SAR TEST REPORT

Applicant	Qboid,Inc.
FCC ID	2AYQM-M2W01
Product	Handheld 3D Dimensioning Terminal
Brand	Qboid
Model	Perceptor M2
Report No.	R2111A0948-S1
Issue Date	February 9, 2022

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **IEEE 1528- 2013, ANSI C95.1: 1992, IEEE C95.1: 1991.** The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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1 Test Laboratory

1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

1.2 Test facility

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform measurements.

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform measurement.

1.3 Testing Location

Company:	TA Technology (Shanghai) Co., Ltd.
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City:	Shanghai
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1.4 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.	

2 Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for the EUT are as follows:

Table 1: Highest Reported SAR

Mode	Highest Reported SAR (W/kg)	
	1g SAR Body-worn (Separation 15mm)	Product Specific 10-g SAR (Separation 0mm)
Wi-Fi (2.4G)	＜0.1	0.179
Wi-Fi (5G)	0.240	0.724
BT	＜0.1	＜0.1
Date of Testing: January 5, 2022 ~ January 8, 2022 Date of Sample Received: November 19, 2021		
Note: 1. The device is in compliance with SAR for Uncontrolled Environment /General Population exposure limits (1.6 W/kg and 4.0 W/kg) specified in ANSI C95.1: 1992/IEEE C95.1: 1991, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013. 2.All indications of Pass/Fail in this report are opinions expressed by TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.		

Table 2: Highest Simultaneous Transmission SAR

Exposure Configuration	1g SAR Body-worn (Separation 15mm)	Product Specific 10-g SAR (Separation 0mm)
Highest Simultaneous Transmission SAR (W/kg)	0.268	0.846
Note: The detail for simultaneous transmission consideration is described in chapter 10.3.		

3 Description of Equipment under Test

Client Information

Applicant	Qboid,Inc.
Applicant address	118 Charcot Ave, San Jose, CA, 95131
Manufacturer	Nantong Kefei Technology Co., Ltd.
Manufacturer address	Room 1604，Building 8, Xinghu 101 Square，Nantong Economic and Technological Development Zone

General Technologies

Application Purpose	Original Grant
EUT Stage	Identical Prototype
Model	Perceptor M2
SN	FH04021A1900071
Hardware Version	V1.1
Software Version	V1.16
Antenna Type	Internal Antenna
EUT Accessory	
Adapter	Manufacturer: Shenzhen Tianyin Electronics CO.,LTD. Model: TPA-10R120150UU01HS
Battery	Manufacturer: Jiade Energy Technology (Zhuhai) Co., Ltd. Model: FH04(JKSG)
USB Cable	Manufacturer: SUZHOU KELI SCIENCE&TECHNOLOGY DEVELOPMENT CO.,LTD. Model: KLC-5243
Note: The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant.	

Wireless Technology and Frequency Range

Wireless Technology		Modulation	Operating mode	Tx (MHz)
BT	2.4G	Version 5.0 BR/EDR + LE		2402 ~2480
Wi-Fi	2.4G	DSSS, OFDM	802.11b/g/n HT20	2412 ~ 2462
		OFDM	802.11n HT40	2422 ~ 2452
	5G	OFDM	802.11a/n HT20/ HT40/ ac VHT20/ VHT40/ VHT80	5150 ~ 5350 5470 ~ 5850
	Does this device support MIMO ☐Yes(2TX, 2RX) ☒No			

4 Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1093, IEEE 1528- 2013, ANSI C95.1: 1992, IEEE C95.1: 1991, the following FCC Published RF exposure KDB procedures:

IEC 62209-1

Reference Standards

KDB 248227 D01 802.11Wi-Fi SAR v02r02
KDB 447498 D01 General RF Exposure Guidance v06
KDB 648474 D04 Handset SAR v01r03
KDB 690783 D01 SAR Listings on Grants v01r03
KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
KDB 865664 D02 RF Exposure Reporting v01r02

5 Operational Conditions during Test

5.1 Test Positions

5.1.1 Body Worn Configuration

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.

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 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.

5.2 Measurement Variability

Per FCC KDB Publication 865664 D01, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR Measurement Variability was assessed using the following procedures for each frequency band:
1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
2) A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

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.

5.3 Test Configuration

5.3.1 Wi-Fi Test Configuration

SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements. For 2.4 GHz DSSS, either the initial test position or DSSS procedure is applied to reduce the number of SAR tests; These are mutually exclusive. For OFDM, an initial test position is only applicable to next to the ear, UMPC mini-tablet and hotspot mode configurations, which is tested using the initial test configuration to facilitate test reduction. For other exposure conditions with a fixed test position, SAR test reduction is determined using only the initial test configuration.

