



SAR TEST REPORT

For

TireCheck GmbH

FlexiGauge TPMS

Test Model: 030570

Prepared for : TireCheck GmbH
Address : In den Stegwiesen 18, 89542 Herbrechtingen, Germany
Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.
Address : 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park
Yabianxueziwei, Shajing Street, Baoan District, Shenzhen,
518000, China
Tel : (+86)755-82591330
Fax : (+86)755-82591332
Web : www.LCS-cert.com
Mail : webmaster@LCS-cert.com

Date of receipt of test sample : March 11, 2026
Number of tested samples : 1
Sample number : A260306076-1
Serial number : Prototype
Date of Test : March 11, 2026 ~ April 12, 2026
Date of Report : April 13, 2026





SAR TEST REPORT	
Report Reference No.....	LCSA03106020EB
Date Of Issue	April 13, 2026
Testing Laboratory Name.....	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China
Testing Location/ Procedure	Full application of Harmonised standards ☒ Partial application of Harmonised standards ☐ Other standard testing method ☐
Applicant's Name	TireCheck GmbH
Address	In den Stegwiesen 18, 89542 Herbrechtingen, Germany
Test Specification:	
Standard.....	FCC 47CFR §2.1093 IEEE C95.1-2019 IEEE 1528-2013
Test Report Form No.....	TRF-4-E-102 A/0
TRF Originator.....	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF	Dated 2014-09
Shenzhen LCS Compliance Testing Laboratory Ltd. All rights reserved. This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen LCS Compliance Testing Laboratory Ltd. is acknowledged as copyright owner and source of the material. Shenzhen LCS Compliance Testing Laboratory Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.	
Test Item Description.	FlexiGauge TPMS
Trade Mark	N/A
Model/Type Reference	030570
Ratings	Please Refer to Page 8
Result	Positive

Compiled by:

Jay Zhan

Jay Zhan/ Administrator

Supervised by:

Kevin Huang

Kevin Huang/ RF Manager

Approved by:

Gavin Liang

Gavin Liang/ Manager



SAR -- TEST REPORT

Test Report No. :	LCSA03106020EB	April 13, 2026 Date of issue
EUT : FlexiGauge TPMS		
Type / Model..... : 030570		
Applicant..... : TireCheck GmbH Address..... : In den Stegwiesen 18, 89542 Herbrechtingen, Germany Telephone..... : / Fax..... : /		
Manufacturer..... : TireCheck GmbH Address..... : In den Stegwiesen 18, 89542 Herbrechtingen, Germany Telephone..... : / Fax..... : /		
Factory..... : Async Technologies ltd Address..... : Unit 7, Gort Rd. Industrial Estate, Gort Road, Ennis, Co. Clare, V95 X4RP, Ireland Telephone..... : / Fax..... : /		

Test Result	Positive
--------------------	-----------------

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.



Revision History

Revision	Issue Date	Revision Content	Revised By
000	April 13, 2026	Initial Issue	---



TABLE OF CONTENTS

1. TEST STANDARDS AND TEST DESCRIPTION.....	6
1.1. STATEMENT OF COMPLIANCE	6
1.2. TEST LOCATION.....	7
1.3. TEST FACILITY.....	8
1.4. TEST LABORATORY ENVIRONMENT	9
1.5. PRODUCT DESCRIPTION	10
1.6. DUT ANTENNA LOCATIONS	11
1.7. TEST SPECIFICATION.....	12
1.8. RF EXPOSURE LIMITS	13
1.9. EQUIPMENT LIST	14
2. SAR MEASUREMENTS SYSTEM CONFIGURATION	15
2.1. SAR MEASUREMENT SYSTEM	15
2.2. ISOTROPIC E-FIELD PROBE EX3DV4.....	17
2.3. DATA ACQUISITION ELECTRONICS (DAE).....	18
2.4. SAM TWIN PHANTOM	18
2.5. ELI PHANTOM	19
2.6. DEVICE HOLDER FOR TRANSMITTERS.....	20
2.7. MEASUREMENT PROCEDURE	21
3. SAR MEASUREMENT VARIABILITY AND UNCERTAINTY.....	25
3.1. SAR MEASUREMENT VARIABILITY.....	25
3.2. SAR MEASUREMENT UNCERTAINTY	25
4. DESCRIPTION OF TEST POSITION.....	26
4.1. BODY EXPOSURE CONDITION	26
4.2. EXTREMITY EXPOSURE CONDITIONS	27
4.3. DEVICE SPECIFIC GUIDANCE.....	27
5. SAR SYSTEM VERIFICATION PROCEDURE	30
5.1. TISSUE SIMULATE LIQUID.....	30
5.2. SAR SYSTEM CHECK.....	32
6. SAR MEASUREMENT PROCEDURE	35
6.1. CONDUCTED POWER MEASUREMENT	35
6.2. POWER REDUCTION	35
6.3. POWER DRIFT	35
7. TEST CONDITIONS AND RESULTS.....	36
7.1. CONDUCTED POWER RESULTS	36
7.2. SAR MEASUREMENT RESULTS	37



1. TEST STANDARDS AND TEST DESCRIPTION

1.1. Statement of Compliance

The maximum of results of SAR found during testing for 030570 are follows:

<Highest Reported standalone SAR Summary>

Classment Class	Frequency Band	Body (Report SAR1-g (W/kg)
		(Separation Distance 0mm)
DTS	Bluetooth	0.179

Note

1) This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2 (2.1093) and IEEE C95.1-2019, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013.



1.2. Test Location

Company: Shenzhen LCS Compliance Testing Laboratory Ltd.
Address: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China
Telephone: (+86)755-82591330
Fax: (+86)755-82591330
Web: www.LCS-cert.com
E-mail: webmaster@LCS-cert.com



1.3. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

Site Description
SAR Lab.

