


TEST REPORT

For SAR

Report No. : **CHEW23060042** Report verification: 

Project No..... : **SHT2304087401EW**

FCC ID..... : **2ASLFGZX-B300**

Applicant's name..... : **Guangzhou Homesun Medical Technology Co., Ltd**

Address..... : Floor 7th,TianxiangBusiness Building, No.28, Li Fu Road, Haizhu District, Guangzhou,GD .China

Test item description : **Smart Peak Flow Meter**

Trade Mark : -

Model/Type reference..... : B300

Listed Model(s) : -

Standard : **FCC 47 CFR Part2.1093
 IEEE Std C95.1: 1999 Edition
 IEEE Std 1528: 2013**

Date of receipt of test sample..... : Apr.27, 2023

Date of testing..... : Apr.27, 2023-Jun.27, 2023

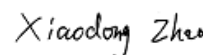
Date of issue..... : Jun.28, 2023

Result..... : **PASS**

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Testing Laboratory Name : **Shenzhen Huatongwei International Inspection Co., Ltd**

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The test report merely correspond to the test sample.

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1. Statement of Compliance

Maximum Reported SAR (W/kg @1g)		
Type	Test setting	WWAN
1g Head	Dist.= 15mm	0.004
Maximum Reported SAR (W/kg @10g)		
Type	Test setting	WWAN
10g Extremity	Dist.= 0mm	0.208

Note:

1. This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg@1g) and (4 W/kg@10g) specified in FCC 47 CFR part 2 (2.1093) and IEEE Std C95.1,
2. This device had been tested in accordance with the measurement methods and procedures specified in IEEE 1528 and FCC KDB publications.

2 . Test Standards and Report version

2.1. Test Standards

The tests were performed according to following standards:

[FCC 47 Part 2.1093](#): Radiofrequency radiation exposure evaluation: portable devices.

[IEEE Std C95.1, 1999 Edition](#): IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz

[IEEE Std 1528™-2013](#): IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.

FCC published RF exposure KDB procedures:

[865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04](#): SAR Measurement Requirements for 100 MHz to 6 GHz

[865664 D02 RF Exposure Reporting v01r02](#): RF Exposure Compliance Reporting and Documentation Considerations

[KDB 447498 D01 General RF Exposure Guidance v06](#): Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies

[248227 D01 802.11 Wi-Fi SAR v02r02](#): SAR Measurement Procedures for 802.11 a/b/g Transmitters

[941225 D01 3G SAR Procedures v03r01](#): SAR Measurement Procedures for 3G Devices

[941225 D05 SAR for LTE Devices v02r05](#): SAR Evaluation Considerations for LTE Devices

[TCB workshop](#) April, 2019; Page 19, Tissue Simulating Liquids (TSL)

2.2. Report version

Revision No.	Date of issue	Description
N/A	2023-06-28	Original

3. Summary

3.1. Client Information

Applicant:	Guangzhou Homesun Medical Technology Co., Ltd
Address:	Floor 7th,TianxiangBusiness Building, No.28, Li Fu Road, Haizhu District, Guangzhou,GD .China
Manufacturer:	Guangzhou Homesun Medical Technology Co., Ltd
Address:	Floor 7th,TianxiangBusiness Building, No.28, Li Fu Road, Haizhu District, Guangzhou,GD .China

3.2. Product Description

Main unit	
Name of EUT:	Smart Peak Flow Meter
Trade Mark:	-
Model No.:	B300
Listed Model(s):	-
Power supply:	DC 3.7V from battery
Hardware version:	V1.0.1.20220801
Software version:	V1.0.1.20220825
Device Category:	Portable
Product stage:	Production unit
RF Exposure Environment:	General Population/Uncontrolled
HTW test sample No.:	YPHT23030119005
Support SIM card quantity:	<input checked="" type="checkbox"/> Single card <input type="checkbox"/> Double card

Note:

The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power.

3.3. RF Specification Description

LTE	
Operation Band:	<input checked="" type="checkbox"/> Band 2 <input checked="" type="checkbox"/> Band 4 <input type="checkbox"/> Band 5 <input type="checkbox"/> Band 7
	<input checked="" type="checkbox"/> Band 12 <input checked="" type="checkbox"/> Band 13 <input type="checkbox"/> Band 17 <input type="checkbox"/> Band 25
	<input type="checkbox"/> Band 26 <input type="checkbox"/> Band 30 <input checked="" type="checkbox"/> Band 66 <input type="checkbox"/> Band 71
	<input type="checkbox"/> Band 38 <input type="checkbox"/> Band 41
Support type:	<input checked="" type="checkbox"/> Cat M <input checked="" type="checkbox"/> Cat NB
Power Class:	Class 5
Bluetooth	
Support type:	<input type="checkbox"/> BR <input type="checkbox"/> EDR <input checked="" type="checkbox"/> BLE-1Mbps <input type="checkbox"/> BLE-2Mbps
Note:	
This device support Bluetooth Tethering.	