The multiple test positions require SAR measurements in head, hotspot mode or UMPC mini-tablet configurations may be reduced according to the highest reported SAR determined using the *initial test position(s)* by applying the DSSS or OFDM SAR measurement procedures in the required wireless mode test configuration(s). The *initial test position(s)* is measured using the highest measured maximum output power channel in the required wireless mode test configuration(s). When the *reported* SAR for the *initial test position* is:

- ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and wireless mode combination within the frequency band or aggregated band. DSSS and OFDM configurations are considered separately according to the required SAR procedures.
- 0.4 W/kg, SAR is repeated using the same wireless mode test configuration tested in the *initial test position* to measure the subsequent next closet/smallest test separation distance and maximum coupling test position, on the highest maximum output power channel, until the *reported* SAR is ≤ 0.8 W/kg or all required test positions are tested.
  - ✧ For subsequent test positions with equivalent test separation distance or when exposure is dominated by coupling conditions, the position for maximum coupling condition should be tested.
  - ✧ When it is unclear, all equivalent conditions must be tested.
- For all positions/configurations tested using the *initial test position* and subsequent test positions, when the *reported* SAR is > 0.8 W/kg, measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the *reported* SAR is ≤ 1.2 W/kg or all required test channels are considered.
  - ✧ The additional power measurements required for this step should be limited to those necessary for identifying subsequent highest output power channels to apply the test reduction.

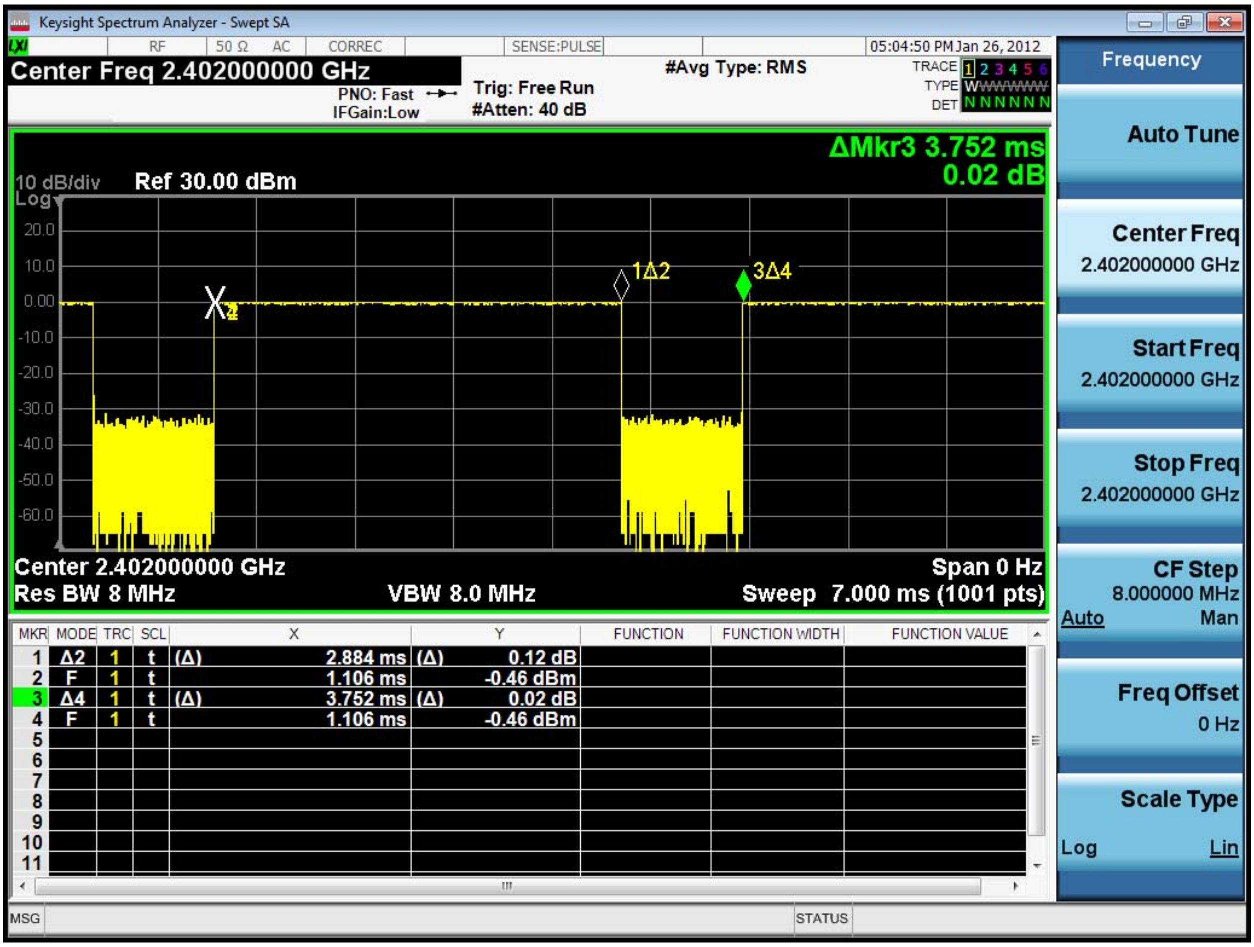
To determine the initial test position, Area Scans were performed to determine the position with the Maximum Value of SAR (measured). The position that produced the highest Maximum Value of SAR is considered the worst case position; thus used as the initial test position.