: NVLAP Accreditation Code is 600167-0.
FCC Designation Number is CN5024.
CAB identifier is CN0071.
CNAS Registration Number is L4595.
Test Firm Registration Number: 254912.



1.4. Test Laboratory Environment

Temperature	Min. = 18°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 Ω
Atmospheric pressure:	950-1050mbar
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	



1.5. Product Description

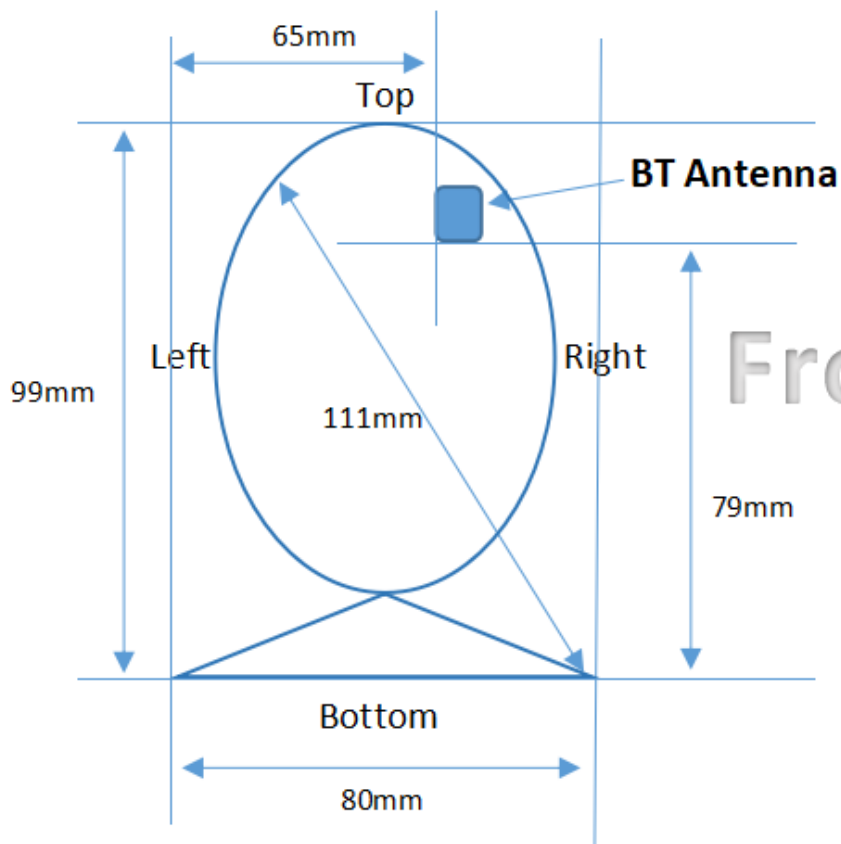
The **TireCheck GmbH's** Model: **030570** or the "EUT" as referred to in this report; more general information as follows, for more details, refer to the user's manual of the EUT.

EUT	: FlexiGauge TPMS
Test Model	: 030570
Ratings	: Input: 5V $\approx$ 0.2A 1.0W Battery: DC 3.7V $\approx$ 1000mA
Hardware Version	: 030570
Software Version	: 1.6.1
Bluetooth	:
Frequency Range	: 2402MHz~2480MHz
Channel Number	: 40 channels for Bluetooth V5.3 (DTS)
Channel Spacing	: 2MHz for Bluetooth V5.3 (DTS)
Modulation Type	: GFSK for Bluetooth V5.3 (DTS)
Bluetooth Version	: V5.3
Antenna Description	: Ceramic chip antenna, 1.5dBi(Max.)
SRD	:
Operating Frequency	: 125.0KHz
Modulation Type	: OOK
Antenna Description	: THT Small emitter antenna

Note: For a more detailed antenna description, please refer to the antenna specifications or the antenna report provided by the customer.



1.6. DUT Antenna Locations



Front view



1.7. Test Specification

Identity	Document Title
FCC 47CFR §2.1093	Radiofrequency Radiation Exposure Evaluation: Portable Devices
ANSI/IEEE C95.1-2019	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz.
IEEE 1528-2013	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
KDB 447498 D01	General RF Exposure Guidance v06
KDB 865664 D01	SAR Measurement 100 MHz to 6 GHz v01r04
KDB 865664 D02	RF Exposure Reporting v01r02
KDB 690783 D01	SAR Listings on Grants v01r03
KDB 775926 V01	SPECIFIC ABSORPTION RATE (SAR) TESTING FOR IRREGULAR SHAPED DEVICES



1.8. RF exposure limits

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Spatial Peak SAR* (Brain*Trunk)	1.60 mW/g	8.00 mW/g
Spatial Average SAR** (Whole Body)	0.08 mW/g	0.40 mW/g
Spatial Peak SAR*** (Hands/Feet/Ankle/Wrist)	4.00 mW/g	20.00 mW/g

Notes:

* The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time

** The Spatial Average value of the SAR averaged over the whole body.

*** The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation.)



1.9. Equipment list

Test Platform		SPEAG DASY5 Professional				
Description		SAR Test System (Frequency range 300MHz-6GHz)				
Software Reference		DASY52; SEMCAD X				
Hardware Reference						
Equipment		Manufacturer	Model	Serial Number	Calibration Date	Due date of calibration
☒	PC	Lenovo	NA	NA	NA ¹	NA ¹
☒	Twin Phantom	SPEAG	SAM V5.0	1850	NA ¹	NA ¹
☒	ELI Phantom	SPEAG	ELI V6.0	2010	NA ¹	NA ¹
☒	DAE	SPEAG	DAE3	373	2026/3/2	2027/3/1
☒	E-Field Probe	SPEAG	EX3DV4	3805	2026/3/2	2027/3/1
☒	Validation Kits	SPEAG	D2450V2	808	2023/10/23	2026/10/22
☒	Agilent Network Analyzer	Agilent	8753E	SU38432944	2025/5/22	2026/5/21
☒	Dielectric Probe Kit	SPEAG	DAKS 3.5	1157	2025/8/18	2026/8/17
☒	Universal Radio Communication Tester	R&S	CMW500	42115	2025/9/27	2026/9/26
☒	Directional Coupler	MCLI/USA	4426-20	03746	2025/9/27	2026/9/26
☒	Power meter	Agilent	E4419B	MY45104493	2025/9/27	2026/9/26
☒	Power meter	Agilent	E4419B	MY45100308	2025/9/27	2026/9/26
☒	Power sensor	Agilent	E9301H	MY41495616	2025/9/27	2026/9/26
☒	Power sensor	Agilent	E9301H	MY41495234	2025/9/27	2026/9/26
☒	3dB Attenuator	NA	2N-3dB	NA	2025/9/27	2026/9/26
☒	3dB Attenuator	NA	2N-3dB	NA	2025/9/27	2026/9/26
☒	3dB Attenuator	NA	2N-3dB	NA	2025/9/27	2026/9/26
☒	Signal Generator	Agilent	E4438C	MY49072627	2025/9/27	2026/9/26
☒	Broadband Preamplifier	/	BP-01M18G	P190501	2025/9/27	2026/9/26
☒	DC POWER SUPPLY	I-SHENG	SP-504	NA	2025/9/27	2026/9/26
☒	Speed reading thermometer	HTC-1	NA	LCS-E-138	2025/9/27	2026/9/26

Note: All the equipments are within the valid period when the tests are performed.

1" : NA as this is not measurement equipment.



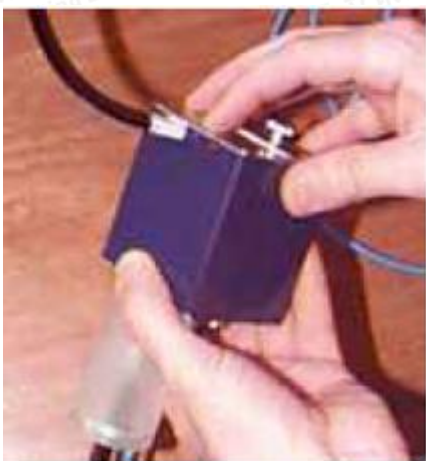


- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 7.
- DASY5 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand, right-hand and Body Worn usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validating the proper functioning of the system.

2.2. Isotropic E-field Probe EX3DV4

	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available.
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in TSL (rotation around probe axis) ± 0.5 dB in TSL (rotation normal to probe axis)
Dynamic Range	10 μ W/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μ W/g)
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better 30%.
Compatibility	DASY3, DASY4, DASY52 SAR and higher, EASY4/MRI

2.3. Data Acquisition Electronics (DAE)

Model	DAE	
Construction	Signal amplifier, multiplexer, A/D converter and control logic. Serial optical link for communication with DASY4/5 embedded system (fully remote controlled). Two step probe touch detector for mechanical surface detection and emergency robot stop.	
Measurement Range	-100 to +300 mV (16 bit resolution and two range settings: 4mV, 400mV)	
Input Offset Voltage	< 5μV (with auto zero)	
Input Bias Current	< 50 f A	
Dimensions	60 x 60 x 68 mm	

2.4. SAM Twin Phantom

Material	Vinylester, glass fiber reinforced (VE-GF)	
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)	
Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)	
Dimensions (incl. Wooden Support)	Length: 1000 mm Width: 500 mm Height: adjustable feet	
Filling Volume	approx. 25 liters	
Wooden Support	SPEAG standard phantom table	

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 evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.

Twin SAM V5.0 has the same shell geometry and is manufactured from the same material as Twin SAM V4.0, but has reinforced top structure.

2.5. ELI Phantom

Material	Vinylester, glass fiber reinforced (VE-GF)	
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)	
Shell Thickness	2.0 ± 0.2 mm (bottom plate)	
Dimensions	Major axis: 600 mm Minor axis: 400 mm	
Filling Volume	approx. 30 liters	
Wooden Support	SPEAG standard phantom table	

Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.

ELI V5.0 has the same shell geometry and is manufactured from the same material as ELI4, but has reinforced top structure.

2.6. Device Holder for Transmitters



F-2. Device Holder for Transmitters

- The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation centres for both scales are the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.
- The DASY device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity $\epsilon=3$ and loss tangent $\delta=0.02$. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.



2.7. Measurement procedure

2.7.1. Scanning procedure

Step 1: Power reference measurement

The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure.

Step 2: Area scan

The SAR distribution at the exposed side of the head was measured at a distance of 4mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 15mm*15mm or 12mm*12mm or 10mm*10mm. Based on the area scan data, the area of the maximum absorption was determined by spline interpolation.

Step 3: Zoom scan

Around this point, a volume of 32mm*32mm*30mm ($f \leq 2\text{GHz}$), 30mm*30mm*30mm (f for 2-3GHz) and 24mm*24mm*22mm (f for 5-6GHz) was assessed by measuring 5x5x7 points ($f \leq 2\text{GHz}$), 7x7x7 points (f for 2-3GHz) and 7x7x12 points (f for 5-6GHz). On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

The data at the surface was extrapolated, since the centre of the dipoles is 2.0mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2mm. (This can be variable. Refer to the probe specification). The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-Spline interpolation algorithm. The volume was integrated with the trapezoidal algorithm. One thousand points were interpolated to calculate the average. All neighbouring volumes were evaluated until no neighboring volume with a higher average value was found.

The area and zoom scan resolutions specified in the table below must be applied to the SAR measurements. 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.