3.4. Testing Laboratory Information

Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.	
Laboratory Location	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China	
Connect information:	Tel: 86-755-26715499 E-mail: cs@szhtw.com.cn http://www.szhtw.com.cn	
Qualifications	Type	Accreditation Number
	FCC	762235

3.5. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Ambient temperature	18 °C to 25 °C
Ambient humidity	30%RH to 70%RH
Air Pressure	950-1050mbar

4. Equipments Used during the Test

Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Cal. date (YY-MM-DD)	Due date (YY-MM-DD)
●	Data Acquisition Electronics DAEx	SPEAG	HTWE0313-05	DAE4	1549	2023/03/27	2024/03/26
●	E-field Probe	SPEAG	HTWE0313-06	EX3DV4	7494	2023/04/17	2024/04/16
●	E-field Probe	SPEAG	-	EX3DV4	3748	2022/08/03	2023/08/02
●	Universal Radio Communication Tester	R&S	HTWE0323	CMW500	137681	2023/05/04	2024/05/03
Tissue-equivalent liquids Validation							
●	Dielectric Assessment Kit	SPEAG	HTWE0315-02	DAK-3.5	1267	N/A	N/A
●	Dielectric Assessment Kit	SPEAG	HTWE0315-01	DAK-12	1130	N/A	N/A
●	Network analyzer	Keysight	HTWE0331	E5071C	MY46733048	2022/08/29	2023/08/28
System Validation							
●	System Validation Antenna	SPEAG	HTWE0314-01	CLA-150	4024	2021/01/25	2024/01/24
○	System Validation Dipole	SPEAG	HTWE0314-02	D450V3	1102	2021/01/20	2024/01/19
●	System Validation Dipole	SPEAG	HTWE0314-03	D750V3	1180	2021/01/22	2024/01/21
○	System Validation Dipole	SPEAG	HTWE0314-04	D835V2	4d238	2021/01/22	2024/01/21
●	System Validation Dipole	SPEAG	HTWE0314-05	D1750V2	1164	2021/01/22	2024/01/21
●	System Validation Dipole	SPEAG	HTWE0314-06	D1900V2	5d226	2021/01/22	2024/01/21
○	System Validation Dipole	SPEAG	HTWE0314-07	D2450V2	1009	2021/01/25	2024/01/24
○	System Validation Dipole	SPEAG	HTWE0314-08	D2600V2	1150	2021/01/25	2024/01/24
○	System Validation Dipole	SPEAG	HTWE0314-09	D5GHzV2	1273	2021/01/26	2024/01/25
●	Signal Generator	R&S	HTWE0276	SMB100A	114360	2023/05/23	2024/05/22
●	Power Viewer for Windows	R&S		N/A	N/A	N/A	N/A
●	Power sensor	R&S	HTWE0278	NRP18A	101010	2023/05/23	2024/05/22
●	Power sensor	R&S	HTWE0389	NRP18A	101386	2023/03/29	2024/03/28
●	Power Amplifier	BONN	HTWE0336	BLWA 0160-2M	1811887	2022/11/10	2023/11/09
●	Dual Directional Coupler	Mini-Circuits	HTWE0335	ZHDC-10-62-S+	F975001814	2022/11/10	2023/11/09
●	Attenuator	Mini-Circuits	HTWE0333	VAT-3W2+	1819	2022/11/10	2023/11/09
●	Attenuator	Mini-Circuits	HTWE0334	VAT-10W2+	1741	2022/11/10	2023/11/09

Note:

1. The Probe, Dipole and DAE calibration reference to the Appendix E and F.
2. Referring to KDB865664 D01, the dipole calibration interval can be extended to 3 years with justification. The dipole are also not physically damaged or repaired during the interval.

5. Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be $\leq 30\%$, for a confidence interval of $k = 2$. If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std 1528 is not required in SAR reports submitted for equipment approval.

Therefore, the measurement uncertainty is not required.

6. SAR Measurement System Configuration

6.1. SAR Measurement Set-up

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

A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating 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 electronic (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.

A unit to operate the optical surface detector which is connected to the EOC.

The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY5 measurement server.

The DASY5 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows 2003.

DASY5 software and SEMCAD data evaluation software.

