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: K15SRA

Test Engineer:	Xu Yihan
Report Number:	WSCT-ANAB-R&E241200076A-SAR
Report Date:	03 March 2025
FCC ID:	2ADYY-K15SRA
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Modified History

REV.	Modification Description	Issued Date	Remark
REV.1.0	Initial Test Report Relesse	03 February 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: 2024-12-25
Start of test: 2024-12-27
End of test: 2025-02-22

1.3 Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for K15SRA is as below:

Band	Position	MAX ReportedSAR_{1g}(W/kg)	Limit (W/kg)
2.4G WIFI	Body-Worn 0mm	0.873	1.6
5.2G WIFI	Body-Worn 0mm	0.908	
5.4G WIFI	Body-Worn 0mm	0.993	
5.6G WIFI	Body-Worn 0mm	1.223	
5.8G WIFI	Body-Worn 0mm	0.877	
BT	Body-Worn 0mm	0.071	
Max.Simultaneous Transmission SAR(W/kg)			
Items	Body SAR (Gap 0mm)		1.6
Sum SAR	1.294		

The device is in compliance with Specific Absorption Rate (SAR) for general population/uncontraolled exposure limits of 1.6 W/Kg as averaged over any 1g tissue according to the FCC rule the ANSI/IEEE C95.1:2005, the NCRP Report Number 86 for uncontrolled environment, according to the Industry Canada Radio Standards Specification RSS-102 for General Population/Uncontrolled exposure, and had been tested in accordance with the measurement methods and procedures specified in IEEE Std 1528-2013.

1.4 EUT Information

Device Information:			
Product Type:	Laptop Computer		
Model:	K15SRA		
Brand Name:	TECNO		
Device Type:	Portable device		
Exposure Category:	uncontrolled environment / general population		
Production Unit or Identical Prototype:	Production Unit		
Antenna Type :	Integral Antenna		
Antenna Gain:	BT: 3.97dBi 2.4GWIFI: MAIN ANT: 6.04dBi /AUX ANT: 3.97 dBi 5GWIFI: MAIN ANT: 2.49dBi /AUX ANT: 2.76 dBi		
Device Operating Configurations:			
Supporting Mode(s) :	Wi-Fi , BT		
Modulation:	DSSS, OFDM 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: 5150-5250 MHz Band 2: 5250-5350 MHz Band 3: 5470-5725 MHz Band 4: 5725-5850 MHz	
	BT	2402~2480	2402~2480
Power Source:	Rechargeable Li-ion Polymer Battery: K15S Nominal Voltage: 11.55V Rated Capacity: 6060mAh Rated nergy:70.00Wh 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.
Laboratory A:	Building A-B,Baoli'an Industrial Park,No.58 and 60,Tangtou Avenue, Shiyan Street, Bao'an District, Shenzhen City, Guangdong Province, China
Laboratory B:	Building J-7F and Building D, Dongjiang Science & Technology Park, Tangjia Community, Fenghuang Street, Guangming District, Shenzhen City, Guangdong Province, China

3 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

CBTL	IECEE(international Electrotechnical Commiss,The certificate registration number is TL672)	Laboratory A ☐ Laboratory B ☐
China	CNAS (The certificated registration number: L3732)	Laboratory A ☐ Laboratory B ☐
USA	A2LA (The certificated registration number: 5768.01)	Laboratory A ☐ Laboratory B ☐
USA	ANAB (The certificated registration number:AT-3951)	Laboratory A ☒ Laboratory B ☐

Copies of granted accreditation certificates are available for downloading from our web site, http://www.wsct-cert.com

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:

No.	Identity	Document Title
1	IEC/IEEE 62209-1528	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate in the Human Head from Wireless Communications Devices: Measurement Techniques
2	RSS-102	Radio Frequency Exposure Compliance of Radio communication Apparatus (All Frequency Bands(Issue 5 March 2015)
3	KDB447498 D01	General RF Exposure Guidance v06
4	KDB616217 D04	SAR for laptop and tabletsv01r03
5	KDB248227D01	SARmeas for 802.11a/b/g v02r02
6	KDB865664D01	SAR Measurement 100 MHz to 6 GHz v01r04
7	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

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

where:

σ = conductivity of the tissue (S/m)

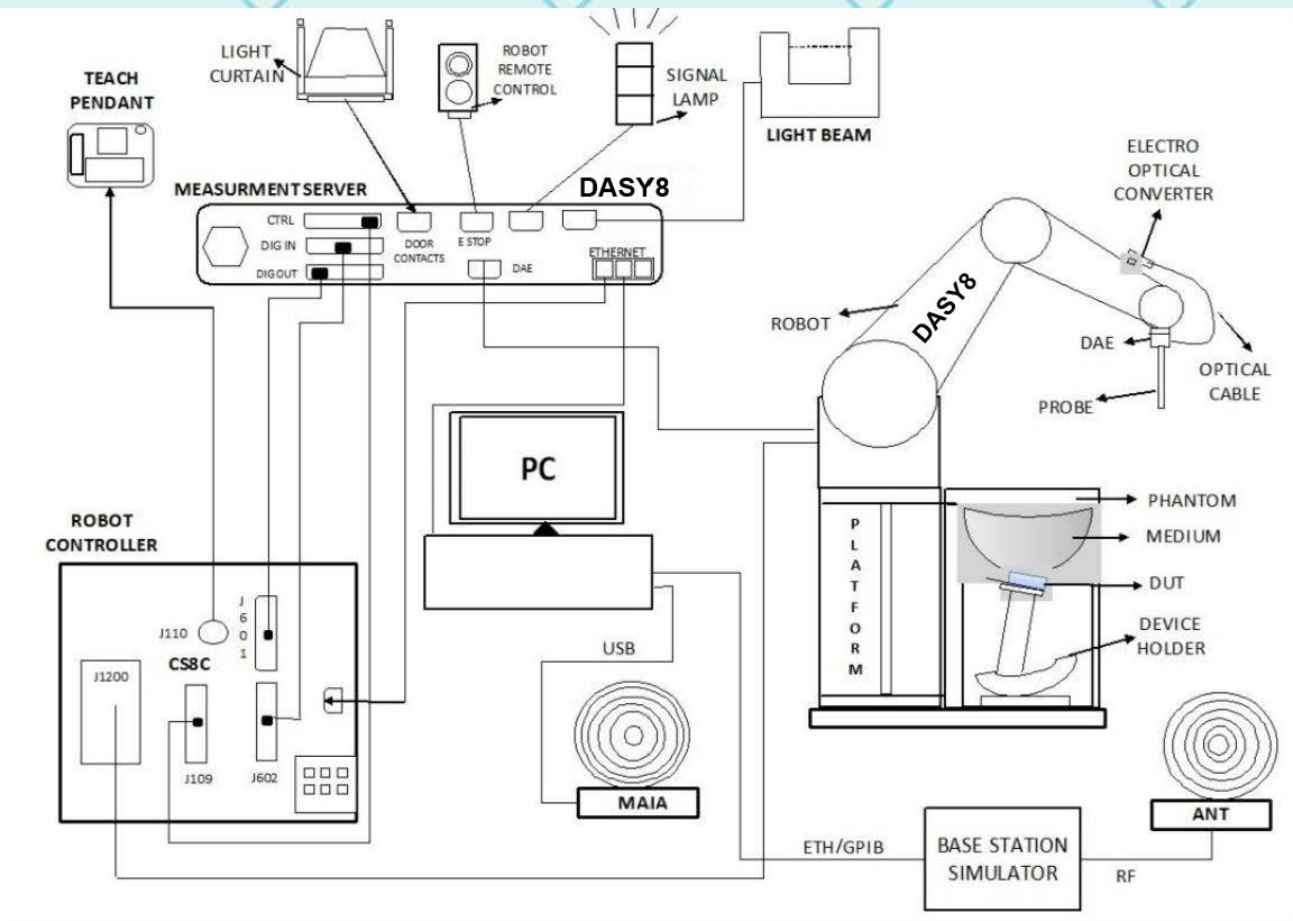
ρ = mass density of the tissue (kg/m^3)

E = rms electric field strength (V/m)

7 SAR Measurement System

7.1 The Measurement System

DASY8 is a flexible, high-precision near-field scanner optimized for automated measurements in free-space and tissue simulating liquids (TSL), using the most advanced probes covering the frequency range from 3 kHz to 110 GHz. The software enables point, area, and volume measurements and conformal scanning of complex geometries.



The DASY8 SAR module consists of an isotropic dosimetric probe (SAR) mounted on the TX2 precision robot, which allows field scanning inside anthropomorphic phantoms filled with tissue-simulating liquids. The probes are miniaturized, sensitive, isotopic, linear, stable and calibrated with precise boundary compensation. The spatial accuracy of probe positioning within the phantom is better than 0.2 mm. Scanning is optimized and adaptive to the induced field. The spatial SAR peak is determined without reconstruction.

7.2 Robot

The DASY8 system uses the high-precision industrial robots TX2-60L and TX2-90XL from Stäubli SA (France). The TX2 family of robots provides the ideal combination of speed, rigidity, size, and precision:

- High precision (repeatability 0.03 mm)
- High reliability and low maintenance costs (industrial design)
- ELF interference (motor control fields are shielded by the closed metallic construction)
- Hygienic encapsulated 6-axis arm enabled by a hollow shaft gearbox, no external cables.

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7.3 Probe

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

For the measurements the Specific Dosimetric E-Field Probe EX3DV4-SN:7895&7391 with following specifications is used

Frequency: 4MHz – 10GHz ;
Linearity: ±0.2dB (30MHz – 10GHz)

Dynamic Range: 10µW/g–>100 mW/g
Linearity: ±0.2dB (noise: typically <1µW/g)

Directivity (typical): ±0.1 dB in TSL (rotation around probe axis)
±0.3 dB in TSL (rotation normal to probe axis)

Sensor Arrangement	Triangular
Connector Angle	46.9°
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	9mm
Tip Diameter	2.5mm
Probe Tip to Sensor X Calibration Point	1mm
Probe Tip to Sensor Y Calibration Point	1mm
Probe Tip to Sensor Z Calibration Point	1mm
Recommended Measurement Distance from Surface	1.4mm

7.4 DAE

DAE4ip– Data Acquisition Electronics 4 with Integrated Power

Data Acquisition Electronics 4 with an integrated power supply for time unlimited measurements.