			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: Δx_{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 $\leq$ 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: Δx_{Zoom} , Δy_{Zoom}			≤ 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: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: 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
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Step 4: Power reference measurement (drift)

The Power Drift Measurement job measures the field at the same location as the most recent power reference measurement job within the same procedure, and with the same settings. The indicated drift is mainly the variation of the DUT's output power and should vary max. $\pm 5\%$

2.7.2. Data Storage

The DASY software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension “.DAE4”. The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated. The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [m W/g], [m W/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.



2.7.3. Data Evaluation by SEMCAD

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

Probe parameters:	- Sensitivity	Normi, ai0, ai1, ai2
- Conversion factor	ConvFi	
- Diode compression point	Dcpi	
Device parameters:	- Frequency	f
- Crest factor	cf	
Media parameters:	- Conductivity	ϵ
- Density	ρ	

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

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.

If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot cf / dcpi$$

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

U_i = input signal of channel i (i = x, y, z)

cf = crest factor of exciting field (DASY parameter)

dcpi = diode compression point (DASY parameter)

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

E-field probes:

$$E_i = (V_i / Norm_i \cdot ConvF)^{1/2}$$



H-field probes:

$$H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1}f + a_{i2}f^2) / f$$

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

Normi = sensor sensitivity of channel i ($i = x, y, z$)

[mV/(V/m)²] for E-field Probes

ConvF = sensitivity enhancement in solution

a_{ij} = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

E_i = electric field strength of channel i in V/m

H_i = magnetic field strength of channel i in A/m

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

$$E_{tot} = (E_x^2 + E_y^2 + E_z^2)^{1/2}$$

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

$$SAR = (E_{tot}^2 \cdot \sigma) / (\epsilon \cdot 1000)$$

with SAR = local specific absorption rate in mW/g

E_{tot} = total field strength in V/m

σ = conductivity in [mho/m] or [Siemens/m]

ϵ = equivalent tissue density in g/cm³

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{pwe} = E_{tot}^2 / 3770 \text{ or } P_{pwe} = H_{tot}^2 \cdot 37.7$$

with P_{pwe} = equivalent power density of a plane wave in mW/cm²

E_{tot} = total electric field strength in V/m

H_{tot} = total magnetic field strength in A/m



3. SAR measurement variability and uncertainty

3.1. SAR measurement variability

Per KDB865664 D01 SAR measurement 100 MHz to 6 GHz v01r04, SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. The additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.

2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.

3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).

4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .

The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.

3.2. SAR measurement uncertainty

Per KDB865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. The equivalent ratio (1.5/1.6) is applied to extremity and occupational exposure conditions.

4. Description of Test Position

4.1. Body Exposure Condition

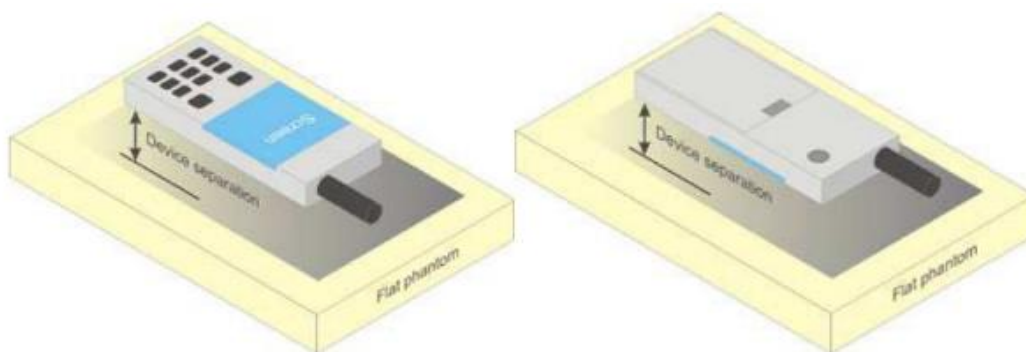
4.1.1. Body-worn accessory exposure conditions

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations.

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration. Per FCC KDB Publication 648474 D04, Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB Publication 447498 D01 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is $> 1.2 \text{ W/kg}$, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented. Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.



F-1. Test positions for body-worn devices

4.1.2. Wireless Router exposure conditions

Some battery-operated handsets have the capability to transmit and receive user data through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 where SAR test considerations for handsets ($L \times W \geq 9 \text{ cm} \times 5 \text{ cm}$) are based on a composite test separation distance of 10 mm from the front, back and edges of the device containing transmitting antennas within 2.5 cm of their edges, determined from general mixed use conditions for this type of devices. For devices with form factors smaller than 9 cm x 5 cm, a test separation distance of 5 mm is required.

4.2. Extremity exposure conditions

Per FCC KDB 648474D04, for smart phones with a display diagonal dimension $> 15.0 \text{ cm}$ or an overall diagonal dimension $> 16.0 \text{ cm}$ that provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets that support voice calls next to the ear, the device is marketed as "Phablet".

The UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna located at $\leq 25 \text{ mm}$ from that surface or edge, in direct contact with a flat phantom, for Product Specific 10-g SAR according to the body-equivalent tissue dielectric parameters in KDB 865664 to address interactive hand use exposure conditions. The UMPC mini-tablet 1-g SAR at 5 mm is not required. When hotspot mode applies, Product Specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR $> 1.2 \text{ W/kg}$; however, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold.

Due to the SAR result, the Main antenna frequency bands are not required to test with 0mm for the Product Specific 10 g SAR.

4.3. DEVICE SPECIFIC GUIDANCE

3.1 Protrusions on Flat Devices

Many devices, including smart phones and tablets, include protrusions, e.g., built-in camera modules, which may prevent positioning the probes sufficiently close to the antenna(s) under test. Given that these protrusions cannot be removed, repositioning the device is necessary such that the required probe separation distance is maintained during testing.

