by 30 mm by 30 mm.
 - 2) The horizontal grid step shall be 8 mm or less.
 - 3) The grid step in the vertical direction shall be 5 mm, or less if uniform spacing is used.
 - 4) If variable spacing is used in the vertical direction, the maximum spacing between the two closest measured points to the phantom shell (M1 and M2, see Figure 20 of IEC/IEEE 62209-1528 section 7.4.2) shall be 4 mm or less, and the spacing between the farther points shall increase by a factor of 1.5 or less.

- 5) For other parameters, see Table 4.
2. For frequencies above 3 GHz, the following procedure shall be applied.
 - 1) The minimum size of the zoom scan volume may be reduced to 22 mm by 22 mm by 22 mm.
 - 2) The horizontal grid step shall be $(24 / f \text{ [GHz]})$ mm or less.
 - 3) If uniform spacing in the vertical direction is used, the grid step in the vertical direction shall be $(10 / (f \text{ [GHz]} - 1))$ mm or less.
 - 4) If variable spacing is used in the vertical direction, the maximum spacing between the two measured points closest to the phantom shell shall be $(12 / f \text{ [GHz]})$ mm or less, and the spacing between farther points shall increase by a factor of 1.5 or less.
3. If the highest SAR 1 g or 10 g cube is touching the boundary of a zoom-scan volume, the entire zoom scan shall be repeated with the new centre located at the maximum psSAR location indicated by the preceding zoom scan measurement. It is also acceptable to expand the zoom scan during measurement until the 1 g or 10 g cube is no longer touching the boundary of the zoom-scan volume.
4. If the zoom scan measured as specified in the preceding paragraphs complies with both i) and ii), or if the psSAR is below 0.1 W/kg, no additional measurements are needed.
 - 1) The smallest horizontal distance from the local SAR peaks to all points 3 dB below the SAR peak shall be larger than the horizontal grid steps in both x- and y-directions (Δx , Δy). This shall be checked for the measured zoom scan plane conformal to the phantom at the distance zM1. The minimum distance shall be recorded in the SAR test report.
 - 2) ii) The ratio of the SAR at the second measured point (M2) to the SAR at the closest measured point (M1) at the x-y location of the measured maximum SAR value shall be at least 30 % (Figure 20). This ratio (in %) shall be recorded in the SAR test report.

12.3. Description of Interpolation/Extrapolation Scheme

The local SAR inside the phantom is measured using small dipole sensing elements inside a probe body. The probe tip must not be in contact with the phantom surface in order to minimize measurements errors, but the highest local SAR will occur at the surface of the phantom.

An extrapolation is using to determinate this highest local SAR values. The extrapolation is based on a fourth-order least-square polynomial fit of measured data. The local SAR value is then extrapolated from the liquid surface with a 1mm step.

The measurements have to be performed over a limited time (due to the duration of the battery) so the step of measurement is high. It could vary between 5 and 8 mm. To obtain an accurate assessment of the maximum SAR averaged over 10 grams and 1 gram requires a very fine resolution in the three dimensional scanned data array.



12.4. Wireless Router

Some battery-operated handsets have the capability to transmit and receive user through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 v02r01 where SAR test considerations for handsets ($L \times W \geq 9 \text{ cm} \times 5 \text{ cm}$) are based on a composite test separation distance of 10 from the front, back and edges of the device containing transmitting antennas within 2.5cm of their edges, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D01v06 publication procedures. The "Portable Hotspot" feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

13. SAR Test Configuration

<GSM Mode>

A summary of these settings is illustrated below:

For GSM850 frequency band, the power control is set to 5 for GSM/GPRS mode (GSMK-CS1) and set to 8 for EDGE mode (MCS5); For GSM1900 frequency band, the power control is set to 0 for GSM/GPRS mode (GSMK-CS1) and set to 2 for EDGE mode (MCS5).

1. Per KDB 447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
2. Per KDB 941225 D01v03r01, SAR test reduction for GSM / GPRS / EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Therefore, the GPRS (4Tx slots) for GSM850/GSM1900 is considered as the primary mode.
3. Other configurations of GSM / GPRS / EDGE are considered as secondary modes.

Timeslot consignations:

Remark:

1. The frame-averaged power is linearly reported the maximum burst averaged power over 8 time slots. The calculated methods are shown as below:
The duty cycle "x" of different time slots as below:
1 TX slot is 1/8, 2 TX slots is 2/8, 3 TX slots is 3/8 and 4 TX slots is 4/8
Based on the calculation formula:
Frame-averaged power = Burst averaged power + 10 log (x)
So,
Frame-averaged power (1 TX slot) = Burst averaged power (1 TX slot)– 9.03
Frame-averaged power (2 TX slots) = Burst averaged power (2 TX slots)– 6.02
Frame-averaged power (3 TX slots) = Burst averaged power (3 TX slots)– 4.26
Frame-averaged power (4 TX slots) = Burst averaged power (4 TX slots) – 3.01
2. CS1 coding scheme was used in GPRS conducted power measurements and SAR testing, MCS5 coding scheme was used in EGPRS conducted power measurements and SAR testing (if necessary).

No. of Slots:	Slot 1	Slot 2	Slot 3	Slot 4
Slot Consignation:	1Up 4Down	2Up 3Down	3Up 2Down	4Up 1Down
Duty Cycle:	1:8.3	1:4.15	1:2.77	1:2.08
Correct Factor:	-9.03dB	-6.02dB	-4.26dB	-3.01dB

<WCDMA Mode>

Summary of UMTS conducted power measurement:

1. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq \frac{1}{4}$ dB higher than the primary mode, SAR measurement is not required for the secondary mode.
2. The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
3. The procedures in KDB 941225 D01v03r01 are applied for 3GPP Rel. 6 HSPA to configure the device in the required sub-test mode(s) to determine SAR test exclusion.
4. For HSPA+ devices supporting 16 QAM in the uplink, power measurements procedure is according to the configurations in Table C.11.1.4 of 3GPP TS 34.121-1.
5. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA / HSPA+ is $\leq \frac{1}{4}$ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA / HSPA+ to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+, and according to the following RF output power, the output power results of the secondary modes (HSDPA / HSUPA / DC-HSDPA / HSPA+) are less than $\frac{1}{4}$ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+.
6. A fixed level power reduction is applied for WCDMA Band II when handset open Hotspot mode, the power reduction triggered.

HSDPA Setup Configuration

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{hs}^{(1)}$	CM (dB) ⁽²⁾
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15 ⁽³⁾	15/15 ⁽³⁾	64	12/15 ⁽³⁾	24/15	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5
Note 1: $\Delta_{ACK}, \Delta_{NACK}$ and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$ Note 2: CM = 1 for $\beta_c/\beta_d = 12/15, \beta_{hs}/\beta_c = 24/15$. Note 3: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.						

HSUPA Setup Configuration

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{hs}^{(1)}$	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM ⁽²⁾ (dB)	MPR (dB)	AG ⁽⁴⁾ Index	E-TFCI
1	11/15 ⁽³⁾	15/15 ⁽³⁾	64	11/15 ⁽³⁾	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 ⁽⁴⁾	15/15 ⁽⁴⁾	64	15/15 ⁽⁴⁾	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.

Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$.

Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.

Note 6: β_{ed} cannot be set directly; it is set by Absolute Grant Value.

HSPA+ 3GPP release 7 (uplink category 7) 16QAM, Setup Configuration:

Table C.11.1.4: β values for transmitter characteristics tests with HS-DPCCH and E-DCH with 16QAM

Sub-test	β_c (Note 3)	β_d	β_{hs} (Note 1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	$\beta_{ed1}: 30/15$ $\beta_{ed2}: 30/15$	$\beta_{ed3}: 24/15$ $\beta_{ed4}: 24/15$	3.5	2.5	14	105	105

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$.

Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).

Note 3: DPDCH is not configured, therefore the β_c is set to 1 and $\beta_d = 0$ by default.

Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signaled to use the extrapolation algorithm.

DC-HSDPA Setup Configuration

The following tests were completed according to procedures in section 7.3.13 of 3GPP TS34.108 v9.5.0. A summary of these settings are illustrated below:

Downlink Physical Channels are set as per 3GPP TS34.121-1 v9.0.0 E.5.

Table E.5.0: Levels for HSDPA connection setup

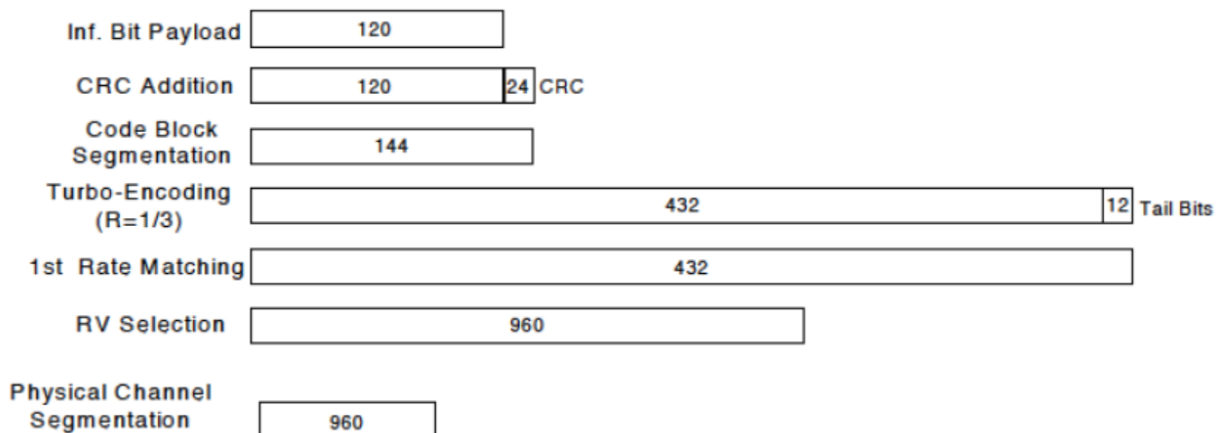
Parameter During Connection setup	Unit	Value
P-CPICH_Ec/Ior	dB	-10
P-CCPCH and SCH_Ec/Ior	dB	-12
PICH_Ec/Ior	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/Ior	dB	-5
OCNS_Ec/Ior	dB	-3.1

Call is set up as per 3GPP TS34.108 v9.5.0 sub clause 7.3.13

The configurations of the fixed reference channels for HSDPA RF tests are described in 3GPP TS 34.121, annex C for FDD and 3GPP TS 34.122.

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table. Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)



<CDMA Mode>

1xEV-DO Rev. B

Call box setup procedure

1xEV-DO Release B

1> CMW 500 Signal Generator > 1xEV-DO Taskbar Enable

2> CMW 500 1xEV-DO Signaling Configuration Window >

3> 1xEV-DO Signaling On Window:

Under Access Network Control:

Band Class: BC0: US Cellular

RF Channel: 31

1xEV-DO Power: -70 dBm

4> 1xEV-DO Signaling Configuration Window

Under RF Frequency Band / Channel: Enter Ch. Frequency

- Under Carrier Configuration: RF Frequency
For Two Carriers: Low Channel (1013)

	<u>RF Channel</u>	<u>RF Channel Offset</u>
Carrier [0]	31	0
Carrier [1]	1013	982

- Under Carrier Configuration: RF Pilot
- | | <u>Carrier Sector</u> | <u>Active on AN</u> | <u>Assigned to AT</u> |
|-----------|-----------------------|---------------------|-----------------------|
| Pilot [0] | C0/S0 | ✓ | ✓ |
| | CA/S1 | ✓ | ✓ |

For Three Carriers: Low Channel (1013)

	<u>RF Channel</u>	<u>RF Channel Offset</u>
Carrier [0]	72	0
Carrier [1]	31	-41
Carrier [2]	1013	941

- Under Carrier Configuration: RF Pilot
- | | <u>Carrier Sector</u> | <u>Active on AN</u> | <u>Assigned to AT</u> |
|-----------|-----------------------|---------------------|-----------------------|
| Pilot [0] | C0/S0 | ✓ | ✓ |
| Pilot [1] | C1/S1 | ✓ | ✓ |
| Pilot [2] | C2/S2 | ✓ | ✓ |



<LTE Mode>

LTE Target MPR level

The device implements maximum power reduction per 3GPP 36.101 requirements where the MPR target is as below table. The MPR settings are implemented configured into firmware and cannot be disabled by the end user or LTE carrier network.

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]						MPR	3GPP
	1.4	3.0	5	10	15	20	Target	MPR
	MHz	MHz	MHz	MHz	MHz	MHz	(dB)	(dB)
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	1	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	1	≤ 1
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	2	≤ 2

Note: The measurement result showed some difference from the target MPR level, due to expected 0.5 dB measurement tolerance

LTE Bands

LTE Bands	Channel bandwidth / Transmission bandwidth configuration [RB]					
	1.4	3.0	5	10	15	20
	MHz	MHz	MHz	MHz	MHz	MHz
2	√	√	√	√	√	√
4	√	√	√	√	√	√
5	√	√	√	√	N/A	N/A
7	N/A	N/A	√	√	√	√
12	√	√	√	√	N/A	N/A
13	N/A	N/A	√	√	N/A	N/A
25	N/A	N/A	√	√	√	√
26	√	√	√	√	√	N/A
38	N/A	N/A	√	√	√	√
41	N/A	N/A	√	√	√	√

Note:

1. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
2. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
3. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.



4. Per KDB 941225 D05v02r05, for QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
5. Per KDB 941225 D05v02r05, 16QAM/64QAM output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB941225 D05v02r05, 16QAM/64QAM SAR testing is not required.
6. Per KDB 941225 D05v02r05, smaller bandwidth output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ Db higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported band width is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
7. For LTE B4 / B5 / B7 / B17 the maximum bandwidth does not support three non-overlapping channels, per KDB941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
8. LTE band 2 / 12 SAR test was covered by Band 25 / 17; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
 - a. The maximum output power, including tolerance, for the smaller band is $\leq$ the larger band to qualify for the SAR test exclusion.
 - b. The channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band.
9. According to 2017 TCB workshop, for 64 QAM and 16 QAM should be verified by checking the signal constellation with a call box to avoid incorrect maximum power levels due to MPR and other requirements associated with signal modulation, and the following figure is taken from the "Fundamental Measurement >> Modulation Analysis >> constellation" mode of the device connect to the CMW500 base station, therefore, the device 64QAM and 16QAM signal modulation are correct. Identify if Maximum Power Reduction (MPR) is optional or mandatory, i.e. built-in by design: only mandatory MPR may be considered during SAR testing, when the maximum output power is permanently limited by the MPR implemented within the UE; and only for the applicable RB (resource block) configurations specified in LTE standards: b) A-MPR (additional MPR) must be disabled.
10. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
 - a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
 - b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/ (duty cycle)"

- c. For WWAN: Reported SAR (W/kg) = Measured SAR(W/kg) * Tune-up Scaling Factor
 - d. For WLAN/Bluetooth: Reported SAR (W/kg) = Measured SAR(W/kg) * Duty Cycle scaling factor * Tune-up scaling factor
 - e. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix $63.3\%/62.9\% = 1.006$ is applied to scale-up the measured SAR result. The Reported TDD LTE SAR = measured SAR (W/kg) * Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
11. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is: ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
12. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥ 0.8 W/kg.
13. Per KDB 648474 D04v01r03, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.

<WLAN 2.4GHz>

1. SAR is measured for 2.4 GHz 802.11b DSSS using either the fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:
 - a. When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.
 - b. When the reported SAR is > 0.8 W/kg, SAR is required for that position using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.
2. 2.4 GHz 802.11 g/n OFDM are additionally evaluated for SAR if the highest reported SAR for 802.11b, adjusted by the ratio of the OFDM to DSSS specified maximum output power, is > 1.2 W/kg. When SAR is required for OFDM modes in 2.4 GHz band, the Initial Test configuration Procedures should be followed.
3. For held-to-ear and hotspot operations, the initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg, no additional testing for the remaining test positions was required. Otherwise, SAR is evaluated at the subsequent highest peak SAR

positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.

4. Justification for test configurations for WLAN per KDB Publication 248227 D02DR02-41929 for 2.4 GHz Wi-Fi single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR.
5. A fixed level power reduction is applied for WiFi when handset operates "held to the body" condition or "held to the ear" condition, the power reduction triggered by audio receiver detection and call establish status.
6. Per KDB 248227 D01v02r02, In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. SAR is not required for the following 2.4 GHz OFDM conditions:
 - a. When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.
 - b. When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

<WLAN 5GHz>

A) U-NII-1 and U-NII-2A Bands

For devices that operate in only one of the U-NII-1 and U-NII-2A bands, the normally required SAR procedures for OFDM configurations are applied. For devices that operate in both U-NII bands using the same transmitter and antenna(s), SAR test reduction is determined according to the following:

1. When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, both bands are tested independently for SAR.
2. When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, both bands are tested independently for SAR.
3. The two U-NII bands may be aggregated to support a 160 MHz channel on channel number 50.
4. Without additional testing, the maximum output power for this is limited to the lower of the maximum output power certified for the two bands. When SAR measurement is required for at least one of the bands and the highest reported SAR adjusted by the ratio of specified maximum output power of aggregated to standalone band is > 1.2 W/kg, SAR is required for the 160 MHz channel. This procedure does not apply to an aggregated band with maximum output higher than the standalone band(s); the aggregated band must be tested independently for SAR. SAR is not

required when the 160 MHz channel is operating at a reduced maximum power and also qualifies for SAR test exclusion.

B) U-NII-2C and U-NII-3 Bands

The frequency range covered by these bands is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. when Terminal Doppler Weather Radar (TDWR) restriction applies, all channels that operate at 5.60 – 5.65 GHz must be included to apply the SAR test reduction and measurement procedures. When the same transmitter and antenna(s) are used for U-NII-2C band and U-NII-3 band or 5.8 GHz band of §15.247, the bands may be aggregated to enable additional channels with 20, 40 or 80 MHz bandwidth to span across the band gap, as illustrated in Appendix B. The maximum output power for the additional band gap channels is limited to the lower of those certified for the bands. Unless band gap channels are permanently disabled, they must be considered for SAR testing. The frequency range covered by these bands is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. To maintain SAR measurement accuracy and to facilitate test reduction, the channels in U-NII-2C band above 5.65 GHz may be grouped with the 5.8 GHz channels in U-NII-3 or §15.247 band to enable two SAR probe calibration frequency points to cover the bands, including the band gap channels. When band gap channels are supported and the bands are not aggregated for SAR testing, band gap channels must be considered independently in each band according to the normally required OFDM SAR measurement and probe calibration frequency points requirements.

C) OFDM Transmission Mode SAR Test Configuration and Channel Selection Requirements

The initial test configuration for 5 GHz OFDM transmission modes is determined by the 802.11 configuration with the highest maximum output power specified for production units, including tune-up tolerance, in each standalone and aggregated frequency band. SAR for the initial test configuration is measured using the highest maximum output power channel determined by the default power measurement procedures. When multiple configurations in a frequency band have the same specified maximum output power, the initial test configuration is determined according to the following steps applied sequentially.

1. The largest channel bandwidth configuration is selected among the multiple configurations with the same specified maximum output power.
2. If multiple configurations have the same specified maximum output power and largest channel bandwidth, the lowest order modulation among the largest channel bandwidth configurations is selected.
3. If multiple configurations have the same specified maximum output power, largest channel bandwidth and lowest order modulation, the lowest data rate configuration among these configurations is selected.
4. When multiple transmission modes (802.11a/g/n/ac) have the same specified maximum output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order

802.11 mode is selected; i.e., 802.11a is chosen over 802.11n then 802.11ac or 802.11g is chosen over 802.11n. After an initial test configuration is determined, if multiple test channels have the same measured maximum output power, the channel chosen for SAR measurement is determined according to the following. These channel selection procedures apply to both the initial test configuration and subsequent test configuration(s), with respect to the default power measurement procedures or additional power measurements required for further SAR test reduction. The same procedures also apply to subsequent highest output power channel(s) selection.

5. The channel closest to mid-band frequency is selected for SAR measurement.
6. For channels with equal separation from mid-band frequency; for example, high and low channels or two mid-band channels, the higher frequency (number) channel is selected for SAR measurement.

D) SAR Test Requirements for OFDM configurations

When SAR measurement is required for 802.11 a/n/ac OFDM configurations, each standalone and frequency aggregated band is considered separately for SAR test reduction. When the same transmitter and antenna(s) are used for U-NII-1 and U-NII-2A bands, additional SAR test reduction V applies. When band gap channels between U-NII-2C band and 5.8 GHz U-NII-3 or §15.247 band are supported, the highest maximum output power transmission mode configuration and maximum output power channel across the bands must be used to determine SAR test reduction, according to the initial test configuration and subsequent test configuration requirements. In applying the initial test configuration and subsequent test configuration procedures, the 802.11 transmission configuration with the highest specified maximum output power and the channel within a test configuration with the highest measured maximum output power should be clearly distinguished to apply the procedures.