Performance:

- Measurement range: -100–+300 mV (16-bit resolution and two range settings: 4 mV, 400 mV)
- Input offset voltage:<5µV (with auto zero)
- Input resistance:200MOhm
- Input bias current:<50 FA
- Power supply: integrated (from the DASY8 measurement server)
- Dimensions(L × W × H):60×60×68 mm
- Calibration: ISO/IEC 17025 calibration service available.

7.5 Phantom

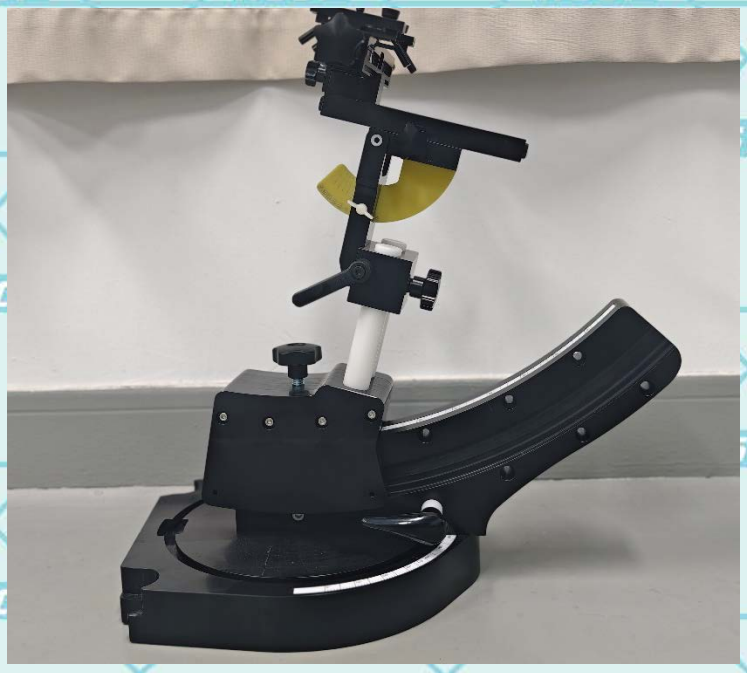
The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEC/IEEE 62209-1528. It enables the dosimetric evaluation of left—and right-hand phone usage as well as body-mounted usage at the flat phantom region. A cover prevents the liquid from evaporating. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.

Material	Vinyl ester, fiberglass reinforced (VE-GF)
Liquid Compatibility	The phantom shell is compatible with SPEAG's tissue-simulating liquids (sugar and oil-based). However, using other liquids may render the phantom warranty void (see note or consult SPEAG support).
Shell Thickness	2 ± 0.2mm (6 ± 0.2mm at ear point)
Dimensions (incl. Wooden Support)	Length:1000 mm Width: 500 mm Height: adjustable feet
Filling Volume	approx.25 liters
Support	DASY6/8: standard-size platform slot DASY52 stand-alone: SPEAG standard phantom table
Accessories	Mounting Device and Adaptors

7.6 Device Holder

The DASY instrument holder is designed to accommodate the various positions specified in the standard. It has two scales for instrument rotation (with respect to the body axis) and instrument tilt (with respect to the line between the ear reference points). The center of rotation for both scales is the Ear Reference Point (ERP). This eliminates the need to reposition the instrument when changing angles.

The DASY instrument holder is made of low-loss POM material with the following dielectric parameters: relative permittivity ε=3 and loss tangent δ=0.02. The amount of dielectric material in the immediate vicinity of the device was reduced because measurements indicated that the influence of the clamp on the test results could be reduced.



Device holder

The positioning system allows obtaining cheek and tilting position with a very good accuracy. In compliance with CENELEC, the tilt angle uncertainty is lower than 1°.

7.7 SAR Scan General Requirement

According to kdb865664 D01 v01r04:
Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR.Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std 1528-2013.The area and zoom scan resolutions specified in the table below must be applied to the SAR measurements and fully documented in SAR reports, unless further guidance has been provided by the FCC.

			≤ 3 GHz	>3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 mm ± 1 mm	½ δ ln(2) mm ±0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30° ± 1°	20° ± 1°
Maximum area sean spatial resolution: Δ x Area , Δy Area			≤2 GHz: ≤ 15 mm 2-3 GHz: ≤ 12 mm	3- 4 GHz: ≤ 12 mm 4- 6 GHz: ≤10 mm
			When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: ΔxZoom , ΔyZoom			≤ 2 GHz: ≤ 8 mm 2-3 GHz: ≤ 5 mm*	3- 4 GHz: ≤5 mm* 4- 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: Δz Zoom (n)		≤5 mm	3- 4 GHz: ≤4 mm 4- 5 GHz: ≤ 3 mm 5- 6 GHz: ≤ 2 mm
	graded grid	Δ zZoom (1): between 1 st two points closest to phantom surface	≤4 mm	3-4 GHz: ≤ 3 mm 4-5 GHz: ≤ 2.5 mm 5-6 GHz: ≤ 2 mm
		Δ zZoom (n>1): between subsequent points	≤1.5·ΔzZoom (n-1) mm	
Minimum zoom scan volume	x, y,z		≥30 mm	3 -4 GHz: ≥ 28 mm 4- 5 GHz: ≥ 25 mm 5- 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see IEEE Std 1528-2013 for details.
* When zoom scan is required and the reported SAR from the area scan based 1-g SAR estimation procedures of KDB Publication 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

7.8 Measurement procedure

Power Drift :

All SAR tests were performed with a fully charged battery under the DUT and transmitting at maximum output power. The DASY measurement software uses the power reference measurement and power drift measurement procedures to monitor the power drift of the DUT during SAR testing. Both methods measure the field value at a specified reference position before and after the SAR test. The software calculates the field difference in dB. If the power drift exceeds 5%, the SAR is retested.

Area scan:

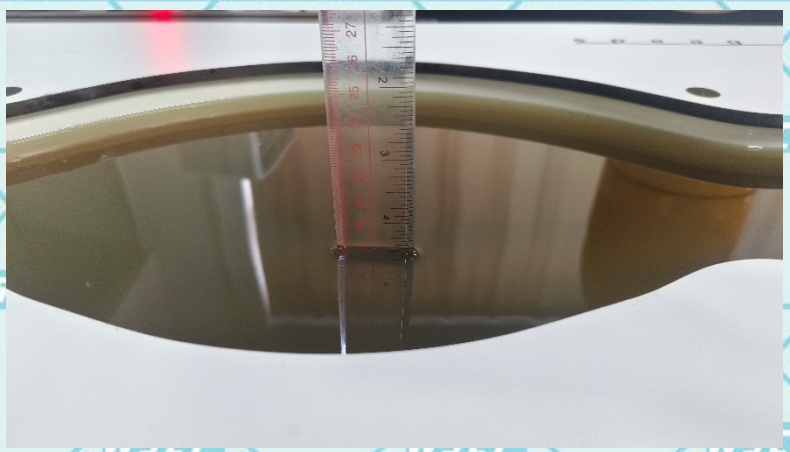
All antennas and radiating structures that may contribute to the measured SAR or influence the SAR distribution must be included in the area scan. The areas of the transmitter(s), antenna(s) and host device, when projected onto the phantom, must be within the area scan measurement region. The area scan measurement resolution must enable the extrapolation algorithms of the SAR system to correctly identify the peak SAR location(s) for subsequent zoom scan measurements to correctly determine the 1-g SAR. Area scans are performed at a constant distance from the phantom surface, determined by the measurement frequencies.

Zoom Scan:

Except when area scan based 1-g SAR estimation applies, a zoom scan measurement is required at the highest peak SAR location determined in the area scan to determine the 1-g SAR. When the 1-g SAR of the highest peak is within 2 dB of the SAR limit, additional zoom scans are required for other peaks within 2 dB of the highest peak that have not been included in any zoom scan to ensure there is no increase in SAR. The zoom scan volume must be larger than the required minimum dimensions described 7.7. There must be at least one measurement point within the first 5 mm from the phantom surface for measurements ⩽ 3 GHz, two measurement points for measurements ⩽ 5 GHz and three measurement points for measurements above 5 GHz.When graded grids are used, which only applies in the direction normal to the phantom surface, the initial grid separation closest to the phantom surface and subsequent graded grid increment ratios must satisfy the required protocols in 7.7 .The 1-g SAR averaging volume must be fully contained within the zoom scan measurement volume oundaries;otherwise, the measurement must be repeated by shifting or expanding the zoom scan volume. The similar requirements also apply to 10-g SAR measurements.

7.9 Tissue simulating liquids: dielectric properties

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must befiled with around 25 liters of homogeneous body tissue simulating liquid. For body SAR testing, the liquidheight from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in the Figure.



Simulating Liquid for 5GHz, Manufactured by SPEAG

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

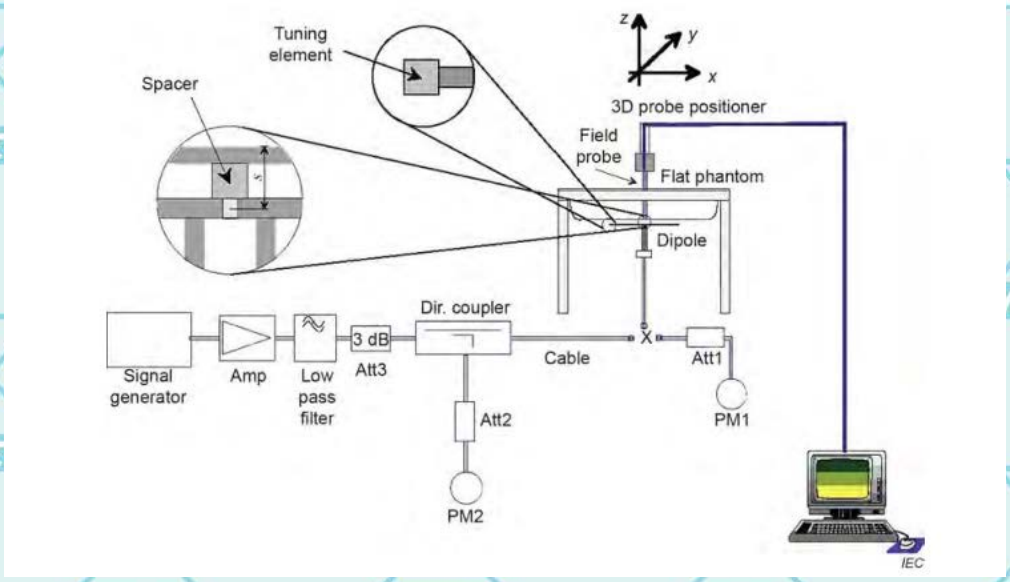
7.10 Tissue simulating liquids: parameters

