





SZEMC-TRF-01 Rev. A/0 Aug01,2022

Report No.: SZCR230700222604

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# FCC SAR TEST REPORT

**Application No.:** SZCR2307002226AT

SZ DJI Osmo Technology Co., Ltd. Applicant:

4F, Jingkou Community Comprehensive Service Building, No. 83 Bishui **Address of Applicant:** 

Road North, Guangming Street, Guangming District, Shenzhen, China.

Manufacturer: SZ DJI Osmo Technology Co., Ltd.

4F, Jingkou Community Comprehensive Service Building, No. 83 Bishui **Address of Manufacturer:** 

Road North, Guangming Street, Guangming District, Shenzhen, China.

**Product Name: DJI MIC 2 Transmitter** 

Model No.: DMT02 Trade mark: DJI

FCC ID: 2ANDR-DMT02

FCC 47CFR §2.1093 Standard(s):

**Date of Receipt:** 2023-08-09 Date of Test: 2023-08-09 2023-08-16 Date of Issue:

Pass\* Test Result:

Keny Xu **EMC Laboratory Manager** 



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<sup>\*</sup> In the configuration tested, the EUT complied with the standards specified above.



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Revision Record			
Version	Description	Date	Remark
00	Original	2023-08-16	1

Authorized for issue by:		
	Owen Xiao	
	Owen Xiao/ Project Engineer	
	Exic Fu	
	Eric Fu / Reviewer	



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#### **TEST SUMMARY**

Frequency Band	Maximum Reported SAR(W/kg)	Maximum Reported SAR(W/kg)	Maximum Reported SAR(W/kg)
. ,	Head	Body	Limbs
ВТ	0.13	0.10	0.12
SDR	0.52	1.06	1.19
SAR Limited(W/kg)	1.60	1.60	4.00



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# 1 General Information

# 1.1 General Description of EUT

Product Phase:	production unit		
Device Type :	portable device		
Exposure Category:	uncontrolled enviro	nment / general population	
Hardware Version:	V1.0		
Software Version:	V00.00.00.01		
IMEI/SN:	6VTDKL68000157		
	ANT1: IFA Antenna	ı	
Antenna Type:	ANT2: PCB Antenn	a	
Antenna Gain:	0.7dBi		
Device Operating Configurations:			
	<b>BT</b> : GFSK, π/4DQPSK		
Modulation Mode:	2.4G SDR: GFSK		
	Band	Tx (MHz)	Rx (MHz)
Frequency Bands:	BT	2402~2480	2402~2480
	2.4G SDR	2402~2480	2402~2480
	Model:	BSX102-360-3.87-TX	
	Normal Voltage:	3.87V	
Battery Information:	Rated capacity:	360mAh, 1.393Wh	
	Battery Type:	Rechargeable Li-ion Battery	
	Manufacturer	Springpower Technology(She	enzhen) Co., Ltd.



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#### 1.2 DUT Antenna Locations

Please see the Appendix D



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# 1.3 Test Specification

Identity	Document Title
FCC 47CFR §2.1093	Radio frequency Radiation Exposure Evaluation: Portable Devices
IEEE Std C95.1 – 1992	IEEE Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 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 D04 v01	RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices
KDB 865664 D01 v01r04	SAR Measurement Requirements for 100 MHz to 6 GHz
KDB 865664 D02 v01r02	RF Exposure Compliance Reporting and Documentation Considerations



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# 1.4 RF exposure limits

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

#### Notes:

**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.)



<sup>\*</sup> 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

<sup>\*\*</sup> The Spatial Average value of the SAR averaged over the whole body.

<sup>\*\*\*</sup> 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.



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#### 1.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

#### 1.6 Test Facility

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

#### A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

#### • VCCI (Member No. 1937)

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen EMC laboratory have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

#### • FCC -Designation Number: CN1336

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1336. Test Firm Registration Number: 787754.

#### • Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.





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# 2 Laboratory Environment

Temperature	Min. = 18°C, Max. = 25 °C	
Relative humidity	Min. = 30%, Max. = 70%	
Ground system resistance	< 0.5 Ω	
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.		



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# 3 SAR Measurements System Configuration

### 3.1 The SAR Measurement System

This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (SPEAG DASY5 professional system). A E-field probe is used to determine the internal electric fields. The SAR can be obtained from the equation SAR=  $\sigma$  (|Ei|2)/  $\rho$  where  $\sigma$  and  $\rho$  are the conductivity and mass density of the tissue-Simulate.

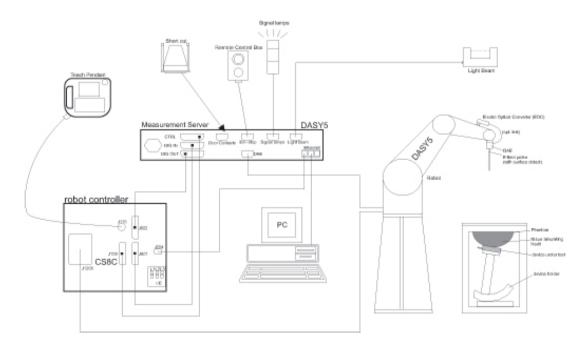
The DASY5 system for performing compliance tests consists of the following items:

A standard high precision 6-axis robot (Stabile RX family) with controller, teach pendant and software. An arm extension for accommodation the data acquisition electronics (DAE).

A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.

A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.



F-1. SAR Measurement System Configuration



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- 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 validat the proper functioning of the system.