14. Conducted Power List

Remark: The output power of GSM/WCDMA/LTE/5G NR/WLAN/Bluetooth refers to the annex E of this report.

15. 5G NR EN-DC Consideration

➤ General Guidance

1. It is operate at EN-DC (NSA) or SA for 5G NR implementation according to the character of the device. SAR measurement should be performed separately for the limitations of the probe calculation factors.
2. When the EN-DC is active the output power of the LTE anchors is equal or less than the standalone carrier, therefore the LTE output power and SAR were estimated based on the standalone carrier to performed sim-TX analysis with 5G NR, WLAN and Bluetooth.

➤ 5G NR (UL) Anchor Combination

EN-DC Combination	LTE Uplink	5G-NR Uplink	SCS (kHz)	Maximum Bandwidth (MHz)	Remark
DC_4A_n2A	4A	n2A	15	20	Uplink
DC_5A_n2A	5A	n2A	15	20	Uplink
DC_7A_n2A	7A	n2A	15	20	Uplink
DC_2A_n7A	2A	n7A	15	20	Uplink
DC_4A_n7A	4A	n7A	15	20	Uplink
DC_5A_n7A	5A	n7A	15	20	Uplink
DC_5A_n25A	5A	n25A	15	20	Uplink
DC_7A_n25A	7A	n25A	15	20	Uplink
DC_2A_n38A	2A	n38A	30	40	Uplink
DC_4A_n38A	4A	n38A	30	40	Uplink
DC_5A_n38A	5A	n38A	30	40	Uplink
DC_2A_n41A	2A	n41A	30	40	Uplink
DC_4A_n41A	4A	n41A	30	40	Uplink



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DC_5A_n41A	5A	n41A	30	40	Uplink
DC_2A_n77A	2A	n77A	30	100	Uplink
DC_5A_n77A	5A	n77A	30	100	Uplink
DC_7A_n77A	7A	n77A	30	100	Uplink
DC_41A_n77A	41A	n77A	30	100	Uplink
DC_2A_n78A	2A	n78A	30	100	Uplink
DC_4A_n78A	4A	n78A	30	100	Uplink
DC_5A_n78A	5A	n78A	30	100	Uplink
DC_7A_n78A	7A	n78A	30	100	Uplink
DC_38A_n78A	38A	n78A	30	100	Uplink
DC_41A_n78A	41A	n78A	30	100	Uplink

16. Hotspot Mode Evaluation Procedure

➤ EUT Antenna Location

The location of antenna was recorded in annex B	
ANT0	TX/RX: GSM 850/1900, WCDMA Band II/IV/V LTE Band 2/4/5/7/12/13/25/26/38/41, 5G NR n2/5/7/12/13/25/26/38/41
ANT1	TX/RX: LTE Band 2/4/25, 5G NR n2/25
ANT2	TX/RX: 5G NR n77/78
ANT3	DRX: WCDMA Band II/IV/V, LTE Band 2/4/5/7/12/13/25/26/38/41, 5G NR n77/78
ANT4	TX/RX: WLAN 2.4GHz/5GHz/6GHz
ANT5	TX/RX: WLAN 2.4GHz/5GHz/6GHz, Bluetooth
ANT6	TX/RX: LTE Band 7/38/41, 5G NR n7/38/41

➤ EUT Antenna Distance

Antenna Location	Front	Back	Left	Right	Top	Bottom
ANT0	<5mm	<5mm	<5mm	<25mm	>25mm	<5mm
ANT1	<5mm	<5mm	>25mm	<5mm	<5mm	>25mm
ANT2	<5mm	<5mm	<5mm	>25mm	>25mm	>25mm
ANT4	<5mm	<5mm	<5mm	>25mm	<5mm	>25mm
ANT5	<5mm	<5mm	<5mm	>25mm	>25mm	>25mm
ANT6	<5mm	<5mm	>25mm	<5mm	>25mm	>25mm

➤ Hotspot Evaluation

Assessment	Hotspot Side for SAR Test Distance: 10 mm					
Antennas	Front	Back	Left	Right	Top	Bottom
ANT0	Yes	Yes	Yes	Yes	No	Yes
ANT1	Yes	Yes	No	Yes	Yes	No
ANT2	Yes	Yes	Yes	No	No	No
ANT4	Yes	Yes	Yes	No	Yes	No
ANT5	Yes	Yes	Yes	No	No	No
ANT6	Yes	Yes	No	Yes	No	No

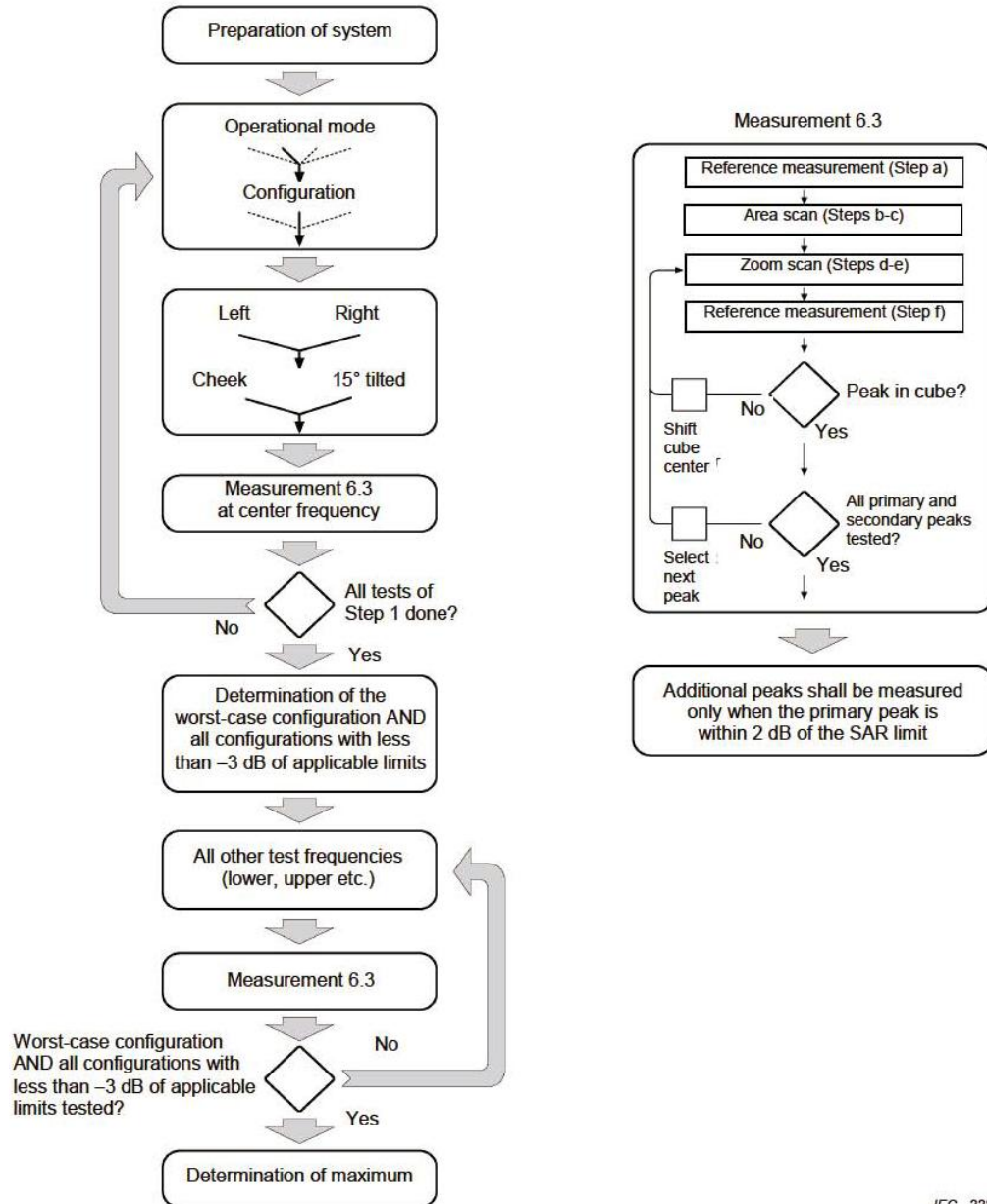
Note :

1. The SAR evaluation procedures for Portable Devices with Wireless Router function is according to KDB 941225 D06 Hotspot SAR v02r01.
2. Head/Body-worn/Hotspot mode SAR assessments are required.
3. Referring to KDB 941225 D06, when the overall device length and width are $\geq 9 \text{ cm} * 5 \text{ cm}$, the test distance is 10 mm. SAR must be measured for all sides and surfaces with a transmitting

antenna located within 25 mm from that surface or edge.

17. Block Diagram of the Tests to be Performed

17.1. Head



IEC 228/05

17.2. Body

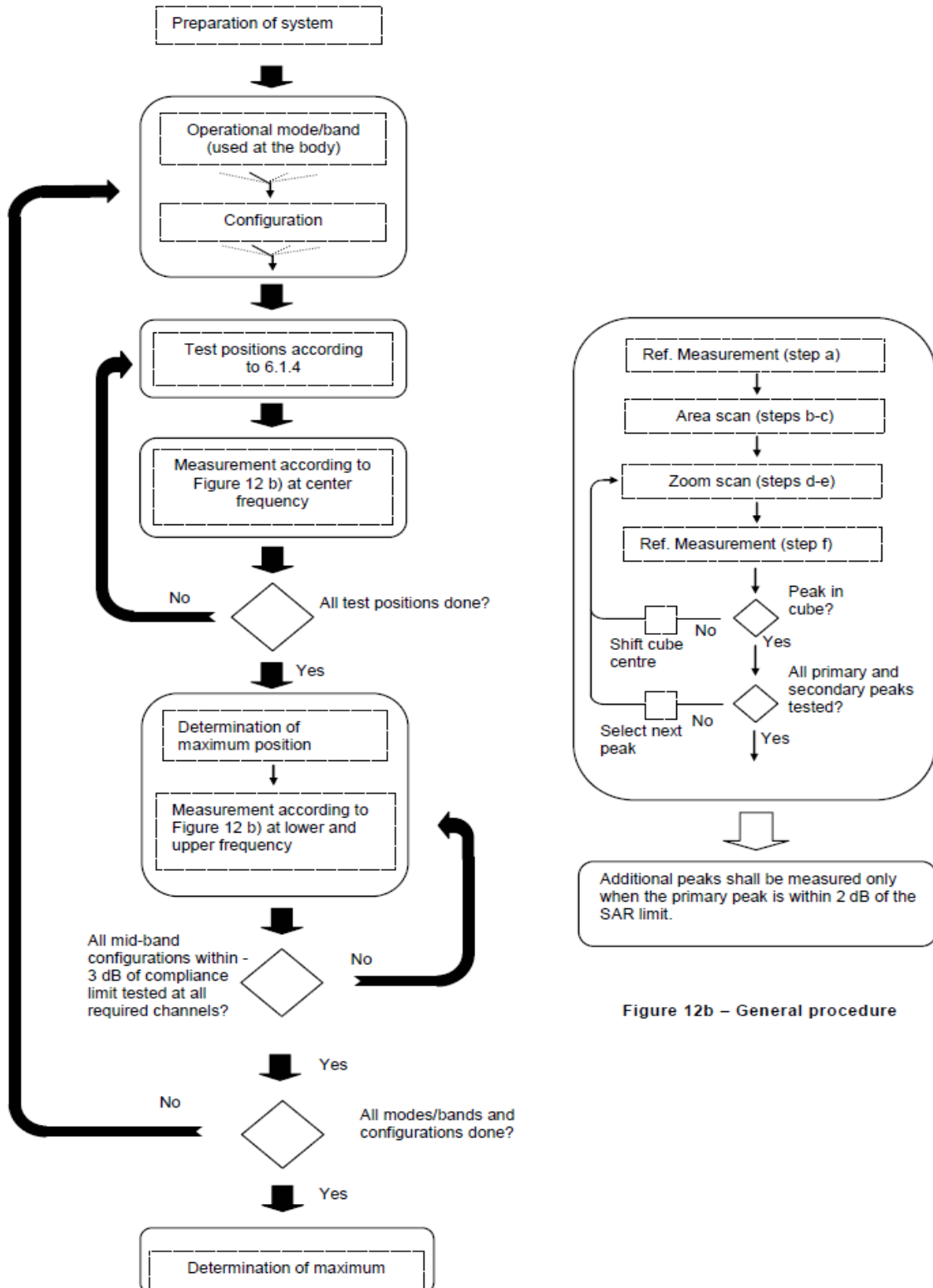


Figure 12b – General procedure



18. Test Results List

18.1. Test Guidance

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
 - a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
 - b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1 / (duty cycle)".
 - c. For WLAN/Bluetooth: Reported SAR(W/kg) = Measured SAR (W/kg) * Duty Cycle scaling factor * Tune-up scaling factor.
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
 - a. ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
 - b. ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
 - c. ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥ 0.8 W/kg.
4. Per KDB 648474 D04v01r03, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.
5. Per KDB648474 D04v01r03, for smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm, when hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg, however, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for tablet modes to compare with the 1.2 W/kg SAR test reduction threshold.
6. Per KDB248227 D01v02r02, a Wi-Fi device must be configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools for SAR measurement. The test frequencies established using test mode must correspond to the actual channel frequencies required for operations in the U.S. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. In addition, a periodic transmission duty factor is required for current generation SAR systems to measure SAR



correctly. Unless it is permitted by specific KDB procedures or continuous transmission is specifically restricted by the device, the reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. When a device is not capable of sustaining continuous transmission or the output can become nonlinear, and it is limited by hardware design and unable to transmit at higher than 85% duty factor, a periodic duty factor within 15% of the maximum duty factor the device is capable of transmitting should be used. The reported SAR must be scaled to the maximum transmission duty factor to determine compliance. Descriptions of the procedures applied to establish the specific duty factor used for SAR testing are required in SAR reports to support the test results.

7. The NSA supports two simultaneous transmission modes:
LTE (MAX) + NR (MIN), where NR power is minimized (NR=0)
NR (MAX) + LTE (MIN), where LTE power is minimized (LTE=0)
Thus, NSA and SA share the same data.
8. Evaluate SAR / APD with DASY6 Module SAR V16.0 or higher. The configurations to be tested are defined in the relevant Knowledge Database (KDB). The 4cm² psSAR and absorbed psPD are reported.



18.2. Head SAR Data

➤ GSM Head SAR

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR _{1g} (W/kg)	Reported SAR _{1g} (W/kg)
ANTO								
1#	GSM850/3TX slots	Right Cheek	189	28.15	29.00	1.216	0.359	0.437
	GSM850/3TX slots	Right Tilt	189	28.15	29.00	1.216	0.177	0.215
	GSM850/3TX slots	Left Cheek	189	28.15	29.00	1.216	0.314	0.382
	GSM850/3TX slots	Left Tilt	189	28.15	29.00	1.216	0.147	0.179
ANTO								
	GSM1900/3TX slots	Right Cheek	661	27.19	28.00	1.205	0.173	0.208
	GSM1900/3TX slots	Right Tilt	661	27.19	28.00	1.205	0.128	0.154
2#	GSM1900/3TX slots	Left Cheek	661	27.19	28.00	1.205	0.200	0.241
	GSM1900/3TX slots	Left Tilt	661	27.19	28.00	1.205	0.150	0.181

➤ WCDMA Head SAR

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR _{1g} (W/kg)	Reported SAR _{1g} (W/kg)
ANTO								
	WCDMA Band II/RMC	Right Cheek	9400	22.73	23.50	1.194	0.149	0.178
	WCDMA Band II/RMC	Right Tilt	9400	22.73	23.50	1.194	0.108	0.129
3#	WCDMA Band II/RMC	Left Cheek	9400	22.73	23.50	1.194	0.208	0.248
	WCDMA Band II/RMC	Left Tilt	9400	22.73	23.50	1.194	0.139	0.166
ANTO								
	WCDMA Band IV/RMC	Right Cheek	1413	23.70	24.50	1.202	0.168	0.202
	WCDMA Band IV/RMC	Right Tilt	1413	23.70	24.50	1.202	0.134	0.161
4#	WCDMA Band IV/RMC	Left Cheek	1413	23.70	24.50	1.202	0.363	0.436
	WCDMA Band IV/RMC	Left Tilt	1413	23.70	24.50	1.202	0.140	0.168
ANTO								
5#	WCDMA Band V/RMC	Right Cheek	4182	23.47	24.00	1.130	0.357	0.403
	WCDMA Band V/RMC	Right Tilt	4182	23.47	24.00	1.130	0.149	0.168
	WCDMA Band V/RMC	Left Cheek	4182	23.47	24.00	1.130	0.244	0.276
	WCDMA Band V/RMC	Left Tilt	4182	23.47	24.00	1.130	0.133	0.150



➤ LTE QPSK Head SAR

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR _{1g} (W/kg)	Reported SAR _{1g} (W/kg)
ANT1 for ENDC								
	LTE Band 4/1RB#0 20M	Right Cheek	20175	23.34	24.00	1.164	0.193	0.225
	LTE Band 4/1RB#0 20M	Right Tilt	20175	23.34	24.00	1.164	0.047	0.055
6#	LTE Band 4/1RB#0 20M	Left Cheek	20175	23.34	24.00	1.164	0.432	0.503
	LTE Band 4/1RB#0 20M	Left Tilt	20175	23.34	24.00	1.164	0.099	0.116
	LTE Band 4/50RB#0 20M	Right Cheek	20175	22.49	23.00	1.125	0.152	0.171
	LTE Band 4/50RB#0 20M	Right Tilt	20175	22.49	23.00	1.125	0.037	0.042
	LTE Band 4/50RB#0 20M	Left Cheek	20175	22.49	23.00	1.125	0.341	0.384
	LTE Band 4/50RB#0 20M	Left Tilt	20175	22.49	23.00	1.125	0.079	0.088
ANT0								
	LTE Band 4/1RB#0 20M	Right Cheek	20175	23.34	24.00	1.164	0.153	0.178
	LTE Band 4/1RB#0 20M	Right Tilt	20175	23.34	24.00	1.164	0.111	0.129
	LTE Band 4/1RB#0 20M	Left Cheek	20175	23.34	24.00	1.164	0.240	0.279
	LTE Band 4/1RB#0 20M	Left Tilt	20175	23.34	24.00	1.164	0.138	0.161
	LTE Band 4/50RB#0 20M	Right Cheek	20175	22.49	23.00	1.125	0.123	0.138
	LTE Band 4/50RB#0 20M	Right Tilt	20175	22.49	23.00	1.125	0.089	0.100
	LTE Band 4/50RB#0 20M	Left Cheek	20175	22.49	23.00	1.125	0.178	0.200
	LTE Band 4/50RB#0 20M	Left Tilt	20175	22.49	23.00	1.125	0.114	0.128
ANT6								
	LTE Band 7/1RB#0 20M	Right Cheek	21100	22.13	23.00	1.222	0.271	0.331
	LTE Band 7/1RB#0 20M	Right Tilt	21100	22.13	23.00	1.222	0.094	0.115
7#	LTE Band 7/1RB#0 20M	Left Cheek	21100	22.13	23.00	1.222	0.480	0.586
	LTE Band 7/1RB#0 20M	Left Tilt	21100	22.13	23.00	1.222	0.135	0.165
	LTE Band 7/50RB#0 20M	Right Cheek	21100	21.33	22.00	1.167	0.222	0.259
	LTE Band 7/50RB#0 20M	Right Tilt	21100	21.33	22.00	1.167	0.075	0.088
	LTE Band 7/50RB#0 20M	Left Cheek	21100	21.33	22.00	1.167	0.384	0.448
	LTE Band 7/50RB#0 20M	Left Tilt	21100	21.33	22.00	1.167	0.108	0.126
ANT0 for ENDC								
	LTE Band 7/1RB#0 20M	Right Cheek	21100	19.63	20.50	1.222	0.142	0.173
	LTE Band 7/1RB#0 20M	Right Tilt	21100	19.63	20.50	1.222	0.058	0.071
	LTE Band 7/1RB#0 20M	Left Cheek	21100	19.63	20.50	1.222	0.066	0.080
	LTE Band 7/1RB#0 20M	Left Tilt	21100	19.63	20.50	1.222	0.071	0.087
	LTE Band 7/50RB#0 20M	Right Cheek	21100	18.83	19.50	1.167	0.122	0.142