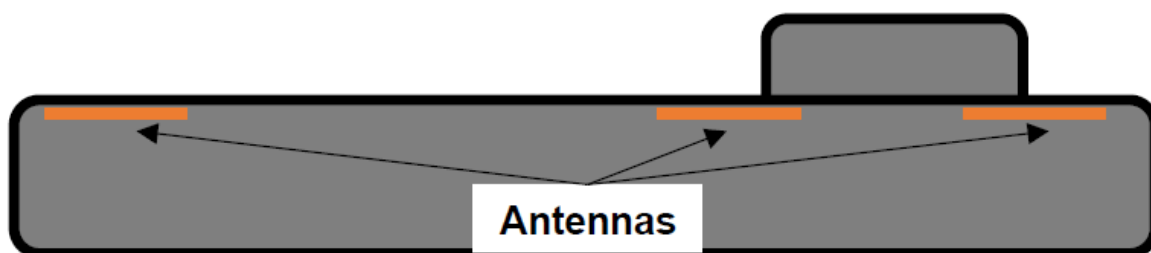


Figure 2 – Profile of smart phone with camera bump

3.3.1. Body SAR evaluation

In accordance with KDB Publication 447498 D01, a test separation distance of $\leq 5 \text{ mm}$ may be required for body SAR evaluations. When an antenna is located near or under a protrusion, the DUT (Device Under Test) shall be positioned with the best obtainable angle for the probe scan ensuring the requisite separation distance relative to the peak SAR location (normally closest to the feed point of the antenna under test). One approach in determining the peak SAR location is to use a fast area scan with the device placed flat under the phantom; however, final measurements need to be made in accordance with KDB publication 865664 D01 with the most conservative separation distance in accordance with normal use. Ideally, when the protrusion is less than the test separation distance, the DUT shall be

placed under the phantom with the required separation distance between the antenna under test and the phantom (example shown in Figure 3).

In the case where the protrusion exceeds the minimum test separation distance, then the DUT needs to be repositioned to maintain the appropriate separation distance. This may be achieved by moving the device (example shown in Figure 4) or tilting the device (example shown in Figure 5).

Note that if the SAR scan cannot reach a required area (e.g., near a protrusion corner) at a sufficiently close distance, the PHANTM PAG is required (per KDB 388624 D02).

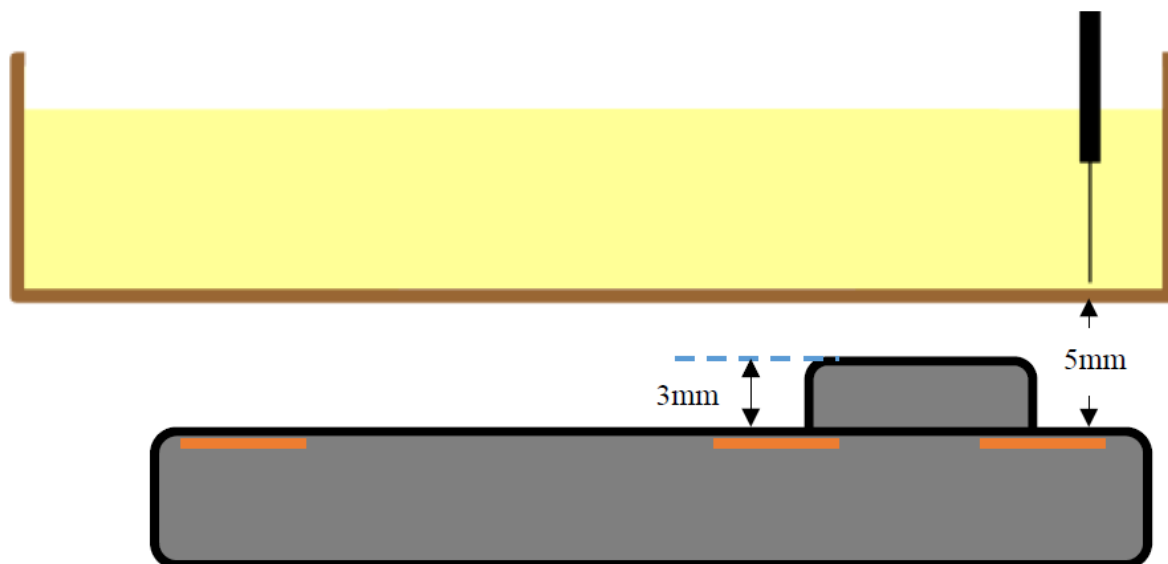


Figure 3 – Example camera protrusion $\leq$ separation distance

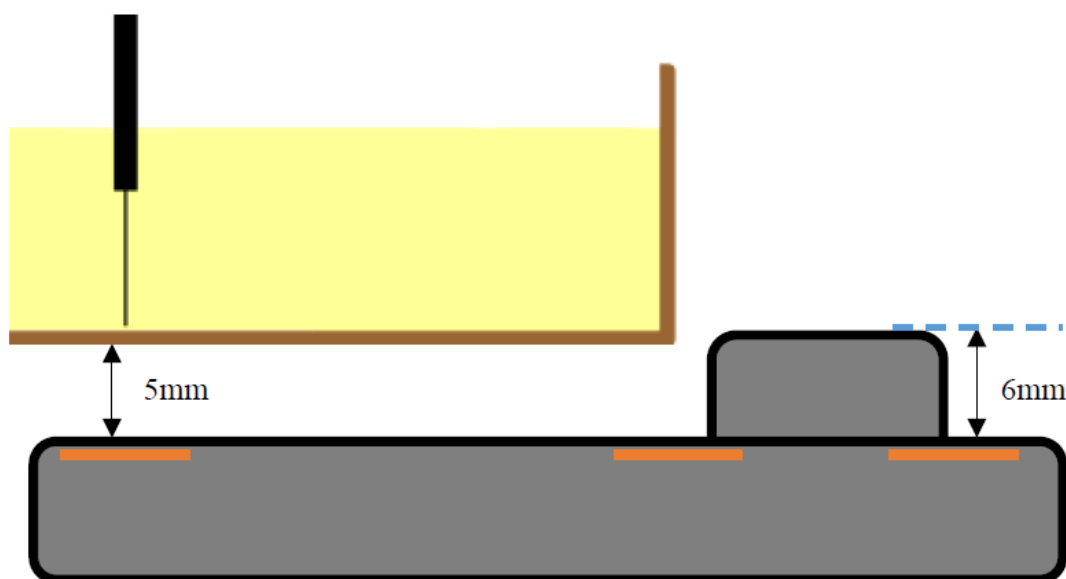


Figure 4 – Example DUT repositioned when camera protrusion $>$ separation distance

