FCC SAR Compliance Test Report

For

TECNO MOBILE LIMITED

FLAT N 16/F BLOCK B UNIVERSAL INDUSTRIAL CENTRE 19-25 SHAN MEI STREET

FOTAN NT HONGKONG

Model:T15RA

Test Engineer:	Xu Yihan
Report Number:	WSCT-ANAB-R&E240800043A-SAR
Report Date:	13 January 2025
FCC ID:	2ADYY-T15RA-1
Check By:	Wei Liangmei
Approved By:	Li Huaibi
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Modified History

REV.	Modification Description	Issued Date	Remark
REV.1.0	Initial Test Report Relesse	13 January 2025	Li Huaibi

1 General information

1.1 Notes

The test results of this test report relate exclusively to the test item specified in this test report. QTC Certification & Testing Co., Ltd. does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report is not to be reproduced or published in full without the prior written permission.

1.2 Application details

Date of receipt of test item: 2024-09-20
Start of test: 2024-09-23
End of test: 2025-01-10

1.3 Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for T15RA is as below:

Band	Position	MAX Reported SAR_{1g}(W/kg)	Limit (W/kg)
2.4G WIFI	Body-Worn 0mm	1.036	1.6
5.2G WIFI	Body-Worn 0mm	0.638	
5.4G WIFI	Body-Worn 0mm	1.052	
5.6G WIFI	Body-Worn 0mm	1.273	
5.8G WIFI	Body-Worn 0mm	1.229	
WIFI6E	Body-Worn 0mm	0.109	
BT	Body-Worn 0mm	0.098	
Max.Simultaneous Transmission SAR(W/kg)			
Items	Body SAR (Gap 0mm)		1.6
Sum SAR	1.371		

The device is in compliance with Specific Absorption Rate（SAR）for general population/uncontraolled exposure limits of 1.6W/Kg as averaged over any 1g tissue according to the FCC rule§2.1093,the ANSI/IEEEC95.1:2005,the NCRP Report Number 86 forun controlled environment,according to the Industry Canada Radio Standards Specification RSS-102 for General Population/ Uncontrolled exposure, and had been tested in accord ance with the measurement methods and proceduresspecified in IEEE Std1528-2013.

1.4 EUT Information

Device Information：			
Product Type:	Laptop Computer		
Model:	T15RA		
Brand Name:	TECNO		
Device Type:	Portable device		
Exposure Category:	uncontrolled environment / general population		
Production Unit or Identical Prototype：	Production Unit		
Antenna Type :	BT:Integral Antenna 2.4G,5GWIFI: Integral Antenna WIFI6E: Integral Antenna		
Antenna Gain:	BT: 1.78dBi 2.4GWIFI: MAIN ANT: 1.78dBi /AUX ANT: 1.88 dBi 5GWIFI: MAIN ANT: 2.86dBi /AUX ANT: 2.24 dBi WIFI6E: MAIN ANT: 2.92dBi /AUX ANT: 2.40 dBi		
Device Operating Configurations:			
Supporting Mode(s) :	Wi-Fi , BT		
Modulation:	DSSS, OFDM/OFDMA GFSK/π/4-DQPSK/ 8-DPSK, GFSK		
Device Class :	Class B, No DTM Mode		
Operating Frequency Range(s):	Band	TX(MHz)	RX(MHz)
	Wi-Fi	2412~2462	
	Wi-Fi (5G)	Band 1: 5180-5240 MHz Band 2: 5260-5320 MHz Band 3: 5500-5700 MHz Band 4: 5745-5825 MHz	
	Wi-Fi6E	U-NII-5: 5925-6425MHz U-NII-6: 6425-6525MHz U-NII-7: 6525-6875MHz U-NII-8: 6875-7125MHz	
	BT	2402~2480	2402~2480
Power Source:	Rechargeable Li-ion Polymer Battery: 156 Rated Voltage: 11.55V Rated Capacity: 6060mAh/70Wh Typical Capacity: 6160mAh/71.14Wh Limited Charge Voltage: 13.2V		

Note:

1.The test results of this test report relate exclusively to the test item specified in this test report. World Standardization Certification & Testing Group (Shenzhen) Co.,Ltd does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report is not to be reproduced or published in full without the prior written permission.

2. Per KDB 616217 D04 SAR for laptop and tablets, The standalone and simultaneous transmission SAR tests required for tablets are more conservative than the hotspot mode use configurations;therefore, additional testing for hotspot SAR is not required.

2 Testing laboratory

Test Site	World Standardization Certification & Testing Group (Shenzhen) Co., Ltd.
Test Location	Building A-B,Baoli'an Industrial Park,No.58 and 60,Tangtou Avenue, Shiyan Street, Bao'an District, Shenzhen City, Guangdong Province, China
Telephone	+86-755-26996192
Fax	+86-755-86376605

3 ACCREDITATIONS

ANAB - Certificate Number: AT-3951

The EMC Laboratory has been accredited by the American Association for Laboratory Accreditation (ANAB).Certification Number: AT-3951

4 Test Environment

	Required	Actual
Ambient temperature:	18 – 25 °C	22 ± 2 °C
Tissue Simulating liquid:	22 ± 2 °C	22 ± 2 °C
Relative humidity content:	30 – 70 %	30 – 70 %

5 Applicant and Manufacturer

Applicant/Client Name:	TECNO MOBILE LIMITED
Applicant Address:	FLAT N 16/F BLOCK B UNIVERSAL INDUSTRIAL CENTRE 19-25 SHAN MEI STREET FOTAN NT HONGKONG
Manufacturer Name:	TECNO MOBILE LIMITED
Manufacturer Address:	FLAT N 16/F BLOCK B UNIVERSAL INDUSTRIAL CENTRE 19-25 SHAN MEI STREET FOTAN NT HONGKONG

6 Test standard/s:

IEC/IEEE 62209-1528	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate(SAR) in the Human Head from Wireless Communications Devices:Measurement Techniques
RSS-102	Radio Frequency Exposure Compliance of Radio communication Apparatus (All Frequency Bands(Issue 5 March 2015)
KDB447498 D01	General RF Exposure Guidance v06
KDB616217 D04	SAR for laptop and tabletsv01r03
KDB248227D01	SARmeas for 802.11a/b/g v02r02
KDB865664D01	SAR Measurement 100 MHz to 6 GHz v01r04
KDB865664D02	RF Exposure Reporting v01r02

6.1 RF exposure limits

HumanExposure	UncontrolledEnvironment GeneralPopulation	ControlledEnvironment Occupational
SpatialPeakSAR* (Brain/Body/Arms/Legs)	**1.60mW/g**	8.00mW/g
SpatialAverageSAR** (WholeBody)	0.08mW/g	0.40mW/g
SpatialPeakSAR*** (Heads/Feet/Ankle/Wrist)	4.00mW/g	20.00mW/g

The limit applied in this test report is shown in bold letters

Notes:

* TheSpatial PeakvalueoftheSAR averagedover any1gram oftissue(definedasatissue volumeintheshapeofacube) andovertheappropriateaveragingtime.

** TheSpatial AveragevalueoftheSARaveragedoverthewholebody.

*** TheSpatial PeakvalueoftheSAR averagedover any10gramsoftissue(definedasatissue volumeintheshapeofacube) andovertheappropriateaveragingtime.

UncontrolledEnvironmentsaredefinedaslocationswherethereistheexposureofindividuals whohavenoknowledgeor control oftheir exposure.

ControlledEnvironmentsaredefinedaslocationswherethereisexposurethatmaybeincurred bypersonswhoareawareofthepotential for exposure,(i.e.asaresultofemploymentor occupation.

6.2 SAR Definition

Specific Absorption Rate is defined as 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).

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

SAR is expressed in units of watts per kilogram (W/kg). SAR can be related to the electric field at a point by

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

where:

σ = conductivity of the tissue (S/m)

ρ = mass density of the tissue (kg/m^3)

E = rms electric field strength (V/m)

7 SAR Measurement System

7.1 The Measurement System

Comosar is a system that is able to determine the SAR distribution inside aphantom of human being according to different standards.The Comosar system consists of the following items:

-Main computer to control all the system
-6 axis robot
- Data acquisition system
-Miniature E-field probe
-Device holder
- Head simulating tissue

The following figure shows the system.

TheEUT under test operating at the maximum power leve lisplace din the phone holder,under the phantom,which is filled with head simulating liquid. The E-Field probe measures the electric field inside the phantom. The OpenSAR software computes the results to giveaSAR value in a 1g or 10g mass.

7.2 Robot

The COMOSAR system uses the high precision robots KR 6 R900 sixx type out of the newer series from Satimo SA (France).Forthe 6-axis controller COMOSAR system, the KUKA robot controller version from Satimo is used.The KR 6 R900 sixx robot series have many features that are important for
our application:

- High precision (repeatability 0.02 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)
- 6-axis controller

7.3 Probe

For themeasurementsthe Specific DosimetricE-FieldProbeSSE 5withfollowing specificationsisused

Figure 1 – MVG COMOSAR Dosimetric E field Dipole

- Dynamicrange:0.01-100W/kg

Probe Length	330 mm
Lengthof Individual Dipoles	4.5 mm
Maximum externaldiameter	8 mm
ProbeTip ExternalDiameter	5 mm
Distance betweendipoles/ probeextremity	2.7 mm

-Calibration range: 300MHzto 3GHzfor head&body simulating liquid.

Anglebetween probeaxis(evaluation axis) andsuface normal line:less than30°

Figure 2 – MVG COMOSAR Dosimetric E field Dipole

Dynamicrange:0.01-100W/kg

Probe Length	330 mm
Lengthof Individual Dipoles	2 mm
Maximum externaldiameter	8 mm
ProbeTip ExternalDiameter	2.5 mm
Distance betweendipoles/ probeextremity	1 mm

-Calibration range: 0.15GHz to 7.5GHz for head & body simulating liquid.

Angle between probe axis(evaluation axis) and suface normal line:less than30°

7.4 Measurement procedure

The following steps are used for each test position

- 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.
- Measurement of the local E-field value at a fixed location.This value serves as a reference value for calculating a possible power drift.
- Measurement of the SAR distribution with a grid of 8 to 16 mm * 8 to 16 mm and a constant distance to the inner surface of the phantom.Since the sensors can not directly measure at the inner phantom surface,the values between the sensors and the inner phantom surface are extrapolated.With these values the area of the maximum SAR is calculated by an interpolation scheme.
- Around this point,a cube of 30 * 30 * 30 mm or 32 * 32 * 32 mm is assessed by measuring 5 or 8 * 5 or 8 * 4 or 5 mm.With these data,the peak spatial-average SAR value can be calculated.

7.5 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 minimise 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 afourth-order least-square polynomial fit of measured data.The local SAR value is then extrapolated from the liquid surface with a 1 mm 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 average over 10 grams and 1gram requires a very fine resolution in the three dimensional scanned data array.

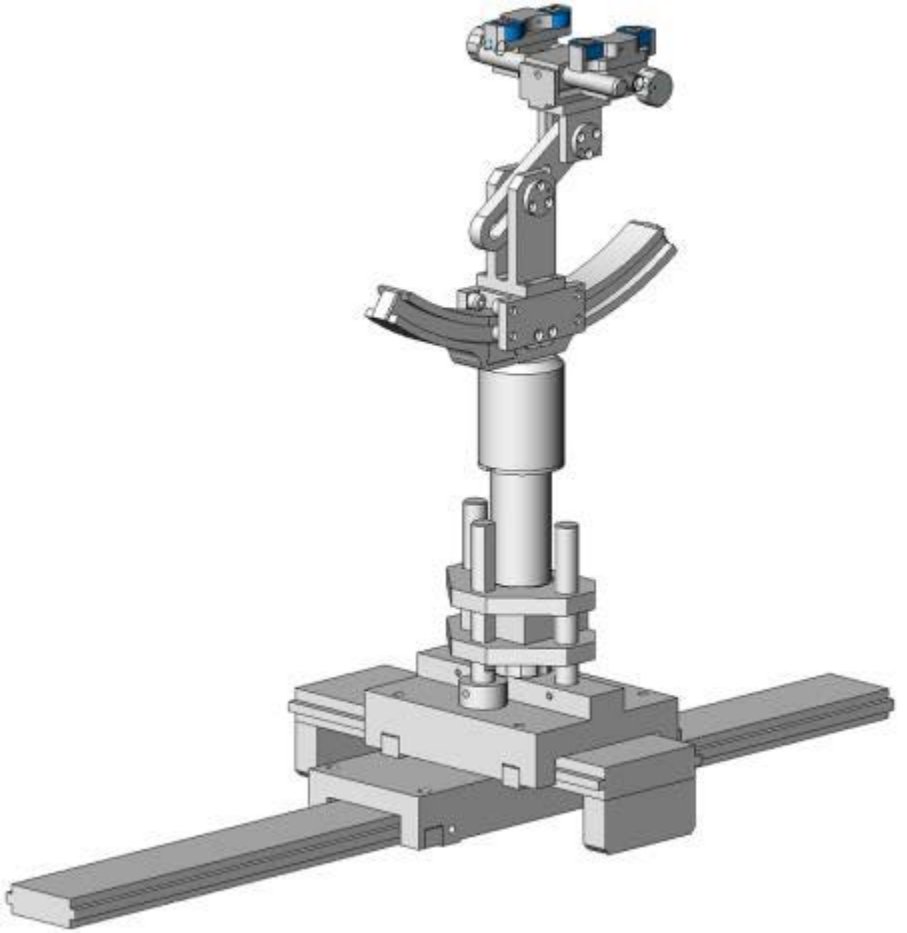
7.6 Phantom

For the measurements the Specific Anthropomorphic Mannequin (SAM) defined by the IEEE SCC-34/SC2groupisused. Thephantomisapolyurethaneshellintegratedinawoodentable. The thickness ofthe phantomamounts to2mm +/- 0.2mm.It enables thedosimetricevaluation of leftand rightphoneusageandincludesanadditionalflatphantompartforthesimplified performancecheck. The phantomset-upincludes acover,whichprevents theevaporation of theliquid.

SystemMaterial	Permittivity	LossTangent
Delrin	3.7	0.005

7.7 Device Holder

The positioning systemallows obtaining cheekand tilting position witha verygood accuracy.In compliancewithCENELEC,thetiltangle uncertaintyislower than1°.



Deviceholder

SystemMaterial	Permittivity	LossTangent
Delrin	3.7	0.005

7.8 Video Positioning System

- The video positioning system is used in OpenSAR to check theprobe. Which is composed of a camera, LED, mirror andmechanical parts. The camera is piloted by the main computerwith firewire link.

- 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. Duringprobe rotations, the probe tip will keep its actual position.

7.9 Tissue simulating liquids: dielectric properties

The following materials are used for producing the tissue-equivalent materials.
(Liquids used for testsare marked with☒):

Ingredients(% ofweight)	**Frequency (MHz)**				
frequency band	☐450	☐ 835	☐ 1800	☐1900	☐ 2450
Tissue Type	Head	Head	Head	Head	Head
Water	38.56	41.45	52.64	55.242	62.7
Salt (NaCl)	3.95	1.45	0.36	0.306	0.5
Sugar	56.32	56.0	0.0	0.0	0.0
HEC	0.98	1.0	0.0	0.0	0.0
Bactericide	0.19	0.1	0.0	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	36.8
DGBE	0.0	0.0	47.0	44.542	0.0
Ingredients(% ofweight)	**Frequency (MHz)**				
frequency band	☐450	☐ 835	☐ 1800	☐1900	☒ 2450
Tissue Type	Body	Body	Body	Body	Body
Water	51.16	52.4	69.91	69.91	73.2
Salt (NaCl)	1.49	1.40	0.13	0.13	0.04
Sugar	46.78	45.0	0.0	0.0	0.0
HEC	0.52	1.0	0.0	0.0	0.0
Bactericide	0.05	0.1	0.0	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0
DGBE	0.0	0.0	29.96	29.96	26.7

Salt: 99+% Pure Sodium Chloride
Sugar: 98+% Pure Sucrose
Water: De-ionized, 16MΩ+ resistivity
HEC: Hydroxyethyl Cellulose
DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]
Triton X-100(ultra pure): Polyethylene glycol mono [4-(1,1,3,3-tetramethylbutyl)phenyl]ether

☐Simulating Head Liquid for 5G(HBBL3500-5800MHz), Manufactured by SPEAG:

Ingredients	**(% by weight)**
Water	50-65%
Mineral oil	10-30%
Emulsifiers	8-25%
Sodium salt	0-1.5%

☒Simulating Body Liquid for 5G(MBBL3500-5800MHz),Manufactured by SPEAG:

Ingredients	**(% by weight)**
Water	60-80%
Esters,Emulsifiers,Inhibitors	20-40%
Sodium salt	0-1.5%

7.10 Tissue simulating liquids: parameters

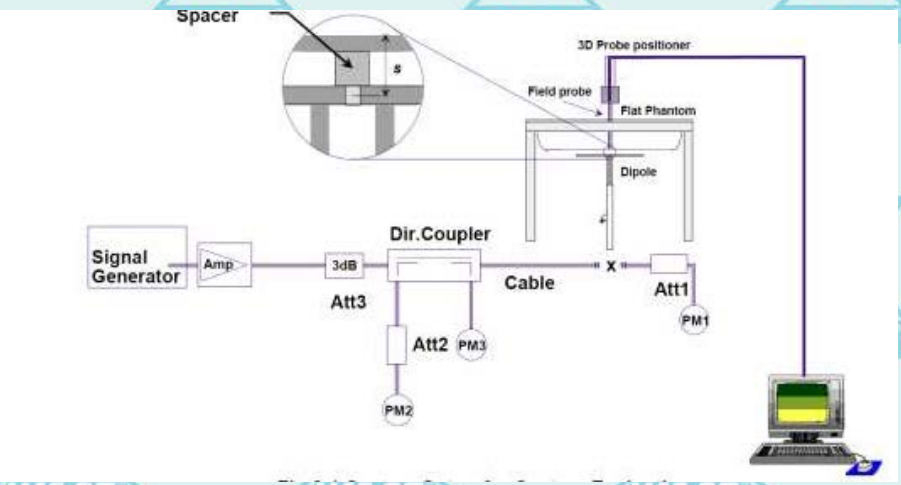
Used Target Frequency	Target Tissue		Measured Tissue		Liquid Temp.	Test Date
	ε_r (+/-5%)	σ (S/m) (+/-5%)	ε_r	σ (S/m)		
2450MHz Head	39.20 (37.24~41.16)	1.80 (1.71~1.89)	40.27	1.82	21.6°C	2024-09-23
5200MHz Head	36.00 (34.20~37.80)	4.66 (4.43~4.89)	35.62	4.52	21.6°C	2024-09-25
5500MHz Head	35.60 (33.82~37.38)	4.96 (4.71~5.20)	36.11	5.02	21.6°C	2024-09-27
5800MHz Head	35.30 (33.54~37.06)	5.27 (5.01~5.53)	34.63	5.16	21.6°C	2024-09-29
6500MHz Head	34.50 (32.78~36.22)	6.07 (5.77~6.37)	34.00	6.08	21.6°C	2024-11-28
ε_r= Relative permittivity, σ= Conductivity						

8 System Check

8.1 System check procedure

The System check is performed by using a System check dipole which is positioned parallel to the planar part of the SAM phantom at the reference point. The distance of the dipole to the SAM phantom is determined by a spacer. The dipole is connected to the signal source consisting of signal generator and amplifier via a directional coupler, N-connector cable and adaption to SMA. It is fed with a power of 100 mW. To adjust this power a power meter is used. The power sensor is connected to the cable before the System check to measure the power at this point and do adjustments at the signal generator. At the outputs of the directional coupler both return loss as well as forward power are controlled during the validation to make sure that emitted power at the dipole is kept constant. This can also be checked by the power drift measurement after the test (result on plot).