## 3.2 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 <u>calibration service</u> 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 μW/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μW/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



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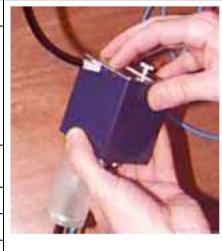
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### 3.3 Data Acquisition Electronics (DAE)

Model	DAE4
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



#### 3.4 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 IEEE 1528 and IEC 62209-1. 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.



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#### 3.5 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.



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#### 3.6 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  $\varepsilon$ =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.





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## 3.7 Measurement procedure

#### 3.7.1 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 30mm\*30mm\*30mm (fine resolution volume scan, zoom scan) was assessed by measuring 5x5x7 points (≤2GHz) and 7x7x7 points (≥2GHz). 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.



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			≤ 3 GHz	> 3 GHz
Maximum distance from (geometric center of pr		•	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle surface normal at the m	-	-	30° ± 1°	20° ± 1°
			≤2 GHz: ≤15 mm 2 – 3 GHz: ≤12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
Maximum area scan sp	atial resolu	ntion: $\Delta x_{Area}$ , $\Delta y_{Area}$	When the x or y dimension of measurement plane orientation the measurement resolution in x or y dimension of the test dimeasurement point on the test	on, is smaller than the above, nust be ≤ the corresponding evice with at least one
Maximum zoom scan spatial resolution: Δx <sub>Zoom</sub> , Δy <sub>Zoom</sub>			≤ 2 GHz: ≤ 8 mm 2 - 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
	uniform	grid: Δz <sub>Zoom</sub> (n)	≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
Maximum zoom scan spatial resolution, normal to phantom surface	graded	Δz <sub>Zoom</sub> (1): between 1 <sup>st</sup> two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
	grid	Δz <sub>Zoom</sub> (n>1): between subsequent points	≤ 1.5·Δz	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

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

#### 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 %



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When zoom scan is required and the <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 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.



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#### 3.7.2 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 ".DAE3". 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 reevaluated. 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.

#### 3.7.3 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 ConvFiDiode compression point Dcpi

Device parameters: - Frequency f

- Crest factor cf Media parameters: - Conductivity

- 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:

$$V_i = U_i + U_i^2 \cdot c f / d c p_i$$

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

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

cf = crest factor of exciting field (DASY parameter)



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dcp i = 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 Vi = 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

aij = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

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

Hi = 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.

$$SAR = (Etot^2 \cdot \sigma) / (\varepsilon \cdot 1000)$$

With SAR = local specific absorption rate in mW/g

Etot = 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.

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

with Ppwe = equivalent power density of a plane wave in mW/cm2

Etot = total electric field strength in V/m

Htot = total magnetic field strength in A/m



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# 4 SAR measurement variability and uncertainty

#### 4.1 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 remounted 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  $\geq$  1.45 W/kg ( $\sim$  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.



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### 4.2 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.



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# 5 Description of Test Position

## 5.1 The Test Position

Per KDB inquiry, SAR can test the sides near the antenna, the surface of the device should be tested for SAR compliance with device touching the phantom. The SAR Exclusion Threshold in KDB 447498 D04 can be applied to determine SAR test exclusion for adjacent edge configurations. The closest distance from the antenna to an adjacent device surface is used to determine if SAR testing is required for the adjacent surfaces, with the adjacent surface positioned against the phantom and the surface containing the antenna positioned perpendicular to the phantom.



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# 6 SAR System Verification Procedure

# 6.1 Tissue Simulate Liquid

#### 6.1.1 Recipes for Tissue Simulate Liquid

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

Ingredients					Frequ (MI	uency Hz)				
(% by weight)	45	50	83	35	915		1900		24	50
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7
Dielectric Constant	43.42	58.0	42.54	56.1	42.0	56.8	39.9	54.0	39.8	52.5
Conductivity (S/m)	0.85	0.83	0.91	0.95	1.0	1.07	1.42	1.45	1.88	1.78

HSL5GHz is composed of the following ingredients:

Water: 50-65%
Mineral oil: 10-30%
Emulsifiers: 8-25%
Sodium salt: 0-1.5%

MSL5GHz is composed of the following ingredients:

Water: 64-78% Mineral oil: 11-18% Emulsifiers: 9-15% Sodium salt: 2-3%

Table 2: Recipe of Tissue Simulate Liquid



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#### 6.1.2 Test Liquids Confirmation

#### Simulated tissue liquid parameter confirmation

The dielectric parameters were checked prior to assessment using the SPEAG DAK3.5 dielectric probe kit. The dielectric parameters measured are reported in each correspondent section.

#### IEEE SCC-34/SC-2 P1528 recommended tissue dielectric parameters

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in P1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in P1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations and extrapolated according to the head parameters specified in P1528

Target Frequency	He	ead	Во	dy
(MHz)	E <sub>r</sub>	σ (S/m)	εr	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800-2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00

( $\varepsilon_r$  = relative permittivity,  $\sigma$  = conductivity and  $\rho$  = 1000 kg/m<sup>3</sup>)



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#### 6.1.3 Measurement for Tissue Simulate Liquid

The dielectric properties for this Tissue Simulate Liquids were measured by using the SPEAG DAK3.5 dielectric probe kit in conjunction with Network Analyzer (300 KHz-8500 MHz). The Conductivity ( $\sigma$ ) and Permittivity ( $\sigma$ ) are listed in bellow table. For the SAR measurement given in this report. The temperature variation of the Tissue Simulate Liquids was 22±2°C.