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	2025-02-11
2550MHz Head	39.10 (37.15~41.05)	1.91 (1.82~2.01)	40.80	1.90	21.6°C	2025-02-11
5200MHz Head	36.00 (34.20~37.80)	4.66 (4.43~4.89)	36.30	4.54	21.6°C	2025-02-11
5300MHz Head	35.90 (34.10~37.70)	4.76 (4.52~5.00)	35.52	4.83	21.6°C	2025-02-11
5500MHz Head	35.60 (33.82~37.38)	4.96 (4.71~5.20)	35.80	4.88	21.6°C	2025-02-12
5600MHz Head	35.50 (33.73~37.27)	5.07 (4.82~5.32)	35.94	5.13	21.6°C	2025-02-12
5800MHz Head	35.30 (33.54~37.06)	5.27 (5.01~5.53)	35.30	5.23	21.6°C	2025-02-12
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)		
D2550V2 Body	54.10 (48.69~59.51)	24.70 (22.23~27.17)	55.80	25.60	21.6°C	2025-02-11
D5200V2 Body	76.00 (68.40~83.60)	22.00 (19.80~24.20)	71.70	20.70	21.6°C	2025-02-11
D5300V2 Body	80.60 (72.54~88.66)	23.30 (20.97~25.63)	80.80	23.10	21.6°C	2025-02-11
D5500V2 Body	85.60 (77.04~94.16)	24.50 (22.05~26.95)	79.00	22.25	21.6°C	2025-02-12
D5600V2 Body	83.30 (74.97~91.63)	24.10 (21.69~26.51)	78.70	22.40	21.6°C	2025-02-12
D5800V2 Body	79.00 (71.10~86.90)	22.70 (20.43~24.97)	77.60	22.00	21.6°C	2025-02-12

Note:
1.All SAR values are normalized to 1W forward power.
2. The actual forward power output to the dipole antenna is 20dbm(100mw), so the measured value differs ten times from the table

9 SAR 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 2.4G SAR Test Procedures

Separate SAR procedures are applied to DSSS and OFDM configurations in the 2.4 GHz band to simplify DSSS test requirements. For 802.11b DSSS SAR measurements, DSSS SAR procedure applies to fixed exposure test position and initial test position procedure applies to multiple exposure test positions.

A)802.11b DSSS SAR Test Requirements

SAR is measured for 2.4 GHz 802.11b DSSS using either a fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:

1) When the reported SAR of the highest measured maximum output power channel (section 3.1 of of KDB 248227D01v02) for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.

2) When the reported SAR is > 0.8 W/kg, SAR is required for that exposure configuration using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

B) 2.4GHz 802.11g/n OFDM SAR Test Exclusion Requirements

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied (section 5.3 of of KDB 248227D01v02r01). SAR is not required for the following 2.4 GHz OFDM conditions.

1) When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.

2) When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

C) SAR Test Requirements for OFDM configurations

When SAR measurement is required for 802.11 g/n OFDM configurations, each standalone and frequency aggregated band is considered separately for SAR test reduction. 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 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.

10 Detailed Test Results

10.1 Conducted Power measurements

The measuring conducted average power (Unit:dBm)is shown as below.

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)	22.79	23.44	23.00
Mode	802.11g		
Channel/Frequency(MHz)	1(2412)	6(2437)	11(2462)
Average Power(dBm)	20.50	**27.07**	20.55
Mode	802.11n(HT20)		
Channel/Frequency(MHz)	1(2412)	6(2437)	11(2462)
Average Power(dBm)	20.36	26.91	20.54
Mode	802.11n(HT40)		
Channel/Frequency(MHz)	7(2422)	6(2437)	9(2452)
Average Power(dBm)	20.48	23.60	20.46

AUX ANT2

Mode	802.11b		
Channel/Frequency(MHz)	1(2412)	6(2437)	11(2462)
Average Power(dBm)	18.45	17.98	18.55
Mode	802.11g		
Channel/Frequency(MHz)	1(2412)	6(2437)	11(2462)
Average Power(dBm)	18.80	**21.07**	18.85
Mode	802.11n(HT20)		
Channel/Frequency(MHz)	1(2412)	6(2437)	11(2462)
Average Power(dBm)	18.72	20.22	18.59
Mode	802.11n(HT40)		
Channel/Frequency(MHz)	7(2422)	6(2437)	9(2452)
Average Power(dBm)	18.62	20.78	18.74

MIMO Mode

Mode	802.11n(HT20)		
Channel/Frequency(MHz)	1(2412)	6(2437)	11(2462)
Average Power(dBm)	22.63	**27.75**	22.68
Mode	802.11n(HT40)		
Channel/Frequency(MHz)	7(2422)	6(2437)	9(2452)
Average Power(dBm)	22.66	25.43	22.69

<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	16.50 ±1.0	16.33	No
		48	5240	17.50 ±1.0	17.27	No
	802.11n-HT20	36	5180	17.00 ±1.0	16.67	No
		48	5240	18.00 ±1.0	17.79	No
	802.11n-HT40	38	5190	16.50 ±1.0	16.12	No
		46	5230	16.50 ±1.0	16.47	No
	802.11ac-VHT20	36	5180	17.00 ±1.0	16.65	No
		48	5240	18.00 ±1.0	17.67	No
	802.11ac-VHT40	38	5190	19.50 ±1.0	**19.20**	Yes
		46	5230	17.50 ±1.0	17.46	No
	802.11ac-VHT80	42	5210	15.00 ±1.0	14.74	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	12.50 ±1.0	12.02	No
		48	5240	13.00 ±1.0	**12.86**	Yes
	802.11n-HT20	36	5180	12.00 ±1.0	11.99	No
		48	5240	12.50 ±1.0	12.49	No
	802.11n-HT40	38	5190	11.00 ±1.0	10.75	No
		46	5230	11.50 ±1.0	11.38	No
	802.11ac-VHT20	36	5180	11.50 ±1.0	11.38	No
		48	5240	12.50 ±1.0	12.18	No
	802.11ac-VHT40	38	5190	11.00 ±1.0	10.72	No
		46	5230	11.50 ±1.0	11.05	No
	802.11ac-VHT80	42	5210	8.50 ±1.0	8.46	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	18.00 ±1.0	17.94	No
		48	5240	19.00 ±1.0	18.91	No
	802.11n-HT40	38	5190	17.50 ±1.0	17.23	No
		46	5230	18.00 ±1.0	17.64	No
	802.11ac-VHT20	36	5180	18.00 ±1.0	17.78	No
		48	5240	19.00 ±1.0	18.75	No
	802.11ac-VHT40	38	5190	20.00 ±1.0	**19.78**	Yes
		46	5230	18.50 ±1.0	18.35	No
	802.11ac-VHT80	42	5210	16.00 ±1.0	15.66	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	17.50 ±1.0	17.25	No
		64	5320	17.00 ±1.0	16.78	No
	802.11n-HT20	52	5260	17.00 ±1.0	16.87	No
		64	5320	18.00 ±1.0	**17.82**	Yes
	802.11n-HT40	54	5270	17.50 ±1.0	17.07	No
		62	5310	13.00 ±1.0	12.96	No
	802.11ac-VHT20	52	5260	18.00 ±1.0	17.72	No
		64	5320	16.00 ±1.0	15.64	No
	802.11ac-VHT40	54	5270	17.50 ±1.0	17.23	No
		62	5310	16.00 ±1.0	15.90	No
	802.11ac-VHT80	58	5290	15.50 ±1.0	15.44	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	12.50 ±1.0	12.22	No
		64	5320	12.50 ±1.0	12.48	Yes
	802.11n-HT20	52	5260	12.50 ±1.0	12.10	No
		64	5320	12.00 ±1.0	11.80	No
	802.11n-HT40	54	5270	11.00 ±1.0	10.65	No
		62	5310	10.00 ±1.0	9.99	No
	802.11ac-VHT20	52	5260	11.50 ±1.0	11.30	No
		64	5320	11.00 ±1.0	10.74	No
	802.11ac-VHT40	54	5270	10.00 ±1.0	9.98	No
		62	5310	10.00 ±1.0	9.99	No
	802.11ac-VHT80	58	5290	9.00 ±1.0	8.64	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	18.12	No
		64	5320	19.00 ±1.0	18.79	Yes
	802.11n-HT40	54	5270	18.00 ±1.0	17.96	No
		62	5310	15.00 ±1.0	14.73	No
	802.11ac-VHT20	52	5260	19.00 ±1.0	18.61	No
		64	5320	17.00 ±1.0	16.86	No
	802.11ac-VHT40	54	5270	18.00 ±1.0	17.98	No
		62	5310	17.00 ±1.0	16.89	No
	802.11ac-VHT80	58	5290	16.50 ±1.0	16.26	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	17.00 ±1.0	16.91	No
		140	5700	17.50 ±1.0	17.49	No
	802.11n-HT20	100	5500	17.50 ±1.0	17.38	No
		140	5700	17.50 ±1.0	17.24	No
	802.11n-HT40	102	5510	17.00 ±1.0	16.88	No
		134	5670	17.00 ±1.0	16.57	No
	802.11ac-VHT20	100	5500	18.50 ±1.0	18.32	Yes
		140	5700	18.00 ±1.0	17.50	No
	802.11ac-VHT40	102	5510	16.00 ±1.0	15.99	No
		134	5670	15.00 ±1.0	14.73	No
	802.11ac-VHT80	106	5530	15.00 ±1.0	14.65	No
		122	5610	16.50 ±1.0	16.28	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	12.00 ±1.0	11.57	No
		140	5700	15.00 ±1.0	14.62	No
	802.11n-HT20	100	5500	12.00 ±1.0	11.75	No
		140	5700	16.00 ±1.0	15.59	Yes
	802.11n-HT40	102	5510	9.50 ±1.0	9.45	No
		134	5670	14.00 ±1.0	13.70	No
	802.11ac-VHT20	100	5500	10.50 ±1.0	10.46	No
		140	5700	14.00 ±1.0	13.99	No
	802.11ac-VHT40	102	5510	9.50 ±1.0	9.29	No
		134	5670	14.00 ±1.0	13.75	No
	802.11ac-VHT80	106	5530	8.00 ±1.0	7.97	No
		122	5610	10.00 ±1.0	9.93	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	18.50 ±1.0	18.43	No
		140	5700	20.00 ±1.0	19.50	Yes
	802.11n-HT40	102	5510	18.00 ±1.0	17.60	No
		134	5670	18.50 ±1.0	18.38	No
	802.11ac-VHT20	100	5500	19.00 ±1.0	18.98	No
		140	5700	19.50 ±1.0	19.10	No
	802.11ac-VHT40	102	5510	17.00 ±1.0	16.83	No
		134	5670	17.50 ±1.0	17.28	No
	802.11ac-VHT80	106	5530	15.50 ±1.0	15.49	No
		122	5610	17.50 ±1.0	17.19	No