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	LTE Band 7/50RB#0 20M	Right Tilt	21100	18.83	19.50	1.167	0.050	0.058
	LTE Band 7/50RB#0 20M	Left Cheek	21100	18.83	19.50	1.167	0.057	0.066
	LTE Band 7/50RB#0 20M	Left Tilt	21100	18.83	19.50	1.167	0.061	0.071
ANT0								
8#	LTE Band 12/1RB#0 10M	Right Cheek	23095	23.33	24.00	1.167	0.183	0.214
	LTE Band 12/1RB#0 10M	Right Tilt	23095	23.33	24.00	1.167	0.107	0.125
	LTE Band 12/1RB#0 10M	Left Cheek	23095	23.33	24.00	1.167	0.174	0.203
	LTE Band 12/1RB#0 10M	Left Tilt	23095	23.33	24.00	1.167	0.095	0.111
	LTE Band 12/25RB#0 10M	Right Cheek	23095	22.32	23.00	1.169	0.170	0.199
	LTE Band 12/25RB#0 10M	Right Tilt	23095	22.32	23.00	1.169	0.086	0.101
	LTE Band 12/25RB#0 10M	Left Cheek	23095	22.32	23.00	1.169	0.162	0.189
	LTE Band 12/25RB#0 10M	Left Tilt	23095	22.32	23.00	1.169	0.070	0.082
ANT0								
9#	LTE Band 13/1RB#0 10M	Right Cheek	23230	23.37	24.00	1.156	0.254	0.294
	LTE Band 13/1RB#0 10M	Right Tilt	23230	23.37	24.00	1.156	0.160	0.185
	LTE Band 13/1RB#0 10M	Left Cheek	23230	23.37	24.00	1.156	0.196	0.227
	LTE Band 13/1RB#0 10M	Left Tilt	23230	23.37	24.00	1.156	0.142	0.164
	LTE Band 13/25RB#0 10M	Right Cheek	23230	22.42	23.00	1.143	0.197	0.225
	LTE Band 13/25RB#0 10M	Right Tilt	23230	22.42	23.00	1.143	0.160	0.183
	LTE Band 13/25RB#0 10M	Left Cheek	23230	22.42	23.00	1.143	0.173	0.198
	LTE Band 13/25RB#0 10M	Left Tilt	23230	22.42	23.00	1.143	0.135	0.154
ANT1 for ENDC								
	LTE Band 25/1RB#0 20M	Right Cheek	26365	23.34	24.00	1.164	0.265	0.308
	LTE Band 25/1RB#0 20M	Right Tilt	26365	23.34	24.00	1.164	0.072	0.083
10#	LTE Band 25/1RB#0 20M	Left Cheek	26365	23.34	24.00	1.164	0.522	0.608
	LTE Band 25/1RB#0 20M	Left Tilt	26365	23.34	24.00	1.164	0.113	0.132
	LTE Band 25/50RB#0 20M	Right Cheek	26365	22.31	23.00	1.172	0.219	0.257
	LTE Band 25/50RB#0 20M	Right Tilt	26365	22.31	23.00	1.172	0.060	0.070
	LTE Band 25/50RB#0 20M	Left Cheek	26365	22.31	23.00	1.172	0.423	0.496
	LTE Band 25/50RB#0 20M	Left Tilt	26365	22.31	23.00	1.172	0.094	0.110
ANT0								
	LTE Band 25/1RB#0 20M	Right Cheek	26365	23.34	24.00	1.164	0.117	0.136
	LTE Band 25/1RB#0 20M	Right Tilt	26365	23.34	24.00	1.164	0.094	0.109
	LTE Band 25/1RB#0 20M	Left Cheek	26365	23.34	24.00	1.164	0.245	0.285
	LTE Band 25/1RB#0 20M	Left Tilt	26365	23.34	24.00	1.164	0.084	0.098
	LTE Band 25/50RB#0 20M	Right Cheek	26365	22.31	23.00	1.172	0.095	0.111
	LTE Band 25/50RB#0 20M	Right Tilt	26365	22.31	23.00	1.172	0.075	0.087



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	LTE Band 25/50RB#0 20M	Left Cheek	26365	22.31	23.00	1.172	0.192	0.225
	LTE Band 25/50RB#0 20M	Left Tilt	26365	22.31	23.00	1.172	0.076	0.089
ANT0								
11#	LTE Band 26/1RB#0 15M	Right Cheek	26865	23.26	24.00	1.186	0.229	0.272
	LTE Band 26/1RB#0 15M	Right Tilt	26865	23.26	24.00	1.186	0.115	0.136
	LTE Band 26/1RB#0 15M	Left Cheek	26865	23.26	24.00	1.186	0.144	0.171
	LTE Band 26/1RB#0 15M	Left Tilt	26865	23.26	24.00	1.186	0.092	0.109
	LTE Band 26/36RB#0 15M	Right Cheek	26865	22.37	23.00	1.156	0.204	0.236
	LTE Band 26/36RB#0 15M	Right Tilt	26865	22.37	23.00	1.156	0.094	0.108
	LTE Band 26/36RB#0 15M	Left Cheek	26865	22.37	23.00	1.156	0.116	0.134
	LTE Band 26/36RB#0 15M	Left Tilt	26865	22.37	23.00	1.156	0.076	0.088
ANT6								
	LTE Band 41/1RB#0 20M	Right Cheek	40620	23.22	24.00	1.197	0.177	0.213
	LTE Band 41/1RB#0 20M	Right Tilt	40620	23.22	24.00	1.197	0.060	0.072
12#	LTE Band 41/1RB#0 20M	Left Cheek	40620	23.22	24.00	1.197	0.297	0.358
	LTE Band 41/1RB#0 20M	Left Tilt	40620	23.22	24.00	1.197	0.083	0.100
	LTE Band 41/50RB#0 20M	Right Cheek	40620	22.40	23.00	1.148	0.146	0.169
	LTE Band 41/50RB#0 20M	Right Tilt	40620	22.40	23.00	1.148	0.050	0.058
	LTE Band 41/50RB#0 20M	Left Cheek	40620	22.40	23.00	1.148	0.219	0.253
	LTE Band 41/50RB#0 20M	Left Tilt	40620	22.40	23.00	1.148	0.062	0.072
ANT0 for ENDC								
	LTE Band 41/1RB#0 20M	Right Cheek	40620	19.22	20.00	1.197	0.115	0.138
	LTE Band 41/1RB#0 20M	Right Tilt	40620	19.22	20.00	1.197	0.054	0.065
	LTE Band 41/1RB#0 20M	Left Cheek	40620	19.22	20.00	1.197	0.086	0.104
	LTE Band 41/1RB#0 20M	Left Tilt	40620	19.22	20.00	1.197	0.040	0.049
	LTE Band 41/50RB#0 20M	Right Cheek	40620	18.40	19.00	1.148	0.095	0.110
	LTE Band 41/50RB#0 20M	Right Tilt	40620	18.40	19.00	1.148	0.046	0.053
	LTE Band 41/50RB#0 20M	Left Cheek	40620	18.40	19.00	1.148	0.074	0.085
	LTE Band 41/50RB#0 20M	Left Tilt	40620	18.40	19.00	1.148	0.032	0.037

➤ 5G NR DFT-S-QPSK Head SAR

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR _{1g} (W/kg)	Reported SAR _{1g} (W/kg)
ANT1 for ENDC								
	5G NR n2/1RB#1 20M	Right Cheek	376000	23.25	24.00	1.189	0.190	0.226
	5G NR n2/1RB#1 20M	Right Tilt	376000	23.25	24.00	1.189	0.046	0.055
13#	5G NR n2/1RB#1 20M	Left Cheek	376000	23.25	24.00	1.189	0.402	0.478
	5G NR n2/1RB#1 20M	Left Tilt	376000	23.25	24.00	1.189	0.104	0.124



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	5G NR n2/50RB#25 20M	Right Cheek	376000	23.11	24.00	1.227	0.152	0.187
	5G NR n2/50RB#25 20M	Right Tilt	376000	23.11	24.00	1.227	0.037	0.045
	5G NR n2/50RB#25 20M	Left Cheek	376000	23.11	24.00	1.227	0.322	0.395
	5G NR n2/50RB#25 20M	Left Tilt	376000	23.11	24.00	1.227	0.083	0.102
ANTO								
	5G NR n2/1RB#1 20M	Right Cheek	376000	22.25	23.00	1.189	0.106	0.126
	5G NR n2/1RB#1 20M	Right Tilt	376000	22.25	23.00	1.189	0.054	0.064
	5G NR n2/1RB#1 20M	Left Cheek	376000	22.25	23.00	1.189	0.188	0.223
	5G NR n2/1RB#1 20M	Left Tilt	376000	22.25	23.00	1.189	0.072	0.086
	5G NR n2/50RB#25 20M	Right Cheek	376000	22.11	23.00	1.227	0.085	0.104
	5G NR n2/50RB#25 20M	Right Tilt	376000	22.11	23.00	1.227	0.043	0.053
	5G NR n2/50RB#25 20M	Left Cheek	376000	22.11	23.00	1.227	0.150	0.184
	5G NR n2/50RB#25 20M	Left Tilt	376000	22.11	23.00	1.227	0.058	0.071
ANTO								
14#	5G NR n5/1RB#1 20M	Right Cheek	167300	23.57	24.00	1.104	0.243	0.268
	5G NR n5/1RB#1 20M	Right Tilt	167300	23.57	24.00	1.104	0.120	0.132
	5G NR n5/1RB#1 20M	Left Cheek	167300	23.57	24.00	1.104	0.231	0.255
	5G NR n5/1RB#1 20M	Left Tilt	167300	23.57	24.00	1.104	0.116	0.128
	5G NR n5/50RB#25 20M	Right Cheek	167800	23.48	24.00	1.127	0.228	0.257
	5G NR n5/50RB#25 20M	Right Tilt	167800	23.48	24.00	1.127	0.108	0.122
	5G NR n5/50RB#25 20M	Left Cheek	167800	23.48	24.00	1.127	0.204	0.230
	5G NR n5/50RB#25 20M	Left Tilt	167800	23.48	24.00	1.127	0.108	0.122
ANT6								
	5G NR n7/1RB#1 20M	Right Cheek	507000	22.83	23.50	1.167	0.180	0.210
	5G NR n7/1RB#1 20M	Right Tilt	507000	22.83	23.50	1.167	0.093	0.109
15#	5G NR n7/1RB#1 20M	Left Cheek	507000	22.83	23.50	1.167	0.270	0.315
	5G NR n7/1RB#1 20M	Left Tilt	507000	22.83	23.50	1.167	0.146	0.170
	5G NR n7/50RB#25 20M	Right Cheek	507000	22.75	23.50	1.189	0.176	0.209
	5G NR n7/50RB#25 20M	Right Tilt	507000	22.75	23.50	1.189	0.093	0.111
	5G NR n7/50RB#25 20M	Left Cheek	507000	22.75	23.50	1.189	0.216	0.257
	5G NR n7/50RB#25 20M	Left Tilt	507000	22.75	23.50	1.189	0.145	0.172
ANTO								
	5G NR n7/1RB#1 20M	Right Cheek	507000	19.83	20.50	1.167	0.130	0.152
	5G NR n7/1RB#1 20M	Right Tilt	507000	19.83	20.50	1.167	0.054	0.063
	5G NR n7/1RB#1 20M	Left Cheek	507000	19.83	20.50	1.167	0.059	0.069
	5G NR n7/1RB#1 20M	Left Tilt	507000	19.83	20.50	1.167	0.066	0.077
	5G NR n7/50RB#25 20M	Right Cheek	507000	19.75	20.50	1.189	0.119	0.141
	5G NR n7/50RB#25 20M	Right Tilt	507000	19.75	20.50	1.189	0.053	0.063
	5G NR n7/50RB#25 20M	Left Cheek	507000	19.75	20.50	1.189	0.057	0.068
	5G NR n7/50RB#25 20M	Left Tilt	507000	19.75	20.50	1.189	0.061	0.072
ANTO								
	5G NR n12/1RB#1 10M	Right Cheek	141500	23.78	24.50	1.180	0.116	0.137
	5G NR n12/1RB#1 10M	Right Tilt	141500	23.78	24.50	1.180	0.054	0.064
16#	5G NR n12/1RB#1 10M	Left Cheek	141500	23.78	24.50	1.180	0.130	0.153
	5G NR n12/1RB#1 10M	Left Tilt	141500	23.78	24.50	1.180	0.058	0.068
	5G NR n12/25RB#12 10M	Right Cheek	141500	23.72	24.50	1.197	0.107	0.128
	5G NR n12/25RB#12 10M	Right Tilt	141500	23.72	24.50	1.197	0.055	0.066



	5G NR n12/25RB#12 10M	Left Cheek	141500	23.72	24.50	1.197	0.117	0.140
	5G NR n12/25RB#12 10M	Left Tilt	141500	23.72	24.50	1.197	0.056	0.067
ANT0								
17#	5G NR n13/1RB#1 10M	Right Cheek	156400	23.47	24.00	1.130	0.174	0.197
	5G NR n13/1RB#1 10M	Right Tilt	156400	23.47	24.00	1.130	0.090	0.102
	5G NR n13/1RB#1 10M	Left Cheek	156400	23.47	24.00	1.130	0.153	0.173
	5G NR n13/1RB#1 10M	Left Tilt	156400	23.47	24.00	1.130	0.077	0.087
	5G NR n13/25RB#12 10M	Right Cheek	156400	23.40	24.00	1.148	0.161	0.185
	5G NR n13/25RB#12 10M	Right Tilt	156400	23.40	24.00	1.148	0.085	0.098
	5G NR n13/25RB#12 10M	Left Cheek	156400	23.40	24.00	1.148	0.141	0.162
	5G NR n13/25RB#12 10M	Left Tilt	156400	23.40	24.00	1.148	0.070	0.080
ANT1								
	5G NR n25/1RB#1 20M	Right Cheek	376500	23.69	24.50	1.205	0.212	0.255
	5G NR n25/1RB#1 20M	Right Tilt	376500	23.69	24.50	1.205	0.060	0.072
18#	5G NR n25/1RB#1 20M	Left Cheek	376500	23.69	24.50	1.205	0.462	0.557
	5G NR n25/1RB#1 20M	Left Tilt	376500	23.69	24.50	1.205	0.115	0.139
	5G NR n25/50RB#25 20M	Right Cheek	376500	23.56	24.50	1.242	0.205	0.255
	5G NR n25/50RB#25 20M	Right Tilt	376500	23.56	24.50	1.242	0.061	0.076
	5G NR n25/50RB#25 20M	Left Cheek	376500	23.56	24.50	1.242	0.443	0.550
	5G NR n25/50RB#25 20M	Left Tilt	376500	23.56	24.50	1.242	0.114	0.142
ANT0								
	5G NR n25/1RB#1 20M	Right Cheek	376500	23.69	24.50	1.205	0.126	0.152
	5G NR n25/1RB#1 20M	Right Tilt	376500	23.69	24.50	1.205	0.106	0.128
	5G NR n25/1RB#1 20M	Left Cheek	376500	23.69	24.50	1.205	0.259	0.312
	5G NR n25/1RB#1 20M	Left Tilt	376500	23.69	24.50	1.205	0.083	0.100
	5G NR n25/50RB#25 20M	Right Cheek	376500	23.56	24.50	1.242	0.105	0.130
	5G NR n25/50RB#25 20M	Right Tilt	376500	23.56	24.50	1.242	0.099	0.123
	5G NR n25/50RB#25 20M	Left Cheek	376500	23.56	24.50	1.242	0.228	0.283
	5G NR n25/50RB#25 20M	Left Tilt	376500	23.56	24.50	1.242	0.066	0.082
ANT0								
	5G NR n26/1RB#1 10M	Right Cheek	163800	23.44	24.00	1.138	0.211	0.240
	5G NR n26/1RB#1 10M	Right Tilt	163800	23.44	24.00	1.138	0.084	0.096
	5G NR n26/1RB#1 10M	Left Cheek	163800	23.44	24.00	1.138	0.187	0.213
	5G NR n26/1RB#1 10M	Left Tilt	163800	23.44	24.00	1.138	0.086	0.098
	5G NR n26/1RB#50 10M	Right Cheek	163800	23.39	24.00	1.151	0.200	0.230
	5G NR n26/1RB#50 10M	Right Tilt	163800	23.39	24.00	1.151	0.071	0.082
	5G NR n26/1RB#50 10M	Left Cheek	163800	23.39	24.00	1.151	0.166	0.191
	5G NR n26/1RB#50 10M	Left Tilt	163800	23.39	24.00	1.151	0.084	0.097
ANT0								
19#	5G NR n26/1RB#1 20M	Right Cheek	167300	23.61	24.50	1.227	0.220	0.270
	5G NR n26/1RB#1 20M	Right Tilt	167300	23.61	24.50	1.227	0.105	0.129
	5G NR n26/1RB#1 20M	Left Cheek	167300	23.61	24.50	1.227	0.209	0.257
	5G NR n26/1RB#1 20M	Left Tilt	167300	23.61	24.50	1.227	0.112	0.137
	5G NR n26/50RB#25 20M	Right Cheek	167300	23.55	24.50	1.245	0.154	0.192
	5G NR n26/50RB#25 20M	Right Tilt	167300	23.55	24.50	1.245	0.074	0.092
	5G NR n26/50RB#25 20M	Left Cheek	167300	23.55	24.50	1.245	0.146	0.182
	5G NR n26/50RB#25 20M	Left Tilt	167300	23.55	24.50	1.245	0.078	0.097



ANT6 for ENDC								
	5G NR n38/1RB#1 40M	Right Cheek	519000	21.83	22.50	1.167	0.452	0.527
	5G NR n38/1RB#1 40M	Right Tilt	519000	21.83	22.50	1.167	0.184	0.215
20#	5G NR n38/1RB#1 40M	Left Cheek	519000	21.83	22.50	1.167	0.633	0.739
	5G NR n38/1RB#1 40M	Left Tilt	519000	21.83	22.50	1.167	0.217	0.253
	5G NR n38/50RB#25 40M	Right Cheek	519000	21.75	22.50	1.189	0.362	0.430
	5G NR n38/50RB#25 40M	Right Tilt	519000	21.75	22.50	1.189	0.147	0.175
	5G NR n38/50RB#25 40M	Left Cheek	519000	21.75	22.50	1.189	0.584	0.694
	5G NR n38/50RB#25 40M	Left Tilt	519000	21.75	22.50	1.189	0.174	0.207
ANT0								
	5G NR n38/1RB#1 40M	Right Cheek	519000	19.83	20.50	1.167	0.130	0.152
	5G NR n38/1RB#1 40M	Right Tilt	519000	19.83	20.50	1.167	0.054	0.063
	5G NR n38/1RB#1 40M	Left Cheek	519000	19.83	20.50	1.167	0.059	0.069
	5G NR n38/1RB#1 40M	Left Tilt	519000	19.83	20.50	1.167	0.066	0.077
	5G NR n38/50RB#25 40M	Right Cheek	519000	19.75	20.50	1.189	0.119	0.141
	5G NR n38/50RB#25 40M	Right Tilt	519000	19.75	20.50	1.189	0.053	0.063
	5G NR n38/50RB#25 40M	Left Cheek	519000	19.75	20.50	1.189	0.057	0.068
	5G NR n38/50RB#25 40M	Left Tilt	519000	19.75	20.50	1.189	0.061	0.072
ANT6(PC2)								
	5G NR n41/1RB#271 100M	Right Cheek	518598	22.82	23.50	1.169	0.513	0.600
	5G NR n41/1RB#271 100M	Right Tilt	518598	22.82	23.50	1.169	0.146	0.171
21#	5G NR n41/1RB#271 100M	Left Cheek	518598	22.82	23.50	1.169	0.586	0.685
	5G NR n41/1RB#271 100M	Left Tilt	518598	22.82	23.50	1.169	0.198	0.232
	5G NR n41/135RB#67 100M	Right Cheek	518598	22.54	23.00	1.112	0.449	0.499
	5G NR n41/135RB#67 100M	Right Tilt	518598	22.54	23.00	1.112	0.102	0.113
	5G NR n41/135RB#67 100M	Left Cheek	518598	22.54	23.00	1.112	0.488	0.543
	5G NR n41/135RB#67 100M	Left Tilt	518598	22.54	23.00	1.112	0.129	0.143
ANT6 (PC3)								
	5G NR n41/1RB#1 100M	Right Cheek	518598	22.66	23.50	1.213	0.450	0.546
	5G NR n41/1RB#1 100M	Right Tilt	518598	22.66	23.50	1.213	0.136	0.165
	5G NR n41/1RB#1 100M	Left Cheek	518598	22.66	23.50	1.213	0.491	0.596
	5G NR n41/1RB#1 100M	Left Tilt	518598	22.66	23.50	1.213	0.111	0.135
	5G NR n41/135RB#67 100M	Right Cheek	518598	22.58	23.50	1.236	0.361	0.446
	5G NR n41/135RB#67 100M	Right Tilt	518598	22.58	23.50	1.236	0.109	0.135
	5G NR n41/135RB#67 100M	Left Cheek	518598	22.58	23.50	1.236	0.382	0.472
	5G NR n41/135RB#67 100M	Left Tilt	518598	22.58	23.50	1.236	0.086	0.106
ANT0 for ENDC (PC2)								
	5G NR n41/1RB#271 100M	Right Cheek	518598	19.82	20.50	1.169	0.122	0.143
	5G NR n41/1RB#271 100M	Right Tilt	518598	19.82	20.50	1.169	0.049	0.057
	5G NR n41/1RB#271 100M	Left Cheek	518598	19.82	20.50	1.169	0.038	0.044
	5G NR n41/1RB#271 100M	Left Tilt	518598	19.82	20.50	1.169	0.030	0.035
	5G NR n41/137RB#67 100M	Right Cheek	518598	19.54	20.50	1.247	0.108	0.135
	5G NR n41/137RB#67 100M	Right Tilt	518598	19.54	20.50	1.247	0.042	0.052
	5G NR n41/137RB#67 100M	Left Cheek	518598	19.54	20.50	1.247	0.039	0.049
	5G NR n41/137RB#67 100M	Left Tilt	518598	19.54	20.50	1.247	0.021	0.026
ANT0 for ENDC (PC3)								
	5G NR n41/1RB#271 100M	Right Cheek	518598	19.73	20.50	1.194	0.105	0.125
	5G NR n41/1RB#271 100M	Right Tilt	518598	19.73	20.50	1.194	0.042	0.050