Measurement for Tissue Simulate Liquid										
Tissue Type	Measured Frequency (MHz)	Conductivity (σ)	Permittivity (ε <sub>r</sub> )	Conductivity Target (σ)	Permittivity Target (ε <sub>r</sub> )	Delta (σ) (%)	Delta (ε <sub>r</sub> ) (%)	Limit (%)	Liquid Temp. (°C)	Date
2450 Head	2450	1.85	38.41	1.80	39.20	2.78	-2.02	±5	22.3	2023/8/9



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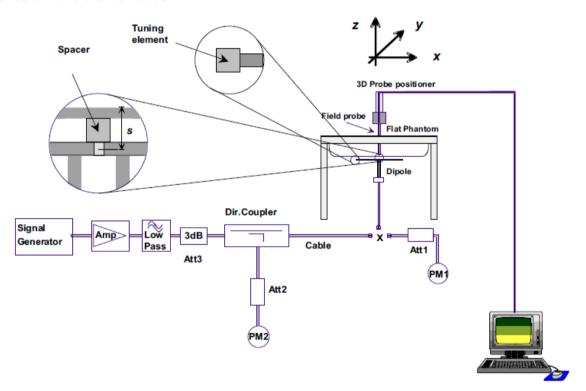
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## 6.2 SAR System Check

The microwave circuit arrangement for system check is sketched in bellow figure. 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 +/- 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. During the tests, the ambient temperature of the laboratory was in the range 22±2°C, the relative humidity was in the range 60% and the liquid depth above the ear reference points was above 15 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-3. the microwave circuit arrangement used for SAR system verification



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#### 6.2.1 Justification for Extended SAR Dipole Calibrations

- 1) Referring to KDB865664 D01 requirements for dipole calibration, instead of the typical annual calibration recommended by measurement standards, 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 remain stable according to the following requirements. Each measured dipole is expected to evaluate with the following criteria at least on annual interval in Appendix C.
- a) There is no physical damage on the dipole;
- b) System check with specific dipole is within 10% of calibrated value;
- c) Return-loss is within 10% of calibrated measurement;
- d) Impedance is within  $5\Omega$  from the previous measurement.
- 2) Network analyzer probe calibration against air, distilled water and a shorting block performed before measuring liquid parameters.



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#### 6.2.2 Summary System Check Result(s)

	SAR System Validation Result(s)									
Validation Kit		Measured SAR 250mW	SAR SAR		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	12.58	6.32	50.32	25.28	53.4 (47.70~58.30)	24.9 (22.23~27.17)	22.3	2023/8/9	

#### 6.2.3 Detailed System Check Results

Please see the Appendix A



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# 7 Test Configuration

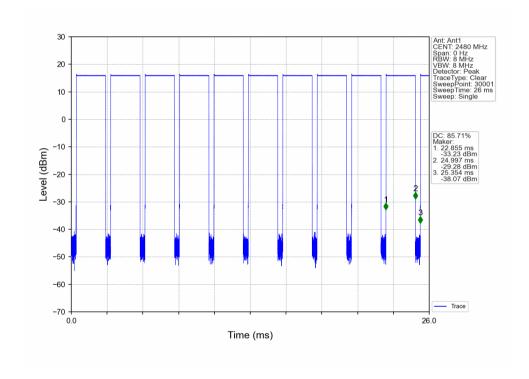
# 7.1 Operation Configurations

#### 7.1.1 Bluetooth Test Configuration

For the Bluetooth SAR tests, a communication link is set up with the test mode software for BT mode test. Bluetooth USES frequency hopping technology to divide the transmitted data into packets and transmit the packets respectively through 79 designated Bluetooth channels, 1MHz Bandwidth, frequency hops at 1600 hops/second per the Bluetooth standard. The Radio Frequency Channel Number (RFCN) is allocated to 0, 39 and 78 respectively in the case of 2402~2480 MHz during the test at each test frequency channel, the EUT is operated at the RF continuous emission mode.

#### 7.1.1.1 Duty cycle

SDR GFSK HCH 2480MHz Ant1 NTNV: 85.71%





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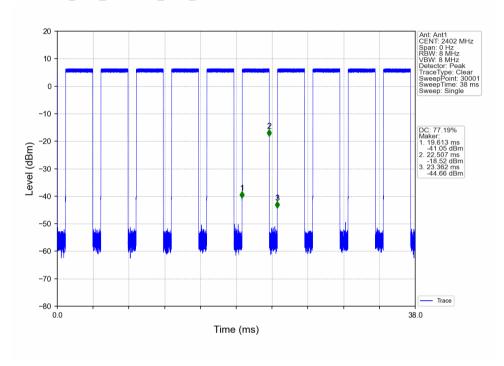


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BT GFSK\_LCH\_2402MHz\_Ant1\_NTNV: 77.19%



#### 7.1.2 DUT Antenna Locations

Please see the Appendix D



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# 8 Test Result

#### 8.1 Measurement of SAR Data

#### 8.1.1 Conducted Power

	ВТ		Average	T	Average Candinated	T
Modulation	Channel	Frequency(MHz)	Conducted Power(dBm)ANT1	Tune up (dBm)	Average Conducted Power(dBm)ANT2	Tune up (dBm)
	0	2402	5.3	7	5.36	7
GFSK	39	2441	6.52	7	6.51	7
	78	2480	5.02	7	4.87	6
	0	2402	4.43	6	4.3	6
π/4DQPSK	39	2441	5.7	6	5.79	6
	78	2480	4.05	6	4.01	6

	2.4G SDR_1I	Mbps	Average	T	Assamana Candisatad	T
Modulation	Channel	Frequency(MHz)	Conducted Power(dBm)ANT1	Tune up (dBm)	Average Conducted Power(dBm)ANT2	Tune up (dBm)
	0	2402	16.75	17	16.34	17
GFSK	19	2440	16.68	17	16.49	17
	39	2480	16	17	15.88	17