Ant 1						
Band	Mode	Channel	Frequency (MHz)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
U-NII-3 (5725-5825)	802.11a	149	5745	18.00 ±1.0	17.81	Yes
		165	5825	17.00 ±1.0	16.96	No
	802.11n-HT20	149	5745	18.00 ±1.0	17.57	No
		165	5825	17.50 ±1.0	17.14	No
	802.11n-HT40	151	5755	16.50 ±1.0	16.20	No
		159	5795	15.00 ±1.0	14.79	No
	802.11ac-VHT20	149	5745	18.00 ±1.0	17.54	No
		165	5825	17.00 ±1.0	16.69	No
	802.11ac-VHT40	151	5755	18.00 ±1.0	17.65	No
		159	5795	17.00 ±1.0	16.82	No
	802.11ac-VHT80	155	5775	16.00 ±1.0	15.88	No
Ant 2						
Band	Mode	Channel	Frequency (MHz)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
U-NII-3 (5725-5825)	802.11a	149	5745	8.50 ±1.0	8.14	No
		165	5825	9.00 ±1.0	8.88	No
	802.11n-HT20	149	5745	8.50 ±1.0	8.22	No
		165	5825	9.00 ±1.0	8.69	No
	802.11n-HT40	151	5755	10.00 ±1.0	9.98	No
		159	5795	11.00 ±1.0	10.60	Yes
	802.11ac-VHT20	149	5745	8.00 ±1.0	7.67	No
		165	5825	8.50 ±1.0	8.13	No
	802.11ac-VHT40	151	5755	10.00 ±1.0	9.93	No
		159	5795	11.00 ±1.0	10.51	No
	802.11ac-VHT80	155	5775	8.50 ±1.0	8.50	No
MIMO						
Band	Mode	Channel	Frequency (MHz)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
U-NII-3 (5725-5825)	802.11n-HT20	149	5745	18.50 ±1.0	18.05	No
		165	5825	18.00 ±1.0	17.72	No
	802.11n-HT40	151	5755	17.50 ±1.0	17.13	No
		159	5795	16.50 ±1.0	16.19	No
	802.11ac-VHT20	149	5745	18.00 ±1.0	17.97	No
		165	5825	17.50 ±1.0	17.26	No
	802.11ac-VHT40	151	5755	18.50 ±1.0	18.33	Yes
		159	5795	18.00 ±1.0	17.73	No
	802.11ac-VHT80	155	5775	17.00 ±1.0	16.61	No

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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 BT

The maximum output power of BT is:

Mode	GFSK mode		
Channel/Frequency(MHz)	0(2402)	39(2441)	78(2480)
Peak Power(dBm)	7.65	8.12	7.83
Mode	Pi/4DQPSK mode		
Channel/Frequency(MHz)	0(2402)	39(2441)	78(2480)
Peak Power(dBm)	9.46	9.97	9.72
Mode	8DPSK mode		
Channel/Frequency(MHz)	0(2402)	39(2441)	78(2480)
Peak Power(dBm)	10.00	10.48	10.27

The maximum output power of BLE is:

Mode	1Mbps		
Channel/Frequency(MHz)	0(2402)	20(2440)	39(2480)
Peak Power(dBm)	5.63	6.29	6.11
Mode	2Mbps		
Channel/Frequency(MHz)	0(2402)	20(2440)	39(2480)
Peak Power(dBm)	6.11	6.70	6.45

10.1.4 Tune-up powertolerance

Band	Tune-up power tolerance(dBm)		
2.4GWIFI	2.4G (MAIN ANT1)	802.11b	Max output power =23.5±1.0dBm
		802.11g	Max output power =27.5±1.0dBm
		802.11n (HT20)	Max output power =27.0±1.0dBm
		802.11n (HT40)	Max output power =24.0±1.0dBm
	2.4G (AUX ANT2)	802.11b	Max output power =19.0±1.0dBm
		802.11g	Max output power =21.5±1.0dBm
		802.11n (HT20)	Max output power =20.5±1.0dBm
		802.11n (HT40)	Max output power =21.0±1.0dBm
	2.4G (MIMOMode)	802.11n (HT20)	Max output power =28.0±1.0dBm
		802.11n (HT40)	Max output power =25.5±1.0dBm
U-NII-1(5150-5250)	MAIN ANT1	802.11ac-VHT40	Max output power =13.0±1.0dBm
	AUX ANT2	802.11a	Max output power =14.0±1.0dBm
	MIMOMode	802.11ac-VHT40	Max output power =20.0±1.0dBm
U-NII-2a(5250-5350)	MAIN ANT1	802.11 n-HT20	Max output power =18.0 ±1.0dBm
	AUX ANT2	802.11a	Max output power =12.5±1.0dBm
	MIMOMode	802.11n-HT20	Max output power =19.0±1.0dBm
U-NII-2c(5470-5725)	MAIN ANT1	802.11 ac-VHT20	Max output power =18.5±1.0dBm
	AUX ANT2	802.11 n-HT20	Max output power =16.0±1.0dBm
	MIMOMode	802.11n-HT20	Max output power =20.0±1.0dBm
U-NII-3(5725-5825)	MAIN ANT1	802.11a	Max output power =18.0±1.0dBm
	AUX ANT2	802.11 n-HT40	Max output power =11.0±1.0dBm
	MIMOMode	802.11ac-VHT440	Max output power =18.5±1.0dBm
BT	GFSK		Max output power =10.5±1.0dBm
	π/4DQPSK		Max output power =10.5±1.0dBm
	8DPSK		Max output power =10.5±1.0dBm
BLE	1Mbps		Max output power =7.0±1.0dBm
	2Mbps		Max output power =7.0±1.0dBm

10.2 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 .

10.2.1 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	0.329	0.127	1.250	22.07	22.50	0.363	1.104
	Back	6/2437	0.172	0.062	-0.500	22.07	22.50	0.190	1.104
	Top	6/2437	0.726	0.324	0.750	22.07	22.50	0.802	1.104
802.11g AUX ANT2	Front	6/2437	0.327	0.106	2.500	21.07	21.50	0.361	1.104
	Back	6/2437	0.146	0.051	-3.250	21.07	21.50	0.161	1.104
	Top	6/2437	0.563	0.204	-2.000	21.07	21.50	0.622	1.104
802.11n-HT20 MIMO	Front	6/2437	0.412	0.153	1.500	27.75	28.00	0.436	1.059
	Back	6/2437	0.234	0.086	0.250	27.75	28.00	0.248	1.059
	Top[	6/2437	0.824	0.326	4.500	27.75	28.00	0.873	1.059

10.2.2 Results overview of Wi-Fi 5G

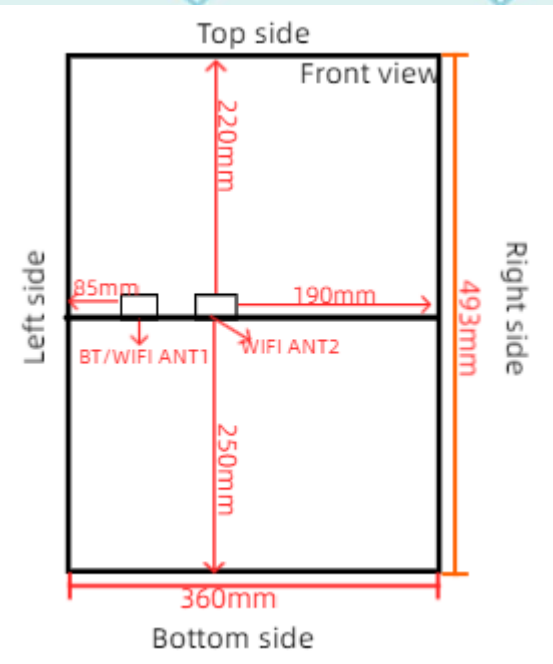
Mode	Test Position of Body with 0mm	Test channel /Freq.(MHz)	SAR Value (W/kg)		Power Drift (%)	Conducted Power (dBm)	Tune-up Limit (dBm)	Scaled SAR1-g (W/kg)	Scaling Factor
			1-g	10-g					
WLAN5.2g(gap 0mm)									
802.11ac-VHT40 ANT1	Front	38/5190	0.489	0.143	1.250	19.20	19.50	0.524	1.072
	Back	38/5190	0.182	0.051	-0.750	19.20	19.50	0.195	1.072
	Top	38/5190	0.648	0.210	-0.250	19.20	19.50	0.694	1.072
802.11a ANT2	Front	48/5240	0.346	0.109	2.500	12.86	13.00	0.357	1.033
	Back	48/5240	0.157	0.043	3.750	12.86	13.00	0.162	1.033
	Top	48/5240	0.534	0.147	-3.250	12.86	13.00	0.551	1.033
802.11ac-VHT40 MIMO-ANT	Front	38/5190	0.513	0.179	0.750	19.78	20.00	0.540	1.052
	Back	38/5190	0.213	0.068	-2.000	19.78	20.00	0.224	1.052
	Top	38/5190	0.863	0.275	0.500	19.78	20.00	0.908	1.052
WLAN5.4g(gap 0mm)									
802.11n-HT20 ANT1	Front	64/5320	0.341	0.109	-2.250	17.82	18.00	0.355	1.042
	Back	64/5320	0.278	0.083	-0.750	17.82	18.00	0.290	1.042
	Top	64/5320	0.623	0.174	0.250	17.82	18.00	0.649	1.042
802.11a ANT2	Front	64/5320	0.295	0.084	-3.750	12.48	12.50	0.296	1.005
	Back	64/5320	0.217	0.061	4.250	12.48	12.50	0.218	1.005
	Top	64/5320	0.518	0.149	-1.750	12.48	12.50	0.520	1.005
802.11n-HT20 MIMO-ANT	Front	64/5320	0.448	0.134	-3.000	18.79	19.00	0.470	1.050
	Back	64/5320	0.349	0.103	-4.750	18.79	19.00	0.366	1.050
	Top	64/5320	0.946	0.294	-3.500	18.79	19.00	0.993	1.050
WLAN5.6g(gap 0mm)									
802.11ac-VHT20 ANT1	Front	100/5500	0.410	0.128	1.250	18.32	18.50	0.427	1.042
	Back	100/5500	0.365	0.114	0.750	18.32	18.50	0.380	1.042
	Top	100/5500	0.762	0.234	-0.250	18.32	18.50	0.794	1.042
802.11n-HT20 ANT2	Front	140/5700	0.384	0.119	1.750	15.59	16.00	0.422	1.099
	Back	140/5700	0.342	0.109	-2.000	15.59	16.00	0.376	1.099
	Top	140/5700	0.687	0.214	3.250	15.59	16.00	0.755	1.099
802.11n-HT20 MIMO-ANT	Front	140/5700	0.467	0.146	4.500	19.50	20.00	0.524	1.122
	Back	140/5700	0.397	0.129	-1.500	19.50	20.00	0.445	1.122
	Top	140/5700	1.090	0.314	0.500	19.50	20.00	1.223	1.122
WLAN5.8g(gap 0mm)									
802.11a ANT1	Front	149/5745	0.317	0.092	-2.250	17.81	18.00	0.331	1.045
	Back	149/5745	0.254	0.075	-1.500	17.81	18.00	0.265	1.045
	Top	149/5745	0.563	0.185	3.000	17.81	18.00	0.588	1.045
802.11n-HT40 ANT2	Front	159/5795	0.240	0.071	-4.750	10.60	11.00	0.263	1.096
	Back	159/5795	0.189	0.054	-2.500	10.60	11.00	0.207	1.096
	Top	159/5795	0.475	0.166	3.250	10.60	11.00	0.521	1.096
802.11ac-VHT40 MIMO-ANT	Front	151/5755	0.406	0.125	-0.750	18.33	18.50	0.422	1.040
	Back	151/5755	0.352	0.102	-1.250	18.33	18.50	0.366	1.040
	Top	151/5755	0.843	0.282	-4.500	18.33	18.50	0.877	1.040