	5G NR n41/1RB#271 100M	Left Cheek	518598	19.73	20.50	1.194	0.033	0.039
	5G NR n41/1RB#271 100M	Left Tilt	518598	19.73	20.50	1.194	0.026	0.031
	5G NR n41/137RB#67 100M	Right Cheek	518598	19.42	20.00	1.143	0.093	0.106
	5G NR n41/137RB#67 100M	Right Tilt	518598	19.42	20.00	1.143	0.036	0.041
	5G NR n41/137RB#67 100M	Left Cheek	518598	19.42	20.00	1.143	0.034	0.039
	5G NR n41/137RB#67 100M	Left Tilt	518598	19.42	20.00	1.143	0.018	0.021
ANT2 (PC2)								
	5G NR n77/1RB#1 100M	Right Cheek	633334	21.95	22.50	1.135	0.163	0.185
	5G NR n77/1RB#1 100M	Right Tilt	633334	21.95	22.50	1.135	0.035	0.040
	5G NR n77/1RB#1 100M	Left Cheek	633334	21.95	22.50	1.135	0.137	0.155
	5G NR n77/1RB#1 100M	Left Tilt	633334	21.95	22.50	1.135	0.031	0.035
	5G NR n77/135RB#67 100M	Right Cheek	633334	21.06	21.50	1.107	0.136	0.151
	5G NR n77/135RB#67 100M	Right Tilt	633334	21.06	21.50	1.107	0.026	0.029
	5G NR n77/135RB#67 100M	Left Cheek	633334	21.06	21.50	1.107	0.117	0.129
	5G NR n77/135RB#67 100M	Left Tilt	633334	21.06	21.50	1.107	0.018	0.020
ANT2 (PC2)								
22#	5G NR n77/1RB#1 100M	Right Cheek	656000	22.74	23.50	1.191	0.511	0.609
	5G NR n77/1RB#1 100M	Right Tilt	656000	22.74	23.50	1.191	0.150	0.179
	5G NR n77/1RB#1 100M	Left Cheek	656000	22.74	23.50	1.191	0.252	0.300
	5G NR n77/1RB#1 100M	Left Tilt	656000	22.74	23.50	1.191	0.050	0.060
	5G NR n77/135RB#67 100M	Right Cheek	656000	22.61	23.00	1.094	0.324	0.354
	5G NR n77/135RB#67 100M	Right Tilt	656000	22.61	23.00	1.094	0.093	0.102
	5G NR n77/135RB#67 100M	Left Cheek	656000	22.61	23.00	1.094	0.247	0.270
	5G NR n77/135RB#67 100M	Left Tilt	656000	22.61	23.00	1.094	0.046	0.050
ANT2 (PC3)								
	5G NR n77/1RB#1 100M	Right Cheek	633334	21.77	22.50	1.183	0.122	0.144
	5G NR n77/1RB#1 100M	Right Tilt	633334	21.77	22.50	1.183	0.029	0.034
	5G NR n77/1RB#1 100M	Left Cheek	633334	21.77	22.50	1.183	0.117	0.138
	5G NR n77/1RB#1 100M	Left Tilt	633334	21.77	22.50	1.183	0.024	0.028
	5G NR n77/135RB#1 100M	Right Cheek	633334	21.28	22.00	1.180	0.106	0.125
	5G NR n77/135RB#1 100M	Right Tilt	633334	21.28	22.00	1.180	0.014	0.017
	5G NR n77/135RB#1 100M	Left Cheek	633334	21.28	22.00	1.180	0.091	0.107
	5G NR n77/135RB#1 100M	Left Tilt	633334	21.28	22.00	1.180	0.011	0.013
ANT2 (PC3)								
	5G NR n77/1RB#1 100M	Right Cheek	656000	22.62	23.50	1.225	0.135	0.165
	5G NR n77/1RB#1 100M	Right Tilt	656000	22.62	23.50	1.225	0.036	0.044
	5G NR n77/1RB#1 100M	Left Cheek	656000	22.62	23.50	1.225	0.140	0.171
	5G NR n77/1RB#1 100M	Left Tilt	656000	22.62	23.50	1.225	0.038	0.047
	5G NR n77/135RB#67 100M	Right Cheek	656000	22.57	23.50	1.239	0.119	0.147
	5G NR n77/135RB#67 100M	Right Tilt	656000	22.57	23.50	1.239	0.020	0.025
	5G NR n77/135RB#67 100M	Left Cheek	656000	22.57	23.50	1.239	0.104	0.129
	5G NR n77/135RB#67 100M	Left Tilt	656000	22.57	23.50	1.239	0.017	0.021
ANT2 (PC2)								
	5G NR n78/1RB#1 100M	Right Cheek	633334	24.57	25.00	1.104	0.205	0.226
	5G NR n78/1RB#1 100M	Right Tilt	633334	24.57	25.00	1.104	0.031	0.034
	5G NR n78/1RB#1 100M	Left Cheek	633334	24.57	25.00	1.104	0.181	0.200
	5G NR n78/1RB#1 100M	Left Tilt	633334	24.57	25.00	1.104	0.039	0.043
	5G NR n78/135RB#67 100M	Right Cheek	633334	24.03	24.50	1.114	0.147	0.164



	5G NR n78/135RB#67 100M	Right Tilt	633334	24.03	24.50	1.114	0.024	0.027
	5G NR n78/135RB#67 100M	Left Cheek	633334	24.03	24.50	1.114	0.152	0.169
	5G NR n78/135RB#67 100M	Left Tilt	633334	24.03	24.50	1.114	0.028	0.031
ANT2 (PC2)								
23#	5G NR n78/1RB#1 100M	Right Cheek	650000	23.18	24.00	1.208	0.631	0.762
	5G NR n78/1RB#1 100M	Right Tilt	650000	23.18	24.00	1.208	0.103	0.124
	5G NR n78/1RB#1 100M	Left Cheek	650000	23.18	24.00	1.208	0.283	0.342
	5G NR n78/1RB#1 100M	Left Tilt	650000	23.18	24.00	1.208	0.041	0.050
	5G NR n78/135RB#67 100M	Right Cheek	650000	22.58	23.00	1.102	0.470	0.518
	5G NR n78/135RB#67 100M	Right Tilt	650000	22.58	23.00	1.102	0.085	0.094
	5G NR n78/135RB#67 100M	Left Cheek	650000	22.58	23.00	1.102	0.248	0.273
	5G NR n78/135RB#67 100M	Left Tilt	650000	22.58	23.00	1.102	0.033	0.036
ANT2 (PC3)								
	5G NR n78/1RB#1 100M	Right Cheek	633334	21.81	22.50	1.172	0.115	0.135
	5G NR n78/1RB#1 100M	Right Tilt	633334	21.81	22.50	1.172	0.011	0.013
	5G NR n78/1RB#1 100M	Left Cheek	633334	21.81	22.50	1.172	0.110	0.129
	5G NR n78/1RB#1 100M	Left Tilt	633334	21.81	22.50	1.172	0.018	0.021
	5G NR n78/135RB#1 100M	Right Cheek	633334	21.33	22.00	1.167	0.090	0.105
	5G NR n78/135RB#1 100M	Right Tilt	633334	21.33	22.00	1.167	0.005	0.006
	5G NR n78/135RB#1 100M	Left Cheek	633334	21.33	22.00	1.167	0.082	0.096
	5G NR n78/135RB#1 100M	Left Tilt	633334	21.33	22.00	1.167	0.011	0.013
ANT2 (PC3)								
	5G NR n78/1RB#1 100M	Right Cheek	650000	22.82	23.50	1.169	0.149	0.174
	5G NR n78/1RB#1 100M	Right Tilt	650000	22.82	23.50	1.169	0.023	0.027
	5G NR n78/1RB#1 100M	Left Cheek	650000	22.82	23.50	1.169	0.131	0.153
	5G NR n78/1RB#1 100M	Left Tilt	650000	22.82	23.50	1.169	0.032	0.037
	5G NR n78/135RB#1 100M	Right Cheek	650000	22.62	23.00	1.091	0.140	0.153
	5G NR n78/135RB#1 100M	Right Tilt	650000	22.62	23.00	1.091	0.005	0.005
	5G NR n78/135RB#1 100M	Left Cheek	650000	22.62	23.00	1.091	0.116	0.127
	5G NR n78/135RB#1 100M	Left Tilt	650000	22.62	23.00	1.091	0.015	0.016

➤ **WLAN Head SAR**

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR _{1g} (W/kg)	Reported SAR _{1g} (W/kg)	Meas. 4cm ² APD (W/m ²)
ANT4									
	WLAN2.4GHz/802.11ax40	Right Cheek	9	16.04	16.50	1.112	0.386	0.477	N/A
	WLAN2.4GHz/802.11ax40	Right Tilt	9	16.04	16.50	1.112	0.106	0.131	N/A
	WLAN2.4GHz/802.11ax40	Left Cheek	9	16.04	16.50	1.112	0.090	0.111	N/A
	WLAN2.4GHz/802.11ax40	Left Tilt	9	16.04	16.50	1.112	0.051	0.063	N/A
ANT5									
	WLAN2.4GHz/802.11ax40	Right Cheek	9	16.58	17.00	1.102	0.130	0.159	N/A
	WLAN2.4GHz/802.11ax40	Right Tilt	9	16.58	17.00	1.102	0.081	0.099	N/A
	WLAN2.4GHz/802.11ax40	Left Cheek	9	16.58	17.00	1.102	0.078	0.095	N/A
	WLAN2.4GHz/802.11ax40	Left Tilt	9	16.58	17.00	1.102	0.047	0.058	N/A



ANT4+5									
24#	WLAN2.4GHz/802.11ax20	Right Cheek	11	20.27	21.00	1.183	0.493	0.651	N/A
	WLAN2.4GHz/802.11ax20	Right Tilt	11	20.27	21.00	1.183	0.214	0.283	N/A
	WLAN2.4GHz/802.11ax20	Left Cheek	11	20.27	21.00	1.183	0.264	0.349	N/A
	WLAN2.4GHz/802.11ax20	Left Tilt	11	20.27	21.00	1.183	0.148	0.196	N/A
ANT4									
25#	WLAN5.2GHz/802.11n20	Right Cheek	44	17.59	18.00	1.099	0.567	0.681	N/A
	WLAN5.2GHz/802.11n20	Right Tilt	44	17.59	18.00	1.099	0.282	0.339	N/A
	WLAN5.2GHz/802.11n20	Left Cheek	44	17.59	18.00	1.099	0.226	0.271	N/A
	WLAN5.2GHz/802.11n20	Left Tilt	44	17.59	18.00	1.099	0.111	0.133	N/A
ANT5									
	WLAN5.2GHz/802.11ax80	Right Cheek	42	18.82	19.50	1.169	0.131	0.170	N/A
	WLAN5.2GHz/802.11ax80	Right Tilt	42	18.82	19.50	1.169	0.081	0.105	N/A
	WLAN5.2GHz/802.11ax80	Left Cheek	42	18.82	19.50	1.169	0.065	0.084	N/A
	WLAN5.2GHz/802.11ax80	Left Tilt	42	18.82	19.50	1.169	0.055	0.071	N/A
ANT4+5									
	WLAN5.2GHz/802.11n40	Right Cheek	38	20.57	21.00	1.104	0.446	0.543	N/A
	WLAN5.2GHz/802.11n40	Right Tilt	38	20.57	21.00	1.104	0.217	0.264	N/A
	WLAN5.2GHz/802.11n40	Left Cheek	38	20.57	21.00	1.104	0.150	0.183	N/A
	WLAN5.2GHz/802.11n40	Left Tilt	38	20.57	21.00	1.104	0.140	0.170	N/A
ANT4									
26#	WLAN5.3GHz/802.11n20	Right Cheek	52	17.13	18.00	1.222	0.563	0.755	N/A
	WLAN5.3GHz/802.11n20	Right Tilt	52	17.13	18.00	1.222	0.254	0.340	N/A
	WLAN5.3GHz/802.11n20	Left Cheek	52	17.13	18.00	1.222	0.238	0.319	N/A
	WLAN5.3GHz/802.11n20	Left Tilt	52	17.13	18.00	1.222	0.177	0.237	N/A
ANT5									
	WLAN5.3GHz/802.11n40	Right Cheek	62	18.00	18.50	1.122	0.128	0.158	N/A
	WLAN5.3GHz/802.11n40	Right Tilt	62	18.00	18.50	1.122	0.095	0.117	N/A
	WLAN5.3GHz/802.11n40	Left Cheek	62	18.00	18.50	1.122	0.048	0.059	N/A
	WLAN5.3GHz/802.11n40	Left Tilt	62	18.00	18.50	1.122	0.036	0.044	N/A
ANT4+5									
	WLAN5.3GHz/802.11n40	Right Cheek	62	20.28	21.00	1.180	0.421	0.545	N/A
	WLAN5.3GHz/802.11n40	Right Tilt	62	20.28	21.00	1.180	0.298	0.386	N/A
	WLAN5.3GHz/802.11n40	Left Cheek	62	20.28	21.00	1.180	0.188	0.243	N/A
	WLAN5.3GHz/802.11n40	Left Tilt	62	20.28	21.00	1.180	0.167	0.216	N/A
ANT4									
27#	WLAN5.5GHz/802.11n40	Right Cheek	142	17.47	18.00	1.130	0.626	0.782	N/A
	WLAN5.5GHz/802.11n40	Right Tilt	142	17.47	18.00	1.130	0.289	0.361	N/A
	WLAN5.5GHz/802.11n40	Left Cheek	142	17.47	18.00	1.130	0.205	0.256	N/A
	WLAN5.5GHz/802.11n40	Left Tilt	142	17.47	18.00	1.130	0.176	0.220	N/A
ANT5									
	WLAN5.5GHz/802.11n40	Right Cheek	142	18.22	19.00	1.197	0.175	0.230	N/A
	WLAN5.5GHz/802.11n40	Right Tilt	142	18.22	19.00	1.197	0.127	0.167	N/A
	WLAN5.5GHz/802.11n40	Left Cheek	142	18.22	19.00	1.197	0.104	0.137	N/A
	WLAN5.5GHz/802.11n40	Left Tilt	142	18.22	19.00	1.197	0.090	0.118	N/A
ANT4+5									
	WLAN5.5GHz/802.11ac40	Right Cheek	142	19.44	20.00	1.138	0.554	0.698	N/A
	WLAN5.5GHz/802.11ac40	Right Tilt	142	19.44	20.00	1.138	0.333	0.419	N/A
	WLAN5.5GHz/802.11ac40	Left Cheek	142	19.44	20.00	1.138	0.243	0.306	N/A



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	WLAN5.5GHz/802.11ac40	Left Tilt	142	19.44	20.00	1.138	0.196	0.247	N/A
ANT4									
	WLAN5.8GHz/802.11n20	Right Cheek	165	19.37	20.00	1.156	0.346	0.439	N/A
	WLAN5.8GHz/802.11n20	Right Tilt	165	19.37	20.00	1.156	0.322	0.408	N/A
	WLAN5.8GHz/802.11n20	Left Cheek	165	19.37	20.00	1.156	0.137	0.174	N/A
	WLAN5.8GHz/802.11n20	Left Tilt	165	19.37	20.00	1.156	0.108	0.137	N/A
ANT5									
	WLAN5.8GHz/802.11ac40	Right Cheek	151	18.84	19.50	1.164	0.169	0.216	N/A
	WLAN5.8GHz/802.11ac40	Right Tilt	151	18.84	19.50	1.164	0.114	0.146	N/A
	WLAN5.8GHz/802.11ac40	Left Cheek	151	18.84	19.50	1.164	0.108	0.138	N/A
	WLAN5.8GHz/802.11ac40	Left Tilt	151	18.84	19.50	1.164	0.084	0.108	N/A
ANT4+5									
28#	WLAN5.8GHz/802.11n40	Right Cheek	151	18.73	19.50	1.194	0.560	0.735	N/A
	WLAN5.8GHz/802.11n40	Right Tilt	151	18.73	19.50	1.194	0.350	0.460	N/A
	WLAN5.8GHz/802.11n40	Left Cheek	151	18.73	19.50	1.194	0.316	0.415	N/A
	WLAN5.8GHz/802.11n40	Left Tilt	151	18.73	19.50	1.194	0.176	0.231	N/A
ANT4									
29#	U-NII-5/802.11ax-HEW80	Right Cheek	7	12.73	13.50	1.194	0.062	0.081	0.348
	U-NII-5/802.11ax-HEW80	Right Tilt	7	12.73	13.50	1.194	0.027	0.035	0.172
	U-NII-5/802.11ax-HEW80	Left Cheek	7	12.73	13.50	1.194	0.030	0.039	0.191
	U-NII-5/802.11ax-HEW80	Left Tilt	7	12.73	13.50	1.194	0.012	0.016	0.070
ANT5									
	U-NII-5/802.11ax-HEW80	Right Cheek	7	11.38	12.00	1.153	0.032	0.040	0.190
	U-NII-5/802.11ax-HEW80	Right Tilt	7	11.38	12.00	1.153	0.015	0.019	0.100
	U-NII-5/802.11ax-HEW80	Left Cheek	7	11.38	12.00	1.153	0.024	0.030	0.130
	U-NII-5/802.11ax-HEW80	Left Tilt	7	11.38	12.00	1.153	0.010	0.013	0.070
ANT4+5									
	U-NII-5/802.11ax-HEW80	Right Cheek	7	15.00	15.50	1.122	0.026	0.032	0.128
	U-NII-5/802.11ax-HEW80	Right Tilt	7	15.00	15.50	1.122	0.012	0.015	0.081
	U-NII-5/802.11ax-HEW80	Left Cheek	7	15.00	15.50	1.122	0.017	0.021	0.102
	U-NII-5/802.11ax-HEW80	Left Tilt	7	15.00	15.50	1.122	0.010	0.012	0.047
ANT4									
30#	U-NII-6/802.11ax-HEW80	Right Cheek	103	13.01	13.5	1.119	0.061	0.075	0.404
	U-NII-6/802.11ax-HEW80	Right Tilt	103	13.01	13.5	1.119	0.022	0.027	0.160
	U-NII-6/802.11ax-HEW80	Left Cheek	103	13.01	13.5	1.119	0.027	0.033	0.186
	U-NII-6/802.11ax-HEW80	Left Tilt	103	13.01	13.5	1.119	0.013	0.016	0.079
ANT5									
	U-NII-6/802.11ax-HEW80	Right Cheek	103	9.76	10.50	1.186	0.035	0.046	0.328
	U-NII-6/802.11ax-HEW80	Right Tilt	103	9.76	10.50	1.186	0.012	0.016	0.089
	U-NII-6/802.11ax-HEW80	Left Cheek	103	9.76	10.50	1.186	0.022	0.029	0.114
	U-NII-6/802.11ax-HEW80	Left Tilt	103	9.76	10.50	1.186	0.009	0.012	0.061
ANT4+5									
	U-NII-6/802.11ax-HEW80	Right Cheek	103	12.81	13.50	1.172	0.013	0.017	0.074
	U-NII-6/802.11ax-HEW80	Right Tilt	103	12.81	13.50	1.172	0.005	0.006	0.035
	U-NII-6/802.11ax-HEW80	Left Cheek	103	12.81	13.50	1.172	0.009	0.012	0.052
	U-NII-6/802.11ax-HEW80	Left Tilt	103	12.81	13.50	1.172	0.003	0.004	0.031
ANT4									
31#	U-NII-7/802.11ax-HEW80	Right Cheek	167	12.90	13.50	1.148	0.029	0.037	0.190
	U-NII-7/802.11ax-HEW80	Right Tilt	167	12.90	13.50	1.148	0.025	0.032	0.110