System check results have to be equal or near the values determined during dipole calibration (target SAR in table above) with the relevant liquids and test system.



8.2 System check results

The system Check is performed for verifying the accuracy of the complete measurement system and performance of the software.The following table shows System check results for all frequency bands and tissue liquids used during the tests (plot(s) see annex A).

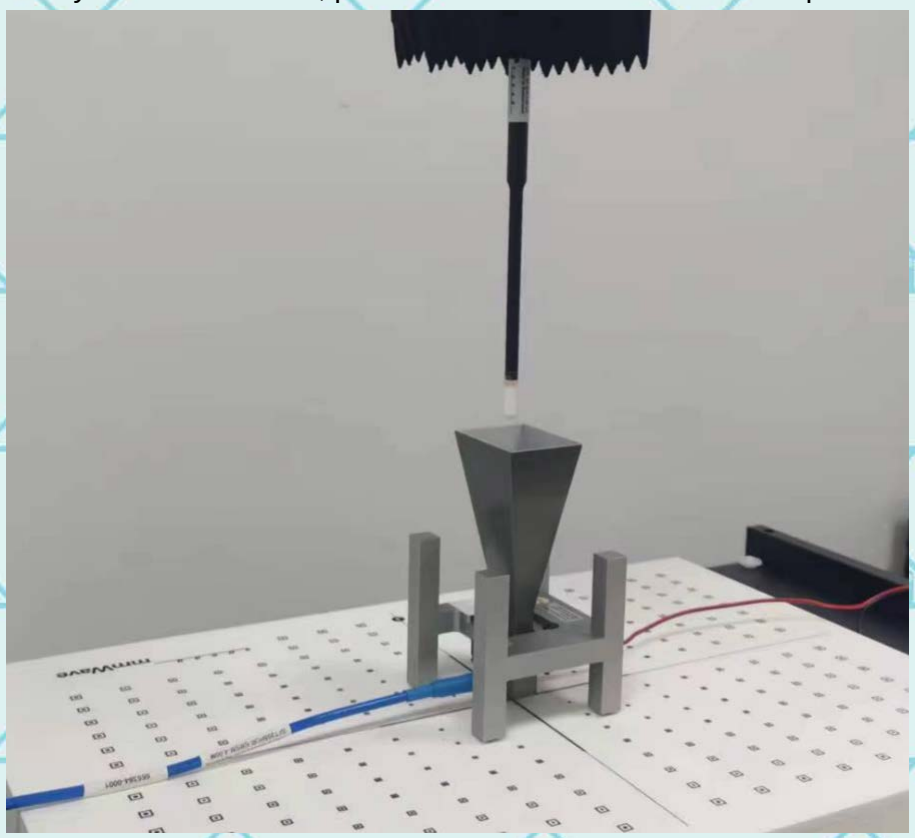
System Check	Target SAR (1W) (+/-10%)		Measured SAR (Normalized to 1W)		Liquid Temp.	Test Date
	1-g (W/Kg)	10-g (W/Kg)	1-g (W/Kg)	10-g (W/Kg)		
D2450V2 Body	52.40 (47.16~57.64)	24.00 (21.60~26.40)	54.33	23.33	21.6°C	2024-09-23
D5200V2 Body	76.50 (68.85~84.15)	21.60 (19.44~23.76)	77.18	22.64	21.6°C	2024-09-25
D5500V2 Body	83.30 (74.97~91.63)	23.40 (21.06~25.74)	83.37	22.82	21.6°C	2024-09-27
D5800V2 Body	78.00 (70.20~85.50)	21.90 (19.71~24.09)	79.66	20.80	21.6°C	2024-09-29
D6.5GHzV2 Body	291.00 (260.10~317.90)	53.40 (48.06~58.74)	304.00	57.90	21.6°C	2024-11-28

Note:
1.All SAR values are normalized to 1W forward power.
2. The forward power of Dipole antenna is actually 20db (100mw), so the actual measured value differs from the table data by 10 times

8.3 Power Density Test System Verification

The system was verified to be within ±0.66 dB of the power density targets on the calibration certificate according to the test system specification in the user's manual and calibration facility recommendation. The 0.66 dB deviation threshold represents the expanded uncertainty for system performance checks using SPEAG's mmWave verification sources. The same spatial resolution and measurement region used in the source calibration was applied during the system check.

The measured power density distribution of verification source was also confirmed through visual inspection to have no noticeable differences, both spatially (shape) and numerically (level) from the distribution provided by the manufacturer, per November 2017 TCBC Workshop Notes



System Verification Setup Photo

Frequency (GHz)	5G Verification Source	Test Date	Distance (mm)	Measured 4cm² (W/m²)	Targeted 4cm² (W/m²)	Deviation (dB)
10	10GHz-	2024/12/20	10	51.6	50	0.03

Detailed System Check Results Please see the annex D.

9 SAR Test Test Configuration

9.1 Wi-Fi Test Configuration

For the 802.11b/g SAR tests, a communication link is set up with the test mode software for Wi-Fi mode test. The Absolute Radio Frequency Channel Number(ARFCN) is allocated to 1 ,6 and 11 respectively in the case of 2450 MHz.During the test,at the each test frequency channel, the EUT is operated at the RF continuous emission mode. Each channel should be tested at the lowest data rate. 802.11b/g operating modes are tested independently according to the service requirements in each frquency band. 802.11b/g modes are tested on channel 1, 6, 11; however,if output power reduction is necessary for channels 1 and/or 11 to meet restricted band requirements the highest output channel closest to each of these channels must be tested instead.

SAR is not required for 802.11g/n channels when the maximum average output power is less than 0.25dB higher than that measured on the corresponding 802.11b channels.

Mode	Band	GHz	Channel	"Default Test Channels"	
				802.11b	802.11g
802.11b/g	2.4 GHz	2412	1#	√	△
		2437	6	√	△
		2462	11#	√	△

Notes:

√ = "default test channels"

△= possible 802.11g channels with maximum average output ¼ dB the "default test channels"

= when output power is reduced for channel 1 and /or 11 to meet restricted band requirements the highest output channels closest to each of these channels should be tested.

802.11 Test Channels per FCC Requirements

9.2 WiFi 5G SAR Test Procedures

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 theband 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. 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 thesame specified maximum output power.

2)If multiple configurations have the same specified maximum output power and largest channelbandwidth, 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 bandwidthand 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.

1)The channel closest to mid-band frequency is selected for SAR measurement.

2)For channels with equal separation from mid-band frequency; for example, high and low channels ortwo 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 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.

9.3 RF Exposure Limits for Frequencies Above 6 GHz

Per §1.1310 (d)(3),the MPE limits are applied for frequencies above 6 GHz. Power Density isexpressed in unitsof W/m² or mW/cm².

Peak Spatially Averaged Power Density was evaluated over a circular area of 4 cm²per interim FCC Guidance fornear-field power density evaluations per October 2018 TCB Workshop notes.

Human Exposure Limits Specified in FCC 47 CFR §1.1310

Human Exposure to Radiofrequency (RF) Radiation Limits		
Frequency Range [MHz]	**Power Density** [mW/cm²]	**Average Time** [Minutes]
(A) Limits For Occupational / Controlled Environments		
1,500 – 100,000	5.0	6
(B) Limits For General Population / Uncontrolled Environments		
1,500 – 100,000	1.0	30

Note: 1.0 mW/cm² is 10 W/m²

9.4 Miscellaneous Testing Considerations

Per FCC guidance,SAR was performed using 6.5 GHz SAR probe calibration factors.FCC KDB 648474 andFCC KDB 248227 were followed for test positions, distances, and modes.Per TCB workshop October 2020notes, 5 channels were tested.Absorbed power density (APD) using a 4cm² averagingarea is reported based onSAR measurements. Incident power density is evaluated at 2mm ensuring that the resolution is sufficient suchthat integrated power density (iPD) between d=2mm and d=15mmvaries by < 1dB per equipment manufacturerguidance.Power density results are scaled up foruncertainty above 30%.

Per FCC KDB Publication 648474 D04v01r03, this device is considered a "phablet" since the diagonal dimensionis greater than 160mm and less than200mm.Therefore, phablet SAR tests are required when wireless routermode does not apply or if wireless router 1g SAR> 1.2 W/kg.

6 GHz WIFI SAR results are used for simultaneous transmission analysis with the other transmitters and totalexposure ratio(TER).Analysis can be found in SAR report and Near Field PD Report.

10 Detailed Test Results

10.1 Conducted Power measurements

Themeasuringconductedaveragepower(Uni t:dBm)isshownasbelow.

10.1.1 Conducted Power of Wi-Fi 2.4G

MAIN ANT1

Mode	802.11b		
Channel/Frequency(MHz)	1(2412)	6(2437)	11(2462)
Average Power(dBm)	18.65	18.63	18.53
Mode	802.11g		
Channel/Frequency(MHz)	1(2412)	6(2437)	11(2462)
Average Power(dBM)	21.44	21.65	21.53
Mode	802.11n(HT20)		
Channel/Frequency(MHz)	1(2412)	6(2437)	11(2462)
Average Power(dBM)	20.57	20.63	20.72
Mode	802.11n(HT40)		
Channel/Frequency(MHz)	3(2422)	6(2437)	9(2452)
Average Power(dBm)	20.87	20.96	20.89
Mode	802.11ax 20		
Channel/Frequency(MHz)	1(2412)	6(2437)	11(2462)
Average Power(dBM)	20.25	20.48	20.44
Mode	802.11ax40		
Channel/Frequency(MHz)	3(2422)	6(2437)	9(2452)
Average Power(dBM)	20.71	20.98	20.75

AUX ANT2

Mode	802.11b		
Channel/Frequency(MHz)	1(2412)	6(2437)	11(2462)
Average Power(dBm)	19.13	19.10	18.94
Mode	802.11g		
Channel/Frequency(MHz)	1(2412)	6(2437)	11(2462)
Average Power(dBM)	21.96	22.22	22.13
Mode	802.11n(HT20)		
Channel/Frequency(MHz)	1(2412)	6(2437)	11(2462)
Average Power(dBM)	20.95	21.19	21.12
Mode	802.11n(HT40)		
Channel/Frequency(MHz)	1(2412)	6(2437)	11(2462)
Average Power(dBm)	21.41	21.26	21.35
Mode	802.11ax 20		
Channel/Frequency(MHz)	1(2412)	6(2437)	11(2462)
Average Power(dBm)	21.01	20.93	20.98
Mode	802.11ax 40		
Channel/Frequency(MHz)	3(2422)	6(2437)	9(2452)
Average Power(dBm)	21.30	21.52	21.19

MIMO Mode

Mode	802.11n(HT20)		
Channel/Frequency(MHz)	1(2412)	6(2437)	11(2462)
Average Power(dBM)	23.77	23.93	23.93
Mode	802.11n(HT40)		
Channel/Frequency(MHz)	1(2412)	6(2437)	11(2462)
Average Power(dBm)	24.16	24.12	24.14
Mode	802.11ax 20		
Channel/Frequency(MHz)	1(2412)	6(2437)	11(2462)
Average Power(dBm)	23.66	23.72	23.73
Mode	802.11ax 40		
Channel/Frequency(MHz)	3(2422)	6(2437)	9(2452)
Average Power(dBm)	24.03	**24.27**	23.99

<KDB 248227 D01, SAR Guidance for Wi-Fi Transmitters>

(1) For handsets operating next to ear, hotspot mode or mini-tablet configurations, 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 the reported SAR of initial test position is <= 0.4 W/kg, SAR testing for remaining test positions is not 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.

(2) For Wi-Fi 2.4 GHz, the highest measured maximum output power channel for DSSS was selected for SAR measurement. When the reported SAR is <= 0.8 W/kg, no further SAR testing is required. Otherwise, SAR is evaluated at the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel. For OFDM modes (802.11g/n), 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 it is <= 1.2 W/kg.

10.1.2 Conducted Power of Wi-Fi 5G

Ant 1						
Band	Mode	Channel	Frequency(MHz)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
U-NII-1 (5150-5250)	802.11a	36	5180	16.00±1.0	15.59	No
		48	5240	16.00±1.0	15.90	Yes
	802.11n-HT20	36	5180	15.00±1.0	14.66	No
		48	5240	15.50±1.0	15.22	No
	802.11n-HT40	38	5190	14.50±1.0	14.26	No
		46	5230	14.50±1.0	14.15	No
	802.11ac-VHT20	36	5180	13.50±1.0	13.28	No
		48	5240	14.50±1.0	14.14	No
	802.11ac-VHT40	38	5190	13.50±1.0	13.16	No
		46	5230	13.50±1.0	13.35	No
	802.11ac-VHT80	42	5210	11.50±1.0	11.34	No
	802.11ax-HT20	36	5180	11.50±1.0	11.07	No
		48	5240	11.50±1.0	11.46	No
	802.11ax-HT40	38	5190	12.00±1.0	11.68	No
		46	5230	12.50±1.0	12.13	No
	802.11ax-HT80	42	5210	11.50±1.0	11.43	No
	802.11ax- HT160	50	5250	10.00±1.0	9.78	No
Ant 2						
Band	Mode	Channel	Frequency(MHz)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
U-NII-1 (5150-5250)	802.11a	36	5180	17.00±1.0	16.55	No
		48	5240	17.00±1.0	16.93	Yes
	802.11n-HT20	36	5180	16.00±1.0	15.64	No
		48	5240	16.50±1.0	16.10	No
	802.11n-HT40	38	5190	15.00±1.0	14.51	No
		46	5230	15.50±1.0	15.02	No
	802.11ac-VHT20	36	5180	14.50±1.0	14.30	No
		48	5240	15.00±1.0	14.73	No
	802.11ac-VHT40	38	5190	13.50±1.0	13.43	No
		46	5230	14.00±1.0	13.59	No
	802.11ac-VHT80	42	5210	12.00±1.0	11.61	No
	802.11ax-HT20	36	5180	13.00±1.0	12.63	No
		48	5240	13.00±1.0	12.99	No
	802.11ax-HT40	38	5190	13.50±1.0	13.42	No
		46	5230	14.00±1.0	13.83	No
	802.11ax-HT80	42	5210	13.50±1.0	13.37	No
	802.11ax- HT160	50	5250	11.50±1.0	11.32	No
MIMO						
Band	Mode	Channel	Frequency(MHz)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
U-NII-1 (5150-5250)	802.11n-HT20	36	5180	18.50±1.0	18.19	No
		48	5240	19.00±1.0	18.69	Yes
	802.11n-HT40	38	5190	17.50±1.0	17.40	No
		46	5230	18.00±1.0	17.62	No
	802.11ac-VHT20	36	5180	17.00±1.0	16.83	No
		48	5240	17.50±1.0	17.46	No
	802.11ac-VHT40	38	5190	16.50±1.0	16.31	No
		46	5230	16.50±1.0	16.48	No
	802.11ac-VHT80	42	5210	14.50±1.0	14.49	No
	802.11ax-HT20	36	5180	15.00±1.0	14.93	No
		48	5240	15.50±1.0	15.30	No
	802.11ax-HT40	38	5190	16.00±1.0	15.65	No
		46	5230	16.50±1.0	16.07	No
	802.11ax-HT80	42	5210	16.00±1.0	15.52	No
	802.11ax- HT160	50	5250	14.00±1.0	13.63	No

Ant 1						
Band	Mode	Channel	Frequency (MHz)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
U-NII-2a (5250-5350)	802.11a	52	5260	16.50±1.0	16.07	No
		64	5320	15.00±1.0	14.84	No
	802.11n-HT20	52	5260	15.00±1.0	14.89	No
		64	5320	14.00±1.0	13.52	No
	802.11n-HT40	54	5270	14.50±1.0	14.28	No
		62	5310	14.00±1.0	13.72	No
	802.11ac-VHT20	52	5260	14.00±1.0	13.58	No
		64	5320	13.00±1.0	12.85	No
	802.11ac-VHT40	54	5270	13.50±1.0	13.19	No
		62	5310	12.50±1.0	12.45	No
	802.11ac-VHT80	58	5290	11.00±1.0	10.75	No
	802.11ax-HT20	52	5260	11.50±1.0	11.33	No
		64	5320	10.50±1.0	10.23	No
	802.11ax-HT40	54	5270	12.00±1.0	11.99	No
		62	5310	11.50±1.0	11.35	No
	802.11ax-HT80	58	5290	11.50±1.0	11.01	No