A Wi-Fi device must be configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools for SAR measurement.

5.3.2 BT Test Configuration

For BT SAR testing, BT engineering testing software installed on the EUT can provide continuous transmitting RF signal with maximum output power. And the CBT control the EUT operating with hoping off and data rate set for DH5.

The SAR measurement takes full account of the BT duty cycle and is reflected in the report, and the duty factor of the device is as follow:

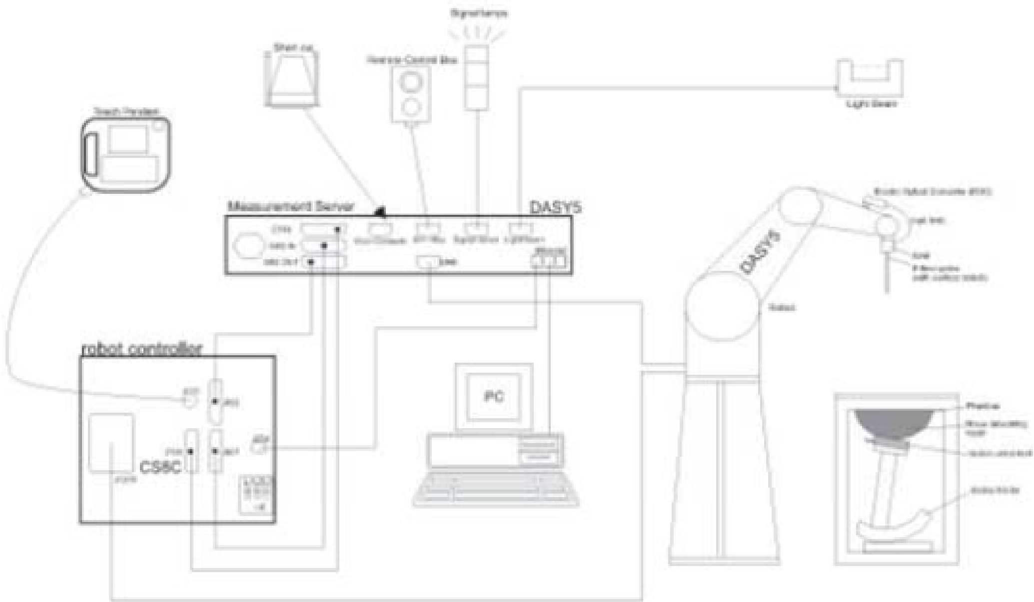


Note: Duty factor= Ton (ms)/ T(on+off) (ms)=2.884/3.752=77%

6 SAR Measurements System Configuration

6.1 SAR Measurement Set-up

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



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- 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 from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- 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.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

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.

EX3DV4 Probe Specification

Construction	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 HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 μW/g to > 100 mW/g Linearity: ± 0.2dB (noise: typically < 1 μW/g)
Dimensions	Overall length: 330 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). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.

E-field Probe Calibration

Each probe is calibrated according to a dosimetric assessment procedure with accuracy better than ± 10%. The spherical isotropy was evaluated and found to be better than ± 0.25dB. The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested.

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies bellow 1 GHz, and in a wave guide above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

SAR=C∆T/∆t

Where: ∆t = Exposure time (30 seconds),

C = Heat capacity of tissue (brain or muscle),

∆T = Temperature increase due to RF exposure.

Or

SAR=IEI²σ/ρ

Where: σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m³).

6.3 SAR Measurement Procedure

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. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

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 DASY software can find the maximum 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 parameters extracted from FCC KDB 865664 D01 SAR measurement 100 MHz to 6 GHz.

	≤3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 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: ΔxArea, ΔyArea	≤ 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.	