	U-NII-7/802.11ax-HEW80	Left Cheek	167	12.90	13.50	1.148	0.020	0.025	0.013
	U-NII-7/802.11ax-HEW80	Left Tilt	167	12.90	13.50	1.148	0.011	0.014	0.071
ANT5									
	U-NII-7/802.11ax-HEW80	Right Cheek	167	11.46	12.00	1.132	0.021	0.026	0.123
	U-NII-7/802.11ax-HEW80	Right Tilt	167	11.46	12.00	1.132	0.012	0.015	0.052
	U-NII-7/802.11ax-HEW80	Left Cheek	167	11.46	12.00	1.132	0.015	0.019	0.064
	U-NII-7/802.11ax-HEW80	Left Tilt	167	11.46	12.00	1.132	0.007	0.009	0.068
ANT4+5									
	U-NII-7/802.11ax-HEW80	Right Cheek	167	14.55	15.00	1.109	0.012	0.015	0.086
	U-NII-7/802.11ax-HEW80	Right Tilt	167	14.55	15.00	1.109	0.006	0.007	0.034
	U-NII-7/802.11ax-HEW80	Left Cheek	167	14.55	15.00	1.109	0.008	0.010	0.051
	U-NII-7/802.11ax-HEW80	Left Tilt	167	14.55	15.00	1.109	0.004	0.005	0.034
ANT4									
32#	U-NII-8/802.11ax-HEW80	Right Cheek	199	12.07	12.50	1.104	0.068	0.083	0.010
	U-NII-8/802.11ax-HEW80	Right Tilt	199	12.07	12.50	1.104	0.029	0.035	0.154
	U-NII-8/802.11ax-HEW80	Left Cheek	199	12.07	12.50	1.104	0.024	0.029	0.181
	U-NII-8/802.11ax-HEW80	Left Tilt	199	12.07	12.50	1.104	0.018	0.022	0.073
ANT5									
	U-NII-8/802.11ax-HEW80	Right Cheek	199	11.71	12.50	1.199	0.043	0.057	0.302
	U-NII-8/802.11ax-HEW80	Right Tilt	199	11.71	12.50	1.199	0.011	0.014	0.085
	U-NII-8/802.11ax-HEW80	Left Cheek	199	11.71	12.50	1.199	0.031	0.041	0.117
	U-NII-8/802.11ax-HEW80	Left Tilt	199	11.71	12.50	1.199	0.009	0.012	0.054
ANT4+5									
	U-NII-8/802.11ax-HEW80	Right Cheek	215	14.76	15.50	1.186	0.028	0.037	0.042
	U-NII-8/802.11ax-HEW80	Right Tilt	215	14.76	15.50	1.186	0.016	0.021	0.107
	U-NII-8/802.11ax-HEW80	Left Cheek	215	14.76	15.50	1.186	0.018	0.023	0.015
	U-NII-8/802.11ax-HEW80	Left Tilt	215	14.76	15.50	1.186	0.005	0.007	0.000

Note:

1. Per KDB 447498 D01v06, for each exposure position, if the highest output power channel Reported SAR $\leq 0.8\text{W/kg}$, other channels SAR testing is not necessary.
2. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required when the measured SAR is $\geq 0.8\text{W/kg}$.
3. Per KDB 941225 D05v02r05, 100% RB allocation SAR measurement is not required when the highest reported SAR for 1 RB and 50% RB allocation are $\leq 0.8\text{ W/kg}$.
4. Per KDB 248227 D01v02r02, for 802.11b DSSS , when the reported SAR of the highest measured maximum output power channel for the exposure configuration is $\leq 0.8\text{ W/kg}$, no further SAR testing is required in that exposure configuration.
5. Per KDB 248227 D01v02r02, OFDM SAR is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is $\leq 1.2\text{ W/kg}$.
6. According to KDB 865664 D02v01r02, SAR plot is required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.
7. For TDD-LTE, the reported SAR should be scaled with the duty cycle scaling factor 1.006.
8. The WLAN 2.4GHz 802.11ax-HEW40 reported 1g SAR (W/kg) should be scaled with the duty



cycle scaling factor 1.112(ANT4) & 1.111(ANT5), WLAN 2.4GHz 802.11ax-HEW20 with 1.117, WLAN 5.2GHz 802.11n-HT20 with 1.093, WLAN 5.2GHz 802.11ax-HEW80 with 1.111, WLAN 5.2GHz 802.11n-HT40 with 1.102, WLAN 5.3GHz 802.11n-HT20 with 1.097, WLAN 5.3GHz 802.11n-HT40 with 1.100(ANT4) & 1.096(ANT5), WLAN 5.5GHz 802.11n-HT40 with 1.106(ANT4) & 1.100(ANT5), WLAN 5.5GHz 802.11ac-VHT40 with 1.107, WLAN 5.8GHz 802.11n-HT20 with 1.097, WLAN 5.8GHz 802.11ac-VHT40 with 1.100, WLAN 5.8GHz 802.11n-HT40 with 1.100 and WLAN 6GHz 802.11ax-HEW0 with 1.100(ANT4) & 1.097(ANT5).

18.3. Body SAR Data

➤ GSM Body SAR

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR _{1g} (W/kg)	Reported SAR _{1g} (W/kg)
ANT0								
	GSM850/3TX slots	Front Side	189	28.15	29.00	1.216	0.164	0.199
33#	GSM850/3TX slots	Back Side	189	28.15	29.00	1.216	0.382	0.465
	GSM850/3TX slots	Left Side	189	28.15	29.00	1.216	0.108	0.131
	GSM850/3TX slots	Right Side	189	28.15	29.00	1.216	0.191	0.232
	GSM850/3TX slots	Bottom Side	189	28.15	29.00	1.216	0.204	0.248
ANT0								
	GSM1900/3TX slots	Front Side	661	27.19	28.00	1.205	0.098	0.118
34#	GSM1900/3TX slots	Back Side	661	27.19	28.00	1.205	0.439	0.529
	GSM1900/3TX slots	Left Side	661	27.19	28.00	1.205	0.180	0.217
	GSM1900/3TX slots	Right Side	661	27.19	28.00	1.205	0.052	0.063
	GSM1900/3TX slots	Bottom Side	661	27.19	28.00	1.205	0.200	0.241

➤ WCDMA Body SAR

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR _{1g} (W/kg)	Reported SAR _{1g} (W/kg)
ANT0								
	WCDMA Band II/RMC	Front Side	9400	22.73	23.50	1.194	0.293	0.350
35#	WCDMA Band II/RMC	Back Side	9400	22.73	23.50	1.194	0.497	0.593
	WCDMA Band II/RMC	Left Side	9400	22.73	23.50	1.194	0.246	0.294
	WCDMA Band II/RMC	Right Side	9400	22.73	23.50	1.194	0.055	0.066
	WCDMA Band II/RMC	Bottom Side	9400	22.73	23.50	1.194	0.254	0.303



ANT0								
	WCDMA Band IV/RMC	Front Side	1413	23.70	24.50	1.202	0.330	0.397
36#	WCDMA Band IV/RMC	Back Side	1413	23.70	24.50	1.202	0.636	0.765
	WCDMA Band IV/RMC	Left Side	1413	23.70	24.50	1.202	0.475	0.571
	WCDMA Band IV/RMC	Right Side	1413	23.70	24.50	1.202	0.110	0.132
	WCDMA Band IV/RMC	Bottom Side	1413	23.70	24.50	1.202	0.429	0.516
ANT0								
	WCDMA Band V/RMC	Front Side	4182	23.47	24.00	1.130	0.279	0.315
37#	WCDMA Band V/RMC	Back Side	4182	23.47	24.00	1.130	0.566	0.639
	WCDMA Band V/RMC	Left Side	4182	23.47	24.00	1.130	0.108	0.122
	WCDMA Band V/RMC	Right Side	4182	23.47	24.00	1.130	0.318	0.359
	WCDMA Band V/RMC	Bottom Side	4182	23.47	24.00	1.130	0.279	0.315

➤ **LTE QPSK Body SAR**

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR _{1g} (W/kg)	Reported SAR _{1g} (W/kg)
ANT1 for ENDC								
	LTE Band 4/1RB#0 20M	Front Side	20175	23.34	24.00	1.164	0.084	0.098
	LTE Band 4/1RB#0 20M	Back Side	20175	23.34	24.00	1.164	0.146	0.170
	LTE Band 4/1RB#0 20M	Right Side	20175	23.34	24.00	1.164	0.224	0.261
	LTE Band 4/1RB#0 20M	Top Side	20175	23.34	24.00	1.164	0.119	0.139
	LTE Band 4/50RB#0 20M	Front Side	20175	22.49	23.00	1.125	0.066	0.074
	LTE Band 4/50RB#0 20M	Back Side	20175	22.49	23.00	1.125	0.115	0.129
	LTE Band 4/50RB#0 20M	Right Side	20175	22.49	23.00	1.125	0.177	0.199
	LTE Band 4/50RB#0 20M	Top Side	20175	22.49	23.00	1.125	0.094	0.106
ANT0								
	LTE Band 4/1RB#0 20M	Front Side	20175	23.34	24.00	1.164	0.197	0.229
38#	LTE Band 4/1RB#0 20M	Back Side	20175	23.34	24.00	1.164	0.442	0.515
	LTE Band 4/1RB#0 20M	Left Side	20175	23.34	24.00	1.164	0.369	0.430
	LTE Band 4/1RB#0 20M	Right Side	20175	23.34	24.00	1.164	0.126	0.147
	LTE Band 4/1RB#0 20M	Bottom Side	20175	23.34	24.00	1.164	0.367	0.427
	LTE Band 4/50RB#0 20M	Front Side	20175	22.49	23.00	1.125	0.195	0.219
	LTE Band 4/50RB#0 20M	Back Side	20175	22.49	23.00	1.125	0.401	0.451
	LTE Band 4/50RB#0 20M	Left Side	20175	22.49	23.00	1.125	0.384	0.432
	LTE Band 4/50RB#0 20M	Right Side	20175	22.49	23.00	1.125	0.090	0.101
	LTE Band 4/50RB#0 20M	Bottom Side	20175	22.49	23.00	1.125	0.300	0.337



ANT6								
	LTE Band 7/1RB#0 20M	Front Side	21100	22.13	23.00	1.222	0.130	0.159
	LTE Band 7/1RB#0 20M	Back Side	21100	22.13	23.00	1.222	0.151	0.184
	LTE Band 7/1RB#0 20M	Right Side	21100	22.13	23.00	1.222	0.204	0.249
	LTE Band 7/50RB#0 20M	Front Side	21100	21.33	22.00	1.167	0.102	0.119
	LTE Band 7/50RB#0 20M	Back Side	21100	21.33	22.00	1.167	0.106	0.124
	LTE Band 7/50RB#0 20M	Right Side	21100	21.33	22.00	1.167	0.143	0.167
ANT0 for ENDC								
	LTE Band 7/1RB#0 20M	Front Side	21100	19.63	20.50	1.222	0.172	0.210
39#	LTE Band 7/1RB#0 20M	Back Side	21100	19.63	20.50	1.222	0.477	0.583
	LTE Band 7/1RB#0 20M	Left Side	21100	19.63	20.50	1.222	0.216	0.264
	LTE Band 7/1RB#0 20M	Right Side	21100	19.63	20.50	1.222	0.108	0.132
	LTE Band 7/1RB#0 20M	Bottom Side	21100	19.63	20.50	1.222	0.365	0.446
	LTE Band 7/50RB#0 20M	Front Side	21100	18.83	19.50	1.167	0.237	0.277
	LTE Band 7/50RB#0 20M	Back Side	21100	18.83	19.50	1.167	0.418	0.488
	LTE Band 7/50RB#0 20M	Left Side	21100	18.83	19.50	1.167	0.254	0.296
	LTE Band 7/50RB#0 20M	Right Side	21100	18.83	19.50	1.167	0.140	0.163
	LTE Band 7/50RB#0 20M	Bottom Side	21100	18.83	19.50	1.167	0.315	0.368
ANT0								
	LTE Band 12/1RB#0 10M	Front Side	23095	23.33	24.00	1.167	0.140	0.163
40#	LTE Band 12/1RB#0 10M	Back Side	23095	23.33	24.00	1.167	0.285	0.333
	LTE Band 12/1RB#0 10M	Left Side	23095	23.33	24.00	1.167	0.171	0.200
	LTE Band 12/1RB#0 10M	Right Side	23095	23.33	24.00	1.167	0.226	0.264
	LTE Band 12/1RB#0 10M	Bottom Side	23095	23.33	24.00	1.167	0.063	0.074
	LTE Band 12/25RB#0 10M	Front Side	23095	22.32	23.00	1.169	0.106	0.124
	LTE Band 12/25RB#0 10M	Back Side	23095	22.32	23.00	1.169	0.268	0.313
	LTE Band 12/25RB#0 10M	Left Side	23095	22.32	23.00	1.169	0.137	0.160
	LTE Band 12/25RB#0 10M	Right Side	23095	22.32	23.00	1.169	0.186	0.218
	LTE Band 12/25RB#0 10M	Bottom Side	23095	22.32	23.00	1.169	0.058	0.068
ANT0								
	LTE Band 13/1RB#0 10M	Front Side	23230	23.37	24.00	1.156	0.164	0.190
41#	LTE Band 13/1RB#0 10M	Back Side	23230	23.37	24.00	1.156	0.403	0.466
	LTE Band 13/1RB#0 10M	Left Side	23230	23.37	24.00	1.156	0.138	0.160
	LTE Band 13/1RB#0 10M	Right Side	23230	23.37	24.00	1.156	0.232	0.268
	LTE Band 13/1RB#0 10M	Bottom Side	23230	23.37	24.00	1.156	0.128	0.148
	LTE Band 13/25RB#0 10M	Front Side	23230	22.42	23.00	1.143	0.137	0.157
	LTE Band 13/25RB#0 10M	Back Side	23230	22.42	23.00	1.143	0.289	0.330



	LTE Band 13/25RB#0 10M	Left Side	23230	22.42	23.00	1.143	0.109	0.125
	LTE Band 13/25RB#0 10M	Right Side	23230	22.42	23.00	1.143	0.193	0.221
	LTE Band 13/25RB#0 10M	Bottom Side	23230	22.42	23.00	1.143	0.115	0.131
ANT1 for ENDC								
	LTE Band 25/1RB#0 20M	Front Side	26365	23.34	24.00	1.164	0.080	0.093
	LTE Band 25/1RB#0 20M	Back Side	26365	23.34	24.00	1.164	0.225	0.262
	LTE Band 25/1RB#0 20M	Right Side	26365	23.34	24.00	1.164	0.251	0.292
	LTE Band 25/1RB#0 20M	Top Side	26365	23.34	24.00	1.164	0.105	0.122
	LTE Band 25/50RB#0 20M	Front Side	26365	22.31	23.00	1.172	0.059	0.069
	LTE Band 25/50RB#0 20M	Back Side	26365	22.31	23.00	1.172	0.139	0.163
	LTE Band 25/50RB#0 20M	Right Side	26365	22.31	23.00	1.172	0.173	0.203
	LTE Band 25/50RB#0 20M	Top Side	26365	22.31	23.00	1.172	0.071	0.083
ANT0								
	LTE Band 25/1RB#0 20M	Front Side	26365	23.34	24.00	1.164	0.209	0.243
42#	LTE Band 25/1RB#0 20M	Back Side	26365	23.34	24.00	1.164	0.645	0.751
	LTE Band 25/1RB#0 20M	Left Side	26365	23.34	24.00	1.164	0.298	0.347
	LTE Band 25/1RB#0 20M	Right Side	26365	23.34	24.00	1.164	0.074	0.086
	LTE Band 25/1RB#0 20M	Bottom Side	26365	23.34	24.00	1.164	0.333	0.388
	LTE Band 25/50RB#0 20M	Front Side	26365	22.31	23.00	1.172	0.152	0.178
	LTE Band 25/50RB#0 20M	Back Side	26365	22.31	23.00	1.172	0.369	0.433
	LTE Band 25/50RB#0 20M	Left Side	26365	22.31	23.00	1.172	0.323	0.379
	LTE Band 25/50RB#0 20M	Right Side	26365	22.31	23.00	1.172	0.081	0.095
	LTE Band 25/50RB#0 20M	Bottom Side	26365	22.31	23.00	1.172	0.275	0.322
ANT0								
	LTE Band 26/1RB#0 15M	Front Side	26865	23.26	24.00	1.186	0.158	0.187
43#	LTE Band 26/1RB#0 15M	Back Side	26865	23.26	24.00	1.186	0.451	0.535
	LTE Band 26/1RB#0 15M	Left Side	26865	23.26	24.00	1.186	0.106	0.126
	LTE Band 26/1RB#0 15M	Right Side	26865	23.26	24.00	1.186	0.184	0.218
	LTE Band 26/1RB#0 15M	Bottom Side	26865	23.26	24.00	1.186	0.138	0.164
	LTE Band 26/36RB#0 15M	Front Side	26865	22.37	23.00	1.156	0.123	0.142
	LTE Band 26/36RB#0 15M	Back Side	26865	22.37	23.00	1.156	0.266	0.308
	LTE Band 26/36RB#0 15M	Left Side	26865	22.37	23.00	1.156	0.088	0.102
	LTE Band 26/36RB#0 15M	Right Side	26865	22.37	23.00	1.156	0.153	0.177
	LTE Band 26/36RB#0 15M	Bottom Side	26865	22.37	23.00	1.156	0.109	0.126
ANT6								
	LTE Band 41/1RB#0 20M	Front Side	40620	23.22	24.00	1.197	0.046	0.055
	LTE Band 41/1RB#0 20M	Back Side	40620	23.22	24.00	1.197	0.097	0.117



	LTE Band 41/1RB#0 20M	Right Side	40620	23.22	24.00	1.197	0.156	0.188
	LTE Band 41/50RB#0 20M	Front Side	40620	22.40	23.00	1.148	0.040	0.046
	LTE Band 41/50RB#0 20M	Back Side	40620	22.40	23.00	1.148	0.079	0.091
	LTE Band 41/50RB#0 20M	Right Side	40620	22.40	23.00	1.148	0.100	0.116
ANT0 for ENDC								
	LTE Band 41/1RB#0 20M	Front Side	40620	19.22	20.00	1.197	0.195	0.235
44#	LTE Band 41/1RB#0 20M	Back Side	40620	19.22	20.00	1.197	0.528	0.636
	LTE Band 41/1RB#0 20M	Left Side	40620	19.22	20.00	1.197	0.153	0.184
	LTE Band 41/1RB#0 20M	Right Side	40620	19.22	20.00	1.197	0.089	0.107
	LTE Band 41/1RB#0 20M	Bottom Side	40620	19.22	20.00	1.197	0.349	0.420
	LTE Band 41/50RB#0 20M	Front Side	40620	18.40	19.00	1.148	0.148	0.171
	LTE Band 41/50RB#0 20M	Back Side	40620	18.40	19.00	1.148	0.401	0.463
	LTE Band 41/50RB#0 20M	Left Side	40620	18.40	19.00	1.148	0.116	0.134
	LTE Band 41/50RB#0 20M	Right Side	40620	18.40	19.00	1.148	0.067	0.077
	LTE Band 41/50RB#0 20M	Bottom Side	40620	18.40	19.00	1.148	0.265	0.306

➤ **5G NR DFT-S-QPSK Body SAR**

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR _{1g} (W/kg)	Reported SAR _{1g} (W/kg)
ANT1 for ENDC								
	5G NR n2/1RB#1 20M	Front Side	376000	23.25	24.00	1.189	0.099	0.118
	5G NR n2/1RB#1 20M	Back Side	376000	23.25	24.00	1.189	0.253	0.301
	5G NR n2/1RB#1 20M	Right Side	376000	23.25	24.00	1.189	0.347	0.412
	5G NR n2/1RB#1 20M	Top Side	376000	23.25	24.00	1.189	0.005	0.006
	5G NR n2/50RB#25 20M	Front Side	376000	23.11	24.00	1.227	0.112	0.137
	5G NR n2/50RB#25 20M	Back Side	376000	23.11	24.00	1.227	0.136	0.167
	5G NR n2/50RB#25 20M	Right Side	376000	23.11	24.00	1.227	0.144	0.177
	5G NR n2/50RB#25 20M	Top Side	376000	23.11	24.00	1.227	0.002	0.002
ANT0								
	5G NR n2/1RB#1 20M	Front Side	376000	22.25	23.00	1.189	0.393	0.467
45#	5G NR n2/1RB#1 20M	Back Side	376000	22.25	23.00	1.189	0.597	0.710
	5G NR n2/1RB#1 20M	Left Side	376000	22.25	23.00	1.189	0.507	0.602
	5G NR n2/1RB#1 20M	Right Side	376000	22.25	23.00	1.189	0.105	0.125
	5G NR n2/1RB#1 20M	Bottom Side	376000	22.25	23.00	1.189	0.395	0.469
	5G NR n2/50RB#25 20M	Front Side	376000	22.11	23.00	1.227	0.350	0.430
	5G NR n2/50RB#25 20M	Back Side	376000	22.11	23.00	1.227	0.514	0.631