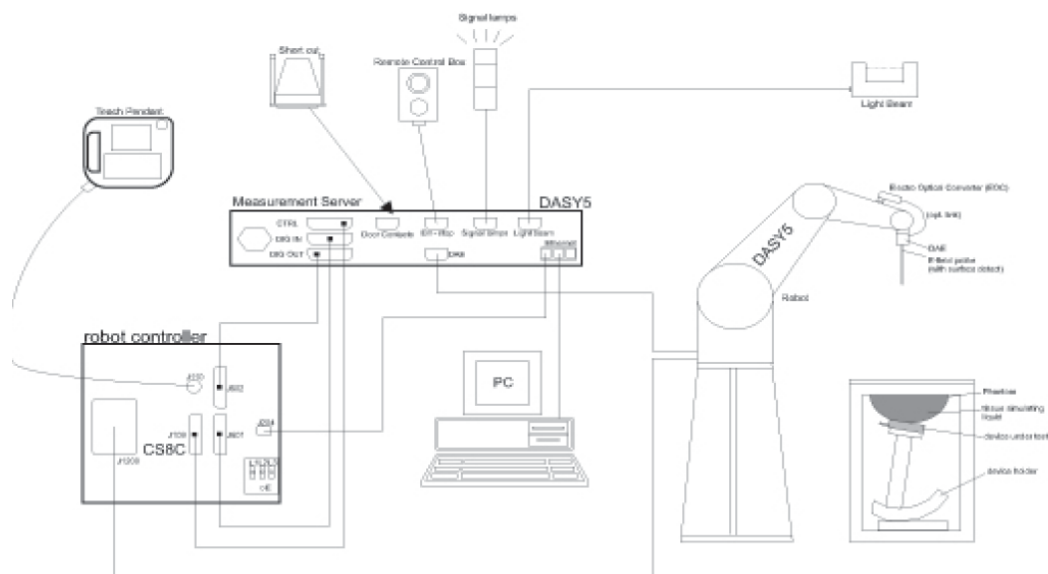
Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.

The generic twin phantom enabling the testing of left-hand and right-hand usage.

The device holder for handheld Mobile Phones.

Tissue simulating liquid mixed according to the given recipes.

System validation dipoles allowing to validate the proper functioning of the system.



6.2. DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe EX3DV4 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

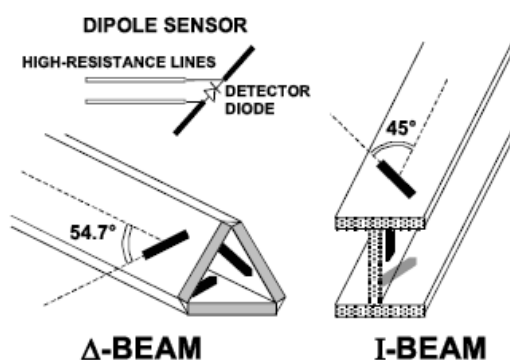
● Probe Specification

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available.
Frequency	4 MHz to 10 GHz; Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 μ W/g to > 100 W/kg; Linearity: ± 0.2 dB
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Distance from probe tip to dipole centers: 1.0 mm
Application	General dosimetry up to 6 GHz Dosimetry in strong gradient fields Compliance tests of Mobile Phones
Compatibility	DASY3, DASY4, DASY52 SAR and higher, EASY4/MRI

◆ Isotropic E-Field Probe

The isotropic E-Field probe has been fully calibrated and assessed for isotropicity, and boundary effect within a controlled environment. Depending on the frequency for which the probe is calibrated the method utilized for calibration will change.

The E-Field probe utilizes a triangular sensor arrangement as detailed in the diagram below:



6.3. Phantoms

The phantom used for all tests i.e. for both system checks and device testing, was the twin-headed "SAM Phantom", manufactured by SPEAG. The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region, where shell thickness increases to 6mm).

System checking was performed using the flat section, whilst Head SAR tests used the left and right head profile sections. Body SAR testing also used the flat section between the head profiles.



SAM-Twin Phantom

6.4. Device Holder

The device was placed in the device holder (illustrated below) that is supplied by SPEAG as an integral part of the DASY system.

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



Device holder supplied by SPEAG

7. SAR Test Procedure

7.1. Scanning Procedure

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. Measure the local SAR at a test point within 8 mm of the phantom inner surface that is closest to the DUT. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

Step 2: Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASYS software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE Standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan). If only one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of Zoom Scans has to be increased accordingly.

Area Scan Resolutions per FCC KDB Publication 865664 D01v04

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 mm ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2)$ mm ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area 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 ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

Step 3: Zoom Scan

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1g and 10g of simulated tissue. The Zoom Scan measures points (refer to table below) within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1 g and 10 g and displays these values next to the job's label.