Ant 2						
Band	Mode	Channel	Frequency (MHz)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
U-NII-2a (5250-5350)	802.11a	52	5260	17.00±1.0	16.87	Yes
		64	5320	16.00±1.0	15.87	No
	802.11n-HT20	52	5260	16.50±1.0	16.00	No
		64	5320	15.50±1.0	15.03	No
	802.11n-HT40	54	5270	15.50±1.0	15.03	No
		62	5310	14.50±1.0	14.26	No
	802.11ac-VHT20	52	5260	15.00±1.0	14.56	No
		64	5320	14.00±1.0	13.73	No
	802.11ac-VHT40	54	5270	13.50±1.0	13.33	No
		62	5310	13.00±1.0	12.72	No
	802.11ac-VHT80	58	5290	11.50±1.0	11.22	No
	802.11ax-HT20	52	5260	13.50±1.0	13.02	No
		64	5320	12.50±1.0	12.27	No
	802.11ax-HT40	54	5270	14.00±1.0	13.67	No
		62	5310	13.50±1.0	13.03	No
	802.11ax-HT80	58	5290	13.00±1.0	12.70	No

MIMO						
Band	Mode	Channel	Frequency (MHz)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
U-NII-2a (5250-5350)	802.11n-HT20	52	5260	18.50±1.0	18.49	Yes
		64	5320	17.50±1.0	17.35	No
	802.11n-HT40	54	5270	18.00±1.0	17.68	No
		62	5310	17.50±1.0	17.01	No
	802.11ac-VHT20	52	5260	17.50±1.0	17.11	No
		64	5320	16.50±1.0	16.32	No
	802.11ac-VHT40	54	5270	16.50±1.0	16.27	No
		62	5310	16.00±1.0	15.60	No
	802.11ac-VHT80	58	5290	14.50±1.0	14.00	No
	802.11ax-HT20	52	5260	15.50±1.0	15.27	No
		64	5320	14.50±1.0	14.38	No
	802.11ax-HT40	54	5270	16.00±1.0	15.92	No
		62	5310	15.50±1.0	15.28	No
	802.11ax-HT80	58	5290	15.00±1.0	14.95	No

Ant 1						
Band	Mode	Channel	Frequency (MHz)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
U-NII-2c (5470-5725)	802.11a	100	5500	15.00±1.0	14.73	No
		140	5700	15.50±1.0	15.46	Yes
	802.11n-HT20	100	5500	14.00±1.0	13.55	No
		140	5700	14.50±1.0	14.24	No
	802.11n-HT40	102	5510	13.50±1.0	13.27	No
		134	5670	13.50±1.0	13.38	No
	802.11ac-VHT20	100	5500	12.50 ±1.0	12.41	No
		140	5700	13.50±1.0	13.27	No
	802.11ac-VHT40	102	5510	12.00±1.0	11.63	No
		134	5670	12.50±1.0	12.32	No
	802.11ac-VHT80	106	5530	10.00±1.0	9.87	No
		122	5610	9.50±1.0	9.04	No
	802.11ax-HT20	100	5500	10.50±1.0	10.10	No
		140	5700	11.00±1.0	11.00	No
	802.11ax-HT40	102	5510	10.00±1.0	9.95	No
		134	5670	11.00±1.0	10.52	No
	802.11ax-HT80	106	5530	10.50±1.0	10.37	No
		122	5610	11.50±1.0	11.07	No
	802.11ax- HT160	114	5570	10.00±1.0	9.88	No

Ant 2						
Band	Mode	Channel	Frequency (MHz)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
U-NII-2c (5470-5725)	802.11a	100	5500	15.50±1.0	15.45	No
		140	5700	17.00±1.0	16.52	Yes
	802.11n-HT20	100	5500	14.50±1.0	14.38	No
		140	5700	15.50±1.0	15.24	No
	802.11n-HT40	102	5510	14.50±1.0	14.26	No
		134	5670	14.00±1.0	13.89	No
	802.11ac-VHT20	100	5500	13.50±1.0	13.33	No
		140	5700	14.50±1.0	14.15	No
	802.11ac-VHT40	102	5510	13.00±1.0	12.62	No
		134	5670	12.50±1.0	12.18	No
	802.11ac-VHT80	106	5530	11.00±1.0	10.57	No
		122	5610	11.50±1.0	11.09	No
	802.11ax-HT20	100	5500	12.50±1.0	12.16	No
		140	5700	13.00±1.0	12.74	No
	802.11ax-HT40	102	5510	13.00±1.0	12.61	No
		134	5670	13.00±1.0	12.53	No
	802.11ax-HT80	106	5530	12.50±1.0	12.06	No
		122	5610	13.00±1.0	12.53	No
	802.11ax- HT160	114	5570	11.50±1.0	11.44	No

MIMO						
Band	Mode	Channel	Frequency (MHz)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
U-NII-2c (5470-5725)	802.11n-HT20	100	5500	17.00±1.0	17.00	No
		140	5700	18.00±1.0	17.78	Yes
	802.11n-HT40	102	5510	17.00±1.0	16.80	No
		134	5670	17.00±1.0	16.65	No
	802.11ac-VHT20	100	5500	16.00±1.0	15.90	No
		140	5700	17.00±1.0	16.74	No
	802.11ac-VHT40	102	5510	15.50±1.0	15.16	No
		134	5670	15.50±1.0	15.26	No
	802.11ac-VHT80	106	5530	13.50±1.0	13.24	No
		122	5610	13.50±1.0	13.20	No
	802.11ax-HT20	100	5500	14.50±1.0	14.26	No
		140	5700	15.00±1.0	14.97	No
	802.11ax-HT40	102	5510	14.50±1.0	14.49	No
		134	5670	15.00±1.0	14.65	No
	802.11ax-HT80	106	5530	14.50±1.0	14.31	No
		122	5610	15.00±1.0	14.87	No
	802.11ax- HT160	114	5570	14.00±1.0	13.74	No

Ant 1						
Band	Mode	Channel	Frequency (MHz)	Tune-up	Average Powe(dBm)	SAR Test (Yes/No)
U-NII-3 (5725-5825)	802.11a	149	5745	16.00±1.0	15.55	Yes
		165	5825	15.00±1.0	14.60	No
	802.11n-HT20	149	5745	14.50±1.0	14.45	No
		165	5825	13.50±1.0	13.42	No
	802.11n-HT40	151	5755	14.00±1.0	13.90	No
		159	5795	14.00±1.0	13.94	No
	802.11ac-VHT20	149	5745	13.00±1.0	12.66	No
		165	5825	12.50±1.0	12.31	No
	802.11ac-VHT40	151	5755	13.00±1.0	12.69	No
		159	5795	12.50±1.0	12.50	No
	802.11ac-VHT80	155	5775	11.00±1.0	10.92	No
	802.11ax-HT20	149	5745	11.00±1.0	10.93	No
		165	5825	10.00±1.0	9.83	No
	802.11ax-HT40	151	5755	11.50±1.0	11.49	No
		159	5795	11.50±1.0	11.32	No
	802.11ax-HT80	155	5775	11.50±1.0	11.25	No

Ant 2						
Band	Mode	Channel	Frequency (MHz)	Tune-up	Average Powe(dBm)	SAR Test (Yes/No)
U-NII-3 (5725-5825)	802.11a	149	5745	17.50±1.0	17.19	Yes
		165	5825	16.00±1.0	15.84	No
	802.11n-HT20	149	5745	16.00 ±1.0	15.51	No
		165	5825	15.00±1.0	14.55	No
	802.11n-HT40	151	5755	15.00±1.0	14.91	No
		159	5795	14.50±1.0	14.44	No
	802.11ac-VHT20	149	5745	14.50±1.0	14.08	No
		165	5825	13.00±1.0	12.95	No
	802.11ac-VHT40	151	5755	13.50±1.0	13.18	No
		159	5795	13.00±1.0	12.91	No
	802.11ac-VHT80	155	5775	13.50±1.0	13.41	No
	802.11ax-HT20	149	5745	13.00±1.0	12.79	No
		165	5825	12.00±1.0	11.51	No
	802.11ax-HT40	151	5755	13.50±1.0	13.14	No
		159	5795	13.50±1.0	13.45	No
	802.11ax-HT80	155	5775	13.50±1.0	13.29	No

MIMO						
Band	Mode	Channel	Frequency (MHz)	Tune-up	Average Powe(dBm)	SAR Test (Yes/No)
U-NII-3 (5725-5825)	802.11n-HT20	149	5745	18.50±1.0	18.02	Yes
		165	5825	17.50±1.0	17.03	No
	802.11n-HT40	151	5755	17.50±1.0	17.44	No
		159	5795	17.50±1.0	17.21	No
	802.11ac-VHT20	149	5745	16.50±1.0	16.44	No
		165	5825	16.00±1.0	15.65	No
	802.11ac-VHT40	151	5755	16.00±1.0	15.95	No
		159	5795	16.00±1.0	15.72	No
	802.11ac-VHT80	155	5775	15.50±1.0	15.35	No
	802.11ax-HT20	149	5745	15.00±1.0	14.97	No
		165	5825	14.00±1.0	13.76	No
	802.11ax-HT40	151	5755	15.50±1.0	15.40	No
		159	5795	16.00±1.0	15.52	No
	802.11ax-HT80	155	5775	15.50±1.0	15.40	No

<KDB 248227 D01, SAR Guidance for Wi-Fi Transmitters>

For WLAN 5 GHz, the initial test configuration was selected according to the transmission mode with thehighest maximum output power. When the reported SAR of initial test configuration is > 0.8 W/kg, SAR is required for the subsequent highest measured output power channel until the reported SAR result is <= 1.2 W/kg or all required channels are measured. For other transmission modes, SAR is not required when the highest reported SAR for initial test configuration is adjusted by the ratio of subsequent test configuration to initial test configuration specified maximum output power and it is <= 1.2 W/kg.

10.1.3 Conducted Power of Wi-Fi 6E

KDB 447498 D01 at the maximum rated output power and within the tune-up tolerance range specified for the product, but not more than 2 dB lower than the maximum tune-up tolerance limit.

6GHz Wi-Fi U-NII-5 Ant1	Channel /Freq.(MHz)	Maximum Output Power (dBm)	
		Tune-up	Meas.
802.11ax-HE20	1/5955	15.00	13.89
	45/6175	13.00	12.36
	93/6415	13.00	11.73
802.11ax-HE40	3/5965	15.00	14.77
	43/6165	14.00	12.28
	91/6405	14.00	12.10
802.11ax-HE80	7/5985	15.00	13.64
	39/6145	13.00	12.16
	87/6385	13.00	11.11
802.11ax-HE160	15/6025	11.00	10.16
	47/6185	11.00	10.41
	79/6345	11.00	9.78
Note. Initial test configuration is 802.11ax-HE40 mode.			

6GHz Wi-Fi U-NII-5 Ant2	Channel /Freq.(MHz)	Maximum Output Power (dBm)	
		Tune-up	Meas.
802.11ax-HE20	1/5955	14.00	12.93
	45/6175	14.00	12.60
	93/6415	13.00	11.92
802.11ax-HE40	3/5965	14.00	12.84
	43/6165	14.00	12.46
	91/6405	13.00	11.73
802.11ax-HE80	7/5985	13.00	12.11
	39/6145	13.00	12.33
	87/6385	12.00	10.99
802.11ax-HE160	15/6025	11.00	10.26
	47/6185	11.00	9.60
	79/6345	11.00	9.60
Note. Initial test configuration is 802.11ax-HE40 mode.			

6GHz Wi-Fi U-NII-5 MIMO	Channel /Freq.(MHz)	Maximum Output Power (dBm)			
		Tune-up	Meas.	Ant1	Ant2
802.11ax-HE20	1/5955	17.00	16.45	13.89	12.93
	45/6175	17.00	15.49	12.36	12.60
	93/6415	16.00	14.84	11.73	11.92
802.11ax-HE40	3/5965	18.00	**16.92**	14.77	12.84
	43/6165	17.00	15.38	12.28	12.46
	91/6405	16.00	14.93	12.10	11.73
802.11ax-HE80	7/5985	17.00	15.95	13.64	12.11
	39/6145	17.00	15.26	12.16	12.33
	87/6385	16.00	14.06	11.11	10.99
802.11ax-HE160	15/6025	14.00	13.22	10.16	10.26
	47/6185	14.00	13.03	10.41	9.60
	79/6345	14.00	12.70	9.78	9.60
Note. Initial test configuration is 802.11ax-HE40 mode.					

6GHz Wi-Fi U-NII-6 Ant1	Channel /Freq.(MHz)	Maximum Output Power (dBm)	
		Tune-up	Meas.
802.11ax-HE20	97/6435	14.00	12.48
	105/6475	14.00	12.89
	113/6515	12.00	10.97
802.11ax-HE40	99/6445	14.00	13.03
	107/6485	14.00	**13.46**
	115/6525	14.00	13.10
802.11ax-HE80	103/6465	14.00	12.72
	119/6545	14.00	12.82
802.11ax-HE160	111/6505	12.00	10.54
Note. Initial test configuration is 802.11ax-HE40 mode.			

6GHz Wi-Fi U-NII-6 Ant2	Channel /Freq.(MHz)	Maximum Output Power (dBm)	
		Tune-up	Meas.
802.11ax-HE20	97/6435	14.00	12.27
	105/6475	14.00	12.61
	113/6515	14.00	12.31
802.11ax-HE40	99/6445	14.00	12.88
	107/6485	14.00	12.89
	115/6525	14.00	**12.96**
802.11ax-HE80	103/6465	12.00	10.98
	119/6545	12.00	10.55
802.11ax-HE160	111/6505	12.00	10.98
Note. Initial test configuration is 802.11ax-HE40 mode.			

6GHz Wi-Fi U-NII-6 MIMO	Channel /Freq.(MHz)	Maximum Output Power (dBm)			
		Tune-up	Meas.	Ant1	Ant2
802.11ax-HE20	97/6435	17.00	15.39	12.48	12.27
	105/6475	17.00	15.76	12.89	12.61
	113/6515	16.00	14.70	10.97	12.31
802.11ax-HE40	99/6445	17.00	15.97	13.03	12.88
	107/6485	17.00	**16.19**	13.46	12.89
	115/6525	17.00	16.04	13.10	12.96
802.11ax-HE80	103/6465	16.00	14.95	12.72	10.98
	119/6545	16.00	14.84	12.82	10.55
802.11ax-HE160	111/6505	15.00	13.78	10.54	10.98
Note. Initial test configuration is 802.11ax-HE40 mode.					

6GHz Wi-Fi U-NII-7 Ant1	Channel /Freq.(MHz)	Maximum Output Power (dBm)	
		Tune-up	Meas.
802.11ax-HE20	117/6535	14.00	12.82
	149/6695	14.00	13.35
	185/6875	15.00	13.91
802.11ax-HE40	123/6565	15.00	13.92
	147/6685	15.00	13.79
	179/6845	15.00	14.14
	187/6885	15.00	14.20
802.11ax-HE80	135/6625	14.00	12.63
	151/6705	14.00	13.23
	183/6865	14.00	13.38
802.11ax-HE160	143/6665	12.00	11.46
	175/6825	12.00	10.66
Note. Initial test configuration is 802.11ax-HE40 mode.			

6GHz Wi-Fi U-NII-7 Ant2	Channel /Freq.(MHz)	Maximum Output Power (dBm)	
		Tune-up	Meas.
802.11ax-HE20	117/6535	14.00	12.42
	149/6695	14.00	13.27
	185/6875	15.00	13.73
802.11ax-HE40	123/6565	15.00	13.38
	147/6685	15.00	13.76
	179/6845	15.00	13.99
	187/6885	15.00	**14.44**
802.11ax-HE80	135/6625	14.00	12.56
	151/6705	14.00	12.62
	183/6865	14.00	12.42
802.11ax-HE160	143/6665	12.00	10.55
	175/6825	12.00	11.11
Note. Initial test configuration is 802.11ax-HE40 mode.			

6GHz Wi-Fi U-NII-7 MIMO	Channel /Freq.(MHz)	Maximum Output Power (dBm)			
		Tune-up	Meas.	Ant1	Ant2
802.11ax-HE20	117/6535	17.00	15.63	12.82	12.42
	149/6695	17.00	16.32	13.35	13.27
	185/6875	18.00	16.83	13.91	13.73
802.11ax-HE40	123/6565	18.00	16.67	13.92	13.38
	147/6685	18.00	16.79	13.79	13.76
	179/6845	18.00	17.08	14.14	13.99
	187/6885	18.00	**17.33**	14.20	14.44
802.11ax-HE80	135/6625	17.00	15.61	12.63	12.56
	151/6705	17.00	15.95	13.23	12.62
	183/6865	17.00	15.94	13.38	12.42
802.11ax-HE160	143/6665	15.00	14.04	11.46	10.55
	175/6825	15.00	13.90	10.66	11.11
Note. Initial test configuration is 802.11ax-HE40 mode.					

6GHz Wi-Fi U-NII-8 Ant1	Channel /Freq.(MHz)	Maximum Output Power (dBm)	
		Tune-up	Meas.
802.11ax-HE20	189/6895	15.00	13.95
	209/6995	15.00	14.18
	229/7095	15.00	13.94
802.11ax-HE40	203/6965	16.00	**15.40**
	227/7085	15.00	14.46
802.11ax-HE80	199/6945	15.00	13.66
	215/7025	15.00	14.37
802.11ax-HE160	207/6985	14.00	12.29
Note. Initial test configuration is 802.11ax-HE40 mode.			

6GHz Wi-Fi U-NII-8 Ant2	Channel /Freq.(MHz)	Maximum Output Power (dBm)	
		Tune-up	Meas.
802.11ax-HE20	189/6895	15.00	13.73
	209/6995	15.00	14.47
	229/7095	15.00	13.79
802.11ax-HE40	203/6965	16.00	**15.14**
	227/7085	15.00	14.47
802.11ax-HE80	199/6945	15.00	13.98
	215/7025	15.00	14.50
802.11ax-HE160	207/6985	12.00	10.31
Note. Initial test configuration is 802.11ax-HE40 mode.			