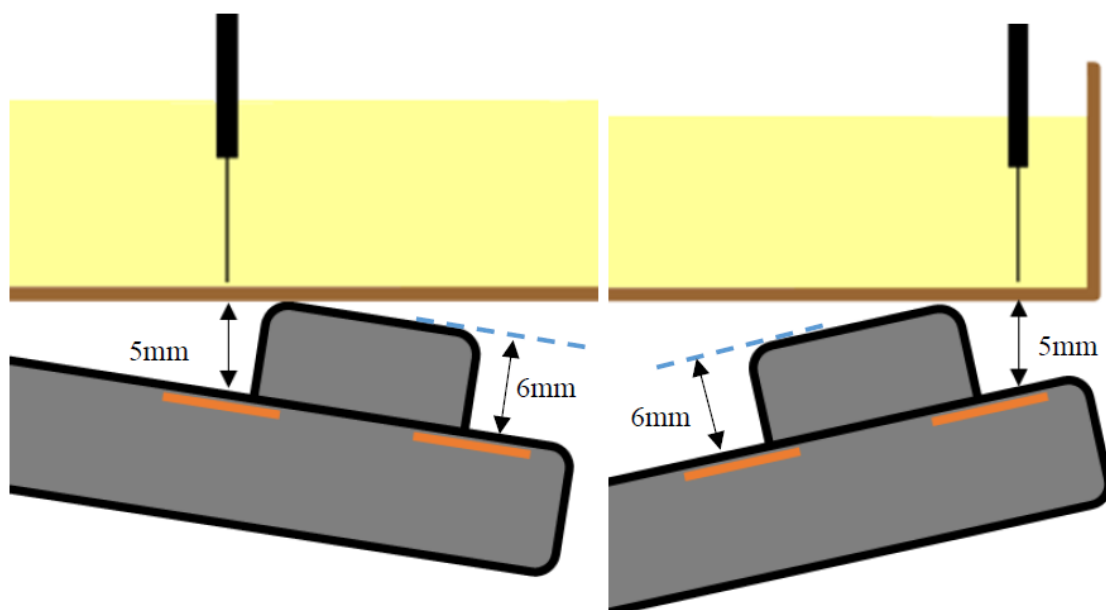


Figure 5 – Example DUT tilt when camera protrusion > separation distance

When antennas wrap around the corner of a protrusion, compliance can be shown by making the measurement on both edges in a tilt position. Alternatively, a fast area scan can be performed with the device protrusion placed parallel or flat against the center of the flat phantom to determine the worst-case SAR location.

When SAR values are measured at less than 0.8 W/kg, then only the worst-case edge needs to be measured; however, when SAR values are measured greater than or equal to 0.8 W/kg, then both edges shall be measured.



5. SAR System Verification Procedure

5.1. Tissue Simulate Liquid

5.1.1. Recipes for Tissue Simulate Liquid

The following tables give the recipes for tissue simulating liquids to be used in different frequency bands:

Ingredients (% by weight)	Frequency (MHz)				
	450	700-900	1750-2000	2300-2500	2500-2700
Water	38.56	40.30	55.24	55.00	54.92
Salt (NaCl)	3.95	1.38	0.31	0.2	0.23
Sucrose	56.32	57.90	0	0	0
HEC	0.98	0.24	0	0	0
Bactericide	0.19	0.18	0	0	0
Tween	0	0	44.45	44.80	44.85
Salt: 99 ⁺ % Pure Sodium Chloride Water: De-ionized, 16 MΩ ⁺ resistivity Tween: Polyoxyethylene (20) sorbitan monolaurate Sucrose: 98 ⁺ % Pure Sucrose HEC: Hydroxyethyl Cellulose					
HSL5GHz is composed of the following ingredients: Water: 50-65% Mineral oil: 10-30% Emulsifiers: 8-25% Sodium salt: 0-1.5%					