10.2.3 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	39/2441	8DPSK	0.038	0.017	0.200	10.48	10.50	0.038	1.005
Rear side	39/2441	8DPSK	0.029	0.012	1.500	10.48	10.50	0.029	1.005
Left side	39/2441	8DPSK	0.051	0.025	0.040	10.48	10.50	0.051	1.005
Top side	39/2441	8DPSK	0.071	0.031	-2.800	10.48	10.50	0.071	1.005

11 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	Yes
Right Side	Yes
Top Side	Yes
Bottom Side	No

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.

11.1.1 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	10.48	11.17	5.00	2.45	3.50	7.50	Pass

11.1.2 Simultaneous Transmission SAR Summation Scenario

Mode	Position	Ant WIFI 1g(W/kg)	Ant 1 BT 1g(W/kg)	WIFI+ BT 1g(W/kg)
2.4Gwifi (MIMO)	Front	0.436	0.038	0.474
	Back	0.248	0.029	0.277
	Top	0.873	0.071	0.944
5.2Gwifi (MIMO)	Front	0.540	0.038	0.578
	Back	0.224	0.029	0.253
	Top	0.908	0.071	0.979
5.4Gwifi (MIMO)	Front	0.470	0.038	0.508
	Back	0.366	0.029	0.395
	Top	0.993	0.071	1.064
5.6Gwifi (MIMO)	Front	0.524	0.038	0.562
	Back	0.445	0.029	0.474
	Top	1.223	0.071	1.294
5.8Gwifi (MIMO)	Front	0.422	0.038	0.460
	Back	0.366	0.029	0.395
	Top	0.877	0.071	0.948

11.2 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	$\sqrt{3}$	$(1-C_p)^{1/2}$	$(1-C_p)^{1/2}$	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	

11.3 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	$\sqrt{3}$	$(1-C_p)^{1/2}$	$(1-C_p)^{1/2}$	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	

12 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	Universal Radio Communication Tester	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: Photographs

(Please see attached test setup photos.)

Annex A: System Check
Tested Model : K15SRA
Report Number: **WSCT-ANAB-R&E241200076A-SAR**

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Measurement Report for Device, , , UID 0 -, Channel 0 (2550.000MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
Device,	50.0 x 10.0 x 8.0		Dipole

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, Head Simulating Liquid	,		CW, 0--	2550.000, 0	6.94	1.90	40.8

Hardware Setup

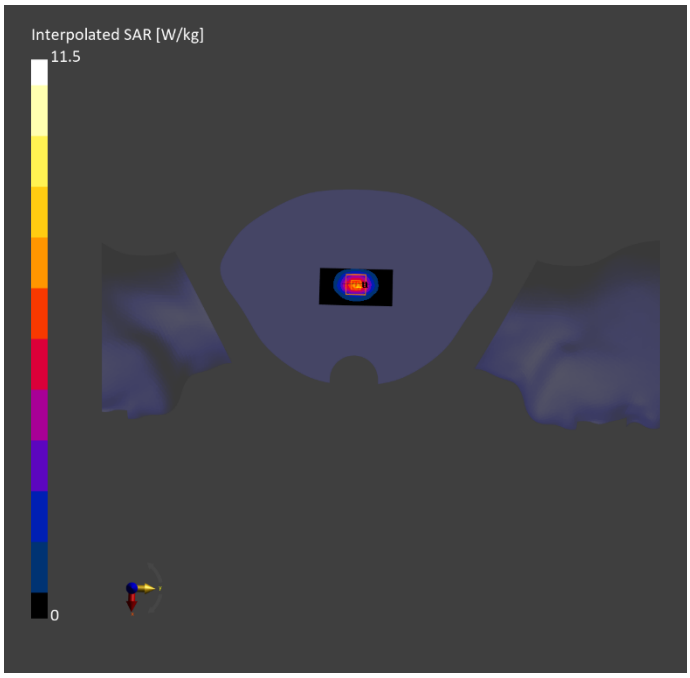
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
Twin-SAM V5.0 (30deg probe tilt) - 2243	HBBL-600-10000 Charge:xxxx, --	EX3DV4 - SN7895, 2024-10-28	DAE4ip Sn1872, 2024-10-18

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	40.0 x 80.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	10.0 x 10.0	5.0 x 5.0 x 1.5
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.5
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-02-11	2025-02-11
psSAR1g [W/kg]	5.48	5.58
psSAR10g [W/kg]	2.53	2.56
Power Drift [dB]	0.00	0.01
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		80.5
Dist 3dB Peak [mm]		9.0



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Measurement Report for Device, , , UID 0 -, Channel 0 (5200.000MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
Device,	50.0 x 10.0 x 8.0		Dipole

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, Head Simulating Liquid	,		CW, 0--	5200.000, 0	5.34	4.54	36.3

Hardware Setup

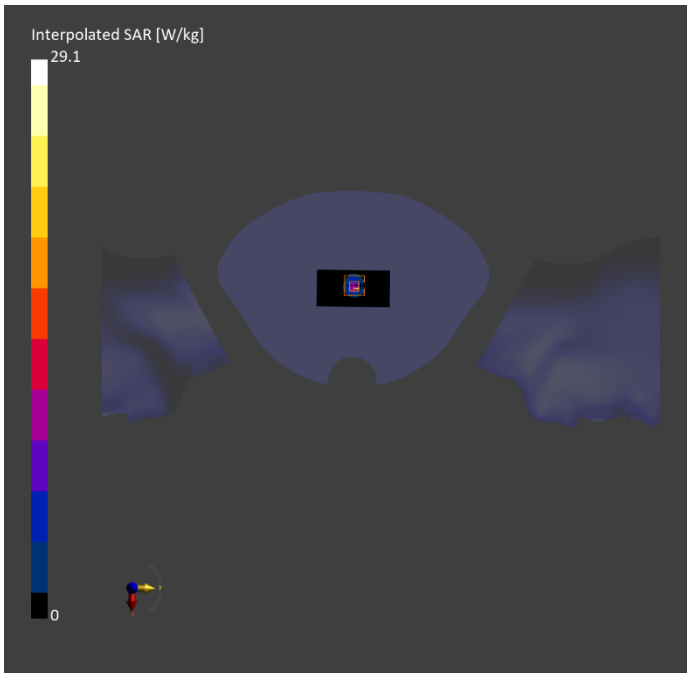
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
Twin-SAM V5.0 (30deg probe tilt) - 2243	HBBL-600-10000 Charge:xxxx, --	EX3DV4 - SN7895, 2024-10-28	DAE4ip Sn1872, 2024-10-18

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	40.0 x 80.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-02-11	2025-02-11
psSAR1g [W/kg]	6.41	7.17
psSAR10g [W/kg]	1.91	2.07
Power Drift [dB]	0.02	0.01
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		62.3
Dist 3dB Peak [mm]		7.2



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Measurement Report for Device, , , UID 0 -, Channel 0 (5300.000MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
Device,	50.0 x 10.0 x 8.0		Dipole

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, Head Simulating Liquid	,		CW, 0--	5300.000, 0	5.28	4.65	36.2

Hardware Setup

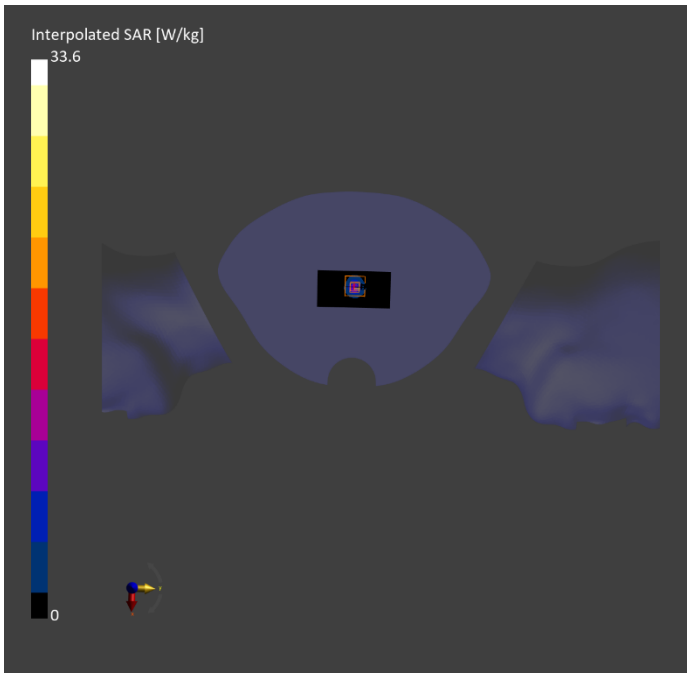
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
Twin-SAM V5.0 (30deg probe tilt) - 2243	HBBL-600-10000 Charge:xxxx, --	EX3DV4 - SN7895, 2024-10-28	DAE4ip Sn1872, 2024-10-18