6GHz Wi-Fi U-NII-8 MIMO	Channel /Freq.(MHz)	Maximum Output Power (dBm)			
		Tune-up	Meas.	Ant1	Ant2
802.11ax-HE20	189/6895	18.00	16.85	13.95	13.73
	209/6995	18.00	17.34	14.18	14.47
	229/7095	18.00	16.88	13.94	13.79
802.11ax-HE40	203/6965	19.00	18.28	15.40	15.14
	227/7085	18.00	**17.48**	14.46	14.47
802.11ax-HE80	199/6945	18.00	16.83	13.66	13.98
	215/7025	18.00	17.45	14.37	14.50
802.11ax-HE160	207/6985	15.00	14.42	12.29	10.31
Note. Initial test configuration is 802.11ax-HE40 mode.					

10.2 Conducted Power of BT

The maximum output power of BT is:

Mode	GFSK mode		
Channel/Frequency(MHz)	0(2402)	39(2441)	78(2480)
Peak Power(dBm)	8.49	8.26	8.04
Mode	Pi/4DQPSK mode		
Channel/Frequency(MHz)	0(2402)	39(2441)	78(2480)
Peak Power(dBm)	8.28	8.07	7.88
Mode	8DPSK mode		
Channel/Frequency(MHz)	0(2402)	39(2441)	78(2480)
Peak Power(dBm)	8.41	8.14	7.94

The maximum output power of BLE is:

Mode	1Mbps		
Channel/Frequency(MHz)	0(2402)	19(2440)	39(2480)
Peak Power(dBm)	9.66	9.64	9.45
Mode	2Mbps		
Channel/Frequency(MHz)	0(2402)	19(2440)	39(2480)
Peak Power(dBm)	**9.81**	9.75	9.33

10.3 Tune-up powertolerance

Band			Tune-up power tolerance(dBm)	
WIFI	2.4G (MAIN ANT1)		802.11b	Max output power =19.0±1.0dbm
			802.11g	Max output power =22.0±1.0dbm
			802.11n (HT20)	Max output power =21.0±1.0dbm
			802.11n (HT40)	Max output power =21.0±1.0dbm
			802.11ax20	Max output power =20.5±1.0dbm
			802.11ax40	Max output power =21.0±1.0dbm
	2.4G (AUX ANT2)		802.11b	Max output power =19.5±1.0dbm
			802.11g	Max output power =22.5±1.0dbm
			802.11n (HT20)	Max output power =21.5±1.0dbm
			802.11n (HT40)	Max output power =21.5±1.0dbm
			802.11ax20	Max output power =21.5±1.0dbm
			802.11ax40)	Max output power =22.0±1.0dbm
	2.4G (MIMOMode)		802.11n (HT20)	Max output power =22.0±1.0dbm
			802.11n (HT40)	Max output power =20.0±1.0dbm
			802.11ax20	Max output power =21.0±1.0dbm
			802.11ax40	Max output power =20.5±1.0dbm
	U-NII-1 (5150-5250)	Ant 1	802.11a	Max output power =16.0±1.0dbm
		Ant 2	802.11a	Max output power =17.0±1.0dbm
		MIMO	802.11n(HT20)	Max output power =19.0±1.0dbm
	U-NII-2 (5250-5350)	Ant 1	802.11a	Max output power =16.5±1.0dbm
		Ant 2	802.11a	Max output power =17.0±1.0dbm
		MIMO	802.11n(HT20)	Max output power =18.5±1.0dbm
	U-NII-3 (5470-5725)	Ant 1	802.11a	Max output power =15.5±1.0dbm
		Ant 2	802.11a	Max output power =17.0±1.0dbm
		MIMO	802.11n(HT20)	Max output power =18.0±1.0dbm
	U-NII-4 (5725-5825)	Ant 1	802.11a	Max output power =16.0±1.0dbm
		Ant 2	802.11a	Max output power =17.5±1.0dbm
		MIMO	802.11n(HT20)	Max output power =18.5±1.0dbm
WIFI 6E	U-NII-5 (5925-6425)	Ant 1	802.11ax-HE40	Max output power =15.0±1.0dbm
		Ant 2	802.11ax-HE40	Max output power =14.0±1.0dbm
		MIMO	802.11ax-HE40	Max output power =18.0±1.0dbm
	U-NII-6 (6425-6525)	Ant 1	802.11ax-HE40	Max output power =14.0±1.0dbm
		Ant 2	802.11ax-HE40	Max output power =14.0±1.0dbm
		MIMO	802.11ax-HE40	Max output power =17.0±1.0dbm
	U-NII-7 (6525-6875)	Ant 1	802.11ax-HE40	Max output power =15.0±1.0dbm
		Ant 2	802.11ax-HE40	Max output power =15.0±1.0dbm
		MIMO	802.11ax-HE40	Max output power =18.0±1.0dbm
	U-NII-8 (6875-7125)	Ant 1	802.11ax-HE40	Max output power =16.0±1.0dbm
		Ant 2	802.11ax-HE40	Max output power =16.0±1.0dbm
		MIMO	802.11ax-HE40	Max output power =18.0±1.0dbm
BT	GFSK mode			Max output power =9.0±1.0dbm
	Pi/4DQPSK mode			Max output power =8.5±1.0dbm
	8DPSK mode			Max output power =8.5±1.0dbm
BLE	1Mbps Power			Max output power =10.0±1.0dbm
	2Mbps Power			Max output power =10.0±1.0dbm

11 SAR test results

Notes:

1) Per KDB447498 D01v05 r02,the SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the scaled SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 0.8 W/kg), testing at the high and low channels is optional.

2) Per KDB447498 D01v05r02, 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. When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel must be used.

3)Per KDB447498 D01v06, All measurement SAR result is scaled-up to account for tune-up tolerance is compliant.

4) Per KDB648474 D04v01r03, body-worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn with headset SAR.

5)Per KDB248227 D01v02r02,the procedures required to establish specific device operating configurations for testing the SAR of 802.11 a/b/g transmitters.

6) Per KDB865664 D01v01r04,for each frequency band,repeated SAR measurement is required only when the measured SAR is ≥0.8W/Kg; if the deviation among the repeated measurement is ≤20%,and the measured SAR <1.45W/Kg,only one repeated measurement is required.

7) Per KDB865664 D02v01r02, SAR plot is only required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination; Plots are also required when the measured SAR is > 1.5 W/kg, or > 7.0 W/kg for occupational exposure. The published RF exposure KDB procedures may require additional plots; for example, to support SAR to peak location separation ratio test exclusion and/or volume scan post-processing(Refer to appendix B for details).

8) Per KDB6162147 D04v01r02, the SAR requirements for laptop and tablet computers, and its to determine the minimum test separation distance .

11.1 Results overview of Wi-Fi 2.4G

Mode	Test Position of Body with 0mm	Test channel /Freq.(MHz)	SAR Value (W/kg)		Power Drift (%)	Conducted Power (dBm)	Tune-up Limit (dBm)	Scaled SAR1-g (W/kg)	Scaling Factor
			1-g	10-g					
WLAN2.4g(gap 0mm)									
802.11g MAIN ANT1	Front	6/2437	0.398	0.214	-0.750	21.65	22.00	0.431	1.084
	Back	6/2437	0.209	0.094	1.000	21.65	22.00	0.227	1.084
	Top	6/2437	0.950	0.411	-1.750	21.65	22.00	1.030	1.084
802.11g AUX ANT2	Front	6/2437	0.381	0.206	-3.750	22.22	22.50	0.406	1.067
	Back	6/2437	0.205	0.091	-2.250	22.22	22.50	0.219	1.067
	Top	6/2437	0.913	0.397	-1.500	22.22	22.50	0.974	1.067
802.11ax40 MIMO	Front	6/2437	0.429	0.225	3.250	24.27	24.50	0.452	1.054
	Back	6/2437	0.227	0.103	2.750	24.27	24.50	0.239	1.054
	Top	6/2437	0.983	0.428	-0.250	24.27	24.50	1.036	1.054

11.2 Results overview of Wi-Fi 5G

Mode	Test Position of Body with 0mm	Test channel /Freq.(MHz)	SAR Value (W/kg)		Power Drift (%)	Conducted Power (dBm)	Tune-up Limit (dBm)	Scaled SAR1-g (W/kg)	Scaling Factor
			1-g	10-g					
WLAN5.2g(gap 0mm)									
802.11a ANT1	Front	48/5240	0.596	0.193	-0.750	15.90	16.00	0.610	1.023
	Back	48/5240	0.360	0.127	-1.000	15.90	16.00	0.368	1.023
	Top	48/5240	0.487	0.174	-4.250	15.90	16.00	0.498	1.023
802.11a ANT2	Front	48/5240	0.497	0.145	-2.250	16.93	17.00	0.505	1.016
	Back	48/5240	0.390	0.136	1.000	16.93	17.00	0.396	1.016
	Top	48/5240	0.536	0.193	-1.750	16.93	17.00	0.545	1.016
802.11n-HT20 MIMO-ANT	Front	48/5240	0.571	0.161	-0.750	18.69	19.00	0.613	1.074
	Back	48/5240	0.354	0.126	-4.750	18.69	19.00	0.380	1.074
	Top	48/5240	0.594	0.216	-0.500	18.69	19.00	0.638	1.074
WLAN5.4g(gap 0mm)									
802.11a ANT1	Front	52/5260	0.894	0.283	0.250	16.07	16.50	0.987	1.104
	Back	52/5260	0.462	0.171	2.500	16.07	16.50	0.510	1.104
	Top	52/5260	0.550	0.193	-1.000	16.07	16.50	0.607	1.104
802.11a ANT2	Front	52/5260	0.847	0.278	0.500	16.87	17.00	0.873	1.030
	Back	52/5260	0.483	0.178	-1.750	16.87	17.00	0.498	1.030
	Top	52/5260	0.571	0.199	-2.500	16.87	17.00	0.588	1.030
802.11n-HT20 MIMO-ANT	Front	52/5260	1.050	0.345	-2.250	18.49	18.50	1.052	1.002
	Back	52/5260	0.598	0.203	-1.000	18.49	18.50	0.599	1.002
	Top	52/5260	0.621	0.211	-1.750	18.49	18.50	0.622	1.002
WLAN5.6g(gap 0mm)									
802.11a ANT1	Front	140/5700	1.129	0.386	4.750	15.46	15.50	1.139	1.009
	Back	140/5700	0.764	0.251	-2.500	15.46	15.50	0.771	1.009
	Top	140/5700	1.095	0.357	-0.250	15.46	15.50	1.105	1.009
802.11a ANT2	Front	140/5700	1.080	0.353	-4.750	16.52	17.00	1.206	1.117
	Back	140/5700	0.617	0.224	0.250	16.52	17.00	0.689	1.117
	Top	140/5700	0.913	0.332	-2.250	16.52	17.00	1.020	1.117
802.11n-HT20 MIMO-ANT	Front	140/5700	1.210	0.404	-1.000	17.78	18.00	1.273	1.052
	Back	140/5700	0.834	0.276	-0.250	17.78	18.00	0.877	1.052
	Top	140/5700	1.153	0.387	-2.750	17.78	18.00	1.213	1.052
WLAN5.8g(gap 0mm)									
802.11a ANT1	Front	149/5745	0.945	0.318	0.250	15.55	16.00	1.048	1.109
	Back	149/5745	0.593	0.218	0.750	15.55	16.00	0.658	1.109
	Top	149/5745	0.803	0.274	-0.250	15.55	16.00	0.891	1.109
802.11a ANT2	Front	149/5745	1.090	0.358	-0.750	17.19	17.50	1.171	1.074
	Back	149/5745	0.680	0.241	-2.250	17.19	17.50	0.730	1.074
	Top	149/5745	0.975	0.334	-0.250	17.19	17.50	1.047	1.074
802.11n-HT20 MIMO-ANT	Front	149/5745	1.100	0.378	-1.000	18.02	18.50	1.229	1.117
	Back	149/5745	0.759	0.260	0.750	18.02	18.50	0.848	1.117
	Top	149/5745	1.040	0.387	-4.250	18.02	18.50	1.162	1.117

11.3 Results overview of Wi-Fi6E & APD

Band	Antenna	Test Position with 0mm	Mode	Duty Cycle	Ch./Freq. (MHz)	Tune-up (dBm)	Measured power (dBm)	Measured SAR1g (W/Kg)	Measured APD (W/m^2)	Power Drift (dB)	Scaling Factor	Report SAR1g (W/kg)	Report APD (W/m^2)
Wi-Fi 6G	ANT1	Back Side	802.11ax-HE40	100.0%	43/6165	14.00	12.28	0.037	0.062	0.118	1.49	0.055	0.092
U-NII-5	ANT2	Back Side	802.11ax-HE40	100.0%	43/6165	14.00	12.46	0.059	0.246	-0.035	1.43	0.084	0.351
Wi-Fi 6G	ANT1	Back Side	802.11ax-HE40	100.0%	107/6485	14.00	13.46	0.062	0.170	0.170	1.13	0.070	0.193
U-NII-6	ANT2	Back Side	802.11ax-HE40	100.0%	115/6525	14.00	12.96	0.086	0.365	-0.058	1.27	0.109	0.464
Wi-Fi 6G	ANT1	Back Side	802.11ax-HE40	100.0%	187/6885	15.00	14.20	0.087	0.356	0.121	1.20	0.105	0.428
U-NII-7	ANT2	Back Side	802.11ax-HE40	100.0%	187/6885	15.00	14.44	0.096	0.411	0.010	1.14	0.109	0.468
Wi-Fi 6G	ANT1	Back Side	802.11ax-HE40	100.0%	203/6965	16.00	15.40	0.053	0.101	0.050	1.15	0.061	0.116
U-NII-8	ANT2	Back Side	802.11ax-HE40	100.0%	203/6965	16.00	15.14	0.063	0.248	-0.069	1.22	0.077	0.302

11.4 Results overview of PD

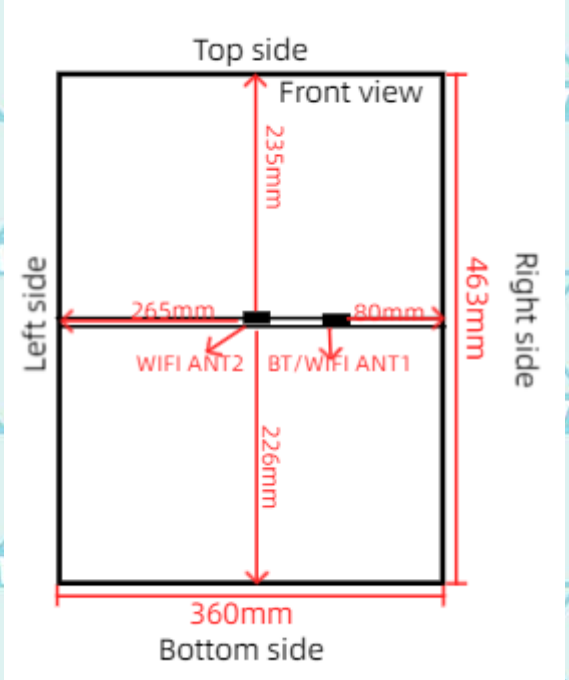
Band	Antenna	Test Position	Dist. (mm)	Mode	Duty Cycle	Ch./Freq. (MHz)	Tune-up (dBm)	Measured power (dBm)	Normal psPD (W/m^2)	Total psPD (W/m^2)	Power Drift [dB]	Measurement Uncertainty Scaling Factor	Tune up Scaling Factor	Scaled Normal psPD (W/m^2)	Scaled Total psPD (W/m^2)
U-NII-5	ANT2	Back Side	2	802.11ax-HE40	100.0%	43/6165	14.00	12.46	1.050	2.390	0.038	1.280	1.43	1.916	4.361
	ANT2	Back Side	9.7	802.11ax-HE40	100.0%	43/6165	14.00	12.46	0.746	0.908	-0.090	1.280	1.43	1.361	1.657
U-NII-6	ANT2	Back Side	2	802.11ax-HE40	100.0%	115/6525	14.00	12.96	0.646	1.260	0.031	1.280	1.27	1.051	2.049
	ANT2	Back Side	9.2	802.11ax-HE40	100.0%	115/6525	14.00	12.96	0.285	0.428	0.131	1.280	1.27	0.464	0.696
U-NII-7	ANT2	Back Side	2	802.11ax-HE40	100.0%	187/6885	15.00	14.44	0.504	1.230	-0.093	1.280	1.14	0.734	1.791
	ANT2	Back Side	8.7	802.11ax-HE40	100.0%	187/6885	15.00	14.44	0.263	0.452	0.011	1.280	1.14	0.383	0.658
U-NII-8	ANT2	Back Side	2	802.11ax-HE40	100.0%	203/6965	16.00	15.14	0.739	1.590	-0.150	1.280	1.22	1.153	2.481
	ANT2	Back Side	8.6	802.11ax-HE40	100.0%	203/6965	16.00	15.14	0.361	0.568	0.016	1.280	1.22	0.563	0.886

11.5 Results overview of BT

Test Position of Body with 0mm	Test channel /Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (%)	Conducted Power (dBm)	Tune-up Limit(dBm)	Scaled SAR_{1-g} (W/kg)	Scalig factor
			1-g	10-g					
BTantenna to side									
Front side	0/2402	GFSK	0.064	0.029	-4.330	8.49	8.50	0.064	1.002
Rear side	0/2402	GFSK	0.038	0.017	3.580	8.49	8.50	0.038	1.002
Left side	0/2402	GFSK	0.005	0.002	-2.720	8.49	8.50	0.005	1.002
Top side	0/2402	GFSK	0.098	0.046	-4.640	8.49	8.50	0.098	1.002

12 Multiple Transmitter Information

The SAR measurement positions of each side are as below:



<Rear Side>

Side	Wi-Fi/BT antenna **(0 degree) to Side**
	SAR Consideration
Front Side	Yes
Rear Side	Yes
Left Side	No
Right Side	Yes
Top Side	Yes
Bottom Side	Yes

Note: According to section 6.1.4.5 device with swivel antennas, if the antennas can be rotated to two planes, an evaluation should be performed and documented on the report to decide the highest exposure conditions, and only that position need consideration.