	2.4G SDR_2	Mbps	Average	Tungun	Average Conducted	Tungun
Modulation	Channel	Frequency(MHz)	Conducted Power(dBm)ANT1	Tune up (dBm)	Average Conducted Power(dBm)ANT2	Tune up (dBm)
	0	2402	16.24	17	15.94	17
GFSK	19	2440	16.39	17	16.19	17
	39	2480	15.69	17	15.5	17



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#### 8.1.2 SAR Result Of SDR

					SD	R SAR Te	est Recor	d					
Test position	Test mode	Test Ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg) 1-g	SAR (W/kg) 10-g	Power drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg) 10-g	Liquid Temp.	Limit (W/kg) 10-g
					mbs Test								
Side 1	GFSK	19/2440	85.71%	1.17	0.741	0.387	-0.14	16.68	17.0	1.076	0.486	22.0	4
Side 2	GFSK	19/2440	85.71%	1.17	0.340	0.158	0.07	16.68	17.0	1.076	0.198	22.0	4
Side 3	GFSK	19/2440	85.71%	1.17	0.004	0.002	0.03	16.68	17.0	1.076	0.003	22.0	4
Side 4	GFSK	19/2440	85.71%	1.17	1.150	0.427	-0.17	16.68	17.0	1.076	0.536	22.0	4
Side 5	GFSK	19/2440	85.71%	1.17	1.530	0.721	0.05	16.68	17.0	1.076	0.906	22.0	4
Side 6	GFSK	19/2440	85.71%	1.17	0.563	0.215	-0.09	16.68	17.0	1.076	0.270	22.0	4
Side 5	GFSK	0/2402	85.71%	1.18	1.620	0.781	-0.07	16.75	17.0	1.059	0.972	22.0	4
Side 5	GFSK	39/2480	85.71%	1.17	1.472	0.703	-0.14	16.00	17.0	1.259	1.033	22.0	4
Side 5+Ear	GFSK	39/2480	85.71%	1.17	1.354	0.687	0.06	16.00	17.0	1.259	1.009	22.0	4
Test position	Test mode	Test Ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg) 1-g	SAR (W/kg) 10-g	Power drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg) 1-g	Liquid Temp.	Limit (W/kg) 1-g
		•			Body Test	data for A	nt1 (Sepa	rate 0mm)					
Side 1	GFSK	39/2480	85.71%	1.17	0.724	0.387	-0.09	16.00	17.0	1.259	1.064	22.0	1.6
			•		Head Tes	t data for	Ant1 (Sep	arate 10mm)				•	
Side 5	GFSK	39/2480	85.71%	1.17	0.354	0.157	0.07	16.00	17.0	1.259	0.520	22.0	1.6
Test position	Test mode	Test Ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg) 1-g	SAR (W/kg) 10-g	Power drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg) 10-g	Liquid Temp.	Limit (W/kg) 10-g
					mbs Test								
Side 1	GFSK	19/2440	85.71%	1.17	0.687	0.364	-0.05	16.49	17.0	1.125	0.478	22.0	4
Side 2	GFSK	19/2440	85.71%	1.17	0.248	0.123	0.07	16.49	17.0	1.125	0.161	22.0	4
Side 3	GFSK	19/2440	85.71%	1.17	0.080	0.037	0.04	16.49	17.0	1.125	0.049	22.0	4
C:4- 4	CECK												
Side 4	GFSK	19/2440	85.71%	1.17	0.580	0.245	0.03	16.49	17.0	1.125	0.322	22.0	4
Side 5	GFSK	19/2440	85.71%	1.17	1.421	0.857	-0.09	16.49	17.0	1.125	1.125	22.0	4
Side 5 Side 6	GFSK GFSK	19/2440 19/2440	85.71% 85.71%	1.17 1.17	1.421 0.421	0.857 0.224	-0.09 0.07	16.49 16.49	17.0 17.0	1.125 1.125	1.125 0.294	22.0 22.0	4
Side 5 Side 6 Side 5	GFSK GFSK GFSK	19/2440 19/2440 0/2402	85.71% 85.71% 85.71%	1.17 1.17 1.18	1.421 0.421 1.364	0.857 0.224 0.841	-0.09 0.07 0.05	16.49 16.49 16.34	17.0 17.0 17.0	1.125 1.125 1.164	1.125 0.294 1.150	22.0 22.0 22.0	4 4 4
Side 5 Side 6 Side 5 Side 5	GFSK GFSK	19/2440 19/2440	85.71% 85.71%	1.17 1.17	1.421 0.421	0.857 0.224	-0.09 0.07	16.49 16.49	17.0 17.0	1.125 1.125	1.125 0.294	22.0 22.0	4
Side 5 Side 6 Side 5	GFSK GFSK GFSK	19/2440 19/2440 0/2402	85.71% 85.71% 85.71%	1.17 1.17 1.18	1.421 0.421 1.364	0.857 0.224 0.841	-0.09 0.07 0.05	16.49 16.49 16.34	17.0 17.0 17.0	1.125 1.125 1.164	1.125 0.294 1.150	22.0 22.0 22.0	4 4 4
Side 5 Side 6 Side 5 Side 5 Side	GFSK GFSK GFSK GFSK	19/2440 19/2440 0/2402 39/2480	85.71% 85.71% 85.71% 85.71%	1.17 1.17 1.18 1.17	1.421 0.421 1.364 1.257 1.366 SAR (W/kg) 1-g	0.857 0.224 0.841 0.787 0.769 SAR (W/kg) 10-g	-0.09 0.07 0.05 0.09 -0.09 Power drift (dB)	16.49 16.49 16.34 15.88 16.49 Conducted power (dBm)	17.0 17.0 17.0 17.0	1.125 1.125 1.164 1.294	1.125 0.294 1.150 1.189	22.0 22.0 22.0 22.0	4 4 4 4
Side 5 Side 6 Side 5 Side 5 Side 5 Side 5+Ear	GFSK GFSK GFSK GFSK GFSK	19/2440 19/2440 0/2402 39/2480 19/2440 Test Ch./Freq.	85.71% 85.71% 85.71% 85.71% 85.71% Duty Cycle	1.17 1.17 1.18 1.17 1.17 Duty Cycle Scaled factor	1.421 0.421 1.364 1.257 1.366 SAR (W/kg) 1-g	0.857 0.224 0.841 0.787 0.769 SAR (W/kg) 10-g	-0.09 0.07 0.05 0.09 -0.09 Power drift (dB)	16.49 16.49 16.34 15.88 16.49 Conducted power (dBm)	17.0 17.0 17.0 17.0 17.0 17.0 Tune up Limit (dBm)	1.125 1.125 1.164 1.294 1.125 Scaled factor	1.125 0.294 1.150 1.189 1.009 Scaled SAR (W/kg) 1-g	22.0 22.0 22.0 22.0 22.0	4 4 4 4 4 Limit (W/kg) 1-g
Side 5 Side 6 Side 5 Side 5 Side 5 Side 5+Ear	GFSK GFSK GFSK GFSK GFSK	19/2440 19/2440 0/2402 39/2480 19/2440	85.71% 85.71% 85.71% 85.71% 85.71%	1.17 1.18 1.17 1.17 1.17 Duty Cycle Scaled	1.421 0.421 1.364 1.257 1.366 SAR (W/kg) 1-g Body 0.687	0.857 0.224 0.841 0.787 0.769  SAR (W/kg) 10-g  Test data 0.364	-0.09 0.07 0.05 0.09 -0.09 Power drift (dB) for Ant2 (\$\frac{1}{2}\$	16.49 16.34 15.88 16.49 Conducted power (dBm) Separate 0mm)	17.0 17.0 17.0 17.0 17.0 17.0 Tune up Limit (dBm)	1.125 1.125 1.164 1.294 1.125	1.125 0.294 1.150 1.189 1.009 Scaled SAR (W/kg)	22.0 22.0 22.0 22.0 22.0	4 4 4 4 Limit (W/kg)
Side 5 Side 6 Side 5 Side 5 Side 5 Side 5+Ear  Test position	GFSK GFSK GFSK GFSK GFSK	19/2440 19/2440 0/2402 39/2480 19/2440 Test Ch./Freq.	85.71% 85.71% 85.71% 85.71% 85.71% Duty Cycle	1.17 1.17 1.18 1.17 1.17 Duty Cycle Scaled factor	1.421 0.421 1.364 1.257 1.366 SAR (W/kg) 1-g Body 0.687	0.857 0.224 0.841 0.787 0.769  SAR (W/kg) 10-g  Test data 0.364	-0.09 0.07 0.05 0.09 -0.09 Power drift (dB) for Ant2 (\$\frac{1}{2}\$	16.49 16.49 16.34 15.88 16.49 Conducted power (dBm)	17.0 17.0 17.0 17.0 17.0 17.0 Tune up Limit (dBm)	1.125 1.125 1.164 1.294 1.125 Scaled factor	1.125 0.294 1.150 1.189 1.009 Scaled SAR (W/kg) 1-g	22.0 22.0 22.0 22.0 22.0 Liquid Temp.	4 4 4 4 4 Limit (W/kg) 1-g