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	40.0 x 80.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-02-11	2025-02-11
psSAR1g [W/kg]	7.15	8.08
psSAR10g [W/kg]	2.09	2.31
Power Drift [dB]	0.01	0.08
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		61.4
Dist 3dB Peak [mm]		7.2



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Measurement Report for Device, , , UID 0 -, Channel 0 (5500.000MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
Device,	50.0 x 10.0 x 8.0		Dipole

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, Head Simulating Liquid	,		CW, 0--	5500.000, 0	4.87	4.88	35.8

Hardware Setup

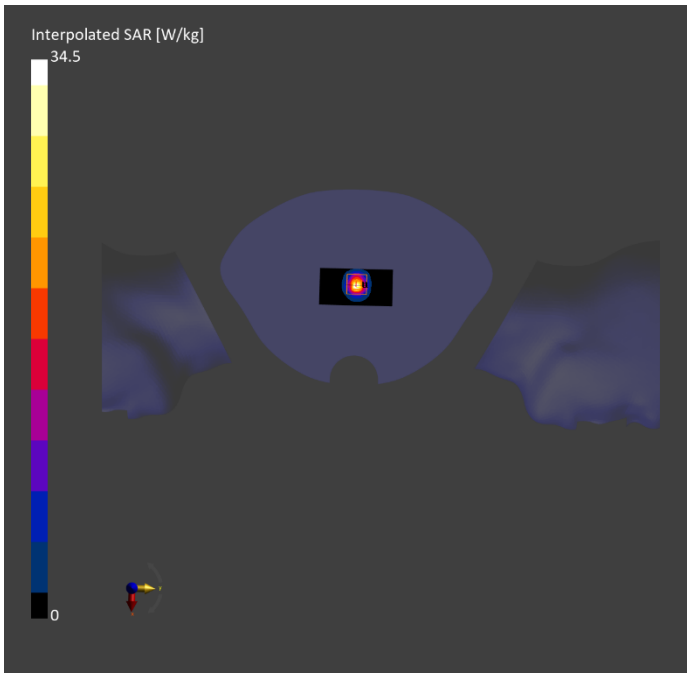
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
Twin-SAM V5.0 (30deg probe tilt) - 2243	HBBL-600-10000 Charge:xxxx, --	EX3DV4 - SN7895, 2024-10-28	DAE4ip Sn1872, 2024-10-18

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	40.0 x 80.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-02-12	2025-02-12
psSAR1g [W/kg]	6.98	7.90
psSAR10g [W/kg]	2.03	2.25
Power Drift [dB]	0.03	0.02
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		59.5
Dist 3dB Peak [mm]		7.2



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Measurement Report for Device, , , UID 0 -, Channel 0 (5600.000MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
Device,	50.0 x 10.0 x 8.0		Dipole

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, Head Simulating Liquid	,		CW, 0--	5600.000, 0	4.87	5.00	35.6

Hardware Setup

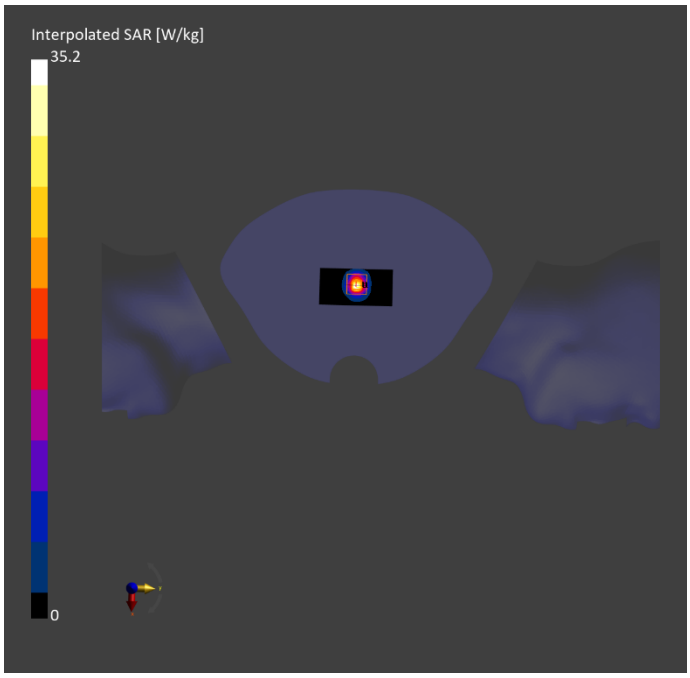
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
Twin-SAM V5.0 (30deg probe tilt) - 2243	HBBL-600-10000 Charge:xxxx, --	EX3DV4 - SN7895, 2024-10-28	DAE4ip Sn1872, 2024-10-18

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	40.0 x 80.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-02-12	2025-02-12
psSAR1g [W/kg]	7.00	7.87
psSAR10g [W/kg]	2.04	2.24
Power Drift [dB]	0.02	0.01
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		58.4
Dist 3dB Peak [mm]		7.2



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Measurement Report for Device, , , UID 0 -, Channel 0 (5800.000MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
Device,	50.0 x 10.0 x 8.0		Dipole

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, Head Simulating Liquid	,		CW, 0--	5800.000, 0	4.84	5.23	35.3

Hardware Setup

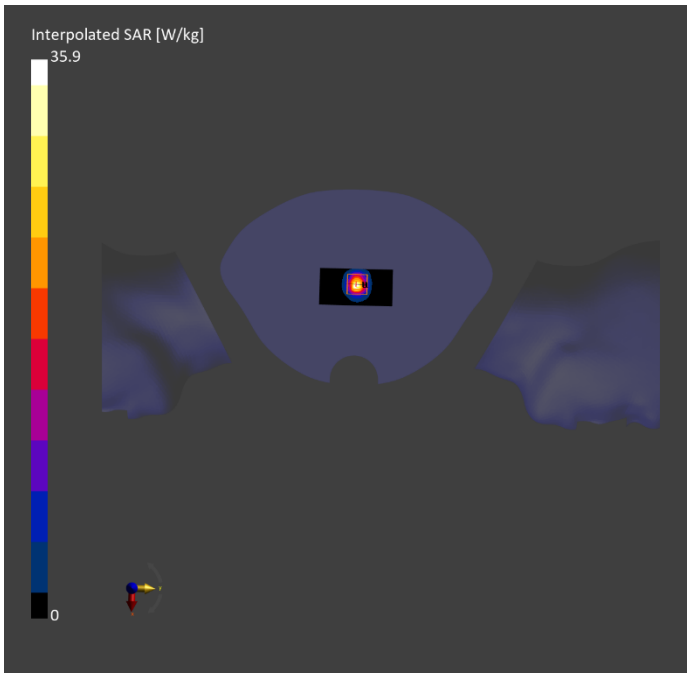
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
Twin-SAM V5.0 (30deg probe tilt) - 2243	HBBL-600-10000 Charge:xxxx, --	EX3DV4 - SN7895, 2024-10-28	DAE4ip Sn1872, 2024-10-18

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	40.0 x 80.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-02-12	2025-02-12
psSAR1g [W/kg]	6.76	7.76
psSAR10g [W/kg]	2.00	2.20
Power Drift [dB]	0.01	0.01
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		56.9
Dist 3dB Peak [mm]		7.6



Annex B: Measurement Results
Tested Model : K15SRA
Report Number: **WSCT-ANAB-R&E241200076A-SAR**

.

Measurement Report for Device, EDGE TOP, WLAN 2.4GHz, Channel 6 (2437.000MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
Device,	360.0 x 236.0 x 160.0		Laptop

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HBBL 5-10000MHz	EDGE TOP, 0.00	WLAN 2.4GHz	WLAN, 10516-AAA	2437.000, 6	7.9	1.80	39.2

Hardware Setup

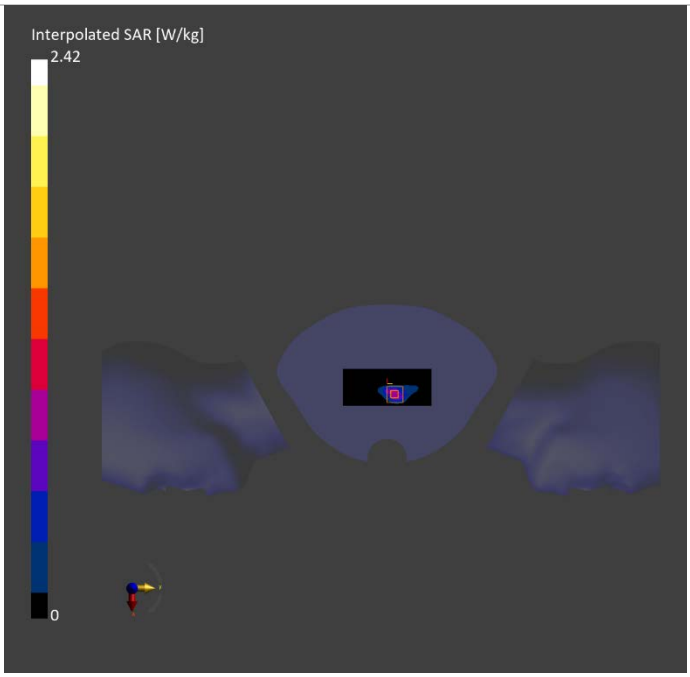
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
Twin-SAM V5.0 (30deg probe tilt) - 1901	HBBL 5-10000MHz , --	EX3DV4 - SN7391, 2024-11-29	DAE4 Sn1495, 2024-07-24

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	40.0 x 120.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	10.0 x 10.0	5.0 x 5.0 x 1.5
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-02-11	2025-02-11
psSAR1g [W/kg]	0.722	0.824
psSAR10g [W/kg]	0.321	0.326
Power Drift [dB]	-0.04	4.50
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		73.2
Dist 3dB Peak [mm]		5.0



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Measurement Report for Device, EDGE TOP, WLAN 5GHz, Channel 38 (5190.000MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
Device,	360.0 x 236.0 x 160.0		Laptop

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HBBL 5-10000MHz	EDGE TOP, 0.00	WLAN 5GHz	WLAN, 10417-AAD	5190.000, 38	5.66	4.67	36.0