Zoom Scan

Zoom scans are used assess the peak spatial SAR values within a cubic averaging volume containing 1 gram and 10 gram of simulated tissue. The zoom scan measures points (refer to table below) within a cube shoes 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 gram and 10 gram and displays these values next to the job's label.

Zoom scan parameters extracted from FCC KDB 865664 D01 SAR measurement 100 MHz to 6 GHz.

			≤3GHz	> 3 GHz
Maximum zoom scan spatial resolution: $\triangle x_{zoom} \triangle y_{zoom}$			≤2GHz: ≤8mm 2 – 3GHz: ≤5mm*	3 – 4GHz: ≤5mm* 4 – 6GHz: ≤4mm*
Maximum zoom scan spatial resolution, normal to phantom surface	Uniform grid: $\triangle z_{zoom}(n)$		≤5mm	3 – 4GHz: ≤4mm 4 – 5GHz: ≤3mm 5 – 6GHz: ≤2mm
	Graded grid	$\triangle z_{zoom}(1)$: between 1st two points closest to phantom surface	≤4mm	3 – 4GHz: ≤3mm 4 – 5GHz: ≤2.5mm 5 – 6GHz: ≤2mm
		$\triangle z_{zoom}(n>1)$: between subsequent points	≤1.5•$\triangle z_{zoom}(n-1)$	
Minimum zoom scan volume	X, y, z		≥30mm	3 – 4GHz: ≥28mm 4 – 5GHz: ≥25mm 5 – 6GHz: ≥22mm

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.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4W/kg, ≤8mm, ≤7mm and ≤5mm zoom scan resolution may be applied, respectively, for 2GHz to 3GHz, 3GHz to 4GHz and 4GHz to 6GHz.

Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASY measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drifts more than 5%, the SAR will be retested.

7 Main Test Equipment

Name of Equipment	Manufacturer	Type/Model	Serial Number	Last Cal.	Cal. Due Date
Network analyzer	Agilent	E5071B	MY42404014	2021-05-15	2022-05-14
Dielectric Probe Kit	Agilent	85070E	US44020115	/	/
Power meter	Agilent	E4417A	GB41291714	2021-05-15	2022-05-14
Power sensor	Agilent	N8481H	MY50350004	2021-05-15	2022-05-14
Power sensor	Agilent	E9327A	US40441622	2021-05-15	2022-05-14
Dual directional coupler	Agilent	777D	50146	/	/
Dual directional coupler	UCL	UCL-DDC056G-S	20010600118	/	/
Amplifier	INDEXSAR	TPA-005060G01	13030502	2021-05-15	2022-05-14
Base Station Simulator	R&S	CMW270	100673	2021-05-15	2022-05-14
E-field Probe	SPEAG	EX3DV4	3677	2021-08-12	2022-08-11
DAE	SPEAG	DAE4	1317	2021-02-23	2022-02-22
Validation Kit 2450MHz	SPEAG	D2450V2	786	2020-08-27	2023-08-26
Validation Kit 5GHz	SPEAG	D5GHzV2	1151	2020-02-27	2023-02-26
Temperature Probe	Tianjin jinming	JM222	381	2021-05-15	2022-05-14
Hygrothermograph	Anymetr	HTC - 1	TY2020A001	2021-05-15	2022-05-14
Twin SAM Phantom	Speag	SAM1	1534	/	/
Software for Test	Speag	DASY52	/	/	/
Softwarefor Tissue	Agilent	85070	/	/	/

8 Tissue Dielectric Parameter Measurements & System Verification

8.1 Tissue Verification

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within ± 2°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 24 hours of use; or earlier if the dielectric parameters can become out of tolerance.

Target values

Frequency (MHz)	ε_r	σ(s/m)
2450	39.2	1.80
Frequency (MHz)	**ε_r**	**σ(s/m)**
5250	35.9	4.71
5600	35.5	5.07
5750	35.4	5.22