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#### 8.1.3 SAR Result Of Bluetooth

					Bluetoo	oth SAR T	est Reco	rd					
Test position	Test mode	Test Ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg) 1-g	SAR (W/kg) 10-g	Power drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg) 10-g	Liquid Temp.	Limit (W/kg) 10-g
				Lim	bs Test da	ta for Ant	1 (Separa						
Side 1	GFSK	39/2441	77.19%	1.30	0.071	0.038	-0.02	6.52	7.0	1.117	0.055	22.0	4
Side 2	GFSK	39/2441	77.19%	1.30	0.064	0.032	0.08	6.52	7.0	1.117	0.046	22.0	4
Side 3	GFSK	39/2441	77.19%	1.30	0.041	0.020	-0.11	6.52	7.0	1.117	0.029	22.0	4
Side 4	GFSK	39/2441	77.19%	1.30	0.112	0.054	-0.06	6.52	7.0	1.117	0.078	22.0	4
Side 5	GFSK	39/2441	77.19%	1.30	0.151	0.073	0.07	6.52	7.0	1.117	0.106	22.0	4
Side 6	GFSK	39/2441	77.19%	1.30	0.134	0.065	-0.13	6.52	7.0	1.117	0.093	22.0	4
Side 5	GFSK	0/2402	77.19%	1.30	0.121	0.060	0.04	5.30	7.0	1.479	0.115	22.0	4
Side 5	GFSK	78/2480	77.19%	1.30	0.118	0.052	-0.15	5.02	7.0	1.578	0.106	22.0	4
Side 5+Ear	GFSK	39/2441	77.19%	1.30	0.109	0.055	-0.06	5.30	7.0	1.479	0.105	22.0	4
Test position	Test mode	Test Ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg) 1-g	SAR (W/kg) 10-g	Power drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg) 1-q	Liquid Temp.	Limit (W/kg) 1-g
				Вс	dy Test d	ata for An	1 (Separa	ate 0mm)					
Side 1	GFSK	0/2402	77.19%	1.30	0.071	0.038	-0.02	6.52	7.0	1.117	0.103	22.0	1.6
				Н	ead Test	data for Ar	nt1 (Separ	ate 10mm)	•		•	•	•
Side 5	GFSK	0/2402	77.19%	1.30	0.065	0.030	0.09	5.30	7.0	1.479	0.125	22.0	1.6
Test position	Test mode	Test Ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg) 1-g	SAR (W/kg) 10-g	Power drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg) 10-g	Liquid Temp.	Limit (W/kg) 10-g
					bs Test da	ata for Anta	2 (Separa						
Side 1	GFSK	39/2441	77.19%	1.30	0.051	0.025	-0.11	6.51	7.0	1.119	0.036	22.0	4
Side 2	GFSK	39/2441	77.19%	1.30	0.015	0.007	-0.06	6.51	7.0	1.119	0.010	22.0	4
Side 3	GFSK	39/2441	77.19%	1.30	0.023	0.011	-0.10	0.54	7.0	1.119	0.016	00.0	4
0:1 4					0.020	0.011	-0.10	6.51				22.0	
Side 4	GFSK	39/2441	77.19%	1.30	0.112	0.053	0.08	6.51	7.0	1.119	0.077	22.0	4
Side 5	GFSK	39/2441	77.19% 77.19%	1.30 1.30	0.112 0.128	0.053 0.062	0.08 0.07	6.51 6.51	7.0 7.0	1.119 1.119	0.077 0.090	22.0 22.0	4 4
Side 5 Side 6	GFSK GFSK	39/2441 39/2441	77.19% 77.19% 77.19%	1.30 1.30 1.30	0.112 0.128 0.119	0.053 0.062 0.059	0.08 0.07 -0.13	6.51 6.51 6.51	7.0 7.0 7.0	1.119 1.119 1.119	0.077 0.090 0.086	22.0 22.0 22.0	4 4 4
Side 5 Side 6 Side 5	GFSK GFSK GFSK	39/2441 39/2441 0/2402	77.19% 77.19% 77.19% 77.19%	1.30 1.30 1.30 1.30	0.112 0.128 0.119 0.105	0.053 0.062 0.059 0.050	0.08 0.07 -0.13 0.04	6.51 6.51 6.51 5.36	7.0 7.0 7.0 7.0	1.119 1.119 1.119 1.459	0.077 0.090 0.086 <b>0.095</b>	22.0 22.0 22.0 22.0	4 4 4 4
Side 5 Side 6 Side 5 Side 5	GFSK GFSK GFSK GFSK	39/2441 39/2441 0/2402 78/2480	77.19% 77.19% 77.19% 77.19% 77.19%	1.30 1.30 1.30 1.30 1.30	0.112 0.128 0.119 0.105 0.097	0.053 0.062 0.059 0.050 0.043	0.08 0.07 -0.13 0.04 0.05	6.51 6.51 6.51 5.36 4.87	7.0 7.0 7.0 7.0 7.0 6.0	1.119 1.119 1.119 1.459 1.297	0.077 0.090 0.086 <b>0.095</b> 0.072	22.0 22.0 22.0 22.0 22.0 22.0	4 4 4 4 4