In addition, in case of this antenna, the two representative positions 0degree and 90degree shall be evaluated independently for each required EUT edge. When evaluating the test surfaces, the nearest distance between the antenna and the edges is applicable.

12.1.1 Stand-alone SAR test exclusion

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR,where

• f(GHz) is the RF channel transmit frequency in GHz

• Power and distance are rounded to the nearest mW and mm before calculation

• The result is rounded to one decimal place for comparison

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

Body-Wornposition

Mode	Pmax(dBm)	Pmax(mW)	Distance(mm)	f(GHz)	Calculation Result	exclusion Threshold	SAR test exclusion
BT	8.49	7.06	5.00	2.45	7.50	8.49	Yes

12.1.2 Simultaneous Transmission SAR Summation Scenario

Mode	Position	Ant 1WIFI 1g(W/kg)	Ant 1 BT 1g(W/kg)	Ant 1 WIFI+ BT 1g(W/kg)
2.4Gwifi (MIMO)	Front	0.452	0.064	0.516
	Back	0.239	0.038	0.277
	Top	1.036	0.005	1.041
5.2Gwifi (MIMO)	Front	0.613	0.098	0.711
	Back	0.380	0.064	0.444
	Top	0.638	0.038	0.676
5.4Gwifi (MIMO)	Front	1.052	0.005	1.057
	Back	0.599	0.098	0.697
	Top	0.622	0.064	0.686
5.6Gwifi (MIMO)	Front	1.273	0.038	1.311
	Back	0.877	0.005	0.882
	Top	1.213	0.098	1.311
5.8Gwifi (MIMO)	Front	1.229	0.064	1.293
	Back	0.848	0.038	0.886
	Top	1.162	0.005	1.167
WIFI6E (U-NII-7 Ant 2)	Back	0.109	0.038	0.147

12.2 Measurement uncertainty evaluation for SAR test

The following table includes the uncertainty table of the IEEE 1528. The values are determined by Satimo.The breakdown of the individual uncertainties is as follows:

Measurement Uncertainty evaluation for SAR test								
Uncertainty Component	Tol. (±%)	Prob. Dist.	Div.	C_i (1g)	C_i (10g)	1g U_i (±%)	10g U_i (±%)	V_i
measurement system								
Probe Calibration	5.8	N	1	1	1	5.8	5.8	∞
Axial Isotropy	3.5	R	$\sqrt{3}$	$(1\text{-}C_p)^{1/2}$	$(1\text{-}C_p)^{1/2}$	1.43	1.43	∞
Hemispherical Isotropy	5.9	R	$\sqrt{3}$	$\sqrt{C_p}$	$\sqrt{C_p}$	2.41	2.41	∞
Boundary Effect	1	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	4.7	R	$\sqrt{3}$	1	1	2.71	2.71	∞
system Detection Limits	1	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Modulation response	3	N	1	1	1	3.00	3.00	∞
Readout Electronics	0.5	N	1	1	1	0.50	0.50	∞
Response Time	0	R	$\sqrt{3}$	1	1	0.00	0.00	∞
Integration Time	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
RF Ambient Conditions-Noise	3	R	$\sqrt{3}$	1	1	1.73	1.73	∞
RF Ambient Conditions-Reflections	3	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe Positioner Mechanical Tolerance	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Probe positioning with respect to Phantom Shell	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Extrapolation, interpolation and Integration Algorithms for Max.SAR Evaluation	2.3	R	$\sqrt{3}$	1	1	1.33	1.33	∞
Test sample Related								
Test Sample Positioning	2.6	N	1	1	1	2.60	2.60	11
Device Holder Uncertainty	3	N	1	1	1	3.00	3.00	7
Output Power Variation-SAR drift measurement	5	R	$\sqrt{3}$	1	1	2.89	2.89	∞
SAR scaling	2	R	$\sqrt{3}$	1	1	1.15	1.15	∞

Phantom and Tissue Parameters								
Phantom Uncertainty (shape and thickness tolerances)	4	R	$\sqrt{3}$	1	1	2.31	2.31	∞
Uncertainty in SAR correction for deviation (in permittivity and conductivity)	2	N	1	1	0.84	2.00	1.68	∞
Liquid conductivity（meas.）	2.5	N	1	0.64	0.43	1.60	1.08	5
Liquid conductivity (target.)	5	R	$\sqrt{3}$	0.64	0.43	1.85	1.24	5
Liquid Permittivity（meas.）	2.5	N	1	0.60	0.49	1.50	1.23	∞
Liquid Permittivity (target.)	5	R	$\sqrt{3}$	0.60	0.49	1.73	1.42	∞
Combined Standard Uncertainly		Rss				10.63	10.54	
Expanded Uncertainty{95% CONFIDENCE INTERRVAL}		k				21.26	21.08	

12.3 Measurement uncertainty evaluation for system check

The following table includes the uncertainty table of the IEEE 1528. The values are determined by Satimo.The breakdown of the individual uncertainties is as follows:

Uncertainty For System Performance Check								
Uncertainty Component	Tol. (±%)	Prob. Dist.	Div.	C_i 1g	C_i 10g	1g U_i(±%)	10g U_i (±%)	V_i
measurement system								
Probe Calibration	5.8	N	1	1	1	5.80	5.80	∞
Axial Isotropy	3.5	R	$\sqrt{3}$	$(1\text{-}C_p)^{1/2}$	$(1\text{-}C_p)^{1/2}$	1.43	1.43	∞
Hemispherical Isotropy	5.9	R	$\sqrt{3}$	$\sqrt{C_p}$	$\sqrt{C_p}$	2.41	2.41	∞
Boundary Effect	1	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	4.7	R	$\sqrt{3}$	1	1	2.71	2.71	∞
system detection Limits	1	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Modulation response	0	N	1	1	1	0.00	0.00	∞
Readout Electronics	0.5	N	1	1	1	0.50	0.50	∞
Response Time	0	R	$\sqrt{3}$	1	1	0.00	0.00	∞
Integration Time	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
RF ambient Conditions - Noise	3	R	$\sqrt{3}$	1	1	1.73	1.73	∞
RF ambient Conditions – Reflections	3	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioned Mechanical Tolerance	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Probe positioning with respect to Phantom Shell	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Extrapolation, interpolation and integration Algorithms for Max. SAR Evaluation	2.3	R	$\sqrt{3}$	1	1	1.33	1.33	∞
Dipole								
Deviation of experimental source from numerical source	4	N	1	1	1	4.00	4.00	∞
Input power and SAR drift measurement	5	R	$\sqrt{3}$	1	1	2.89	2.89	∞
Dipole axis to liquid Distance	2	R	$\sqrt{3}$	1	1	1.16	1.16	∞

Phantom and Tissue Parameters								
Phantom Uncertainty (shape and thickness tolerances)	4	R	$\sqrt{3}$	1	1	2.31	2.31	∞
Uncertainty in SAR correction for deviation (in permittivity and conductivity)	2	N	1	1	0.84	2.00	1.68	∞
Liquid conductivity（meas.）	2.5	N	1	0.64	0.43	1.60	1.08	5
Liquid conductivity (target.)	5	R	$\sqrt{3}$	0.64	0.43	1.85	1.24	5
Liquid Permittivity（meas.）	2.5	N	1	0.60	0.49	1.50	1.23	∞
Liquid Permittivity (target.)	5	R	$\sqrt{3}$	0.60	0.49	1.73	1.41	∞
Combined Standard Uncertainty		Rss				10.28	9.98	
Expanded Uncertainty (95% Confidence interval)		k				20.57	19.95	

13 Test equipment and ancillaries used for tests

To simplify the identification of the test equipment and/or ancillaries which were used, the reporting of the relevant test cases only refer to the test item number as specified in the table below.

	Manufacturer	Device Type	Type(Model)	Serial number	calibration	
					Last Cal.	Due Date
☒	SATIMO	COMOSAR DOSIMETRIC E FIELD PROBE	SSE2	3523-EPGO-428	2024-06-18	2025-06-17
☒	SATIMO	COMOSAR 750 MHz REFERENCE DIPOLE	SID750	SN 48/16 DIP0G750-444	2023-06-25	2026-06-24
☒	SATIMO	COMOSAR 835 MHz REFERENCE DIPOLE	SID835	SN 14/13 DIP0G835-235	2023-06-25	2026-06-24
☒	SATIMO	COMOSAR 900 MHz REFERENCE DIPOLE	SID900	SN 14/13 DIP0G900-231	2023-06-25	2026-06-24
☒	SATIMO	COMOSAR 1800 MHz REFERENCE DIPOLE	SID1800	SN 14/13 DIP1G800-232	2023-06-25	2026-06-24
☐	SATIMO	COMOSAR 1900 MHz REFERENCE DIPOLE	SID1900	SN 14/13 DIP1G900-236	2023-06-25	2026-06-24
☒	SATIMO	COMOSAR 2000 MHz REFERENCE DIPOLE	SID2000	SN 14/13 DIP2G000-237	2023-06-25	2026-06-24
☒	SATIMO	COMOSAR 2450 MHz REFERENCE DIPOLE	SID2450	SN 14/13 DIP2G450-238	2023-06-25	2026-06-24
☒	SATIMO	COMOSAR 2600 MHz REFERENCE DIPOLE	SID2600	SN 28/14 DIP2G600-327	2023-06-25	2026-06-24
☒	SATIMO	Software	OPENSAR	N/A	N/A	N/A
☒	SATIMO	Phantom	COMOSAR IEEE SAM PHANTOM	SN 14/13 SAM99	N/A	N/A
☒	R & S	Universal Radio Communication Tester	CMU 200	119733	2024-10-21	2025-10-20
☒	R & S	Universal Radio Communication Tester	CMW500	144459	2024-10-21	2025-10-20
☒	R & S	UXM5G Wireless Test Platform	E7515B	MY60192341	2024-10-21	2025-10-20
☒	HP	Network Analyser	8753D	3410A08889	2024-10-21	2025-10-20
☒	HP	Signal Generator	E4421B	GB39340770	2024-10-28	2025-10-27
☒	Keithley	Multimeter	Keithley 2000	4014539	2024-10-28	2025-10-27
☒	SATIMO	Amplifier	Power Amplifier	MODU-023-A-0004	2024-10-21	2025-10-20
☒	Agilent	Power Meter	E4418B	GB43312909	2024-10-21	2025-10-20
☒	Agilent	Power Meter Sensor	E4412A	MY41500046	2024-10-21	2025-10-20

Annex A: System performance verification

(**Please See the SAR Measurement Plots of annex A.**)

Annex B: Measurement results

(**Please See the SAR Measurement Plots of annex B.**)

Annex C: Calibrationreports

(Please See the Calibration reports of annex C.)

Annex D: Attachment Report for WIFI6E

Annex E: Photographs

Annex A: System Check

Tested Model : T15RA

Report Number:

WSCT-ANAB-R&E240800043A-SAR

MEASUREMENT 1

BODY

Type: Validation measurement (Complete)

Date of measurement:23/9/2024

Measurement duration: 10 minutes 43 seconds

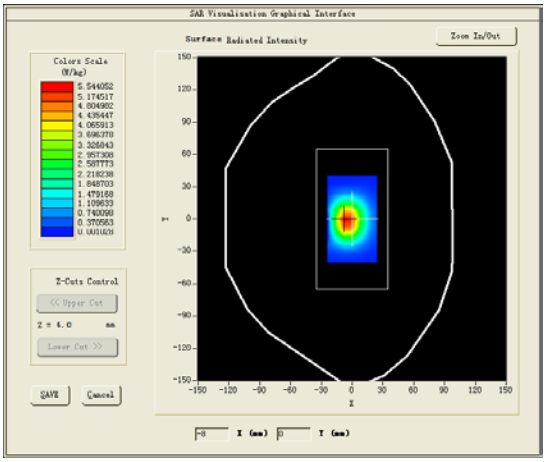
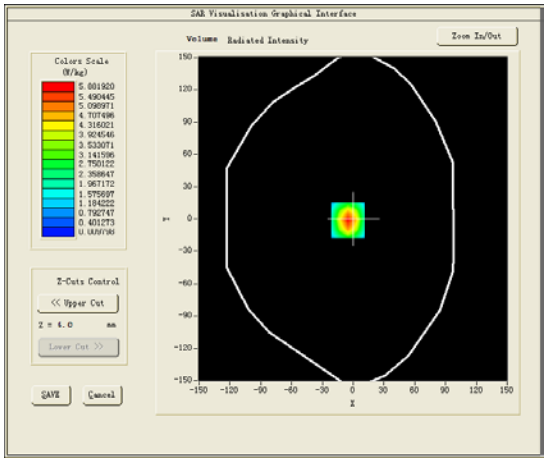
A. Experimental conditions.

Area Scan	dx=8mm dy=8mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW2450
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

Middle Band SAR (Channel -1):

Frequency (MHz)	2450.000000
Relative permittivity (real part)	40.269142
Relative permittivity (imaginary part)	14.039240
Conductivity (S/m)	1.82349
Variation (%)	0.390000

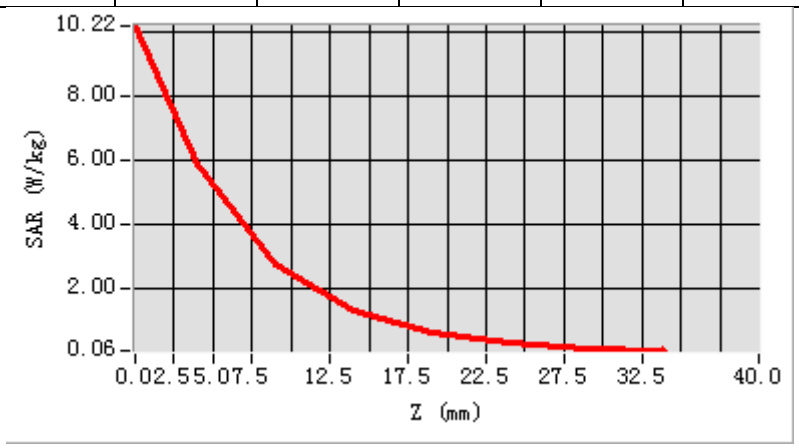
SURFACE SAR	VOLUME SAR
	

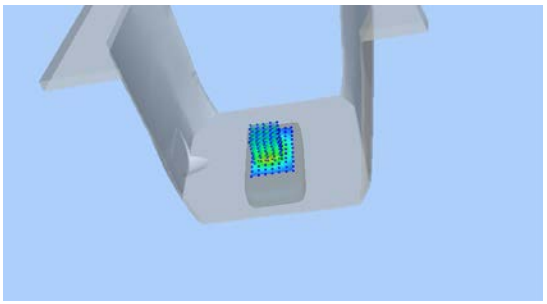
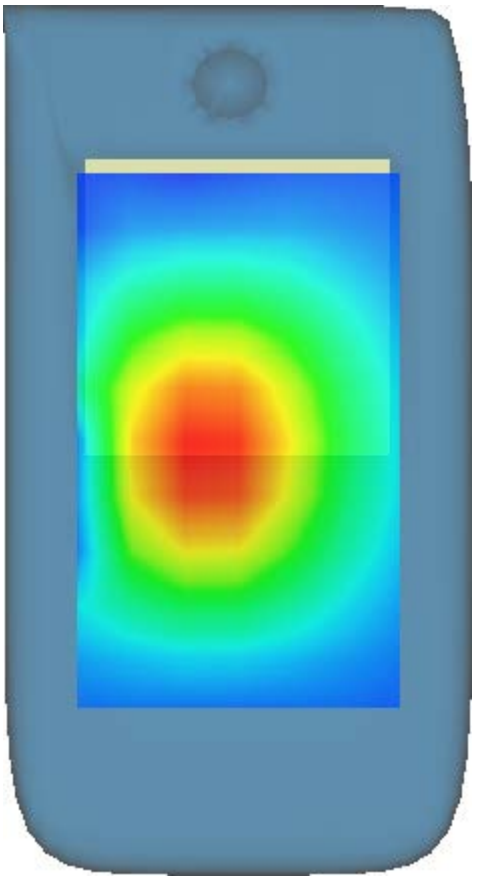
Maximum location: X=-5.00, Y=-1.00

SAR Peak: 10.96 W/kg

SAR 10g (W/Kg)	2.333453
SAR 1g (W/Kg)	5.433343

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	10.2188	5.8819	2.7478	1.3151	0.6266	0.2969	0.1341



3D screen shot	Hot spot position
	

MEASUREMENT 2

BODY

Type: Validation measurement (Complete)

Date of measurement: 25/9/2024

Measurement duration: 27 minutes 45 seconds

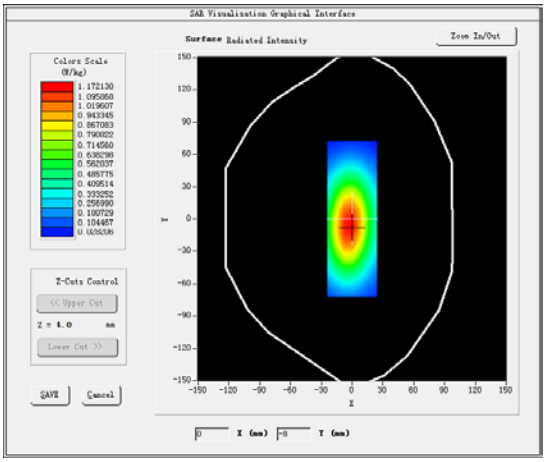
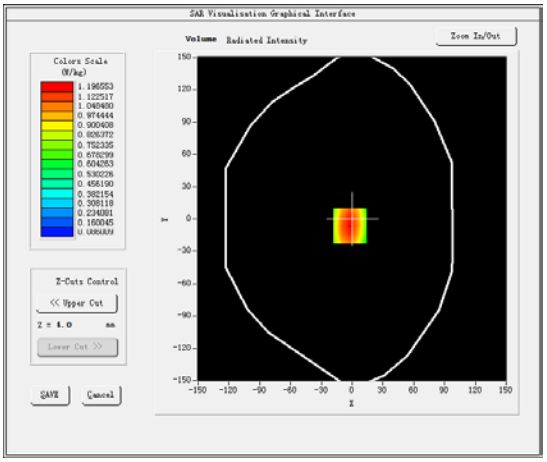
A. Experimental conditions.