Zoom Scan Resolutions per FCC KDB Publication 865664 D01v04

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	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$ mm	
Minimum zoom scan volume	x, y, z	≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm	
<p>Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see IEEE Std 1528-2013 for details.</p> <p>* When zoom scan is required and the <i>reported</i> SAR from the <i>area scan based 1-g SAR estimation</i> procedures of KDB Publication 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</p>				

Step 4: Power drift measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1. The SAR drift shall be kept within ± 5 %.

7.2. Data Storage and Evaluation

Data Storage

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors),s 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 “.DA4”. 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], [W/kg], [mW/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.

Data Evaluation

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:	σ
	Density:	ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY5 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:

$$V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}$$

Vi:	compensated signal of channel (i = x, y, z)
Ui:	input signal of channel (i = x, y, z)
cf:	crest factor of exciting field (DASY parameter)
dcp _i :	diode compression point (DASY parameter)

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

$$E - \text{fieldprobes} : \quad E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$$

$$H - \text{fieldprobes} : \quad H_i = \sqrt{V_i} \cdot \frac{a_{i0} + a_{i1}f + a_{i2}f^2}{f}$$

Vi:	compensated signal of channel (i = x, y, z)
Norm _i :	sensor sensitivity of channel (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):

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

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

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1'000}$$

SAR: local specific absorption rate in W/kg
Etot: total field strength in V/m
 σ : conductivity in [mho/m] or [Siemens/m]
 ρ : equivalent tissue density in g/cm³

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid.

8. Dielectric Property Measurements & System Check

8.1. Tissue Dielectric Parameters

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within $\pm 2^\circ\text{C}$ of the temperature when the tissue parameters are characterized.

The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3-4 days of use; or earlier if the dielectric parameters can become out of tolerance; for example, when the parameters are marginal at the beginning of the measurement series.

The dielectric constant (ϵ_r) and conductivity (σ) of typical tissue-equivalent media recipes are expected to be within $\pm 5\%$ of the required target values; but for SAR measurement systems that have implemented the SAR error compensation algorithms documented in IEEE Std 1528, to automatically compensate the measured SAR results for deviations between the measured and required tissue dielectric parameters, the tolerance for ϵ_r and σ may be relaxed to $\pm 10\%$. This is limited to frequencies ≤ 3 GHz.

Tissue Dielectric Parameters

FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

Tissue dielectric parameters for Head and Body				
Target Frequency (MHz)	Head		Body	
	ϵ_r	$\sigma(\text{S/m})$	ϵ_r	$\sigma(\text{S/m})$
750	41.9	0.89	55.5	0.96
1750	40.1	1.37	53.4	1.49
1800-2000	40.0	1.40	53.3	1.52

Measurement Results:

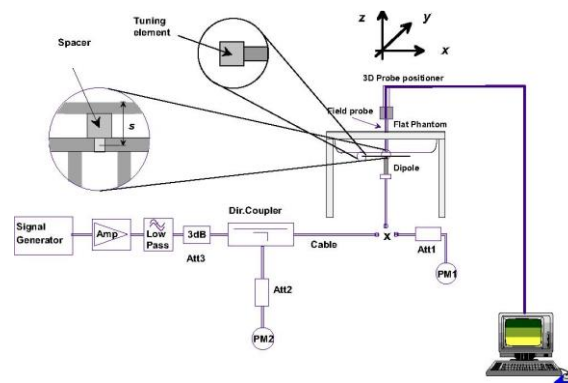
Dielectric performance of Head tissue simulating liquid									
Frequency (MHz)	ϵ_r		$\sigma(\text{S/m})$		Delta (ϵ_r)	Delta (σ)	Limit	Temp ($^\circ\text{C}$)	Date
	Target	Measured	Target	Measured					
750	41.90	40.42	0.890	0.869	-3.53%	-2.36%	$\pm 5\%$	22.2	2023/6/5
1750	40.10	38.56	1.370	1.316	-3.84%	-3.94%	$\pm 5\%$	22.2	2023/6/6
1900	40.00	38.39	1.400	1.344	-4.03%	-4.00%	$\pm 5\%$	22.2	2023/6/8

8.2. System Check

SAR system verification is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device. The same SAR probe(s) and tissue-equivalent media combinations used with each specific SAR system for system verification must be used for device testing. When multiple probe calibration points are required to cover substantially large transmission bands, independent system verifications are required for each probe calibration point. A system verification must be performed before each series of SAR measurements using the same probe calibration point and tissue-equivalent medium. Additional system verification should be considered according to the conditions of the tissue-equivalent medium and measured tissue dielectric parameters, typically every three to four days when the liquid parameters are re-measured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