Hardware Setup

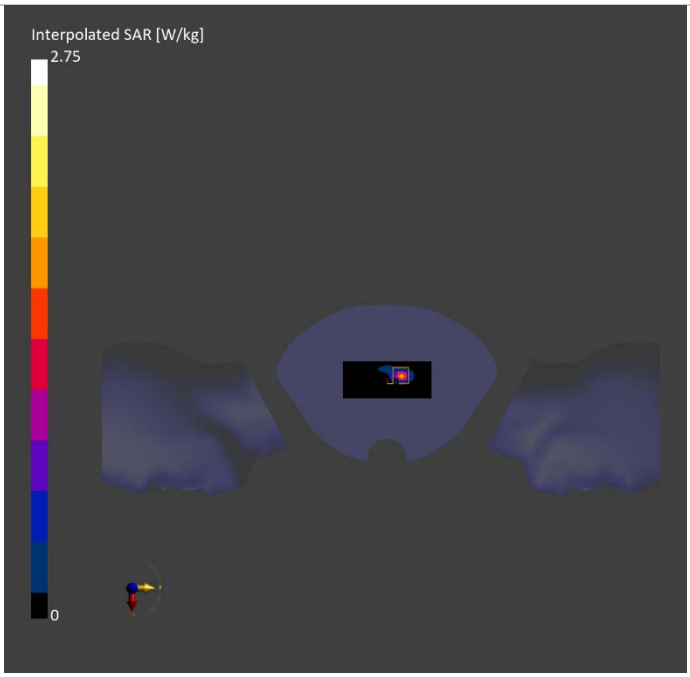
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
Twin-SAM V5.0 (30deg probe tilt) - 1901	HBBL 5-10000MHz , --	EX3DV4 - SN7391, 2024-11-29	DAE4 Sn1495, 2024-07-24

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	40.0 x 120.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-02-11	2025-02-11
psSAR1g [W/kg]	0.794	0.863
psSAR10g [W/kg]	0.253	0.275
Power Drift [dB]	-0.01	0.50
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		60.8
Dist 3dB Peak [mm]		5.2



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Measurement Report for Device, EDGE TOP, WLAN 5GHz, Channel 64 (5320.000MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
Device,	360.0 x 236.0 x 160.0		Laptop

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HBBL 5-10000MHz	EDGE TOP, 0.00	WLAN 5GHz	WLAN, 10417-AAD	5320.000, 64	5.43	4.75	35.9

Hardware Setup

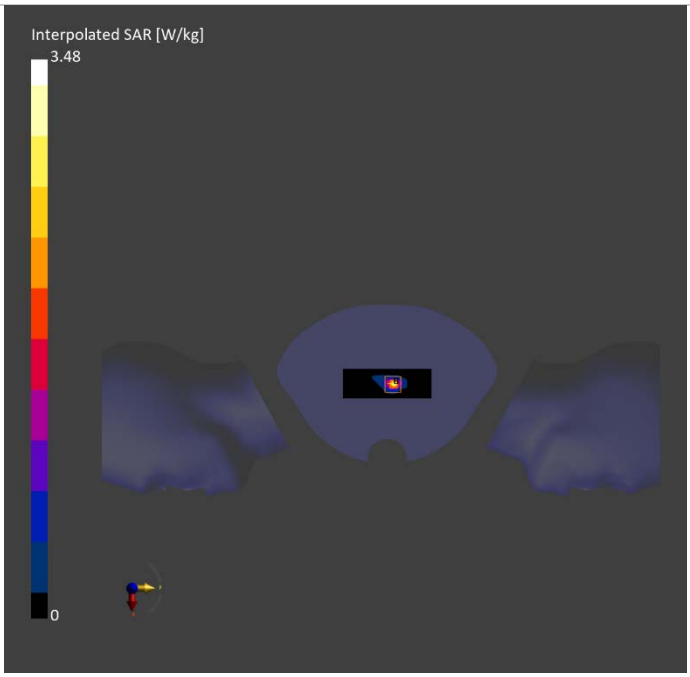
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
Twin-SAM V5.0 (30deg probe tilt) - 1901	HBBL 5-10000MHz , --	EX3DV4 - SN7391, 2024-11-29	DAE4 Sn1495, 2024-07-24

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	40.0 x 120.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-02-11	2025-02-11
psSAR1g [W/kg]	0.873	0.946
psSAR10g [W/kg]	0.245	0.294
Power Drift [dB]	-0.04	-3.50
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		61.0
Dist 3dB Peak [mm]		5.4



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Measurement Report for Device, EDGE TOP, WLAN 5GHz, Channel 140 (5700.000MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
Device,	**360.0 x 236.0 x 160.0**		**Laptop**

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HBBL 5-10000MHz	EDGE TOP, 0.00	WLAN 5GHz	WLAN, 10417-AAD	5700.000, 140	4.94	5.08	35.5

Hardware Setup

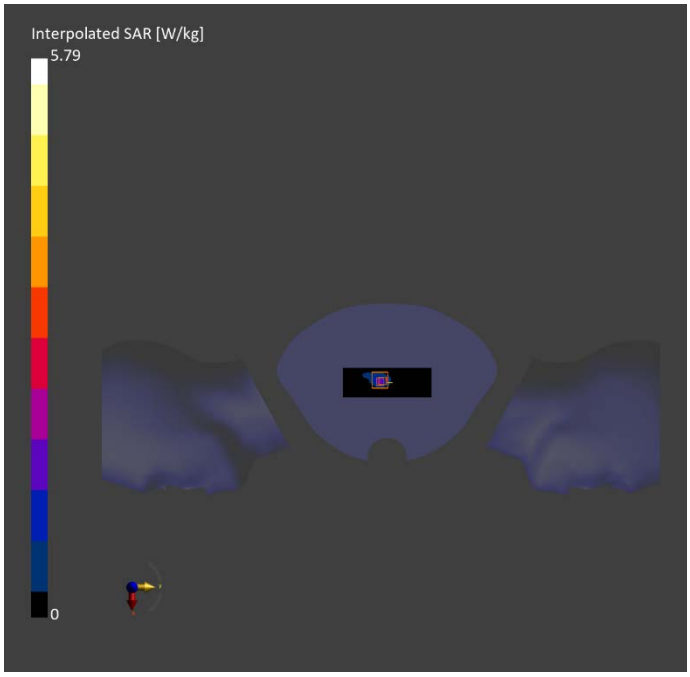
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
Twin-SAM V5.0 (30deg probe tilt) - 1901	HBBL 5-10000MHz , --	EX3DV4 - SN7391, 2024-11-29	DAE4 Sn1495, 2024-07-24

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	40.0 x 120.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-02-12	2025-02-12
psSAR1g [W/kg]	1.02	1.09
psSAR10g [W/kg]	0.279	0.314
Power Drift [dB]	-0.07	0.50
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		59.8
Dist 3dB Peak [mm]		5.3



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Measurement Report for Device, EDGE TOP, WLAN 5GHz, Channel 151 (5755.000MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
Device,	360.0 x 236.0 x 160.0		Laptop

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HBBL 5-10000MHz	EDGE TOP, 0.00	WLAN 5GHz	WLAN, 10417-AAD	5755.000, 151	5.02	5.30	35.3

Hardware Setup

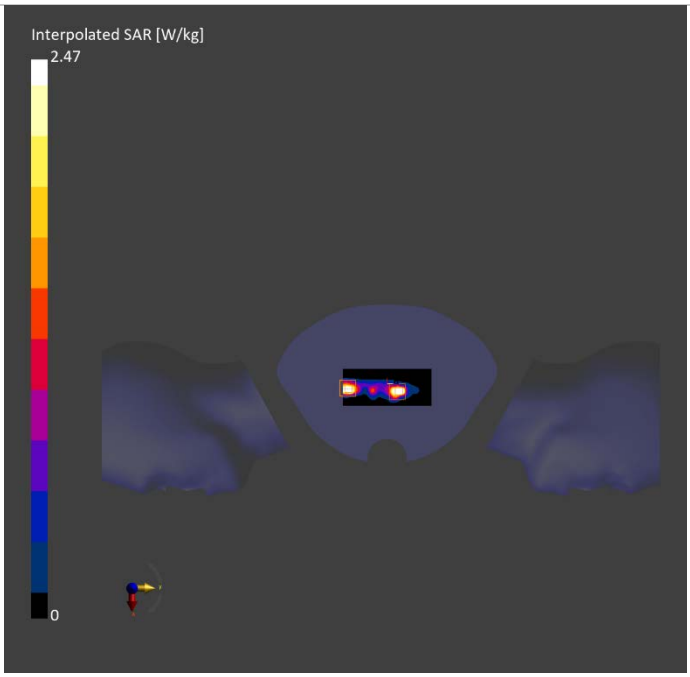
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
Twin-SAM V5.0 (30deg probe tilt) - 1901	HBBL 5-10000MHz , --	EX3DV4 - SN7391, 2024-11-29	DAE4 Sn1495, 2024-07-24

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	40.0 x 120.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-02-12	2025-02-12
psSAR1g [W/kg]	0.821	0.843
psSAR10g [W/kg]	0.247	0.282
Power Drift [dB]	-0.07	-4.50
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		60.4
Dist 3dB Peak [mm]		5.4



Annex C: Calibration Reports
Tested Model : K15SRA
Report Number: **WSCT-ANAB-R&E241200076A-SAR**

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **WSCT**
Shenzhen

Certificate No. **D2550V2-1015_Aug24**

CALIBRATION CERTIFICATE

Object	D2550V2 - SN: 1015
Calibration procedure(s)	QA CAL-05.v12 Calibration Procedure for SAR Validation Sources between 0.7 - 3 GHz
Calibration date	August 16, 2024

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Cal
Power Sensor R&S NRP-33T	SN: 100967	28-Mar-24 (No. 217-04038)	Mar-25
Power Sensor R&S NRP18A	SN: 101859	21-Mar-24 (No. 4030A315007801)	Mar-25
Spectrum Analyzer R&S FSV40	SN: 101832	25-Jan-24 (No. 4030-315007551)	Jan-25
Mismatch; Short [S4188] Attenuator [S4423]	SN: 1152	28-Mar-24 (No. 217-04050)	Mar-25
OCP DAK-12	SN: 1016	05-Oct-23 (No. OCP-DAK12-1016_Oct23)	Oct-24
OCP DAK-3.5	SN: 1249	05-Oct-23 (No. OCP-DAK3.5-1249_Oct23)	Oct-24
Reference Probe EX3DV4	SN: 7349	03-Jun-24 (No. EX3-7349_Jun24)	Jun-25
DAE4ip	SN: 1836	10-Jan-24 (No. DAE4ip-1836_Jan24)	Jan-25