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	5G NR n2/50RB#25 20M	Left Side	376000	22.11	23.00	1.227	0.416	0.511
	5G NR n2/50RB#25 20M	Right Side	376000	22.11	23.00	1.227	0.059	0.072
	5G NR n2/50RB#25 20M	Bottom Side	376000	22.11	23.00	1.227	0.326	0.400
ANT0								
	5G NR n5/1RB#1 20M	Front Side	167300	23.57	24.00	1.104	0.195	0.215
46#	5G NR n5/1RB#1 20M	Back Side	167300	23.57	24.00	1.104	0.437	0.482
	5G NR n5/1RB#1 20M	Left Side	167300	23.57	24.00	1.104	0.056	0.062
	5G NR n5/1RB#1 20M	Right Side	167300	23.57	24.00	1.104	0.081	0.089
	5G NR n5/1RB#1 20M	Bottom Side	167300	23.57	24.00	1.104	0.288	0.318
	5G NR n5/1RB#1 20M	Back Side	166800	23.49	24.00	1.125	0.298	0.335
	5G NR n5/1RB#1 20M	Back Side	167800	23.47	24.00	1.130	0.279	0.315
	5G NR n5/50RB#25 20M	Front Side	167800	23.48	24.00	1.127	0.168	0.189
	5G NR n5/50RB#25 20M	Back Side	167800	23.48	24.00	1.127	0.318	0.358
	5G NR n5/50RB#25 20M	Left Side	167800	23.48	24.00	1.127	0.068	0.077
	5G NR n5/50RB#25 20M	Right Side	167800	23.48	24.00	1.127	0.081	0.091
	5G NR n5/50RB#25 20M	Bottom Side	167800	23.48	24.00	1.127	0.255	0.287
	5G NR n5/50RB#25 20M	Back Side	166800	23.44	24.00	1.138	0.258	0.294
	5G NR n5/50RB#25 20M	Back Side	167300	23.47	24.00	1.130	0.296	0.334
ANT6								
	5G NR n7/1RB#1 20M	Front Side	507000	22.83	23.50	1.167	0.104	0.121
	5G NR n7/1RB#1 20M	Back Side	507000	22.83	23.50	1.167	0.348	0.406
47#	5G NR n7/1RB#1 20M	Right Side	507000	22.83	23.50	1.167	0.472	0.551
	5G NR n7/50RB#25 20M	Front Side	507000	22.75	23.50	1.189	0.090	0.107
	5G NR n7/50RB#25 20M	Back Side	507000	22.75	23.50	1.189	0.211	0.251
	5G NR n7/50RB#25 20M	Right Side	507000	22.75	23.50	1.189	0.272	0.323
ANT0 for ENDC								
	5G NR n7/1RB#1 20M	Front Side	507000	19.83	20.50	1.167	0.129	0.151
48#	5G NR n7/1RB#1 20M	Back Side	507000	19.83	20.50	1.167	0.556	0.649
	5G NR n7/1RB#1 20M	Left Side	507000	19.83	20.50	1.167	0.039	0.046
	5G NR n7/1RB#1 20M	Right Side	507000	19.83	20.50	1.167	0.094	0.110
	5G NR n7/1RB#1 20M	Bottom Side	507000	19.83	20.50	1.167	0.516	0.602
	5G NR n7/50RB#25 20M	Front Side	507000	19.75	20.50	1.189	0.090	0.107
	5G NR n7/50RB#25 20M	Back Side	507000	19.75	20.50	1.189	0.438	0.521
	5G NR n7/50RB#25 20M	Left Side	507000	19.75	20.50	1.189	0.027	0.032
	5G NR n7/50RB#25 20M	Right Side	507000	19.75	20.50	1.189	0.066	0.078
	5G NR n7/50RB#25 20M	Bottom Side	507000	19.75	20.50	1.189	0.413	0.491
ANT0								



	5G NR n12/1RB#1 10M	Front Side	141500	23.78	24.50	1.180	0.135	0.159
49#	5G NR n12/1RB#1 10M	Back Side	141500	23.78	24.50	1.180	0.373	0.440
	5G NR n12/1RB#1 10M	Left Side	141500	23.78	24.50	1.180	0.100	0.118
	5G NR n12/1RB#1 10M	Right Side	141500	23.78	24.50	1.180	0.137	0.162
	5G NR n12/1RB#1 10M	Bottom Side	141500	23.78	24.50	1.180	0.256	0.302
	5G NR n12/25RB#12 10M	Front Side	141500	23.72	24.50	1.197	0.098	0.117
	5G NR n12/25RB#12 10M	Back Side	141500	23.72	24.50	1.197	0.296	0.354
	5G NR n12/25RB#12 10M	Left Side	141500	23.72	24.50	1.197	0.073	0.087
	5G NR n12/25RB#12 10M	Right Side	141500	23.72	24.50	1.197	0.115	0.138
	5G NR n12/25RB#12 10M	Bottom Side	141500	23.72	24.50	1.197	0.149	0.178
ANT0								
	5G NR n13/1RB#1 10M	Front Side	156400	23.47	24.00	1.130	0.224	0.253
50#	5G NR n13/1RB#1 10M	Back Side	156400	23.47	24.00	1.130	0.442	0.499
	5G NR n13/1RB#1 10M	Left Side	156400	23.47	24.00	1.130	0.028	0.032
	5G NR n13/1RB#1 10M	Right Side	156400	23.47	24.00	1.130	0.051	0.058
	5G NR n13/1RB#1 10M	Bottom Side	156400	23.47	24.00	1.130	0.263	0.297
	5G NR n13/25RB#12 10M	Front Side	156400	23.40	24.00	1.148	0.115	0.132
	5G NR n13/25RB#12 10M	Back Side	156400	23.40	24.00	1.148	0.197	0.226
	5G NR n13/25RB#12 10M	Left Side	156400	23.40	24.00	1.148	0.020	0.023
	5G NR n13/25RB#12 10M	Right Side	156400	23.40	24.00	1.148	0.065	0.075
	5G NR n13/25RB#12 10M	Bottom Side	156400	23.40	24.00	1.148	0.221	0.254
ANT1 for ENDC								
	5G NR n25/1RB#1 20M	Front Side	376500	23.69	24.50	1.205	0.069	0.083
	5G NR n25/1RB#1 20M	Back Side	376500	23.69	24.50	1.205	0.219	0.264
	5G NR n25/1RB#1 20M	Right Side	376500	23.69	24.50	1.205	0.372	0.448
	5G NR n25/1RB#1 20M	Top Side	376500	23.69	24.50	1.205	0.020	0.024
	5G NR n25/50RB#25 20M	Front Side	376500	23.56	24.50	1.242	0.041	0.051
	5G NR n25/50RB#25 20M	Back Side	376500	23.56	24.50	1.242	0.079	0.098
	5G NR n25/50RB#25 20M	Right Side	376500	23.56	24.50	1.242	0.121	0.150
	5G NR n25/50RB#25 20M	Top Side	376500	23.56	24.50	1.242	0.012	0.015
ANT0								
	5G NR n25/1RB#1 20M	Front Side	376500	23.69	24.50	1.205	0.233	0.281
51#	5G NR n25/1RB#1 20M	Back Side	376500	23.69	24.50	1.205	0.657	0.792
	5G NR n25/1RB#1 20M	Back Side Battery Type 3	376500	23.69	24.50	1.205	0.643	0.775
	5G NR n25/1RB#1 20M	Left Side	376500	23.69	24.50	1.205	0.281	0.339
	5G NR n25/1RB#1 20M	Right Side	376500	23.69	24.50	1.205	0.023	0.028



	5G NR n25/1RB#1 20M	Bottom Side	376500	23.69	24.50	1.205	0.492	0.593
	5G NR n25/50RB#25 20M	Front Side	376500	23.56	24.50	1.242	0.201	0.250
	5G NR n25/50RB#25 20M	Back Side	376500	23.56	24.50	1.242	0.418	0.519
	5G NR n25/50RB#25 20M	Left Side	376500	23.56	24.50	1.242	0.226	0.281
	5G NR n25/50RB#25 20M	Right Side	376500	23.56	24.50	1.242	0.013	0.016
	5G NR n25/50RB#25 20M	Bottom Side	376500	23.56	24.50	1.242	0.520	0.646
ANT0								
	5G NR n26/1RB#1 10M	Front Side	163800	23.44	24.00	1.138	0.097	0.110
	5G NR n26/1RB#1 10M	Back Side	163800	23.44	24.00	1.138	0.388	0.441
	5G NR n26/1RB#1 10M	Left Side	163800	23.44	24.00	1.138	0.020	0.023
	5G NR n26/1RB#1 10M	Right Side	163800	23.44	24.00	1.138	0.055	0.063
	5G NR n26/1RB#1 10M	Bottom Side	163800	23.44	24.00	1.138	0.259	0.295
	5G NR n26/25RB#12 10M	Front Side	163800	23.39	24.00	1.151	0.139	0.160
	5G NR n26/25RB#12 10M	Back Side	163800	23.39	24.00	1.151	0.274	0.315
	5G NR n26/25RB#12 10M	Left Side	163800	23.39	24.00	1.151	0.011	0.013
	5G NR n26/25RB#12 10M	Right Side	163800	23.39	24.00	1.151	0.047	0.054
	5G NR n26/25RB#12 10M	Bottom Side	163800	23.39	24.00	1.151	0.220	0.253
ANT0								
	5G NR n26/1RB#1 20M	Front Side	167300	23.61	24.50	1.227	0.126	0.155
52#	5G NR n26/1RB#1 20M	Back Side	167300	23.61	24.50	1.227	0.498	0.611
	5G NR n26/1RB#1 20M	Left Side	167300	23.61	24.50	1.227	0.031	0.038
	5G NR n26/1RB#1 20M	Right Side	167300	23.61	24.50	1.227	0.070	0.086
	5G NR n26/1RB#1 20M	Bottom Side	167300	23.61	24.50	1.227	0.285	0.350
	5G NR n26/50RB#25 20M	Front Side	167300	23.55	24.50	1.245	0.099	0.123
	5G NR n26/50RB#25 20M	Back Side	167300	23.55	24.50	1.245	0.190	0.236
	5G NR n26/50RB#25 20M	Left Side	167300	23.55	24.50	1.245	0.026	0.032
	5G NR n26/50RB#25 20M	Right Side	167300	23.55	24.50	1.245	0.065	0.081
	5G NR n26/50RB#25 20M	Bottom Side	167300	23.55	24.50	1.245	0.202	0.251
ANT6								
	5G NR n38/1RB#1 40M	Front Side	519000	21.83	22.50	1.167	0.141	0.165
	5G NR n38/1RB#1 40M	Back Side	519000	21.83	22.50	1.167	0.318	0.371
	5G NR n38/1RB#1 40M	Right Side	519000	21.83	22.50	1.167	0.415	0.484
	5G NR n38/50RB#25 40M	Front Side	519000	21.75	22.50	1.189	0.112	0.133
	5G NR n38/50RB#25 40M	Back Side	519000	21.75	22.50	1.189	0.293	0.348
	5G NR n38/50RB#25 40M	Right Side	519000	21.75	22.50	1.189	0.347	0.412
ANT0 for ENDC								
	5G NR n38/1RB#1 40M	Front Side	519000	19.83	20.50	1.167	0.130	0.152



53#	5G NR n38/1RB#1 40M	Back Side	519000	19.83	20.50	1.167	0.598	0.698
	5G NR n38/1RB#1 40M	Left Side	519000	19.83	20.50	1.167	0.156	0.182
	5G NR n38/1RB#1 40M	Right Side	519000	19.83	20.50	1.167	0.052	0.061
	5G NR n38/1RB#1 40M	Bottom Side	519000	19.83	20.50	1.167	0.595	0.694
	5G NR n38/50RB#25 40M	Front Side	519000	19.75	20.50	1.189	0.078	0.093
	5G NR n38/50RB#25 40M	Back Side	519000	19.75	20.50	1.189	0.414	0.492
	5G NR n38/50RB#25 40M	Left Side	519000	19.75	20.50	1.189	0.094	0.112
	5G NR n38/50RB#25 40M	Right Side	519000	19.75	20.50	1.189	0.031	0.037
	5G NR n38/50RB#25 40M	Bottom Side	519000	19.75	20.50	1.189	0.357	0.424
ANT6 (PC2)								
	5G NR n41/1RB#271 100M	Front Side	518598	22.82	23.50	1.169	0.240	0.281
	5G NR n41/1RB#271 100M	Back Side	518598	22.82	23.50	1.169	0.501	0.586
54#	5G NR n41/1RB#271 100M	Right Side	518598	22.82	23.50	1.169	0.675	0.789
	5G NR n41/135RB#67 100M	Front Side	518598	22.54	23.00	1.112	0.222	0.247
	5G NR n41/135RB#67 100M	Back Side	518598	22.54	23.00	1.112	0.458	0.509
	5G NR n41/135RB#67 100M	Right Side	518598	22.54	23.00	1.112	0.502	0.558
ANT6 (PC3)								
	5G NR n41/1RB#1 100M	Front Side	518598	22.66	23.50	1.213	0.189	0.229
	5G NR n41/1RB#1 100M	Back Side	518598	22.66	23.50	1.213	0.303	0.368
	5G NR n41/1RB#1 100M	Right Side	518598	22.66	23.50	1.213	0.511	0.620
	5G NR n41/135RB#67 100M	Front Side	518598	22.58	23.50	1.236	0.168	0.208
	5G NR n41/135RB#67 100M	Back Side	518598	22.58	23.50	1.236	0.206	0.255
	5G NR n41/135RB#67 100M	Right Side	518598	22.58	23.50	1.236	0.407	0.503
ANT0 for ENDC (PC2)								
	5G NR n41/1RB#271 100M	Front Side	518598	19.82	20.50	1.169	0.118	0.138
55#	5G NR n41/1RB#271 100M	Back Side	518598	19.82	20.50	1.169	0.593	0.694
	5G NR n41/1RB#271 100M	Left Side	518598	19.82	20.50	1.169	0.111	0.130
	5G NR n41/1RB#271 100M	Right Side	518598	19.82	20.50	1.169	0.041	0.048
	5G NR n41/1RB#271 100M	Bottom Side	518598	19.82	20.50	1.169	0.400	0.468
	5G NR n41/137RB#67 100M	Front Side	518598	19.54	20.00	1.112	0.086	0.096
	5G NR n41/137RB#67 100M	Back Side	518598	19.54	20.00	1.112	0.416	0.462
	5G NR n41/137RB#67 100M	Left Side	518598	19.54	20.00	1.112	0.070	0.078
	5G NR n41/137RB#67 100M	Right Side	518598	19.54	20.00	1.112	0.028	0.031
	5G NR n41/137RB#67 100M	Bottom Side	518598	19.54	20.00	1.112	0.265	0.295
ANT0 for ENDC (PC3)								
	5G NR n41/1RB#271 100M	Front Side	518598	19.73	20.50	1.194	0.096	0.115
	5G NR n41/1RB#271 100M	Back Side	518598	19.73	20.50	1.194	0.480	0.573



	5G NR n41/1RB#271 100M	Left Side	518598	19.73	20.50	1.194	0.090	0.107
	5G NR n41/1RB#271 100M	Right Side	518598	19.73	20.50	1.194	0.033	0.039
	5G NR n41/1RB#271 100M	Bottom Side	518598	19.73	20.50	1.194	0.324	0.387
	5G NR n41/137RB#67 100M	Front Side	518598	19.42	20.00	1.143	0.106	0.121
	5G NR n41/137RB#67 100M	Back Side	518598	19.42	20.00	1.143	0.514	0.587
	5G NR n41/137RB#67 100M	Left Side	518598	19.42	20.00	1.143	0.086	0.098
	5G NR n41/137RB#67 100M	Right Side	518598	19.42	20.00	1.143	0.034	0.039
	5G NR n41/137RB#67 100M	Bottom Side	518598	19.42	20.00	1.143	0.327	0.374
ANT2 (PC2)								
	5G NR n77/1RB#1 100M	Front Side	633334	21.95	22.50	1.135	0.058	0.066
	5G NR n77/1RB#1 100M	Back Side	633334	21.95	22.50	1.135	0.309	0.351
	5G NR n77/1RB#1 100M	Left Side	633334	21.95	22.50	1.135	0.122	0.138
	5G NR n77/135RB#67 100M	Front Side	633334	21.06	21.50	1.107	0.041	0.045
	5G NR n77/135RB#67 100M	Back Side	633334	21.06	21.50	1.107	0.163	0.180
	5G NR n77/135RB#67 100M	Left Side	633334	21.06	21.50	1.107	0.104	0.115
ANT2 (PC2)								
	5G NR n77/1RB#1 100M	Front Side	656000	22.74	23.50	1.191	0.084	0.100
56#	5G NR n77/1RB#1 100M	Back Side	656000	22.74	23.50	1.191	0.628	0.748
	5G NR n77/1RB#1 100M	Left Side	656000	22.74	23.50	1.191	0.428	0.510
	5G NR n77/135RB#67 100M	Front Side	653000	22.61	23.00	1.094	0.059	0.065
	5G NR n77/135RB#67 100M	Back Side	653000	22.61	23.00	1.094	0.440	0.481
	5G NR n77/135RB#67 100M	Left Side	653000	22.61	23.00	1.094	0.300	0.328
ANT2 (PC3)								
	5G NR n77/1RB#1 100M	Front Side	633334	21.77	22.50	1.183	0.040	0.047
	5G NR n77/1RB#1 100M	Back Side	633334	21.77	22.50	1.183	0.171	0.202
	5G NR n77/1RB#1 100M	Left Side	633334	21.77	22.50	1.183	0.104	0.123
	5G NR n77/135RB#1 100M	Front Side	633334	21.28	22.00	1.180	0.023	0.027
	5G NR n77/135RB#1 100M	Back Side	633334	21.28	22.00	1.180	0.145	0.171
	5G NR n77/135RB#1 100M	Left Side	633334	21.28	22.00	1.180	0.086	0.102
ANT2 (PC3)								
	5G NR n77/1RB#1 100M	Front Side	656000	22.62	23.50	1.225	0.071	0.087
	5G NR n77/1RB#1 100M	Back Side	656000	22.62	23.50	1.225	0.605	0.741
	5G NR n77/1RB#1 100M	Left Side	656000	22.62	23.50	1.225	0.414	0.507
	5G NR n77/135RB#67 100M	Front Side	656000	22.57	23.50	1.239	0.072	0.089
	5G NR n77/135RB#67 100M	Back Side	656000	22.57	23.50	1.239	0.462	0.572
	5G NR n77/135RB#67 100M	Left Side	656000	22.57	23.50	1.239	0.251	0.311
ANT2 (PC2)								



	5G NR n78/1RB#1 100M	Front Side	633334	21.57	22.00	1.104	0.078	0.086
	5G NR n78/1RB#1 100M	Back Side	633334	21.57	22.00	1.104	0.191	0.211
	5G NR n78/1RB#1 100M	Left Side	633334	21.57	22.00	1.104	0.169	0.187
	5G NR n78/135RB#67 100M	Front Side	633334	21.03	22.00	1.250	0.075	0.094
	5G NR n78/135RB#67 100M	Back Side	633334	21.03	22.00	1.250	0.179	0.224
	5G NR n78/135RB#67 100M	Left Side	633334	21.03	22.00	1.250	0.156	0.195
ANT2 (PC2)								
	5G NR n78/1RB#1 100M	Front Side	650000	23.18	24.00	1.208	0.073	0.088
57#	5G NR n78/1RB#1 100M	Back Side	650000	23.18	24.00	1.208	0.650	0.785
	5G NR n78/1RB#1 100M	Left Side	650000	23.18	24.00	1.208	0.348	0.420
	5G NR n78/135RB#67 100M	Front Side	650000	22.58	23.00	1.102	0.051	0.056
	5G NR n78/135RB#67 100M	Back Side	650000	22.58	23.00	1.102	0.455	0.501
	5G NR n78/135RB#67 100M	Left Side	650000	22.58	23.00	1.102	0.243	0.268
ANT2 (PC3)								
	5G NR n78/1RB#1 100M	Front Side	633334	21.81	22.50	1.172	0.054	0.063
	5G NR n78/1RB#1 100M	Back Side	633334	21.81	22.50	1.172	0.133	0.156
	5G NR n78/1RB#1 100M	Left Side	633334	21.81	22.50	1.172	0.123	0.144
	5G NR n78/135RB#1 100M	Front Side	633334	21.33	22.00	1.167	0.048	0.056
	5G NR n78/135RB#1 100M	Back Side	633334	21.33	22.00	1.167	0.125	0.146
	5G NR n78/135RB#1 100M	Left Side	633334	21.33	22.00	1.167	0.110	0.128
ANT2 (PC3)								
	5G NR n78/1RB#1 100M	Front Side	650000	22.82	23.50	1.169	0.076	0.089
	5G NR n78/1RB#1 100M	Back Side	650000	22.82	23.50	1.169	0.573	0.670
	5G NR n78/1RB#1 100M	Left Side	650000	22.82	23.50	1.169	0.339	0.396
	5G NR n78/135RB#1 100M	Front Side	650000	22.62	23.00	1.091	0.063	0.069
	5G NR n78/135RB#1 100M	Back Side	650000	22.62	23.00	1.091	0.415	0.453
	5G NR n78/135RB#1 100M	Left Side	650000	22.62	23.00	1.091	0.282	0.308