System Performance Check Measurement Conditions:

- ◆ The measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness: 2.0 ± 0.2 mm (bottom plate) filled with Body or Head simulating liquid of the following parameters.
- ◆ The depth of tissue-equivalent liquid in a phantom must be ≥ 15.0 cm for SAR measurements ≤ 3 GHz and ≥ 10.0 cm for measurements > 3 GHz.
- ◆ The DASY system with an E-Field Probe was used for the measurements.
- ◆ The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- ◆ The coarse grid with a grid spacing of 15 mm was aligned with the dipole.
For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- ◆ Special 7x7x7 (below 3 GHz) and/or 8x8x7 (above 3 GHz) fine cube was chosen for the cube.
- ◆ The results are normalized to 1 W input power.



System Performance Check Setup

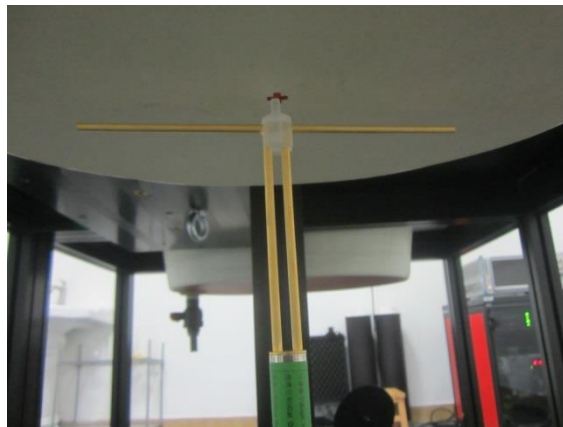


Photo of Dipole Setup

Measurement Results:

Head											
Frequency (MHz)	1g SAR			10g SAR			Delta (1g)	Delta (10g)	Limit	Temp (C°)	Date
	Target 1W	Normalize to 1W	Measured 250mW	Target 1W	Normalize to 1W	Measured 250mW					
750	8.43	8.40	2.10	5.59	5.48	1.37	-0.36%	-1.97%	±10%	22.4	2023/6/5
1750	36.40	35.68	8.92	19.20	18.96	4.74	-1.98%	-1.25%	±10%	22.4	2023/6/6
1900	39.80	40.00	10.00	20.30	20.68	5.17	0.50%	1.87%	±10%	22.4	2023/6/8

Note:

The 1-g and 10-g SAR measured with a reference dipole, using the required tissue-equivalent medium at the test frequency, must be within ±10% of the manufacturer calibrated dipole SAR target.

Plots of System Performance Check**SystemPerformanceCheck-Head 750MHz**

Communication System: UID 0, A-CW (0); Frequency: 750 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.869 \text{ S/m}$; $\epsilon_r = 40.424$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section
Ambient Temperature: 22.4°C ; Liquid Temperature: 22.2°C ;

DASY Configuration:

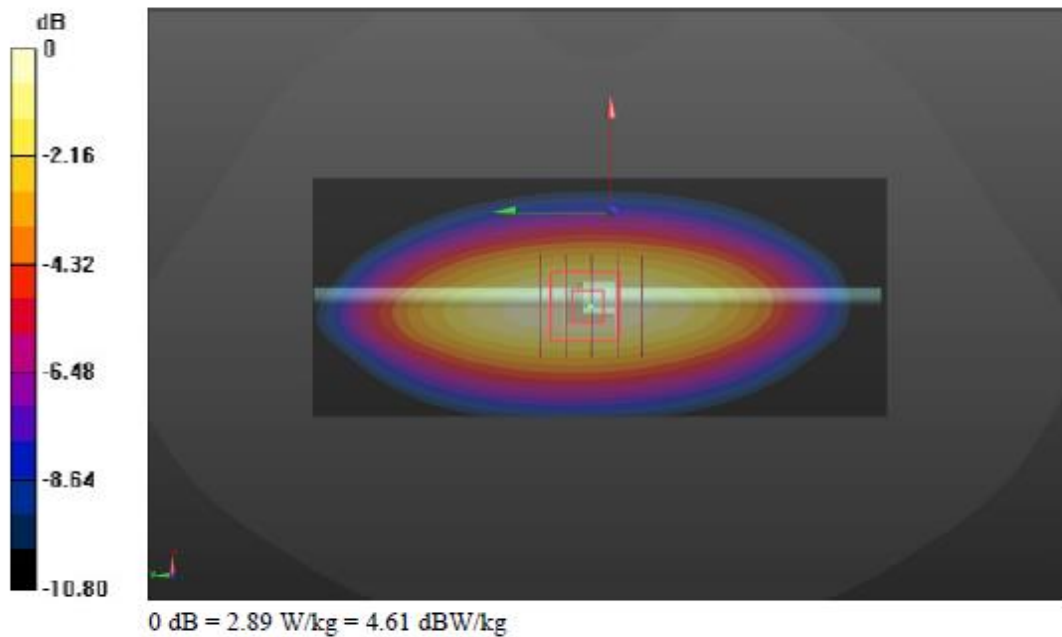
- Probe: EX3DV4 - SN7494; ConvF(10.8, 10.8, 10.8); Calibrated: 4/17/2023;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/27/2023
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Head/d=15mm, Pin=250mW, dist=1.4mm (EX-Probe)/Area Scan (51x121x1):

Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
Maximum value of SAR (interpolated) = 2.87 W/kg

Head/d=15mm, Pin=250mW, dist=1.4mm (EX-Probe)/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 58.62 V/m ; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 3.36 W/kg
SAR(1 g) = 2.1 W/kg ; SAR(10 g) = 1.37 W/kg
Maximum value of SAR (measured) = 2.89 W/kg



SystemPerformanceCheck-Head 1750MHz

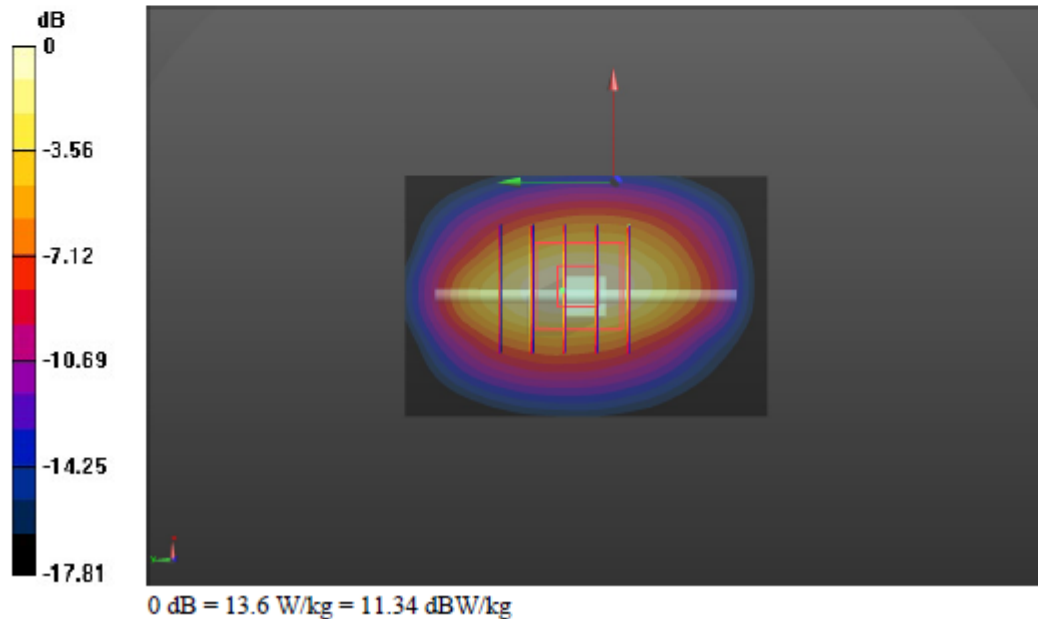
Communication System: UID 0, CW (0); Frequency: 1750 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1750$ MHz; $\sigma = 1.316$ S/m; $\epsilon_r = 38.564$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Ambient Temperature: 22.4°C; Liquid Temperature: 22.2°C;

DASY Configuration:

- Probe: EX3DV4 - SN7494; ConvF(8.99, 8.99, 8.99); Calibrated: 4/17/2023;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/27/2023
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Head/d=10mm, Pin=250mW/Area Scan (41x61x1): Interpolated grid: dx=1.500 mm,
dy=1.500 mm
Maximum value of SAR (interpolated) = 14.1 W/kg

Head/d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,
dy=8mm, dz=5mm
Reference Value = 103.0 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 16.5 W/kg
SAR(1 g) = 8.92 W/kg; SAR(10 g) = 4.74 W/kg
Maximum value of SAR (measured) = 13.6 W/kg



SystemPerformanceCheck-Head 1900MHz

Communication System: UID 0, CW (0); Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.344$ S/m; $\epsilon_r = 38.388$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.4°C; Liquid Temperature: 22.2°C;

DASY Configuration:

- Probe: EX3DV4 - SN7494; ConvF(8.64, 8.64, 8.64); Calibrated: 4/17/2023;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/27/2023
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Head/d=10mm, Pin=250mW/Area Scan (41x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 15.8 W/kg