Secondary Standards	ID	Check Date (in house)	Scheduled Check
ACAD Source Box	SN: 1000	28-May-24 (No. 675-ACAD_Source_Box-240528)	May-25
Signal Generator R&S SMB100A	SN: 182081	28-May-24 (No. 0001-300719404)	May-25
Mismatch; SMA	SN: 1102	22-May-24 (No. 675-Mismatch_SMA-240522)	May-25

	Name	Function	Signature
Calibrated by	Aidonia Georgiadou	Laboratory Technician	
Approved by	Sven Kühn	Technical Manager	

Issued: August 19, 2024

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Glossary

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards

- IEC/IEEE 62209-1528,"Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation

- DASY System Handbook

Methods Applied and Interpretation of Parameters

- *Measurement Conditions*: Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL*: The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss*: These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay*: One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured*: SAR measured at the stated antenna input power.
- *SAR normalized*: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters*: The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY8 Module SAR	16.4.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with spacer
Zoom Scan Resolution	dx, dy = 5mm, dz = 1.5mm	Graded Ratio = 1.5 mm (Z direction)
Frequency	2550MHz ±1MHz	

Head TSL parameters at 2550 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.1	1.91 mho/m
Measured Head TSL parameters	(22.0 ±0.2)°C	37.5 ±6%	1.95 mho/m ±6%
Head TSL temperature change during test	< 0.5 °C		

SAR result with Head TSL at 2550 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	24 dBm input power	13.6 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	54.1 W/kg ±17.0% (k = 2)

SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	24 dBm input power	6.21 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.7 W/kg ±16.5% (k = 2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 2550 MHz

Impedance	50.4 Ω – 1.3 jΩ
Return Loss	-37.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.151 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.
The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard. No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG

System Performance Check Report

Summary

Dipole	Frequency [MHz]	TSL	Power [dBm]
D2550V2 - SN1015	2550	HSL	24

Exposure Conditions

Phantom Section, TSL	Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat	10		CW, 0--	2550, 0	7.35	1.95	37.5

Hardware Setup

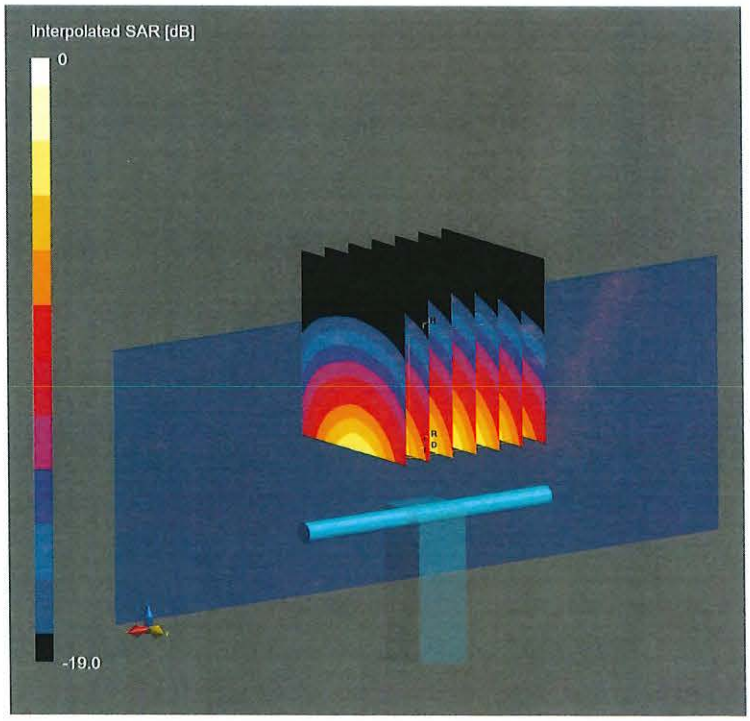
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
MFP V8.0 Center	HSL, 2024-08-16	EX3DV4 - SN7349, 2024-06-03	DAE4ip Sn1836, 2024-01-10

Scans Setup

	Zoom Scan
Grid Extents [mm]	30 x 30 x 30
Grid Steps [mm]	5.0 x 5.0 x 1.5
Sensor Surface [mm]	1.4
Graded Grid	Yes
Grading Ratio	1.5
MAIA	N/A
Surface Detection	VMS + 6p
Scan Method	Measured

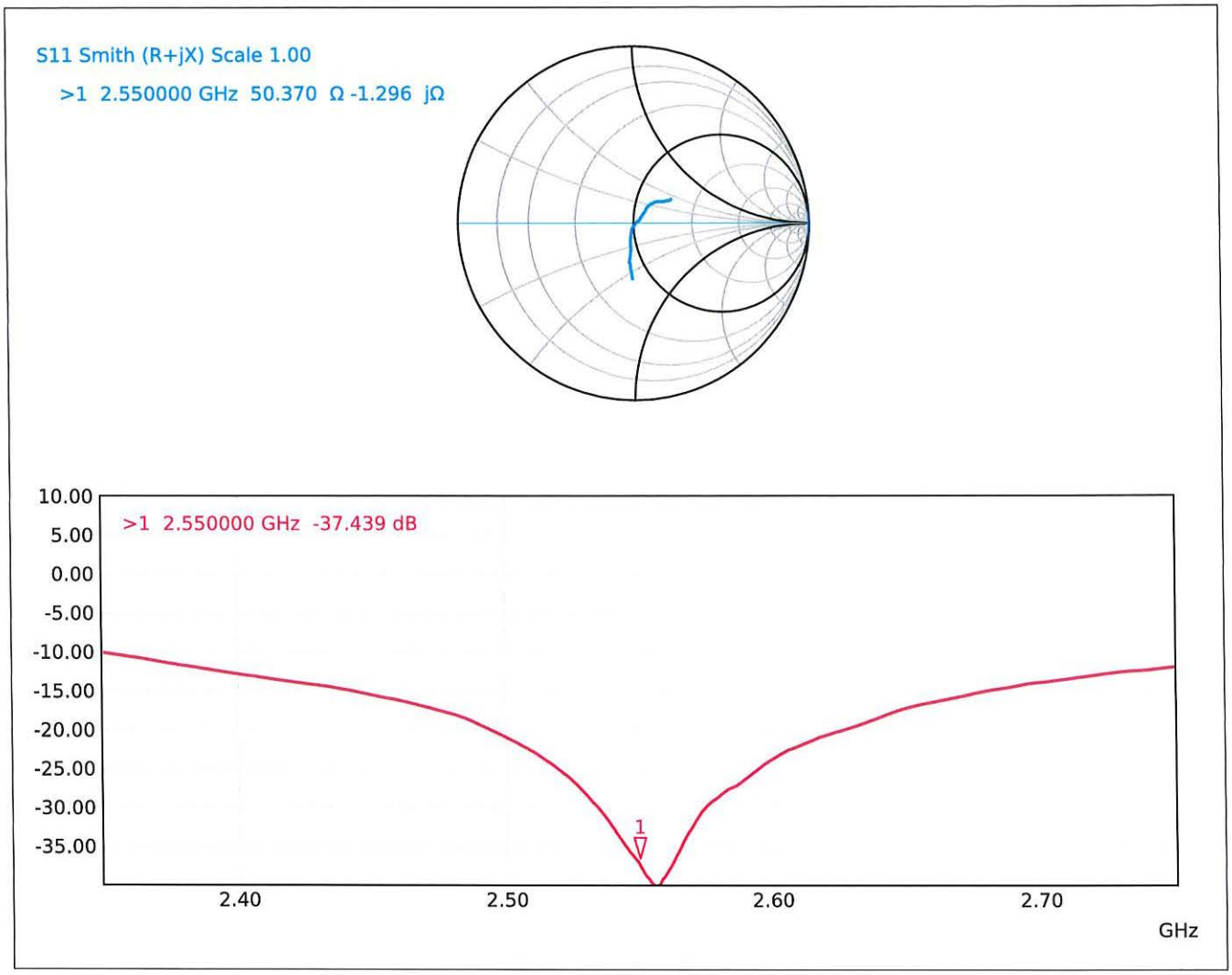
Measurement Results

	Zoom Scan
Date	2024-08-16
psSAR1g [W/Kg]	13.6
psSAR10g [W/Kg]	6.21
Power Drift [dB]	0.01
Power Scaling	Disabled
Scaling Factor [dB]	
TSL Correction	Positive / Negative



0 dB = 29.0 W/Kg

Impedance Measurement Plot for Head TSL



Calibration Laboratory of
Schmid & Partner
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 0108

Client **WSCT**
Shenzhen

Certificate No. **D5GHzV2-1412_Oct24**

CALIBRATION CERTIFICATE

Object	D5GHzV2 - SN: 1412
Calibration procedure(s)	QA CAL-22.v7 Calibration Procedure for SAR Validation Sources between 3 - 10 GHz
Calibration date	October 17, 2024

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Cal
Power Sensor R&S NRP-33T	SN: 100967	28-Mar-24 (No. 217-04038)	Mar-25
Power Sensor R&S NRP18A	SN: 101859	22-Jul-24 (No. 4030A315008547)	Jul-25
Spectrum Analyzer R&S FSV40	SN: 101832	25-Jan-24 (No. 4030-315007551)	Jan-25
Mismatch; Short [S4188] Attenuator [S4423]	SN: 1152	28-Mar-24 (No. 217-04050)	Mar-25
OCP DAK-12	SN: 1016	24-Sep-24 (No. OCP-DAK12-1016_Sep24)	Sep-25
OCP DAK-3.5	SN: 1249	23-Sep-24 (No. OCP-DAK3.5-1249_Sep24)	Sep-25
Reference Probe EX3DV4	SN: 7349	03-Jun-24 (No. EX3-7349_Jun24)	Jun-25
DAE4ip	SN: 1836	10-Jan-24 (No. DAE4ip-1836_Jan24)	Jan-25

Secondary Standards	ID	Check Date (in house)	Scheduled Check
ACAD Source Box	SN: 1000	28-May-24 (No. 675-ACAD_Source_Box-240528)	May-25
Signal Generator R&S SMB100A	SN: 182081	28-May-24 (No. 675-CAL16-S4588-240528)	May-25
Mismatch; SMA	SN: 1102	22-May-24 (No. 675-Mismatch_SMA-240522)	May-25

	Name	Function	Signature
Calibrated by	Paulo Pina	Laboratory Technician	
Approved by	Sven Kühn	Technical Manager	i. A.

Issued: October 17, 2024

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.