➤ WLAN Body SAR

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR _{1g} (W/kg)	Reported SAR _{1g} (W/kg)	Meas. 4cm ² APD (W/m ²)
ANT4									
	WLAN2.4GHz/802.11ax40	Front Side	9	16.04	16.50	1.112	0.073	0.090	N/A
	WLAN2.4GHz/802.11ax40	Back Side	9	16.04	16.50	1.112	0.158	0.195	N/A
	WLAN2.4GHz/802.11ax40	Left Side	9	16.04	16.50	1.112	0.118	0.146	N/A
	WLAN2.4GHz/802.11ax40	Top Side	9	16.04	16.50	1.112	0.129	0.159	N/A
ANT5									
	WLAN2.4GHz/802.11ax40	Front Side	9	16.58	17.00	1.102	0.026	0.032	N/A
	WLAN2.4GHz/802.11ax40	Back Side	9	16.58	17.00	1.102	0.074	0.091	N/A
	WLAN2.4GHz/802.11ax40	Left Side	9	16.58	17.00	1.102	0.057	0.070	N/A
ANT4+5									
	WLAN2.4GHz/802.11ax20	Front Side	11	20.27	21.00	1.183	0.108	0.143	N/A
58#	WLAN2.4GHz/802.11ax20	Back Side	11	20.27	21.00	1.183	0.187	0.247	N/A
	WLAN2.4GHz/802.11ax20	Left Side	11	20.27	21.00	1.183	0.167	0.221	N/A
	WLAN2.4GHz/802.11ax20	Top Side	11	20.27	21.00	1.183	0.102	0.135	N/A
ANT4									
	WLAN5.2GHz/802.11n20	Front Side	44	17.59	18.00	1.099	0.102	0.123	N/A
59#	WLAN5.2GHz/802.11n20	Back Side	44	17.59	18.00	1.099	0.359	0.431	N/A
	WLAN5.2GHz/802.11n20	Left Side	44	17.59	18.00	1.099	0.317	0.381	N/A
	WLAN5.2GHz/802.11n20	Top Side	44	17.59	18.00	1.099	0.170	0.204	N/A
ANT5									
	WLAN5.2GHz/802.11ax80	Front Side	42	18.82	19.50	1.169	0.082	0.107	N/A
	WLAN5.2GHz/802.11ax80	Back Side	42	18.82	19.50	1.169	0.147	0.191	N/A
	WLAN5.2GHz/802.11ax80	Left Side	42	18.82	19.50	1.169	0.075	0.097	N/A
ANT4+5									
	WLAN5.2GHz/802.11n40	Front Side	38	20.57	21.00	1.104	0.094	0.114	N/A
	WLAN5.2GHz/802.11n40	Back Side	38	20.57	21.00	1.104	0.315	0.383	N/A
	WLAN5.2GHz/802.11n40	Left Side	38	20.57	21.00	1.104	0.300	0.365	N/A
	WLAN5.2GHz/802.11n40	Top Side	38	20.57	21.00	1.104	0.205	0.249	N/A
ANT4									
	WLAN5.3GHz/802.11n20	Front Side	52	17.13	18.00	1.222	0.136	0.182	N/A
	WLAN5.3GHz/802.11n20	Back Side	52	17.13	18.00	1.222	0.300	0.402	N/A
ANT5									



	WLAN5.3GHz/802.11n40	Front Side	62	18.00	18.50	1.122	0.145	0.179	N/A
	WLAN5.3GHz/802.11n40	Back Side	62	18.00	18.50	1.122	0.171	0.211	N/A
ANT4+5									
	WLAN5.3GHz/802.11n40	Front Side	62	20.28	21.00	1.180	0.146	0.189	N/A
60#	WLAN5.3GHz/802.11n40	Back Side	62	20.28	21.00	1.180	0.318	0.411	N/A
ANT4									
	WLAN5.5GHz/802.11n40	Front Side	142	17.47	18.00	1.130	0.102	0.127	N/A
	WLAN5.5GHz/802.11n40	Back Side	142	17.47	18.00	1.130	0.370	0.462	N/A
ANT5									
	WLAN5.5GHz/802.11n40	Front Side	142	18.22	19.00	1.197	0.146	0.192	N/A
61#	WLAN5.5GHz/802.11n40	Back Side	142	18.22	19.00	1.197	0.528	0.695	N/A
ANT4+5									
	WLAN5.5GHz/802.11ac40	Front Side	142	19.44	20.00	1.138	0.205	0.258	N/A
	WLAN5.5GHz/802.11ac40	Back Side	142	19.44	20.00	1.138	0.500	0.630	N/A
ANT4									
	WLAN5.8GHz/802.11n20	Front Side	165	19.37	20.00	1.156	0.171	0.217	N/A
	WLAN5.8GHz/802.11n20	Back Side	165	19.37	20.00	1.156	0.413	0.524	N/A
	WLAN5.8GHz/802.11n20	Left Side	165	19.37	20.00	1.156	0.385	0.488	N/A
	WLAN5.8GHz/802.11n20	Top Side	165	19.37	20.00	1.156	0.194	0.246	N/A
ANT5									
	WLAN5.8GHz/802.11ac40	Front Side	151	18.84	19.50	1.164	0.119	0.152	N/A
	WLAN5.8GHz/802.11ac40	Back Side	151	18.84	19.50	1.164	0.403	0.516	N/A
	WLAN5.8GHz/802.11ac40	Left Side	151	18.84	19.50	1.164	0.212	0.271	N/A
ANT4+5									
	WLAN5.8GHz/802.11n40	Front Side	151	18.73	19.50	1.194	0.135	0.177	N/A
62#	WLAN5.8GHz/802.11n40	Back Side	151	18.73	19.50	1.194	0.472	0.620	N/A
	WLAN5.8GHz/802.11n40	Left Side	151	18.73	19.50	1.194	0.283	0.372	N/A
	WLAN5.8GHz/802.11n40	Top Side	151	18.73	19.50	1.194	0.138	0.181	N/A
ANT4									
	U-NII-5/802.11ax-HEW80	Front Side	7	12.73	13.50	1.194	0.062	0.081	0.425
	U-NII-5/802.11ax-HEW80	Back Side	7	12.73	13.50	1.194	0.080	0.105	0.519
	U-NII-5/802.11ax-HEW80	Left Side	7	12.73	13.50	1.194	0.066	0.087	0.436
	U-NII-5/802.11ax-HEW80	Top Side	7	12.73	13.50	1.194	0.071	0.093	0.461
ANT5									
	U-NII-5/802.11ax-HEW80	Front Side	7	11.38	12.00	1.153	0.102	0.129	0.822
63#	U-NII-5/802.11ax-HEW80	Back Side	7	11.38	12.00	1.153	0.125	0.158	0.957
	U-NII-5/802.11ax-HEW80	Left Side	7	11.38	12.00	1.153	0.065	0.082	0.420



ANT4+5									
	U-NII-5/802.11ax-HEW80	Front Side	7	15.00	15.50	1.122	0.059	0.073	0.350
	U-NII-5/802.11ax-HEW80	Back Side	7	15.00	15.50	1.122	0.109	0.135	0.730
	U-NII-5/802.11ax-HEW80	Left Side	7	15.00	15.50	1.122	0.045	0.056	0.229
	U-NII-5/802.11ax-HEW80	Top Side	7	15.00	15.50	1.122	0.078	0.096	0.563
ANT4									
	U-NII-6/802.11ax-HEW80	Front Side	103	13.01	13.50	1.119	0.114	0.140	0.516
	U-NII-6/802.11ax-HEW80	Back Side	103	13.01	13.50	1.119	0.047	0.058	0.290
	U-NII-6/802.11ax-HEW80	Left Side	103	13.01	13.50	1.119	0.052	0.064	0.341
	U-NII-6/802.11ax-HEW80	Top Side	103	13.01	13.50	1.119	0.102	0.126	0.482
ANT5									
	U-NII-6/802.11ax-HEW80	Front Side	103	9.76	10.50	1.186	0.045	0.059	0.241
64#	U-NII-6/802.11ax-HEW80	Back Side	103	9.76	10.50	1.186	0.209	0.272	1.570
	U-NII-6/802.11ax-HEW80	Left Side	103	9.76	10.50	1.186	0.161	0.209	1.380
ANT4+5									
	U-NII-6/802.11ax-HEW80	Front Side	103	12.81	13.50	1.172	0.086	0.111	0.451
	U-NII-6/802.11ax-HEW80	Back Side	103	12.81	13.50	1.172	0.197	0.254	1.550
	U-NII-6/802.11ax-HEW80	Left Side	103	12.81	13.50	1.172	0.143	0.184	1.200
	U-NII-6/802.11ax-HEW80	Top Side	103	12.81	13.50	1.172	0.083	0.107	0.370
ANT4									
	U-NII-7/802.11ax-HEW80	Front Side	167	12.90	13.50	1.148	0.076	0.096	0.346
	U-NII-7/802.11ax-HEW80	Back Side	167	12.90	13.50	1.148	0.078	0.099	0.439
	U-NII-7/802.11ax-HEW80	Left Side	167	12.90	13.50	1.148	0.051	0.064	0.520
	U-NII-7/802.11ax-HEW80	Top Side	167	12.90	13.50	1.148	0.063	0.080	0.487
ANT5									
	U-NII-7/802.11ax-HEW80	Front Side	167	11.46	12.00	1.132	0.065	0.081	0.416
65#	U-NII-7/802.11ax-HEW80	Back Side	167	11.46	12.00	1.132	0.081	0.101	0.631
	U-NII-7/802.11ax-HEW80	Left Side	167	11.46	12.00	1.132	0.071	0.088	0.490
ANT4+5									
	U-NII-7/802.11ax-HEW80	Front Side	167	14.55	15.00	1.109	0.074	0.090	0.582
	U-NII-7/802.11ax-HEW80	Back Side	167	14.55	15.00	1.109	0.076	0.093	0.609
	U-NII-7/802.11ax-HEW80	Left Side	167	14.55	15.00	1.109	0.064	0.078	0.342
	U-NII-7/802.11ax-HEW80	Top Side	167	14.55	15.00	1.109	0.055	0.067	0.329
ANT4									
	U-NII-8/802.11ax-HEW80	Front Side	199	12.07	12.50	1.104	0.090	0.109	0.758
	U-NII-8/802.11ax-HEW80	Back Side	199	12.07	12.50	1.104	0.086	0.104	0.696
	U-NII-8/802.11ax-HEW80	Left Side	199	12.07	12.50	1.104	0.052	0.063	0.366



	U-NII-8/802.11ax-HEW80	Top Side	199	12.07	12.50	1.104	0.083	0.101	0.281
ANT5									
	U-NII-8/802.11ax-HEW80	Front Side	199	11.71	12.50	1.199	0.063	0.083	0.455
66#	U-NII-8/802.11ax-HEW80	Back Side	199	11.71	12.50	1.199	0.095	0.125	0.753
	U-NII-8/802.11ax-HEW80	Left Side	199	11.71	12.50	1.199	0.062	0.082	0.471
ANT4+5									
	U-NII-8/802.11ax-HEW80	Front Side	215	14.76	15.50	1.186	0.085	0.111	0.713
	U-NII-8/802.11ax-HEW80	Back Side	215	14.76	15.50	1.186	0.068	0.089	0.628
	U-NII-8/802.11ax-HEW80	Left Side	215	14.76	15.50	1.186	0.053	0.069	0.414
	U-NII-8/802.11ax-HEW80	Top Side	215	14.76	15.50	1.186	0.050	0.065	0.457
ANT5									
	Bluetooth/DH5	Front Side	39	8.11	8.50	1.094	0.038	0.054	N/A
67#	Bluetooth/DH5	Back Side	39	8.11	8.50	1.094	0.120	0.171	N/A
	Bluetooth/DH5	Left Side	39	8.11	8.50	1.094	0.063	0.090	N/A

Note:

1. For TDD-LTE, the reported SAR should be scaled with the duty cycle scaling factor 1.006.
2. The WLAN 2.4GHz 802.11ax-HEW40 reported 1g SAR (W/kg) should be scaled with the duty cycle scaling factor 1.112(ANT4) & 1.111(ANT5), WLAN 2.4GHz 802.11ax-HEW20 with 1.117, WLAN 5.2GHz 802.11n-HT20 with 1.093, WLAN 5.2GHz 802.11ax-HEW80 with 1.111, WLAN 5.2GHz 802.11n-HT40 with 1.102, WLAN 5.3GHz 802.11n-HT20 with 1.097, WLAN 5.3GHz 802.11n-HT40 with 1.100(ANT4) & 1.096(ANT5), WLAN 5.5GHz 802.11n-HT40 with 1.106(ANT4) & 1.100(ANT5), WLAN 5.5GHz 802.11ac-VHT40 with 1.107, WLAN 5.8GHz 802.11n-HT20 with 1.097, WLAN 5.8GHz 802.11ac-VHT40 with 1.100, WLAN 5.8GHz 802.11n-HT40 with 1.100 and WLAN 6GHz 802.11 ax-HEW80 with 1.100(ANT4) & 1.097(ANT5).

18.4. Extremity SAR Assessment

➤ General Guidance

1. According to KDB 648474 D04v01r03 The UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna located at ≤ 25 mm from that surface or edge, in direct contact with a flat phantom, for 10-g extremity SAR according to the body-equivalent tissue dielectric parameters in KDB Publication 865664 D01 to address interactive hand use exposure conditions.
2. When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg.
3. According to the user manual, the EUT diagonal size is greater than 16cm, therefore the 0mm extremity SAR of WLAN 5GHz is required.



➤ Test Results

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR _{10g} (W/kg)	Reported SAR _{10g} (W/kg)	Meas. 4cm ² APD (W/m ²)
ANT4									
	WLAN5.3GHz/802.11n20	Front Side	52	17.13	18.00	1.222	0.166	0.222	N/A
68#	WLAN5.3GHz/802.11n20	Back Side	52	17.13	18.00	1.222	0.319	0.428	N/A
ANT5									
	WLAN5.3GHz/802.11n40	Front Side	62	18.00	18.50	1.122	0.091	0.112	N/A
	WLAN5.3GHz/802.11n40	Back Side	62	18.00	18.50	1.122	0.139	0.172	N/A
ANT4+5									
	WLAN5.3GHz/802.11n40	Front Side	62	20.28	21.00	1.180	0.291	0.376	N/A
	WLAN5.3GHz/802.11n40	Back Side	62	20.28	21.00	1.180	0.328	0.424	N/A
ANT4									
	WLAN5.5GHz/802.11n40	Front Side	142	17.47	18.00	1.130	0.321	0.401	N/A
	WLAN5.5GHz/802.11n40	Back Side	142	17.47	18.00	1.130	0.314	0.392	N/A
ANT5									
	WLAN5.5GHz/802.11n40	Front Side	142	18.22	19.00	1.197	0.102	0.134	N/A
	WLAN5.5GHz/802.11n40	Back Side	142	18.22	19.00	1.197	0.487	0.641	N/A
ANT4+5									
	WLAN5.5GHz/802.11ac40	Front Side	142	19.44	20.00	1.138	0.326	0.411	N/A
69#	WLAN5.5GHz/802.11ac40	Back Side	142	19.44	20.00	1.138	0.676	0.851	N/A

Note: The WLAN 5.3GHz 802.11n-HT20 reported 1g SAR (W/kg) should be scaled with the duty cycle scaling factor 1.097, WLAN 5.3GHz 802.11n-HT40 with 1.100(ANT4) &1.096(ANT5), WLAN 5.5GHz 802.11n-HT40 with 1.106(ANT4) &1.100(ANT5) and WLAN 5.5GHz 802.11ac-VHT40 with 1.107.

18.5. PD Test Results

➤ General Note

1. The reported PD is the measured Total PD value adjusted for maximum tune-up tolerance.
 - a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
 - b. For PD testing of WLAN signal with non-100% duty cycle, the measured PD is scaled-up by the duty cycle scaling factor which is equal to "1 / (duty cycle)".
 - c. For WLAN: Reported PD (W/m^2) = Measured Total PD (W/m^2) * Duty Cycle scaling factor * Tune-up scaling factor.
2. According to the equipment user manual that the most conservative test distance of 2mm was applied to PD measurement and the REC (field reconstruction) component of the uncertainty budget for a given E-field is valid only for $d \geq \lambda/5\text{mm}$.
3. According to TCBC workshop in April 2021 that in addition to tune-up tolerance scaling, adjust measured results per amount that measurement uncertainty exceeds 30% (e.g. per methods of IEC 62479:2010). Total expanded uncertainty of 1.51 dB which was converted to 85% was used to determining the psPD measurement scaling factor.
4. The duty cycle scaling factor of 1.000 should be calculated the final power density.
5. According to TCBC workshop in October 2018 that 4cm^2 averaging area may now be considered.
6. RF exposure compliance with PD is demonstrated for various radio configurations using below equation:

$$\text{Final PD} = \text{Mea. psPD}_{\text{tot}} * \text{tune-up factor} * \text{duty cycle factor} * \text{Uncertainty Factor}$$

$$\text{Where Uncertainty factor} = 1 + (| 1 - 10^{1.51/10} * 100\% | - 30\%)$$

7. The final psPD should be scaled to the uncertainty factor of 1.12.
8. The measurement procedure consists of measuring the PDinc at two different distances: $d=2\text{mm}$ (compliance distance) and $d = \lambda/5$. The same grid extents and grid steps should be used for both measurements. The grid extents should be large enough to fully capture the transmitted energy. The grid step should be fine enough to demonstrate that the integrated Power Density iPDn varies by less than 1 dB between the $d = 2\text{ mm}$ and $d = \lambda/5$ measurements. We recommend using as first approximation a grid step Lgrid that is a function of the distance to the transmitting structure and not larger than:

$$l_{\text{grid}} = \begin{cases} 1.25d & \text{for } d < \lambda/5 \\ \lambda/4 & \text{for } d \geq \lambda/5 \end{cases}$$

9. According to the TCB WS publication in Oct. 2024, identify the boundary area where the protrusion begins with an added 5 mm margin, therefore 5 mm distance between the antenna and probe tip should be used to scan the power density.