Side 5 Side 6 Side 5	GFSK GFSK GFSK	39/2441 39/2441 0/2402	77.19% 77.19% 77.19% 77.19%	1.30 1.30 1.30 1.30 1.30 1.30	0.112 0.128 0.119 0.105	0.053 0.062 0.059 0.050	0.08 0.07 -0.13 0.04	6.51 6.51 6.51 5.36	7.0 7.0 7.0 7.0 6.0 7.0	1.119 1.119 1.119 1.459	0.077 0.090 0.086 <b>0.095</b> 0.072 0.081	22.0 22.0 22.0 22.0	4 4 4 4
Side 5 Side 6 Side 5 Side 5	GFSK GFSK GFSK GFSK	39/2441 39/2441 0/2402 78/2480	77.19% 77.19% 77.19% 77.19% 77.19%	1.30 1.30 1.30 1.30 1.30	0.112 0.128 0.119 0.105 0.097	0.053 0.062 0.059 0.050 0.043 0.043 SAR (W/kg) 10-g	0.08 0.07 -0.13 0.04 0.05 -0.09 Power drift (dB)	6.51 6.51 5.36 4.87 5.36 Conducted power (dBm)	7.0 7.0 7.0 7.0 6.0 7.0 Tune up Limit (dBm)	1.119 1.119 1.119 1.459 1.297	0.077 0.090 0.086 <b>0.095</b> 0.072	22.0 22.0 22.0 22.0 22.0 22.0	4 4 4 4 4
Side 5 Side 6 Side 5 Side 5 Side 5+Ear  Test position	GFSK GFSK GFSK GFSK GFSK Test mode	39/2441 39/2441 0/2402 78/2480 39/2441 Test Ch./Freq.	77.19% 77.19% 77.19% 77.19% 77.19% 77.19% Duty Cycle	1.30 1.30 1.30 1.30 1.30 1.30 Duty Cycle Scaled factor	0.112 0.128 0.119 0.105 0.097 0.092 SAR (W/kg) 1-g	0.053 0.062 0.059 0.050 0.043 0.043 SAR (W/kg) 10-g	0.08 0.07 -0.13 0.04 0.05 -0.09 Power drift (dB)	6.51 6.51 5.36 4.87 5.36 Conducted power (dBm)	7.0 7.0 7.0 7.0 6.0 7.0 Tune up Limit (dBm)	1.119 1.119 1.119 1.459 1.297 1.459 Scaled factor	0.077 0.090 0.086 0.095 0.072 0.081 Scaled SAR (W/kg) 1-g	22.0 22.0 22.0 22.0 22.0 22.0 22.0 Liquid Temp.	4 4 4 4 4 4 Limit (W/kg) 1-g
Side 5 Side 6 Side 5 Side 5 Side 5+Ear	GFSK GFSK GFSK GFSK GFSK	39/2441 39/2441 0/2402 78/2480 39/2441 <b>Test</b>	77.19% 77.19% 77.19% 77.19% 77.19% 77.19%	1.30 1.30 1.30 1.30 1.30 1.30 Duty Cycle Scaled factor	0.112 0.128 0.119 0.105 0.097 0.092 SAR (W/kg) 1-g	0.053 0.062 0.059 0.050 0.043 0.043 SAR (W/kg) 10-g Body Te	0.08 0.07 -0.13 0.04 0.05 -0.09 Power drift (dB) st data for -0.11	6.51 6.51 5.36 4.87 5.36 Conducted power (dBm) - Ant2 (Separate	7.0 7.0 7.0 7.0 6.0 7.0 Tune up Limit (dBm)	1.119 1.119 1.119 1.459 1.297 1.459	0.077 0.090 0.086 <b>0.095</b> 0.072 0.081 Scaled SAR (W/kg)	22.0 22.0 22.0 22.0 22.0 22.0 Liquid	4 4 4 4 4 Limit (W/kg)
Side 5 Side 6 Side 5 Side 5 Side 5+Ear  Test position	GFSK GFSK GFSK GFSK GFSK Test mode	39/2441 39/2441 0/2402 78/2480 39/2441 Test Ch./Freq.	77.19% 77.19% 77.19% 77.19% 77.19% 77.19% Duty Cycle	1.30 1.30 1.30 1.30 1.30 1.30 Duty Cycle Scaled factor	0.112 0.128 0.119 0.105 0.097 0.092 SAR (W/kg) 1-g	0.053 0.062 0.059 0.050 0.043 0.043 SAR (W/kg) 10-g	0.08 0.07 -0.13 0.04 0.05 -0.09 Power drift (dB) st data for -0.11	6.51 6.51 5.36 4.87 5.36 Conducted power (dBm) - Ant2 (Separate	7.0 7.0 7.0 7.0 6.0 7.0 Tune up Limit (dBm)	1.119 1.119 1.119 1.459 1.297 1.459 Scaled factor	0.077 0.090 0.086 0.095 0.072 0.081 Scaled SAR (W/kg) 1-g	22.0 22.0 22.0 22.0 22.0 22.0 22.0 Liquid Temp.	4 4 4 4 4 4 Limit (W/kg) 1-g