Table 1: Recipe of Tissue Simulate Liquid



5.1.2. Measurement for Tissue Simulate Liquid

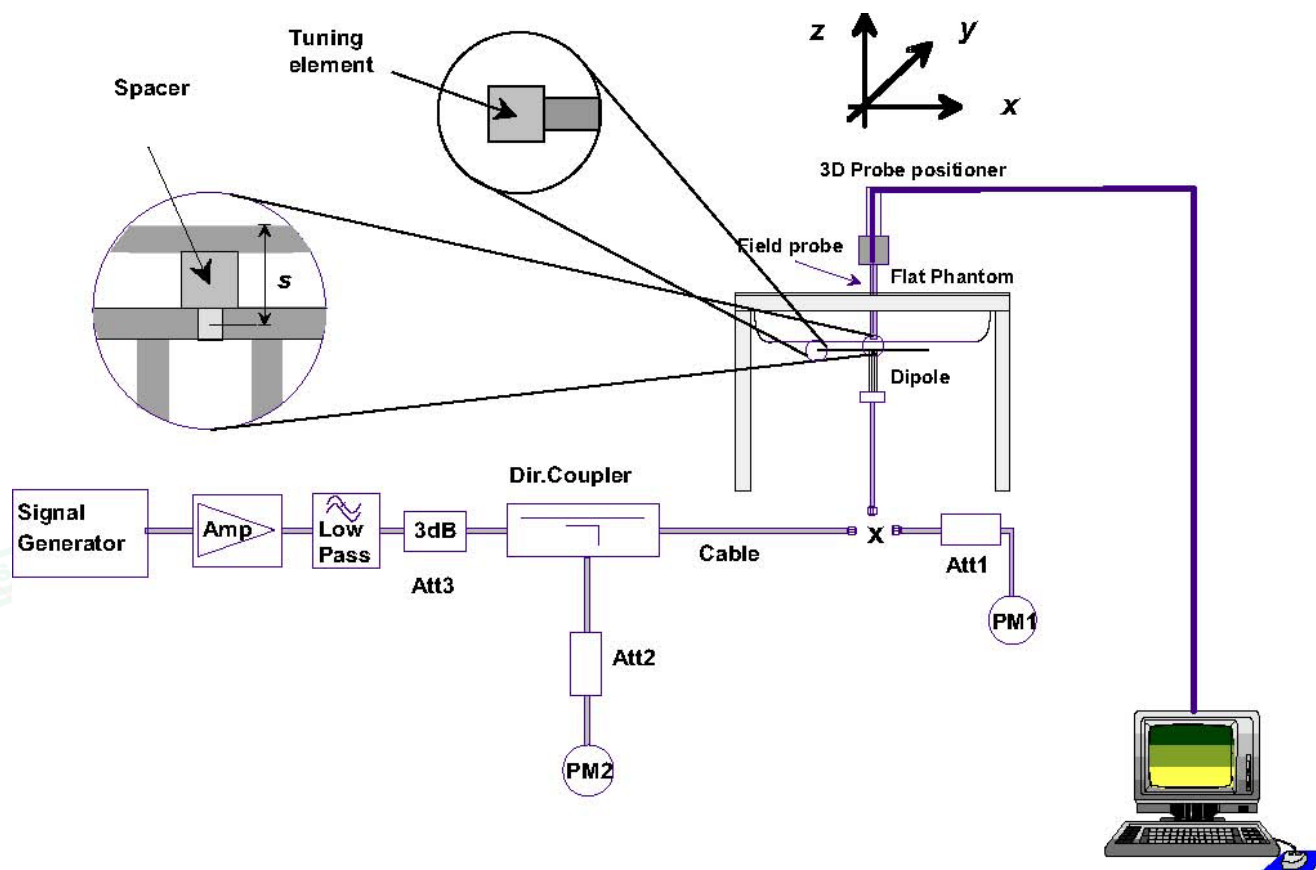
The dielectric properties for this Tissue Simulate Liquids were measured by using the DAKS. The Conductivity (σ) and Permittivity (ρ) are listed in bellow table. For the SAR measurement given in this report. The temperature variation of the Tissue Simulate Liquids was $22\pm2^{\circ}\text{C}$.

Tissue Type	Measured Frequency (MHz)	Target Tissue ($\pm 5\%$)		Measured Tissue		Liquid Temp. ($^{\circ}\text{C}$)	Measured Date
		ϵ_r	$\sigma(\text{S/m})$	ϵ_r	$\sigma(\text{S/m})$		
2450 Head	2450	39.2 (37.24~41.16)	1.8 (1.71~1.89)	38.691	1.746	21.9	April 10, 2026

Table 2: Measurement result of Tissue electric parameters

5.2. SAR System Check

The microwave circuit arrangement for system Check is sketched in F-1. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within $\pm 10\%$ from the target SAR values. The tests were conducted on the same days as the measurement of the EUT. The obtained results from the system accuracy verification are displayed in the following table (A power level of 100mW (below 3GHz) or 100mW (3-6GHz) was input to the dipole antenna). During the tests, the ambient temperature of the laboratory was in the range $22\pm 2^{\circ}\text{C}$, the relative humidity was in the range 60% and the liquid depth above the ear reference points was above $15\pm 0.5\text{ cm}$ in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.



F-1. the microwave circuit arrangement used for SAR system check



5.2.1. Justification for Extended SAR Dipole Calibrations

Referring to RSS-102.SAR.MEAS requirements for dipole calibration,for dipoles, longer calibration intervals of up to three years may be considered when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

- 1. The test laboratory must ensure that the required supporting information and documentation are included in the SAR report to qualify for the three-year extended calibration interval; otherwise, the dipole manufacturer’s recommended calibration applies.
- 2. Immediate recalibration is required for the following conditions:
 - a. After a dipole is damaged and properly repaired to meet required specifications.
 - b. When the measured SAR deviates from the calibrated SAR value by more than 10% due to changes in physical, mechanical, electrical or other relevant dipole conditions (i.e. the error is not introduced by incorrect measurement procedures or other issues relating to the SAR measurement system).
 - c. When the most recent return loss result, measured at least annually, deviates by more than 20% from the previous measurement or not meeting the required 20 dB minimum return loss requirement.
 - d. When the most recent measurement of the real or imaginary parts of the impedance, measured at least annually, deviates by more than 5 Ω from the previous measurement.