Area Scan	dx=10mm dy=10mm
ZoomScan	8x8x7,dx=4mm dy=4mm dz=2mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW5200
Channels	Middle
Signal	CW (Duty cycle:1:1)

B. SAR Measurement Results

Middle Band SAR (Channel -1):

Frequency (MHz)	5200.000000
Relative permittivity (real part)	35.622599
Relative permittivity (imaginary part)	18.202492
Conductivity (S/m)	4.524169
Variation (%)	0.270000

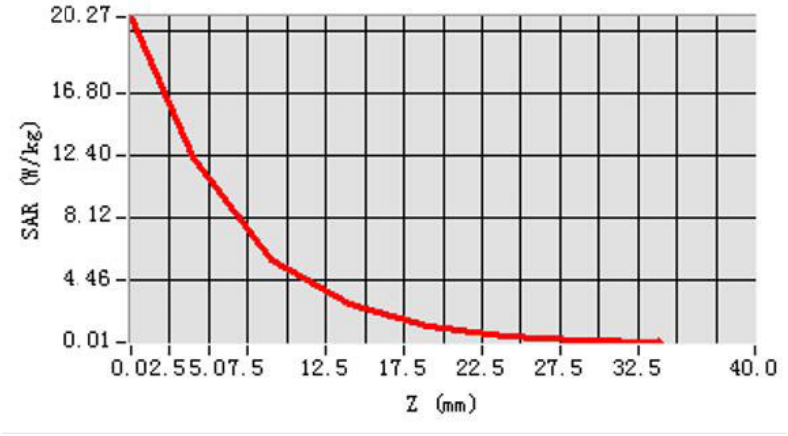
SURFACE SAR	VOLUME SAR
	

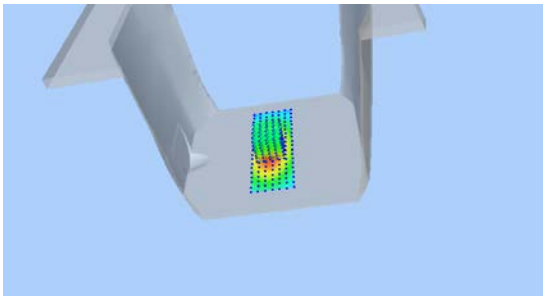
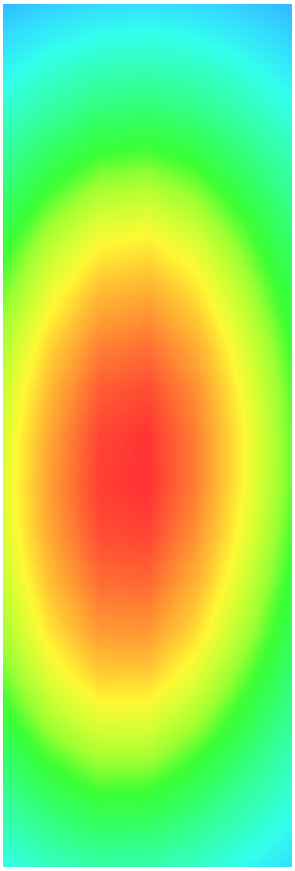
Maximum location: X=-2.00, Y=-1.00

SAR Peak: 10.27 W/kg

SAR 10g (W/Kg)	2.264061
SAR 1g (W/Kg)	7.718314

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	20.2711	16.1966	12.7784	10.5196	8.1218	4.2403	1.1660



3D screen shot	Hot spot position
	

MEASUREMENT 3

BODY

Type: Validation measurement (Complete)

Date of measurement: 27/9/2024

Measurement duration: 29 minutes 31 seconds

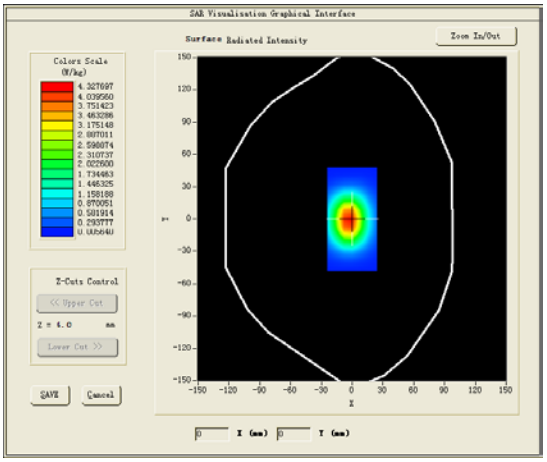
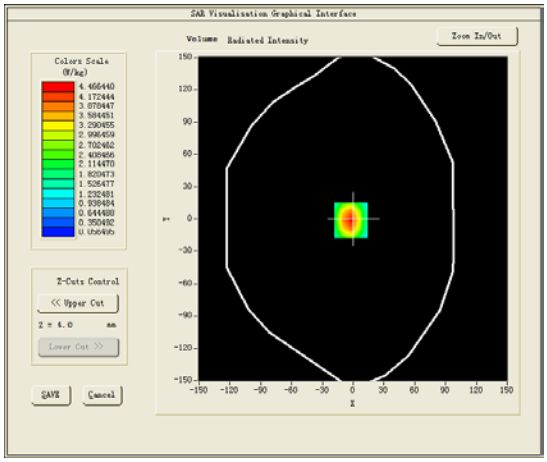
A. Experimental conditions.

Area Scan	dx=10mm dy=10mm
ZoomScan	8x8x7,dx=4mm dy=4mm dz=2mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW5500
Channels	Middle
Signal	CW (Duty cycle:1:1)

B. SAR Measurement Results

Middle Band SAR (Channel -1):

Frequency (MHz)	5500.000000
Relative permittivity (real part)	36.114300
Relative permittivity (imaginary part)	18.167566
Conductivity (S/m)	5.024104
Variation (%)	-0.350000

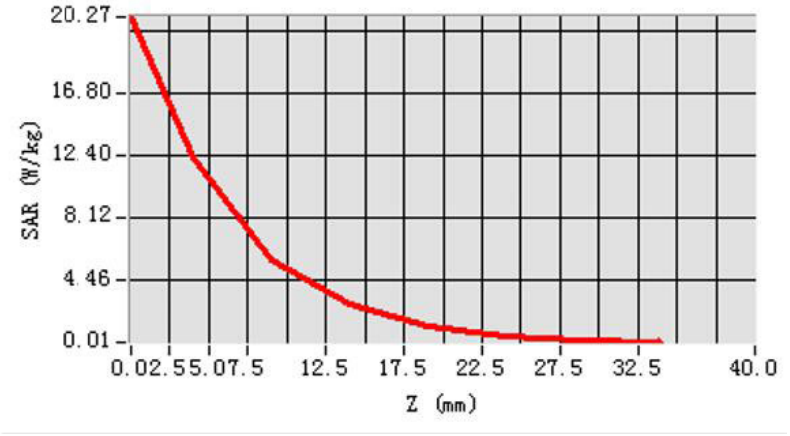
SURFACE SAR	VOLUME SAR
	

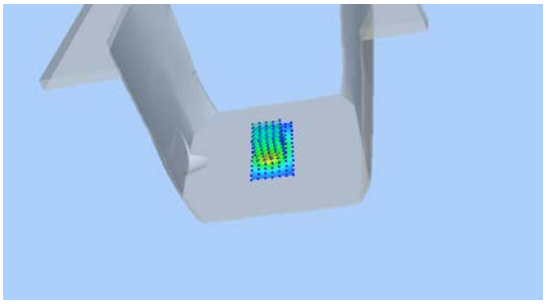
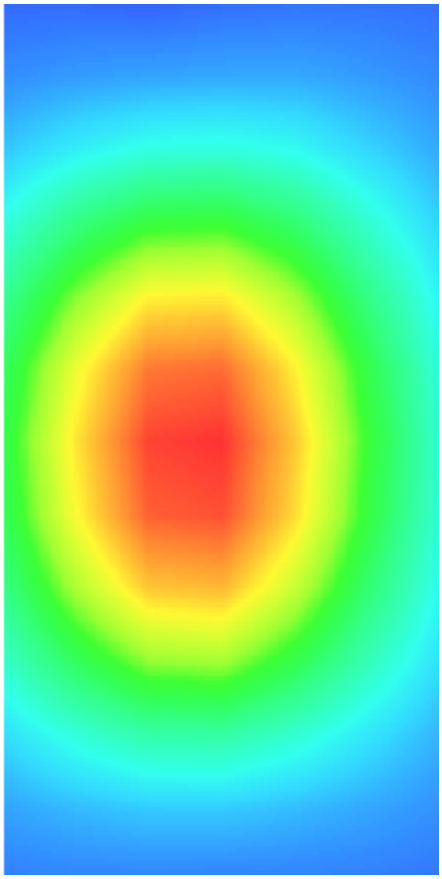
Maximum location: X=-2.00, Y=-1.00

SAR Peak: 10.87 W/kg

SAR 10g (W/Kg)	2.282155
SAR 1g (W/Kg)	8.337029

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	20.2697	16.4664	12.4603	10.3992	6.7963	4.4560	1.2601



3D screen shot	Hot spot position
	

MEASUREMENT 4

BODY

Type: Validation measurement (Complete)

Date of measurement: 29/9/2024

Measurement duration: 31 minutes 30 seconds

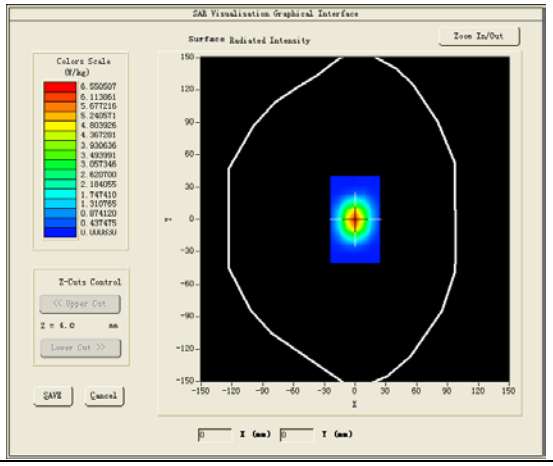
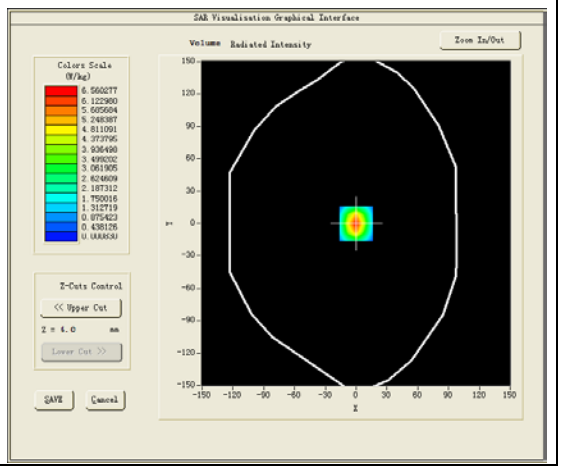
A. Experimental conditions.

Area Scan	dx=10mm dy=10mm
ZoomScan	8x8x7,dx=4mm dy=4mm dz=2mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW5800
Channels	Middle
Signal	CW (Duty cycle:1:1)

B. SAR Measurement Results

Middle Band SAR (Channel -1):

Frequency (MHz)	5800.000000
Relative permittivity (real part)	34.633851
Relative permittivity (imaginary part)	19.038417
Conductivity (S/m)	5.163402
Variation (%)	0.010000

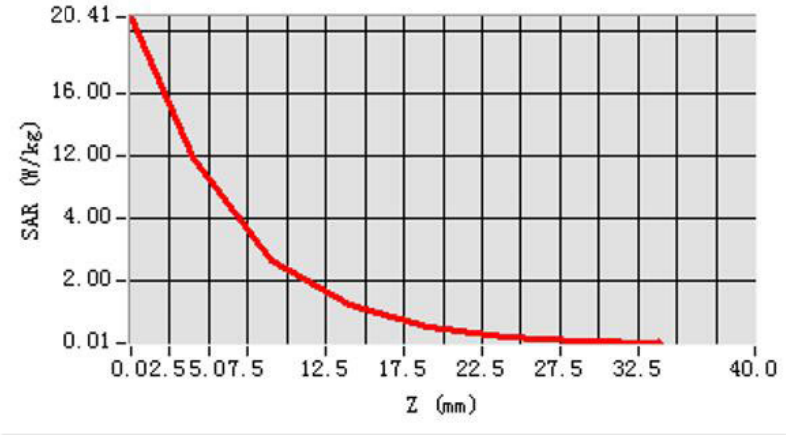
SURFACE SAR	VOLUME SAR
	

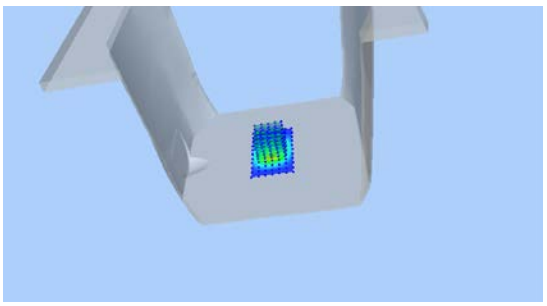
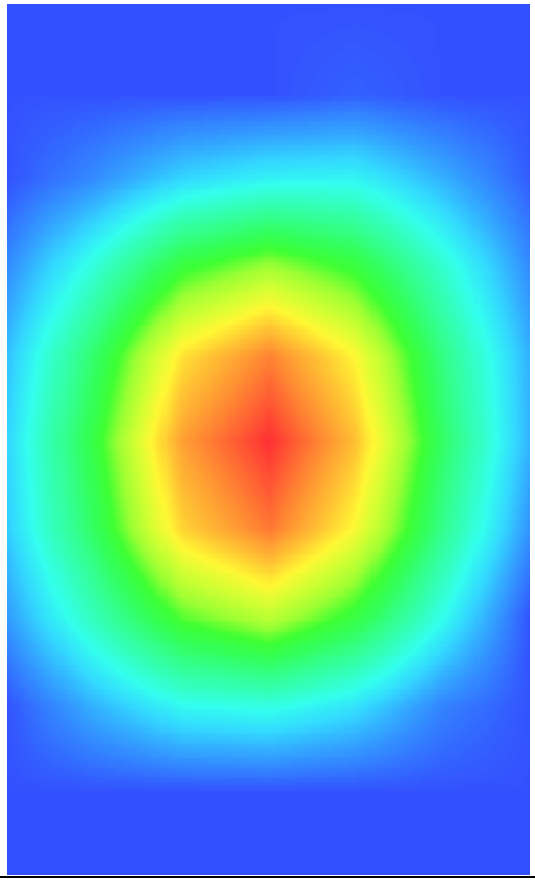
Maximum location: X=0.00, Y=0.00

SAR Peak: 9.41 W/kg

SAR 10g (W/Kg)	2.080196
SAR 1g (W/Kg)	7.965831

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	20.4140	16.5603	12.8797	8.2004	4.4226	2.1066	1.0008



3D screen shot	Hot spot position
	

Annex B: Measurement Results

Tested Model : T15RA

Report Number:

WSCT-ANAB-R&E240800043A-SAR

MEASUREMENT 1

Type: Phone measurement (Complete)

Date of measurement:23/9/2024

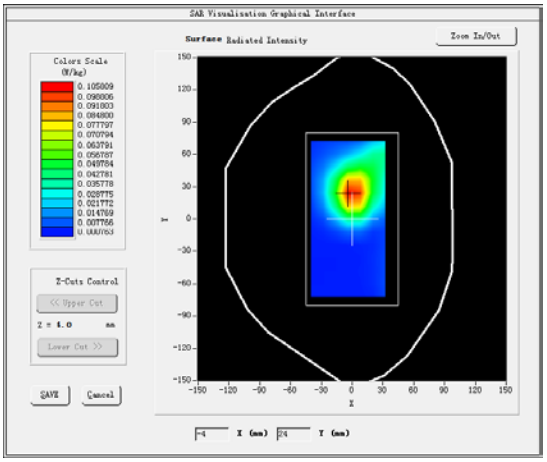
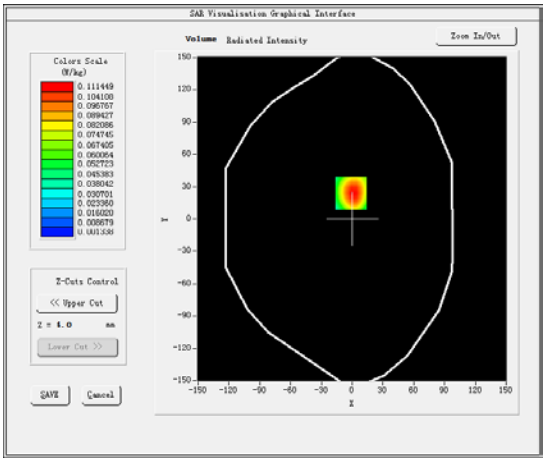
Measurement duration: 11 minutes 11 seconds

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm
ZoomScan	7x7x7,dx=5mm dy=5mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	IEEE 802.11b ISM
Channels	Middle
Signal	IEEE802.b (Crest factor: 1.0)

B. SAR Measurement Results

Frequency (MHz)	2437.000000
Relative permittivity (real part)	40.269142
Relative permittivity (imaginary part)	14.039240
Conductivity (S/m)	1.823490
Variation (%)	-0.250000