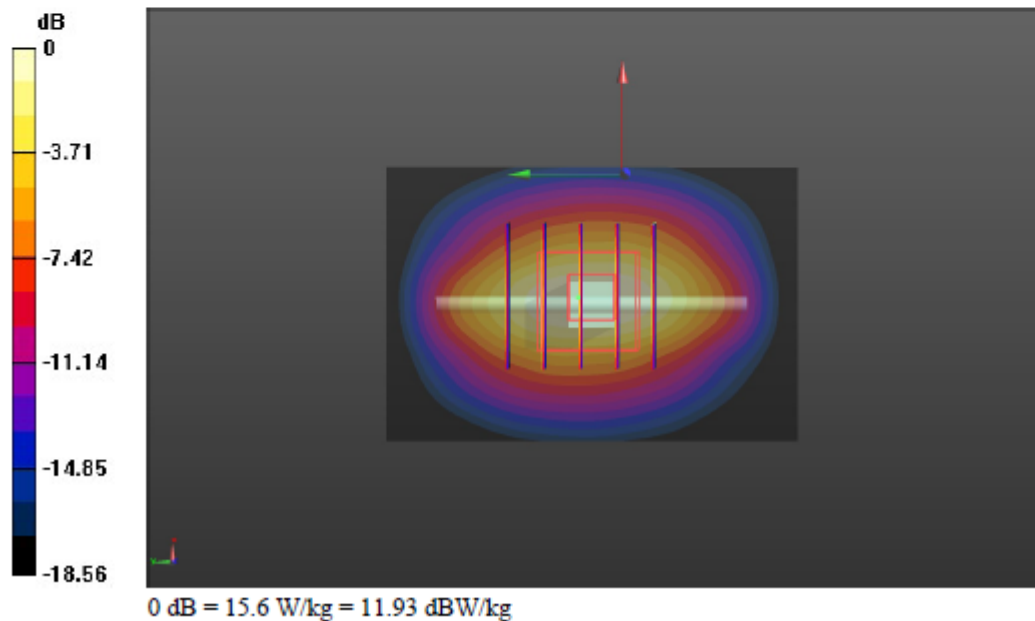
Head/d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 111.6 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 18.8 W/kg

SAR(1 g) = 10 W/kg; SAR(10 g) = 5.17 W/kg

Maximum value of SAR (measured) = 15.6 W/kg



9. SAR Exposure Limits

SAR assessments have been made in line with the requirements of FCC 47 CFR § 2.1093.

Type Exposure	Limit (W/kg)	
	General Population/ Uncontrolled Exposure Environment	Occupational/ Controlled Exposure Environment
Spatial Average SAR (whole body)	0.08	0.4
Spatial Peak SAR (1g cube tissue for head and trunk)	1.6	8.0
Spatial Peak SAR (10g for limb)	4.0	20.0

Note:

- 1. Population/Uncontrolled Environments: are defined as locations where there is the exposure of individual who have no knowledge or control of their exposure.*
- 2. Occupational/Controlled Environments: are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure (i.e. as a result of employment or occupation).*

10. Conducted Power Measurement Results and Tune-up

Please refer to appendix report

Note:

LTE

General:

1. *CMW500 base station simulator was used to setup the connection with EUT; the frequency band, channel, bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.*
2. *Per KDB 941225 D05v02r03, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.*
3. *Per KDB 941225 D05v02r03, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.*
4. *Per KDB 941225 D05v02r03, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.*

11. Measured and Reported SAR Results

Measurement Results:

Please refer to appendix report

Bluetooth SAR estimated

Location	Frequency (GHz)	Tune-up Power		Separation Distance (mm)	Exclusion Thresholds	Estimated SAR
		dBm	mW			
Head	2.450	1.00	1.26	15	0.1	0.018
Extremity				0	0.4	0.021

Note:

- Per KDB 447498 D01, the 1-g and 10-g SAR test exclusion thresholds for 100MHz to 6GHz at test separation distances $\leq 50\text{mm}$ are determined by:

$$[(\text{max. Power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] * [\sqrt{f(\text{GHz})}] \leq 3.0 \text{ for 1-g SAR, and } \leq 7.5 \text{ for 10-g SAR}$$
- Per KDB 447498 D04, when the minimum test separation distance is $< 5\text{mm}$, a distance of 5mm is applied to determine SAR test exclusion.
- KDB 447498 D04 based on the formula below
 - $[(\text{max. Power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] * [\sqrt{f(\text{GHz})} * x] \text{ W/kg}$ for test separation distances $\leq 50\text{mm}$; when $x=7.5$ for 1-g SAR, and $x=18.75$ for 10-g SAR.
 - When the minimum separation distance is $< 5\text{mm}$, the distance is used 5mm to determine SAR test exclusion
 - 0.4 W/kg for 1-g SAR and 1.0W/kg for 10-g SAR, when the test separation distances is $> 50\text{mm}$.