#### Note:

- 1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B
- 2) The scaled SAR = Measured SAR(W/kg) \* Duty Cycle Scaled factor \* Scaled factor
- 3) Duty Cycle Scaled factor = 100% Duty Cycle / Measured Duty Cycle
- 4) If the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the reported SAR is > 0.8 W/kg, SAR is required for that exposure configuration using the next highest measured output power channel.



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# 9 Equipment list

Test Platform	SPEAG DASY5 Professional
Location	SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch
Software Reference	DASY52 52.8.4(1052); SEMCAD X 14.6.8(7028)

#### Hardware Reference Calibration Due date of Equipment Manufacturer Model Serial Number Date calibration Core(TM)i3-6100 $\boxtimes$ PC **DELL** 7LLVLG2 N/A N/A 3.7GHz $\boxtimes$ Signal Generator Agilent N5173B MY53270267 2023/03/21 2024/03/20 S-Parameter Network $\boxtimes$ Agilent E5071C MY46527453 2023/03/21 2024/03/20 Analyzer $\boxtimes$ DAK-3.5 probe **SPEAG DAK-3.5** 1102 N/A N/A $\boxtimes$ Power sensor **KEYSIGHT** U2021XA MY57110007 2023/03/21 2024/03/20 universal Radio $\boxtimes$ R&S CMW500 154501 2023/03/20 2024/03/19 communication tester $\boxtimes$ **SPEAG** DAE4 2024/06/25 DAE 760 2023/06/26 $\boxtimes$ E-field PROBE **SPEAG** EX3DV4 7380 2023/06/21 2024/06/20 $\boxtimes$ **SPEAG** D2450V2 955 2022/06/06 2025/06/05 Dipole $\boxtimes$ **Electro Thermometer MITIR** N/A 2023/03/23 2024/04/22 N/A $\boxtimes$ **Amplifier** Mini-circuits ZVE-3W-83+ 857501833 N/A N/A $\boxtimes$ ZHL-42W N/A N/A **Amplifier** Mini-circuits A0950002 $\boxtimes$ 3db ATTENUATOR SHX SMA-3dB-6G 12021302 N/A N/A $\boxtimes$ **DUMMY PROBE SPEAG** SPDP2001AA N/A DP 2 N/A **Dual Directional** $\boxtimes$ N/A 772D MY46151275 N/A Coupler Agilent SAM PHANTOM $\boxtimes$ **SPEAG** QDOVA001BB 1102 N/A N/A (ELI4 v4.0) $\boxtimes$ **SPEAG** QDOVA004AA 2062 N/A N/A **ELI V8.0** $\boxtimes$ Twin SAM Phantom **SPEAG** QD000P40CD 1673 N/A N/A

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

All measurement facilities used to collect the measurement data are located at

**SPEAG** 

**SPEAG** 

**ANTENNESSA** 

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China. 518057.