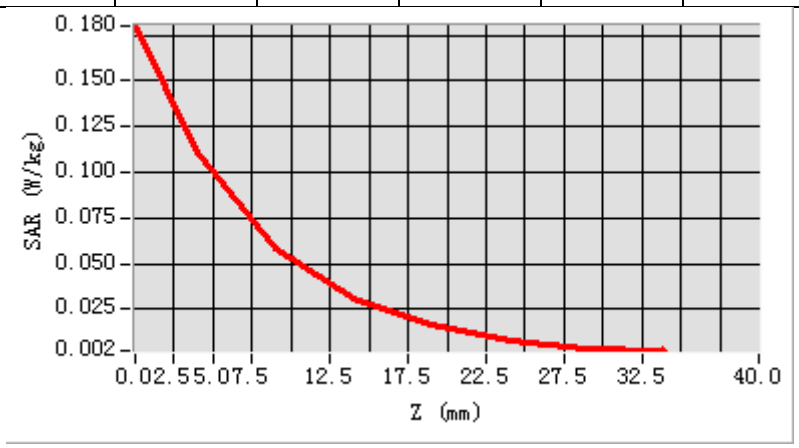
SURFACE SAR	VOLUME SAR
	

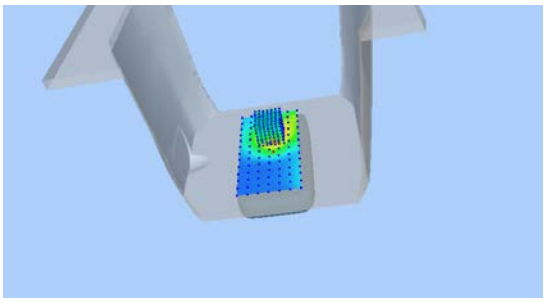
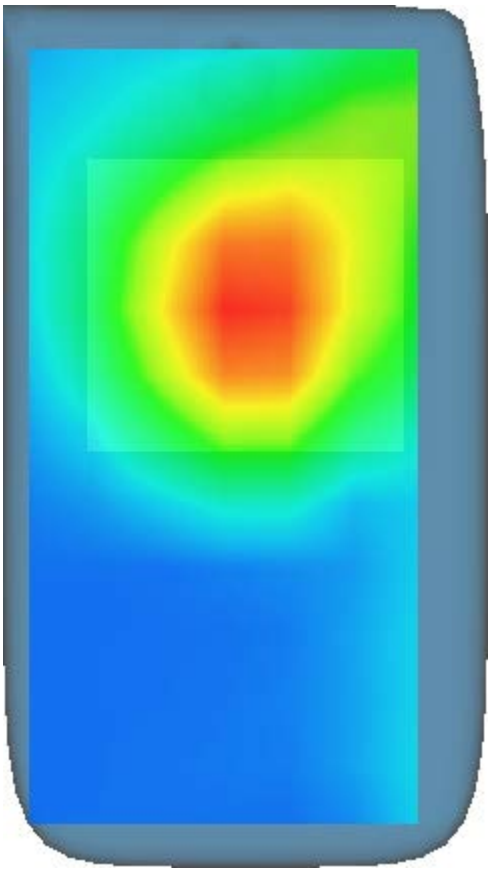
Maximum location: X=-1.00, Y=24.00

SAR Peak: 0.16 W/kg

SAR 10g (W/Kg)	0.428133
SAR 1g (W/Kg)	0.982651

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.1801	0.1114	0.0587	0.0309	0.0161	0.0083	0.0040



3D screen shot	Hot spot position
	

MEASUREMENT 2

Type: Phone measurement (Complete)

Date of measurement: 25/9/2024

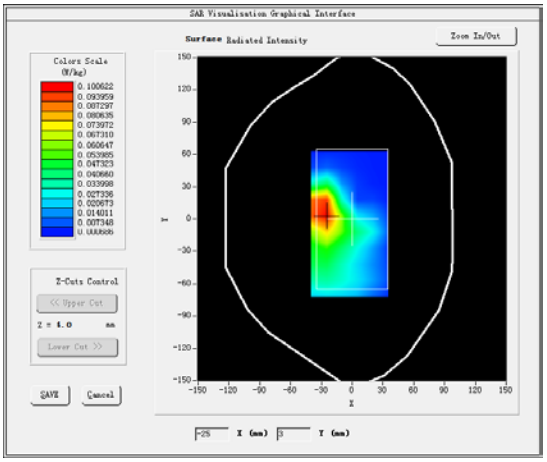
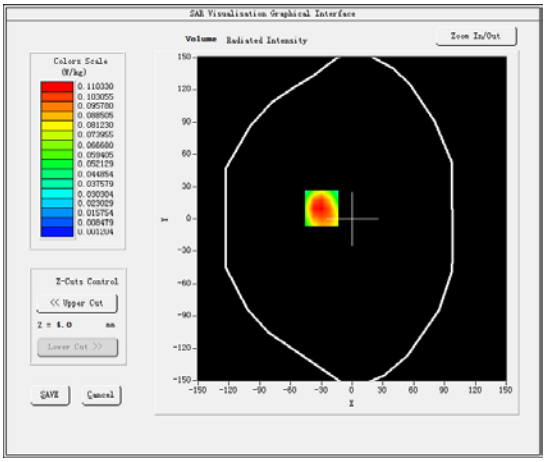
Measurement duration: 10 minutes 44 seconds

A. Experimental conditions.

Area Scan	dx=10mm dy=10mm
ZoomScan	7x7x12,dx=4mm dy=4mm dz=2mm,Complete
Phantom	Validation plane
Device Position	Body
Band	IEEE 802.11a U-NII-1
Channels	Middle
Signal	Duty cycle:1:1

B. SAR Measurement Results

Frequency (MHz)	5240.000000
Relative permittivity (real part)	35.622599
Relative permittivity (imaginary part)	18.202492
Conductivity (S/m)	4.524196
Variation (%)	-0.750000

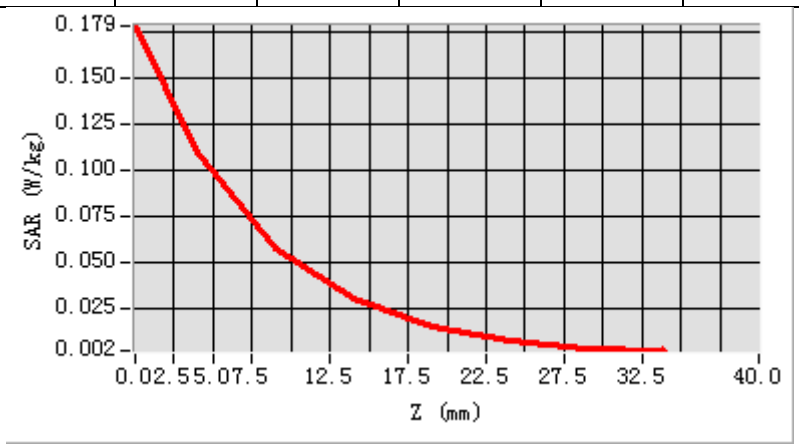
SURFACE SAR	VOLUME SAR
	

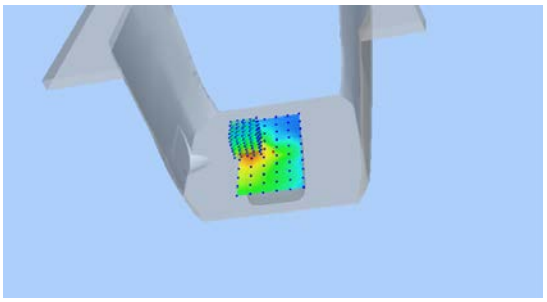
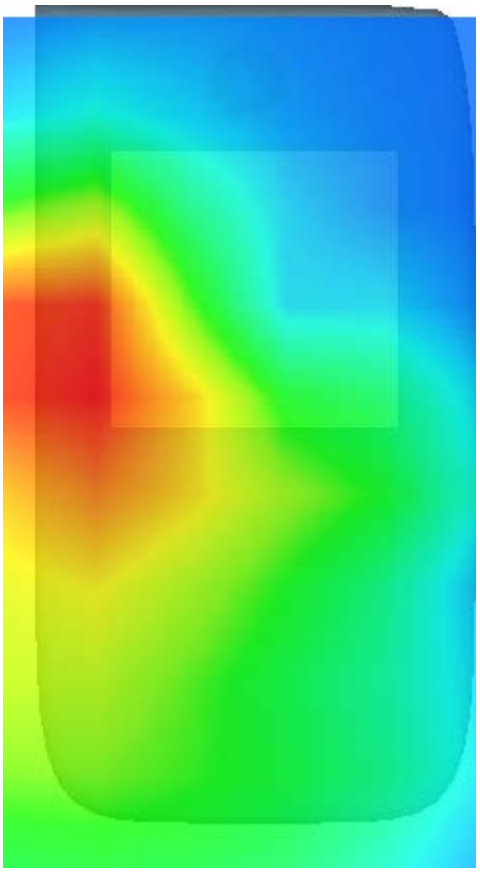
Maximum location: X=-30.00, Y=10.00

SAR Peak: 0.19 W/kg

SAR 10g (W/Kg)	0.192624
SAR 1g (W/Kg)	0.595760

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.1788	0.1103	0.0576	0.0303	0.0156	0.0075	0.0040



3D screen shot	Hot spot position
	

MEASUREMENT 3

Type: Phone measurement (Complete)

Date of measurement: 25/9/2024

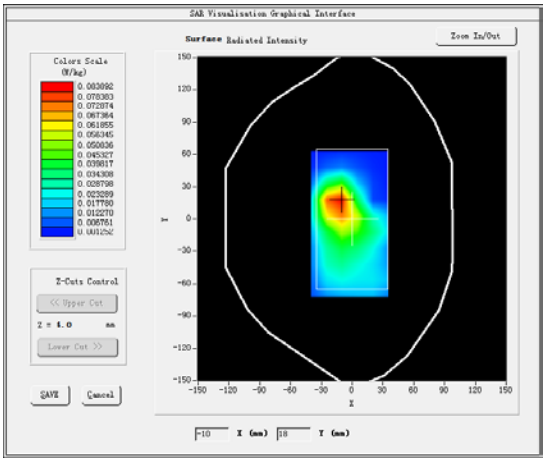
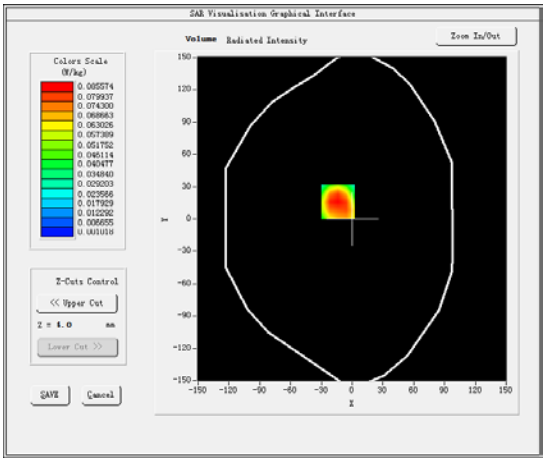
Measurement duration: 16 minutes 21 seconds

A. Experimental conditions.

Area Scan	dx=10mm dy=10mm
ZoomScan	7x7x12,dx=4mm dy=4mm dz=2mm,Complete
Phantom	Validation plane
Device Position	Body
Band	IEEE 802.11a U-NII-2a
Channels	Middle
Signal	Duty cycle:1:1

B. SAR Measurement Results

Frequency (MHz)	5290.000000
Relative permittivity (real part)	35.622599
Relative permittivity (imaginary part)	18.202492
Conductivity (S/m)	4.524169
Variation (%)	-2.250000

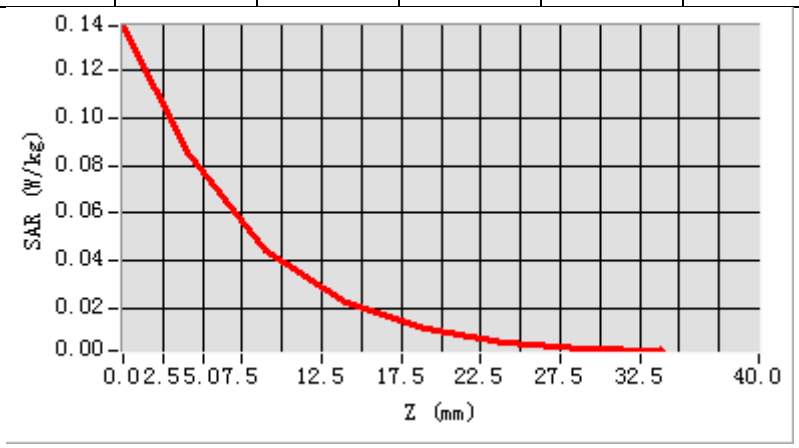
SURFACE SAR	VOLUME SAR
	

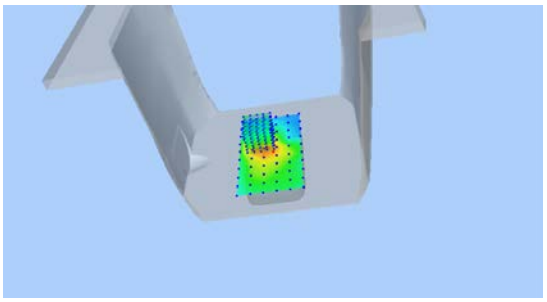
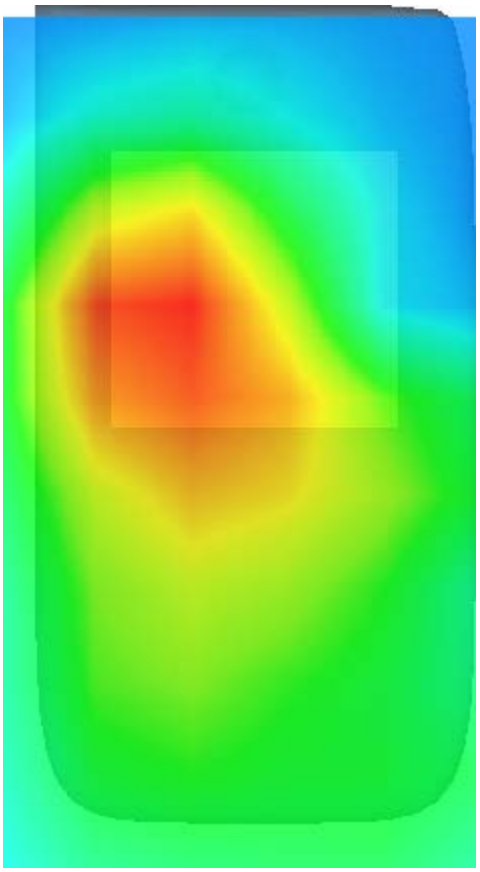
Maximum location: X=-14.00, Y=16.00

SAR Peak: 0.15 W/kg

SAR 10g (W/Kg)	0.345162
SAR 1g (W/Kg)	1.049864

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.1388	0.0856	0.0441	0.0224	0.0109	0.0049	0.0027



3D screen shot	Hot spot position
	

MEASUREMENT 4

Type: Phone measurement (Complete)

Date of measurement: 27/9/2024

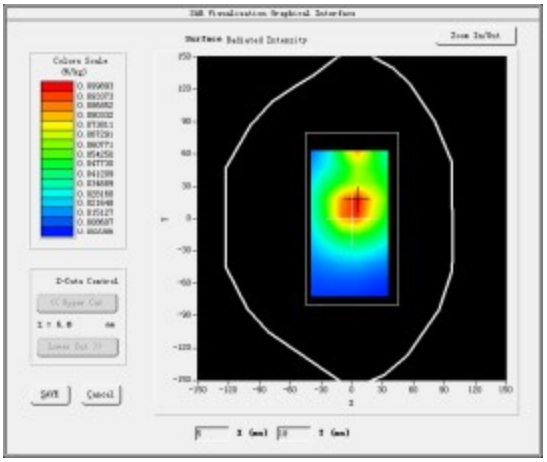
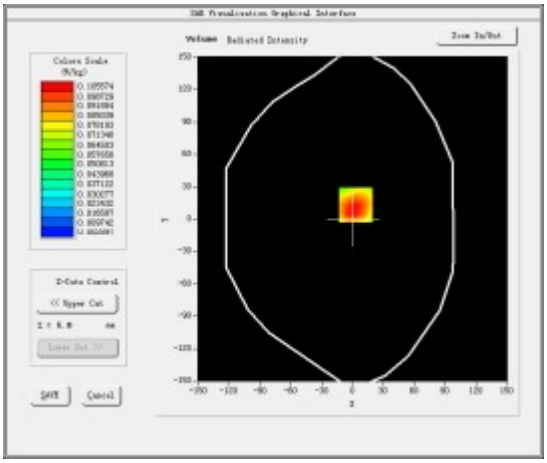
Measurement duration: 8 minutes 31 seconds

A. Experimental conditions.

Area Scan	dx=10mm dy=10mm
ZoomScan	7x7x12,dx=4mm dy=4mm dz=2mm,Complete
Phantom	Validation plane
Device Position	Body
Band	IEEE 802.11a U-NII-2c
Channels	Middle
Signal	Duty cycle:1:1

B. SAR Measurement Results

Frequency (MHz)	5700.000000
Relative permittivity (real part)	36.114300
Relative permittivity (imaginary part)	18.167566
Conductivity (S/m)	5.024104
Variation (%)	-1.000000