D2450V2 SN 808 Extend Dipole Calibrations

Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
2023-10-23	-26.3		51.4		4.73	
2024-10-22	-26.27	-0.11	51.2	-0.2	4.70	-0.03
2025-10-21	-26.31	0.04	51.6	0.2	4.75	0.02



5.2.2. Summary System Check Result(s)

Validation Kit		Measured SAR 100mW	Measured SAR 100mW	Measured SAR (normalized to 1W)	Measured SAR (normalized to 1W)	Target SAR (normalized to 1W) (±10%)	Target SAR (normalized to 1W) (±10%)	Liquid Temp. (°C)	Measured Date
		1g (W/kg)	10g (W/kg)	1g (W/kg)	10g (W/kg)	1-g(W/kg)	10-g(W/kg)		
D2450V2	Head	5.32	2.45	53.20	24.50	53.5 (48.15~58.85)	24.8 (22.32~27.28)	21.9	April 10, 2026



6. SAR measurement procedure

The measurement procedures are as follows:

6.1. Conducted power measurement

- a. For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously Transmission, at maximum RF power in each supported wireless interface and frequency band.
- b. Connect EUT RF port through RF cable to the power meter, and measure WLAN/BT output power.

6.2. Power Reduction

The product without any power reduction.

6.3. Power Drift

To control the output power stability during the SAR test, SAR system calculates the power drift by measuring the E-field at the same location at the beginning and at the end of the measurement for each test position. This ensures that the power drift during one measurement is within $\pm 0.2\text{dB}$.



7. TEST CONDITIONS AND RESULTS

7.1. Conducted Power Results

According KDB 447498 D01 General RF Exposure Guidance v06 Section 4.1 2) states that “Unless it is specified differently in the published RF exposure KDB procedures, these requirements also apply to test reduction and test exclusion considerations. Time-averaged maximum conducted output power applies to SAR and, as required by § 2.1091(c), time-averaged ERP applies to MPE. When an antenna port is not available on the device to support conducted power measurement, such as FRS and certain Part 15 transmitters with built-in integral antennas, the maximum output power allowed for production units should be used to determine RF exposure test exclusion and compliance.”

7.1.1. Conducted Power Measurement Results(Bluetooth)

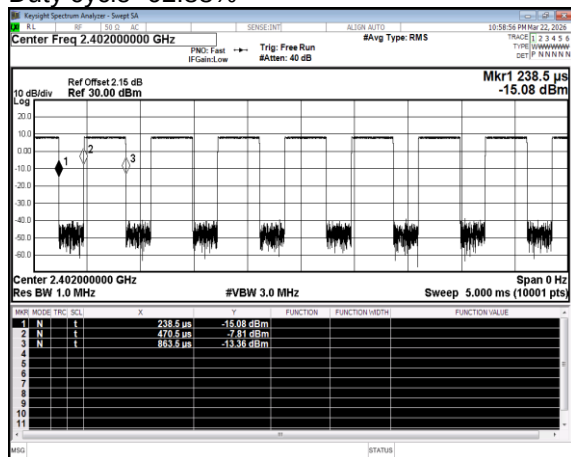
Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Tune Up (dBm)
NVNT	BLE 1M	2402	Ant1	8.39	9.00
NVNT	BLE 1M	2440	Ant1	7.73	8.00
NVNT	BLE 1M	2480	Ant1	7.07	8.00

Note:

- Power must be measured at each transmit antenna port according to the DSSS and OFDM transmission configurations in each standalone and aggregated frequency band.
- Power measurement is required for the transmission mode configuration with the highest maximum output power specified for production units.
 - When the same highest maximum output power specification applies to multiple transmission modes, the largest channel bandwidth configuration with the lowest order modulation and lowest data rate is measured.
 - When the same highest maximum output power is specified for multiple largest channel bandwidth configurations with the same lowest order modulation or lowest order modulation and lowest data rate, power measurement is required for all equivalent 802.11 configurations with the same maximum output power.
- For each transmission mode configuration, power must be measured for the highest and lowest channels; and at the mid-band channel(s) when there are at least 3 channels. For configurations with multiple mid-band channels, due to an even number of channels, both channels should be measured.

BLE (1M) :

Duty cycle=62.88%





7.2. SAR Measurement Results

The calculated SAR is obtained by the following formula:

$$\text{Reported SAR} = \text{Measured SAR} * 10^{(P_{\text{target}} - P_{\text{measured}})/10} * \text{DutyCycle Factor}$$

$$\text{Scaling factor} = 10^{(P_{\text{target}} - P_{\text{measured}})/10}$$

$$\text{DutyCycle Factor} = 1/\text{Dutycycle\%}$$

$$\text{Reported SAR} = \text{Measured SAR} * \text{Scaling factor} * \text{DutyCycle Factor}$$

Where

P_{target} is the power of manufacturing upper limit;

P_{measured} is the measured power;

Measured SAR is measured SAR at measured power which including power drift)

Reported SAR which including Power Drift and Scaling factor

7.2.1. SAR Results [Bluetooth]

SAR Values [Bluetooth]									
Ch/ Freq. (MHz)	Channel Type	Test Position	Duty Cycle Factor	Conducted Power (dBm)	Maximum Allowed Power (dBm)	PowerDrift (dB)	Scaling Factor	SAR _{1-g} results(W/kg)	
								Measured	Reported
measured / reported SAR numbers - Body (distance 0mm)									
0/2402	BLE1M	Front Side	1.590	8.39	9.00	-0.18	1.151	0.098	0.179
0/2402	BLE1M	Rear Side	1.590	8.39	9.00	-0.14	1.151	0.045	0.082
0/2402	BLE1M	Left Side	1.590	8.39	9.00	0.17	1.151	0.008	0.015
0/2402	BLE1M	Right Side	1.590	8.39	9.00	-0.16	1.151	0.041	0.075
0/2402	BLE1M	Top Side	1.590	8.39	9.00	0.03	1.151	0.011	0.020
0/2402	BLE1M	Bottom Side	1.590	8.39	9.00	-0.18	1.151	0.001	0.002

Note:

- 1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B.
- 2) When the highest reported SAR for the initial test configuration is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR test for the other 802.11 modes are not required.



Appendix A: Detailed System Check Results

Appendix B: Detailed Test Results

Appendix C: Calibration certificate

Appendix D: Photographs

.....The End of Test Report.....