➤ PD Test Results

Band/Mode	Exposure Position	Gap (mm)	Ant.	Ch.	Grip Step (λ)	iPDn (W/m^2)	iPDn Ratio (<1dB)	Total psPDtot+ (W/m^2)
U-NII-5/802.11ax80	Back Side	2	ANT 4+5	7	0.0625	0.11	0.872	2.118
U-NII-5/802.11ax80	Back Side	10	ANT 4+5	7	0.0625	0.09		1.967

Plot No.	Band/Mode	Exposure Position	Ch.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	psPDtot+ over 4cm² (W/m²)	
							Mea.	Scaled
ANT 4								
	U-NII-5/802.11ax-HEW80	Front Side	7	12.73	13.50	1.194	0.369	0.543
	U-NII-5/802.11ax-HEW80	Back Side	7	12.73	13.50	1.194	0.809	1.190
	U-NII-5/802.11ax-HEW80	Left Side	7	12.73	13.50	1.194	1.420	2.089
	U-NII-5/802.11ax-HEW80	Right Side	7	12.73	13.50	1.194	0.231	0.340
	U-NII-5/802.11ax-HEW80	Top Side	7	12.73	13.50	1.194	0.512	0.753
	U-NII-5/802.11ax-HEW80	Bottom Side	7	12.73	13.50	1.194	0.131	0.193
	U-NII-5/802.11ax-HEW80	Left Side	55	12.22	13.00	1.197	1.100	1.622
	U-NII-5/802.11ax-HEW80	Left Side	87	12.11	12.50	1.094	1.120	1.509
ANT 5								
	U-NII-5/802.11ax-HEW80	Front Side	7	11.38	12.00	1.153	0.455	0.645
	U-NII-5/802.11ax-HEW80	Back Side	7	11.38	12.00	1.153	1.420	2.012
	U-NII-5/802.11ax-HEW80	Left Side	7	11.38	12.00	1.153	0.775	1.098
	U-NII-5/802.11ax-HEW80	Right Side	7	11.38	12.00	1.153	0.038	0.054
	U-NII-5/802.11ax-HEW80	Top Side	7	11.38	12.00	1.153	0.430	0.609
	U-NII-5/802.11ax-HEW80	Bottom Side	7	11.38	12.00	1.153	0.044	0.062
ANT 4+5								
	U-NII-5/802.11ax-HEW80	Front Side	7	15.00	15.50	1.122	0.271	0.375
70#	U-NII-5/802.11ax-HEW80	Back Side	7	15.00	15.50	1.122	1.532	2.118
	U-NII-5/802.11ax-HEW80	Left Side	7	15.00	15.50	1.122	1.400	1.935
	U-NII-5/802.11ax-HEW80	Right Side	7	15.00	15.50	1.122	0.015	0.021
	U-NII-5/802.11ax-HEW80	Top Side	7	15.00	15.50	1.122	0.185	0.256
	U-NII-5/802.11ax-HEW80	Bottom Side	7	15.00	15.50	1.122	0.022	0.030
ANT 4								
	U-NII-6/802.11ax-HEW80	Front Side	103	13.01	13.50	1.119	0.552	0.761
	U-NII-6/802.11ax-HEW80	Back Side	103	13.01	13.50	1.119	0.882	1.216
	U-NII-6/802.11ax-HEW80	Left Side	103	13.01	13.50	1.119	1.240	1.710



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	U-NII-6/802.11ax-HEW80	Right Side	103	13.01	13.50	1.119	0.260	0.359
	U-NII-6/802.11ax-HEW80	Top Side	103	13.01	13.50	1.119	0.410	0.565
	U-NII-6/802.11ax-HEW80	Bottom Side	103	13.01	13.50	1.119	0.015	0.021
ANT 5								
	U-NII-6/802.11ax-HEW80	Front Side	103	9.76	10.50	1.186	0.129	0.188
	U-NII-6/802.11ax-HEW80	Back Side	103	9.76	10.50	1.186	2.044	2.978
	U-NII-6/802.11ax-HEW80	Left Side	103	9.76	10.50	1.186	0.966	1.407
	U-NII-6/802.11ax-HEW80	Right Side	103	9.76	10.50	1.186	0.239	0.348
	U-NII-6/802.11ax-HEW80	Top Side	103	9.76	10.50	1.186	0.167	0.244
	U-NII-6/802.11ax-HEW80	Bottom Side	103	9.76	10.50	1.186	0.050	0.072
ANT 4+5								
	U-NII-6/802.11ax-HEW80	Front Side	103	12.81	13.50	1.172	0.440	0.635
71#	U-NII-6/802.11ax-HEW80	Back Side	103	12.81	13.50	1.172	2.250	3.249
	U-NII-6/802.11ax-HEW80	Left Side	103	12.81	13.50	1.172	1.092	1.577
	U-NII-6/802.11ax-HEW80	Right Side	103	12.81	13.50	1.172	0.119	0.172
	U-NII-6/802.11ax-HEW80	Top Side	103	12.81	13.50	1.172	0.134	0.194
	U-NII-6/802.11ax-HEW80	Bottom Side	103	12.81	13.50	1.172	0.025	0.035
ANT 4								
	U-NII-7/802.11ax-HEW80	Front Side	167	12.9	13.50	1.148	0.030	0.042
	U-NII-7/802.11ax-HEW80	Back Side	167	12.9	13.50	1.148	0.269	0.381
	U-NII-7/802.11ax-HEW80	Left Side	167	12.9	13.50	1.148	0.263	0.372
	U-NII-7/802.11ax-HEW80	Right Side	167	12.9	13.50	1.148	0.020	0.028
	U-NII-7/802.11ax-HEW80	Top Side	167	12.9	13.50	1.148	0.033	0.047
	U-NII-7/802.11ax-HEW80	Bottom Side	167	12.9	13.50	1.148	0.011	0.016
ANT 5								
	U-NII-7/802.11ax-HEW80	Front Side	167	11.46	12.00	1.132	0.074	0.103
72#	U-NII-7/802.11ax-HEW80	Back Side	167	11.46	12.00	1.132	2.060	2.866
	U-NII-7/802.11ax-HEW80	Left Side	167	11.46	12.00	1.132	0.597	0.831
	U-NII-7/802.11ax-HEW80	Right Side	167	11.46	12.00	1.132	0.035	0.049
	U-NII-7/802.11ax-HEW80	Top Side	167	11.46	12.00	1.132	0.146	0.203
	U-NII-7/802.11ax-HEW80	Bottom Side	167	11.46	12.00	1.132	0.017	0.024
ANT 4+5								
	U-NII-7/802.11ax-HEW80	Front Side	167	14.55	15.00	1.109	0.058	0.079
	U-NII-7/802.11ax-HEW80	Back Side	167	14.55	15.00	1.109	0.404	0.552
	U-NII-7/802.11ax-HEW80	Left Side	167	14.55	15.00	1.109	0.374	0.511
	U-NII-7/802.11ax-HEW80	Right Side	167	14.55	15.00	1.109	0.018	0.025
	U-NII-7/802.11ax-HEW80	Top Side	167	14.55	15.00	1.109	0.177	0.242



	U-NII-7/802.11ax-HEW80	Bottom Side	167	14.55	15.00	1.109	0.009	0.012
ANT 4								
	U-NII-8/802.11ax-HEW80	Front Side	199	12.07	12.50	1.104	0.048	0.065
	U-NII-8/802.11ax-HEW80	Back Side	199	12.07	12.50	1.104	0.602	0.819
	U-NII-8/802.11ax-HEW80	Left Side	199	12.07	12.50	1.104	0.679	0.924
	U-NII-8/802.11ax-HEW80	Right Side	199	12.07	12.50	1.104	0.014	0.019
	U-NII-8/802.11ax-HEW80	Top Side	199	12.07	12.50	1.104	0.021	0.029
	U-NII-8/802.11ax-HEW80	Bottom Side	199	12.07	12.50	1.104	0.009	0.012
ANT 5								
	U-NII-8/802.11ax-HEW80	Front Side	199	11.71	12.50	1.199	0.130	0.192
	U-NII-8/802.11ax-HEW80	Back Side	199	11.71	12.50	1.199	1.440	2.122
	U-NII-8/802.11ax-HEW80	Left Side	199	11.71	12.50	1.199	1.030	1.518
	U-NII-8/802.11ax-HEW80	Right Side	199	11.71	12.50	1.199	0.044	0.065
	U-NII-8/802.11ax-HEW80	Top Side	199	11.71	12.50	1.199	0.136	0.200
	U-NII-8/802.11ax-HEW80	Bottom Side	199	11.71	12.50	1.199	0.011	0.016
ANT 4+5								
	U-NII-8/802.11ax-HEW80	Front Side	215	14.76	15.50	1.186	0.261	0.381
73#	U-NII-8/802.11ax-HEW80	Back Side	215	14.76	15.50	1.186	1.610	2.352
	U-NII-8/802.11ax-HEW80	Left Side	215	14.76	15.50	1.186	0.848	1.239
	U-NII-8/802.11ax-HEW80	Right Side	215	14.76	15.50	1.186	0.018	0.026
	U-NII-8/802.11ax-HEW80	Top Side	215	14.76	15.50	1.186	0.177	0.259
	U-NII-8/802.11ax-HEW80	Bottom Side	215	14.76	15.50	1.186	0.009	0.013

Note: The WLAN 6GHz 802.11ax-HEW80 reported 1g SAR (W/kg) should be scaled with the duty cycle scaling factor 1.100(ANT4) &1.097(ANT5).



19. Simultaneous Transmission Evaluation

19.1. Simultaneous Transmission Consideration

No.	Simultaneous Transmission Consideration	Head	Body-Worn	Hotspot	Extremity
1	WWAN+WLAN 2.4GHz/5GHz/6GHz	Yes	Yes	Yes	No
2	WWAN+Bluetooth	Yes	Yes	Yes	No
3	WWAN+WLAN 2.4GHz(MIMO)+Bluetooth	Yes	Yes	Yes	No
4	WWAN+WLAN 5GHz(MIMO)+Bluetooth	Yes	Yes	Yes	No
5	WWAN+WLAN 6GHz(MIMO)+Bluetooth	Yes	Yes	Yes	No

Note:

1. When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of the WLAN transmitters. The "Portable Hotspot" feature on the handset was NOT activated, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal.
2. The hotspot SAR result may overlap with the body-worn accessory SAR requirements, per KDB 941225 D06, the more conservative configurations can be considered, thus excluding some unnecessary body-worn accessory SAR tests.
3. Per KDB 447498D01v06, simultaneous transmission SAR evaluation procedures is as followed:
Step 1: If sum of 1 g SAR < 1.6 W/kg, Simultaneous SAR measurement is not required.
Step 2: If sum of 1 g SAR > 1.6 W/kg, ratio of SAR to peak separation distance for pair of transmitters calculated.
Step 3: If the ratio of SAR to peak separation distance is ≤ 0.04 , Simultaneous SAR measurement is not required.
Step 4: If the ratio of SAR to peak separation distance is > 0.04 , Simultaneous SAR measurement is required and simultaneous transmission SAR value is calculated.
(The ratio is determined by: $(SAR_1 + SAR_2) ^{1.5} / R_i \leq 0.04$,
 R_i is the separation distance between the peak SAR locations for the antenna pair in mm.

19.2. 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

$$TER^{uncorr}(r) = \sum_{i=1}^I ER_i = \sum_{i=1}^I \frac{S_{av,i}(r, f_i)}{S_{lim}(f_i)}$$

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

$$TER^{uncorr}(r) = \sum_{i=1}^I ER_i = \sum_{i=1}^I \frac{S_{av,i}(r, f_i)}{S_{lim}(f_i)}$$

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 1. Therefore the simultaneous transmission should be follows:

$$TER = \sum_{n=1}^N \frac{SAR_n}{SAR_{n,limit}} + \sum_{n=1}^N \frac{S_{m,avg}}{S_{m,limit}} < 1$$

For transmitters operating above 6000 MHz, it is necessary to perform an assessment against the PD (basic restriction up to 10 GHz and reference levels beyond). The exposure ratio for the m -th transmitter is given by:

$$\max \left[\frac{SAR_m}{SAR_{limit}}, \frac{APD_m}{APD_{limit}} \right] \quad 5925 \text{ MHz} < f_m \leq 10 \text{ GHz}$$

Where:



- SAR_m is the SAR value for the n -th transmitter/test frequency.
- SAR_{limit} is the basic restriction limit that is applicable to the n -th transmitter/test frequency.
- APD_m is the APD value for the m -th transmitter/test frequency.
- APD_{limit} is the basic restriction limit that is applicable for the m -th transmitter/test frequency.

19.3. Simultaneous Transmission Analysis

Remark:

1. The SAR/PD simultaneous transmission data was recorded in annex F.
2. The above numerical summed SAR results for all the case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required.

20. Uncertainty Assessment

The component of uncertainty may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainty by the statistical analysis of a series of observations is termed a Type A evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A Type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience, and knowledge of the behavior and properties of relevant materials and instruments, manufacture's specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in below Table.

Uncertainty Distributions	Normal	Rectangular	Triangular	U-Shape
Multi-plying Factor	$1/k(b)$	$1/\sqrt{3}$	$1/\sqrt{6}$	$1/\sqrt{2}$

Standard Uncertainty for Assumed Distribution

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is shown in the following tables.



DASY6/8 Uncertainty Budget (Frequency Range: 300MHz ~ 3GHz)								
Symbol	Error Description	Uncert. Value (±%)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
Measurement System Errors								
CF	Probe calibration	12.0	N	2	1	1	6.0	6.0
CF _{drift}	Probe calibration Drift	1.7	R	$\sqrt{3}$	1	1	1.0	1.0
LIN	Probe Linearity	4.7	R	$\sqrt{3}$	1	1	2.7	2.7
BBS	Broadband Signal	3.0	R	$\sqrt{3}$	1	1	1.7	1.7
ISO	Probe Isotropy	7.6	R	$\sqrt{3}$	1	1	4.4	4.4
DAE	Other Probe+Electronic	0.7	N	1	1	1	0.7	0.7
AMB	RF Ambient	1.8	N	1	1	1	1.8	1.8
▲ _{sys}	Probe positioning	0.006mm	N	1	0.14	0.14	0.1	0.1
DAT	Data Processing	1.2	N	1	1	1	1.2	1.2
Phantom and Device Errors								
LIQ(σ)	Conductivity (meas.) DAK	2.5	N	1	0.78	0.71	2.0	1.8
LIQ(T _σ)	Conductivity (temp.) ^{BB}	3.3	R	$\sqrt{3}$	0.78	0.71	1.5	1.4
EPS	Phantom Permittivity	14.0	R	$\sqrt{3}$	0	0	0	0
DIS	Distance DUT - TSL	2.0	N	1	2	2	4.0	4.0
D _{xyz}	Device Positioning	1.0	N	1	1	1	1.0	1.0
H	Device Holder	3.6	N	1	1	1	3.6	3.6
MOD	DUT Modulation ^m	2.4	R	$\sqrt{3}$	1	1	1.4	1.4
TAS	Time-average SAR	1.7	R	$\sqrt{3}$	1	1	1.0	1.0
RF _{drift}	DUT Drift	2.5	N	1	1	1	2.5	2.5
VAL	Val Antenna Unc. ^{val}	0.0	N	1	1	1	0.0	0.0
RF _{in}	Unc. Input Power ^{val}	0.0	N	1	1	1	0.0	0.0
Correction to the SAR Results								
C(ε,σ)	Deviation to Target	1.9	N	1	1	0.84	1.9	1.6
C(R)	SAR Scaling ^p	0.0	R	$\sqrt{3}$	1	1	0.0	0.0
u(▲SAR)	Combined Standard Uncertainty						10.9	10.9
U	Expanded Standard Uncertainty						21.9	21.8



DASY6/8 Uncertainty Budget (Frequency Range: 3GHz ~ 6GHz)								
Symbol	Error Description	Uncert. Value (±%)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
Measurement System Errors								
CF	Probe calibration	13.1	N	2	1	1	6.55	6.55
CF _{drift}	Probe calibration Drift	1.7	R	$\sqrt{3}$	1	1	1.0	1.0
LIN	Probe Linearity	4.7	R	$\sqrt{3}$	1	1	2.7	2.7
BBS	Broadband Signal	2.6	R	$\sqrt{3}$	1	1	1.5	1.5
ISO	Probe Isotropy	7.6	R	$\sqrt{3}$	1	1	4.4	4.4
DAE	Other Probe+Electronic	1.2	N	1	1	1	1.2	1.2
AMB	RF Ambient	1.8	N	1	1	1	1.8	1.8
▲ _{sys}	Probe positioning	0.005mm	N	1	0.29	0.29	0.15	0.15
DAT	Data Processing	2.3	N	1	1	1	2.3	2.3
Phantom and Device Errors								
LIQ(σ)	Conductivity (meas.) DAK	2.5	N	1	0.78	0.71	2.0	1.8
LIQ(T _σ)	Conductivity (temp.) ^{BB}	3.4	R	$\sqrt{3}$	0.78	0.71	1.5	1.4
EPS	Phantom Permittivity	14.0	R	$\sqrt{3}$	0.25	0.25	2.0	2.0
DIS	Distance DUT - TSL	2.0	N	1	2	2	4.0	4.0
D _{xyz}	Device Positioning	1.0	N	1	1	1	1.0	1.0
H	Device Holder	3.6	N	1	1	1	3.6	3.6
MOD	DUT Modulation ^m	2.4	R	$\sqrt{3}$	1	1	1.4	1.4
TAS	Time-average SAR	1.7	R	$\sqrt{3}$	1	1	1.0	1.0
RF _{drift}	DUT Drift	2.5	N	1	1	1	2.5	2.5
VAL	Val Antenna Unc. ^{val}	0.0	N	1	1	1	0.0	0.0
RF _{in}	Unc. Input Power ^{val}	0.0	N	1	1	1	0.0	0.0
Correction to the SAR Results								
C(ε,σ)	Deviation to Target	1.9	N	1	1	0.84	1.9	1.6
C(R)	SAR Scaling ^p	0.0	R	$\sqrt{3}$	1	1	0.0	0.0
u(▲SAR)	Combined Standard Uncertainty						11.6	11.5
U	Expanded Standard Uncertainty						23.3	23.0



DASY Uncertainty Budget According to IEC/IEEE 62209-1528:2020 (4 MHz - 10 GHz range)							
Error Description	Uncertainty Value (±%)	Probability	Divisor	(Ci) 1g	(Ci) 10g	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
Measurement System errors							
Probe Calibration	18.6	N	2	1	1	9.3	9.3
Probe calibration drift	1.7	R	1.732	1	1	1.0	1.0
Probe linearity and detection limit	4.7	R	1.732	1	1	2.7	2.7
Broadband signal	2.8	R	1.732	1	1	1.6	1.6
Probe isotropy	7.6	R	1.732	1	1	4.4	4.4
Other probe and data acquisition errors	2.4	N	1	1	1	2.4	2.4
RF ambient and noise	1.8	N	1	1	1	1.8	1.8
Probe positioning errors	0.006	N	1	0.5	0.5	0.0	0.0
Data processing errors	4	N	1	1	1	4.0	4.0
Phantom and device errors							
Measurement of phantom conductivity(σ)	2.5	N	1	0.78	0.71	2.0	1.8
Temperature effects (medium)	5.4	R	1.732	0.78	0.71	2.4	2.2
Shell permittivity	14	R	1.732	0.5	0.5	4.0	4.0
Distance between the radiating element of the DUT and the phantom medium	2	N	1	2	2	4.0	4.0
Repeatability of positioning the DUT or source against the phantom	1	N	1	1	1	1.0	1.0
Device holder effects	3.6	N	1	1	1	3.6	3.6
Effect of operating mode on probe sensitivity	2.4	R	1.732	1	1	1.4	1.4
Time-average SAR	1.7	R	1.732	1	1	1.0	1.0
Variation in SAR due to drift in output of DUT	2.5	N	1	1	1	2.5	2.5
Validation antenna uncertainty (validation measurement)	0	N	1	1	1	0.0	0.0
Uncertainty in accepted power (validation measurement only)	0	N	1	1	1	0.0	0.0
Phantom and Setup							



Phantom deviation from target (ϵ', σ)	1.9	N	1	1	0.84	1.9	1.6
SAR scaling	0	R	1.732	1	1	0.0	0.0
Combined Std. Uncertainty						14.5%	14.4%
Coverage Factor for 95 %						K=2	K=2
Expanded STD Uncertainty						29.0%	28.8%

DASY6/8 Uncertainty Budget for psSAR / psAPD Assessment								
(Frequency Range: 6GHz ~ 10GHz)								
Symbol	Error Description	Uncert. Value ($\pm\%$)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	Standard Uncertainty (1g) ($\pm\%$)	Standard Uncertainty (10g) ($\pm\%$)
psSAR	Module SAR V16.0 (Table 6.3.3)	14.2/13.9	N	1	1	1	14.2	13.9
PDC	Power Density Conversion	13.5	R	$\sqrt{3}$	1	1	7.8	7.8
u(Δ SAR)	Combined Standard Uncertainty						16.2	15.9
U	Expanded Standard Uncertainty in dB						32.4 $\pm 1.2\text{dB}$	31.9 $\pm 1.2\text{dB}$

Error Description	Uncertainty ($\pm\text{dB}$)	Probability Distribution	Divisor	ci	Standard Uncertainty ($\pm\text{dB}$)	ν_i or ν_{eff}
Uncertainty terms dependent on the measurement system						
Probe calibration	0.49	N	1	1	0.49	∞
Probe correction	0	R	1.732	1	0	∞
Frequency response	0.20	R	1.732	1	0.12	∞
Sensor cross coupling	0	R	1.732	1	0	∞
Isotropy	0.50	R	1.732	1	0.29	∞
Linearity	0.20	R	1.732	1	0.12	∞
Probe scattering	0	R	1.732	1	0	∞
Probe positioning offset	0.30	R	1.732	1	0.17	∞
Probe positioning repeatability	0.04	R	1.732	1	0.02	∞
Sensor mechanical offset	0	R	1.732	1	0	∞
Probe spatial resolution	0	R	1.732	1	0	∞
Field impedance dependance	0	R	1.732	1	0	∞
Amplitude and phase drift	0	R	1.732	1	0	∞
Amplitude and phase noise	0.04	R	1.732	1	0.02	∞
Measurement area truncation	0	R	1.732	1	0	∞
Data acquisition	0.03	R	1.732	1	0.03	∞
Sampling	0	R	1.732	1	0	∞
Field reconstruction	2.0	R	1.732	1	1.15	∞
Forward transformation	0	R	1.732	1	0	∞



Power density scaling	-	R	1.732	1	-	∞
Spatial averaging	0.10	R	1.732	1	0.06	∞
System Detection Limits	0.04	R	1.732	1	0.02	∞
Uncertainty terms dependent on the DUT and environmental factors						
Probe coupling with DUT	0	R	1.732	1	0	∞
Modulation response	0.40	R	1.732	1	0.23	∞
Integration time	0	R	1.732	1	0	∞
Response time	0	R	1.732	1	0	∞
Device holder influence	0.10	R	1.732	1	0.06	∞
DUT alignment	0	R	1.732	1	0	∞
RF ambient	0.04	R	1.732	1	0.02	∞
Ambient reflections	0.04	R	1.732	1	0.02	∞
Immunity / secondary reception	0	R	1.732	1	0	∞
Drift of the DUT	-	R	1.732	1	-	∞
Combined standard uncertainty					0.75 dB	∞
Coverage Factor for 95%					K=2	N/A
Expanded standard uncertainty					1.51 dB	

PD Uncertainty Budget for Frequency Range 6 – 10GHz



Annex A General Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Laboratory Address:	FL.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,F,G) will be submitted separately.

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