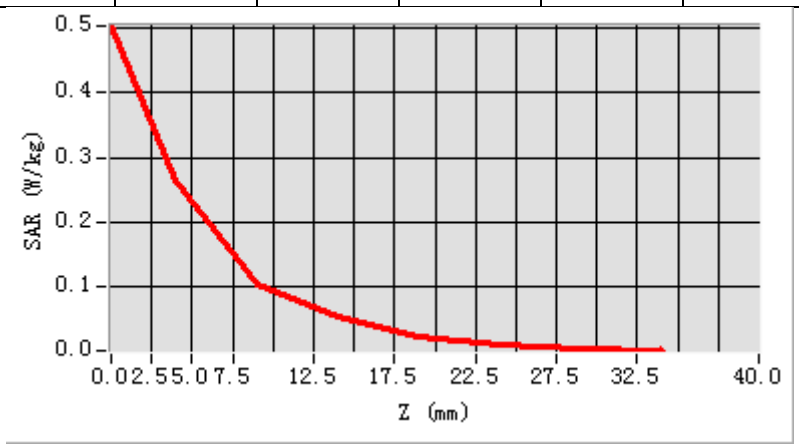
SURFACE SAR	VOLUME SAR
	

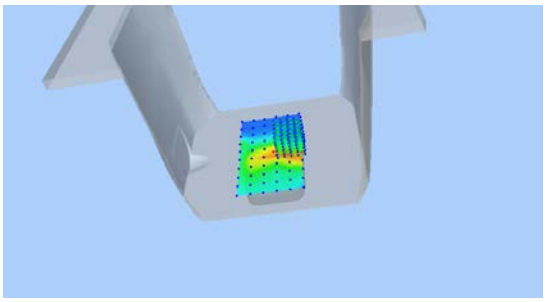
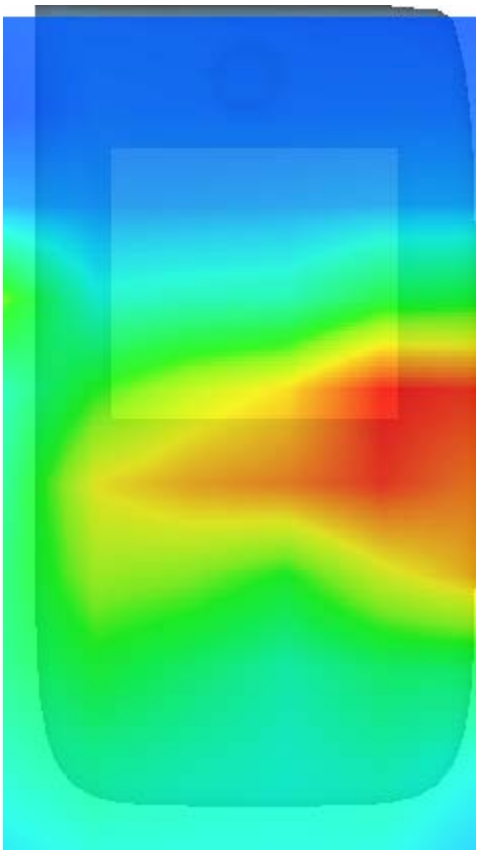
Maximum location: X=3.00, Y=13.00

SAR Peak: 0.17 W/kg

SAR 10g (W/Kg)	0.404316
SAR 1g (W/Kg)	1.210342

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.5035	0.2644	0.1036	0.0539	0.0226	0.0107	0.0050



3D screen shot	Hot spot position
	

MEASUREMENT 5

Top-side-middle

Type: Phone measurement (Complete)

Date of measurement: 29/9/2024

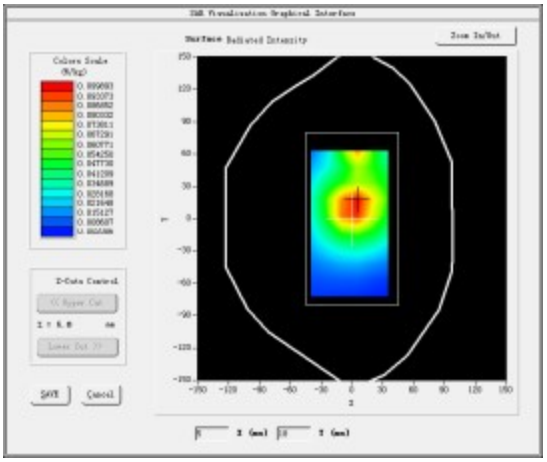
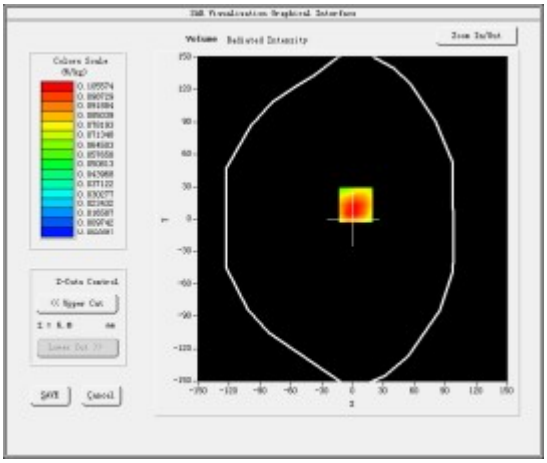
Measurement duration: 8 minutes 31 seconds

A. Experimental conditions.

Area Scan	dx=10mm dy=10mm
ZoomScan	7x7x12,dx=4mm dy=4mm dz=2mm,Complete
Phantom	Validation plane
Device Position	Body
Band	IEEE 802.11a U-NII-3
Channels	Middle
Signal	Duty cycle:1:1

B. SAR Measurement Results

Frequency (MHz)	5825.000000
Relative permittivity (real part)	34.633851
Relative permittivity (imaginary part)	19.038417
Conductivity (S/m)	5.163402
Variation (%)	-1.000000

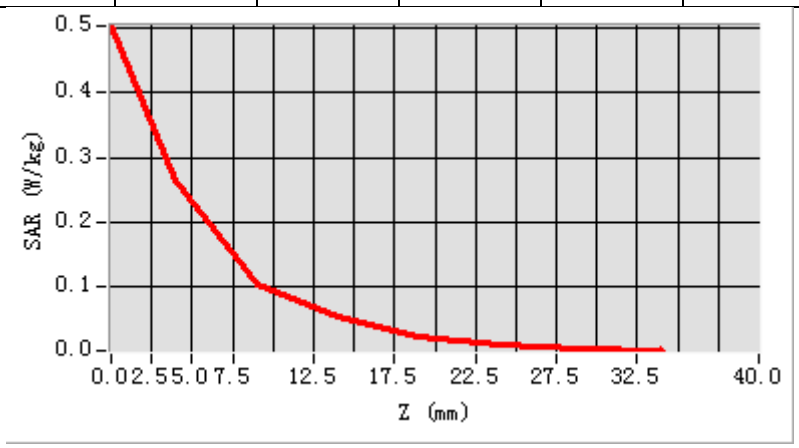
SURFACE SAR	VOLUME SAR
	

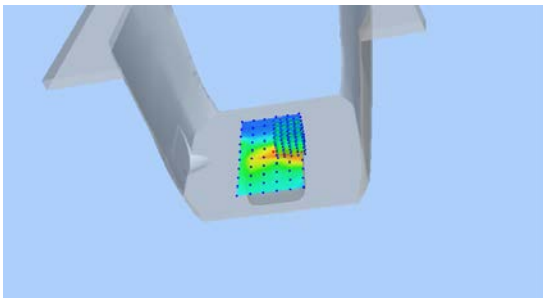
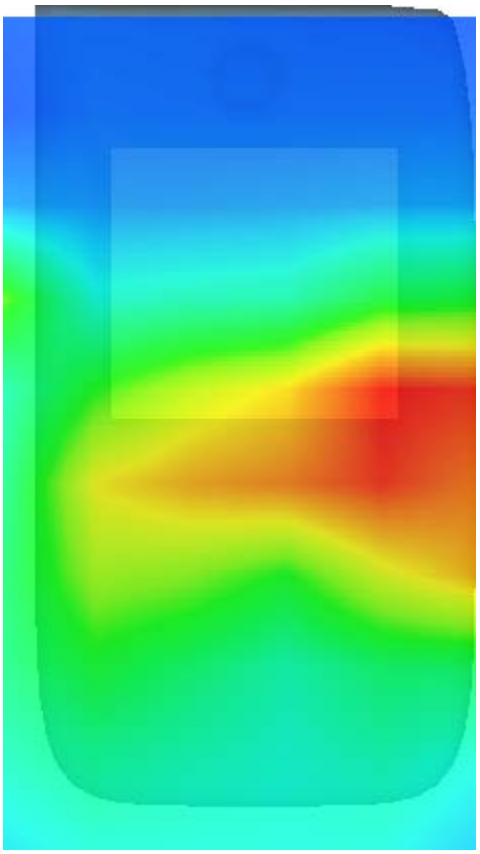
Maximum location: X=3.00, Y=13.00

SAR Peak: 0.17 W/kg

SAR 10g (W/Kg)	0.377845
SAR 1g (W/Kg)	1.099768

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.5035	0.2644	0.1036	0.0539	0.0226	0.0107	0.0050



3D screen shot	Hot spot position
	

MEASUREMENT 7

Type: Phone measurement (Complete)

Date of measurement:23/9/2024

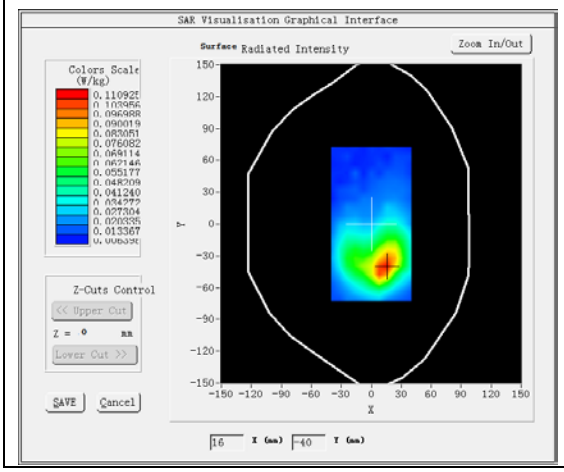
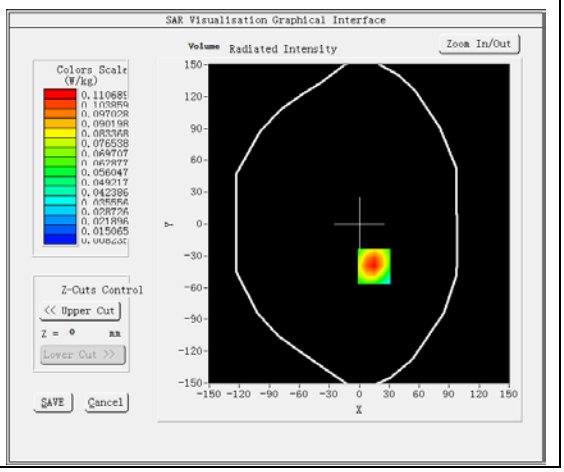
Measurement duration: 11 minutes 11 seconds

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm
ZoomScan	7x7x7,dx=5mm dy=5mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	Bluetooth
Channels	Middle
Signal	Bluetooth (Crest factor: 1.0)

B. SAR Measurement Results

Frequency (MHz)	2402.000000
Relative permittivity (real part)	40.269142
Relative permittivity (imaginary part)	14.039240
Conductivity (S/m)	1.823490
Variation (%)	-4.640000

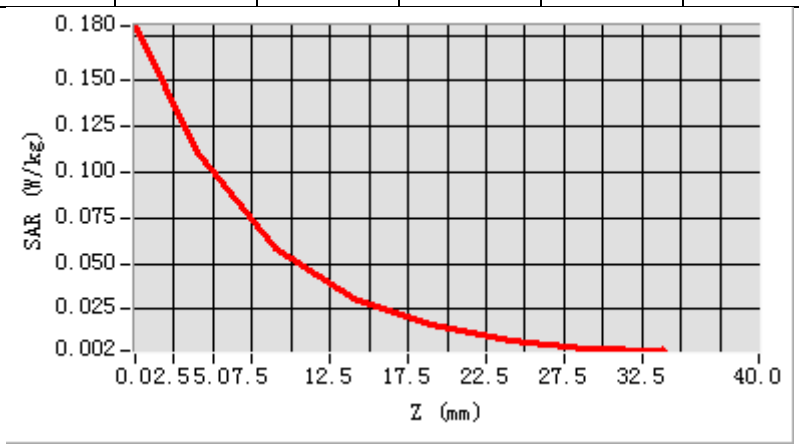
SURFACE SAR	VOLUME SAR
	

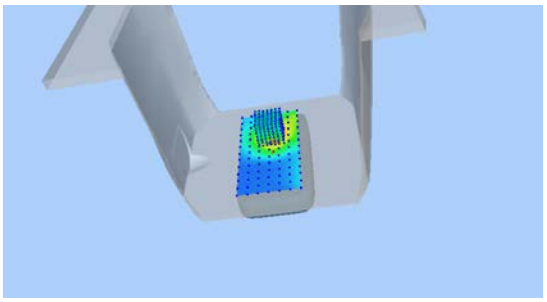
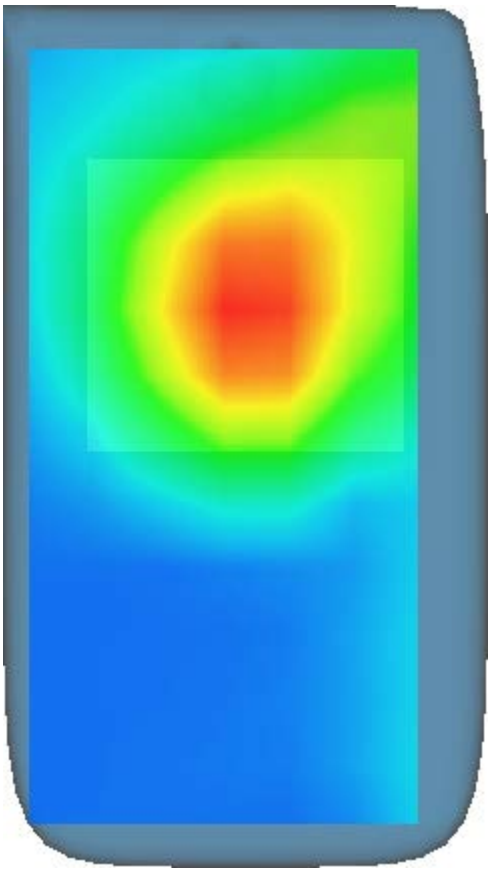
Maximum location: X=15.00, Y=-40.00

SAR Peak: 0.18 W/kg

SAR 10g (W/Kg)	0.045625
SAR 1g (W/Kg)	0.097848

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.1801	0.1114	0.0587	0.0309	0.0161	0.0083	0.0040



3D screen shot	Hot spot position
	

	**Annex C: Calibration Reports**
	Tested Model : T15RA
	Report Number: **WSCT-ANAB-R&E240800043A-SAR**

SAR Reference Dipole Calibration Report

Ref : ACR.313.16.23.BES.A

WORLD STANDARDIZATION CERTIFICATION & TESTING GROUP CO .,LTD

BLOCK A, BAO SHI SCIENCE PARK,BAO SHI ROAD, BAO'AN DISTRICT

SHENZHEN 518108,P.R. CHINA

MVG COMOSAR REFERENCE DIPOLE

FREQUENCY: 2450 MHZ

SERIAL NO.: 3723-DIP2G450-738

Calibrated at MVG

Z.I. de la pointe du diable

Technopôle Brest Iroise – 295 avenue Alexis de Rochon

29280 PLOUZANE - FRANCE

Calibration date: 09/11/2023

Accreditations #2-6789 and #2-6814
Scope available on www.cofrac.fr

Summary:

This document presents the method and results from an accredited SAR reference dipole calibration performed in MVG using the COMOSAR test bench. All calibration results are traceable to national metrology institutions.

	Name	*Function*	*Date*	*Signature*
Prepared by :	Cyrille ONNEE	Measurement Responsible	11/9/2023	
Checked & approved by:	Jérôme Luc	Technical Manager	11/9/2023	
Authorized by:	Yann Toutain	Laboratory Director	11/9/2023	

Yann Toutain ID
Signature numérique de Yann Toutain ID
Date : 2023.11.09 16:44:40 +01'00'

	Customer Name
Distribution :	World Standardization Certification & Testing Group Co .,Ltd

Issue	*Name*	*Date*	*Modifications*
A	Cyrille ONNEE	11/9/2023	Initial release

TABLE OF CONTENTS

1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

2 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR 2450 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID2450
Serial Number	3723-DIP2G450-738
Product Condition (new / used)	New

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards. The product is designed for use with the COMOSAR test bench only.

Figure 1 – *MVG COMOSAR Validation Dipole*

4 MEASUREMENT METHOD

4.1 MECHANICAL REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards specify the mechanical components and dimensions of the validation dipoles, with the dimension's frequency and phantom shell thickness dependent. The COMOSAR test bench employs a 2 mm phantom shell thickness therefore the dipoles sold for use with the COMOSAR test bench comply with the requirements set forth for a 2 mm phantom shell thickness. A direct method is used with a ISO17025 calibrated caliper.

4.2 S11 PARAMETER REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a S11 of -20 dB or better. The S11 measurement shall be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. A direct method is used with a network analyser and its calibration kit, both with a valid ISO17025 calibration.

4.3 SAR REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards provide requirements for reference dipoles used for system validation measurements. The following measurements were performed to verify that the product complies with the fore-mentioned standards.

5 MEASUREMENT UNCERTAINTY

5.1 MECHANICAL DIMENSIONS

For the measurement in the range 0-300mm, the estimated expanded uncertainty (k=2) in calibration for the dimension measurement in mm is +/-0.20 mm with respect to measurement conditions.

For the measurement in the range 300-450mm, the estimated expanded uncertainty (k=2) in calibration for the dimension measurement in mm is +/-0.44 mm with respect to measurement conditions.

5.2 S11 PARAMETER

The estimated expanded uncertainty (k=2) in calibration for the S11 parameter in linear is +/-0.08 with respect to measurement conditions.

5.3 SAR

The guidelines outlined in the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards were followed to generate the measurement uncertainty for validation measurements.

The estimated expanded uncertainty (k=2) in calibration for the 1g and 10g SAR measurement in W/kg is +/-19% with respect to measurement conditions.