QD000P40CB

CS8

41/05 OCP9



Twin Phantom

**ROBOT KRC** 

LIQUID

CALIBRATION KIT

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# 10 Calibration certificate

Please see the Appendix C

# 11 Photographs

Please see the Appendix D



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# **Appendix A: Detailed System Check Results**

The plots are showing as followings.



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Date: 2023/08/10

Test Laboratory: SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

System Performance Check-D2450

DUT: Dipole 2450 MHz D2450V2; Type: 955

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium parameters used: f = 2450 MHz;  $\sigma$  = 1.801 S/m;  $\varepsilon_r$  = 39.351;  $\rho$  = 1000 kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

#### DASY5 Configuration:

• Probe: EX3DV4 - SN7380; ConvF(7.50, 7.50, 7.50); Calibrated: 2023/6/21;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn760: Calibrated: 2023/6/26

Phantom: SAM2; Type: QD000P40CD; Serial: TP:1673

Measurement SW: DASY52, Version 52.8 (4); SEMCAD X Version 14.6.8 (7028)

System Performance Check at Frequencies above 1 GHz/d=10mm, Pin=250 mW, dist=2.0mm (EX-

Probe)/Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 19.3 W/kg

System Performance Check at Frequencies above 1 GHz/d=10mm, Pin=250 mW, dist=2.0mm (EX-

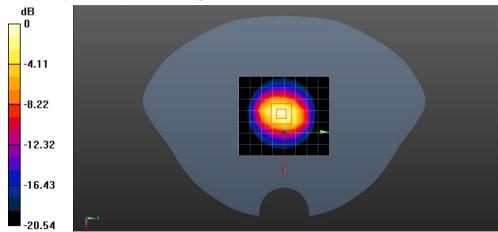
Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 106.58 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 27.5 W/kg

SAR(1 g) = 12.58 W/kg; SAR(10 g) = 6.32 W/kg

Maximum value of SAR (measured) = 20.9 W/kg



0 dB = 20.9 W/kg = 13.20 dBW/kg



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# **Appendix B: Detailed Test Results**

The plots of worse case are showing as followings.



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Date: 2023/8/10

Test Laboratory: SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

SDR GFSK Side5 0mm Ch78

DUT: DMT02; Type: DJI MIC 2 Transmitter;

Communication System: SDR; Frequency: 2480 MHz; Duty Cycle: 1:1

Medium parameters used: f = 2480 MHz;  $\sigma = 1.827$  S/m;  $\varepsilon_r = 39.286$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

#### DASY5 Configuration:

- Probe: EX3DV4 SN7380; ConvF(7.50, 7.50, 7.50); Calibrated: 2023/6/21;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn760; Calibrated: 2023/6/26
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1673
- Measurement SW: DASY52, Version 52.8 (4); SEMCAD X Version 14.6.8 (7028)

Body/Area Scan (5x5x1): Measurement grid: dx=12mm, dy=12mm

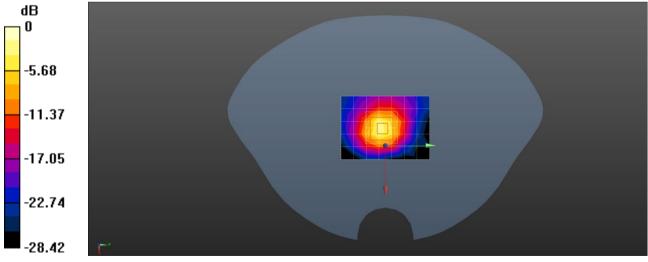
Maximum value of SAR (measured) = 1.87 W/kg

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 22.741 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 4.68 W/kg

SAR(1 g) = 1.227 W/kg; SAR(10 g) = 0.787 W/kg Maximum value of SAR (measured) = 2.32 W/kg



0 dB = 2.32 W/kg = 3.65 dBW/kg



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Date: 2023/8/10

Test Laboratory: SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

Bluetooth GFSK Side5 0mm Ch0

DUT: DMT02; Type: DJI MIC 2 Transmitter;

Communication System: BT; Frequency: 2402 MHz; Duty Cycle: 1:1

Medium parameters used: f = 2402 MHz;  $\sigma = 1.827$  S/m;  $\varepsilon_r = 39.286$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

#### DASY5 Configuration:

• Probe: EX3DV4 - SN7380; ConvF(7.50, 7.50, 7.50); Calibrated: 2023/6/21;

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn760; Calibrated: 2023/6/26

Phantom: SAM2; Type: QD000P40CD; Serial: TP:1673

Measurement SW: DASY52, Version 52.8 (4); SEMCAD X Version 14.6.8 (7028)

Body/Area Scan (5x5x1): Measurement grid: dx=12mm, dy=12mm

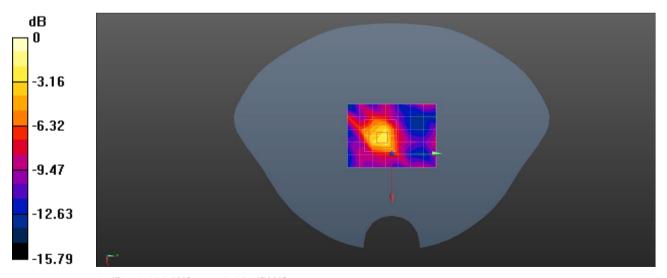
Maximum value of SAR (measured) = 0.117 W/kg

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.940 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.206 W/kg

SAR(1 g) =0.121 W/kg; SAR(10 g) = 0.06 W/kg Maximum value of SAR (measured) = 0.128 W/kg



0 dB = 0.128 W/kg = -8.93 dBW/kg



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**Appendix C: Calibration certificate** 

**Appendix D: Photographs** 

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