Measurement data plots:

Please refer to appendix D

Note:

SAR Test Reduction criteria are as follows:

- Reported SAR(W/kg) for WWAN = Measured SAR * Tune-up Scaling Factor
- Reported SAR(W/kg) for Wi-Fi and Bluetooth = Measured SAR * Tune-up scaling factor * Duty Cycle scaling factor
- Duty Cycle scaling factor = 1 / Duty cycle (%)

KDB 447498 D04 Interim General RF Exposure Guidance v01:

Testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:

- $\leq 0.8 \text{ W/kg}$ or 2.0 W/kg , for 1-g or 10-g respectively, when the transmission band is $\leq 100 \text{ MHz}$
- $\leq 0.6 \text{ W/kg}$ or 1.5 W/kg , for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
- $\leq 0.4 \text{ W/kg}$ or 1.0 W/kg , for 1-g or 10-g respectively, when the transmission band is $\geq 200 \text{ MHz}$

KDB 941225 D05 SAR for LTE Devices:

SAR test reduction is applied using the following criteria:

- Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel.
- When the reported SAR is > 0.8 W/kg, testing for other Channels is performed at the highest output power level for 1RB, and 50% RB configuration for that channel.
- Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are > 0.8 W/kg. Testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation < 1.45 W/kg.
- Testing for 16-QAM and 64-QAM modulation is not required because the reported SAR for QPSK is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of QPSK.
- Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.

12. Simultaneous Transmission analysis

No.	Simultaneous Transmission Configurations	Head	Extremity	Note
9	LTE + Bluetooth(data)	Yes	Yes	

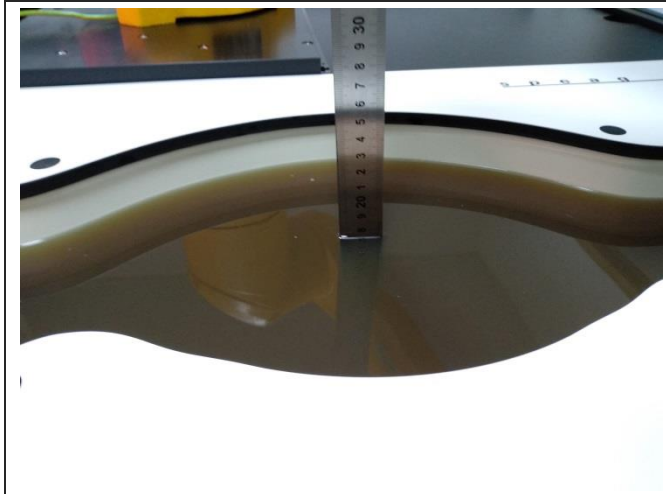
General note:

1. EUT will choose either LTE according to the network signal condition; therefore, they will not operate simultaneously at any moment.
2. The reported SAR summation is calculated based on the same configuration and test position

Simultaneous Transmission data:

Please refer to appendix report

13. TestSetup Photos



Liquid depth in the Body phantom



Front 0mm



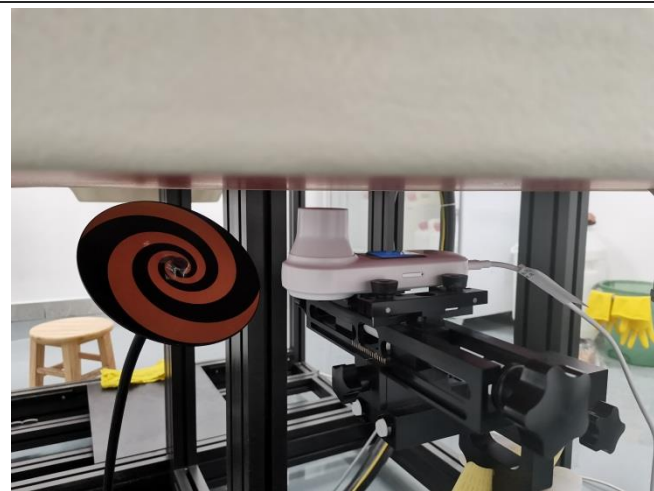
Rear 0mm



Left 0mm



Right 0mm



Front of face 15mm*1

Note:

*1: The minimum distance between the face and the front of the product in normal use is 15mm, so test according to this distance.

14. External and Internal Photos of the EUT

Please reference to the report No.: CHTEW23060033

-----End of Report-----