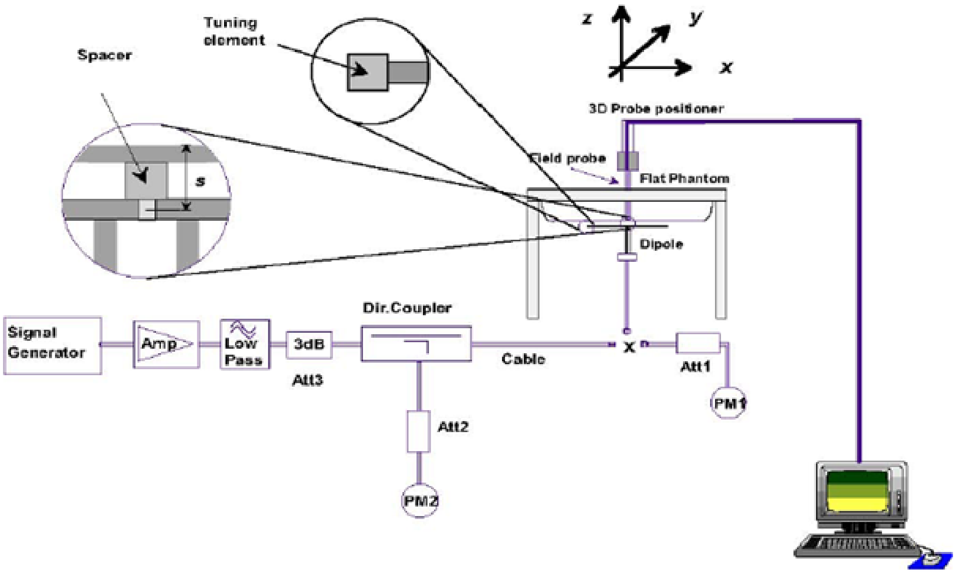
Measurements results

Frequency (MHz)	Test Date	Temp ℃	Measured Dielectric Parameters		Target Dielectric Parameters		Limit (Within ±5%)	
			ε_r	σ(s/m)	ε_r	σ(s/m)	Dev ε_r(%)	Dev σ(%)
2450	2022/1/5	21.5	38.6	1.81	39.2	1.80	-1.53	0.56
5250	2022/1/6	21.5	35.5	4.80	35.9	4.71	-1.11	1.91
5600	2022/1/8	21.5	34.2	5.21	35.5	5.07	-3.66	2.76
5750	2022/1/7	21.5	34.9	5.21	35.4	5.22	-1.41	-0.19
Note: 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.								

8.2 System Performance Check

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulates were measured using the dielectric probe kit and the network analyzer. A system check measurement for every day was made following the determination of the dielectric parameters of the Tissue simulates, using the dipole validation kit. The dipole antenna was placed under the flat section of the twin SAM phantom.

System check is performed regularly on all frequency bands where tests are performed with the DASY system.



Picture 1System Performance Check setup

Picture 2 Setup Photo

Justification for Extended SAR Dipole Calibrations

Usage of SAR dipoles calibrated less than 3 years ago but more than 1 year ago were confirmed in maintaining return loss (< - 20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB 865664 D01:

Dipole		Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
Dipole D2450V2 SN: 786	Head Liquid	8/27/2020	-26.9	/	54.5	/
		8/26/2021	-27.1	-0.7	53.8	0.7
Dipole D5GHzV2 SN: 1151 (5250MHz)	Head Liquid	2/27/2020	-23.4	/	52.4	/
		2/26/2021	-23.8	-0.4	50.0	-2.4
Dipole D5GHzV2 SN: 1151 (5600MHz)	Head Liquid	2/27/2020	-22.6	/	57.0	/
		2/26/2021	-21.5	1.1	55.6	-1.4
Dipole D5GHzV2 SN: 1151 (5750MHz)	Head Liquid	2/27/2020	-25.0	/	55.9	/
		2/26/2021	-26.8	-1.8	52.5	-3.4

System Check results

Frequency (MHz)	**Test Date**	**Temp ℃**	**250mW Measured SAR_{1g} (W/kg)**	**1W Normalized SAR_{1g} (W/kg)**	**1W Target SAR_{1g} (W/kg)**	**Δ % (Limit ±10%)**	**Plot No.**
2450	2022/1/5	21.5	13.70	54.80	52.30	4.78	1
Frequency (MHz)	**Test Date**	**Temp ℃**	**100mW Measured SAR_{1g} (W/kg)**	**1W Normalized SAR_{1g} (W/kg)**	**1W Target SAR_{1g} (W/kg)**	**Δ % (Limit ±10%)**	**Plot No.**
5250	2022/1/6	21.5	7.87	78.70	78.00	0.90	2
5600	2022/1/8	21.5	7.67	76.70	80.50	-4.72	3
5750	2022/1/7	21.5	7.66	76.60	77.40	-1.03	4
Note: Target Values used derive from the calibration certificate Data Storage and Evaluation.							

8.3 SAR System Validation

Per FCC KDB 865664 D02v01, SAR system verification is required to confirm measurement accuracy. The SAR systems (including SAR probes, system components and software versions) used for this device were validated against its performance specifications prior to the SAR measurements. Reference dipoles are used with the required tissue-equivalent media for system validation, according to the procedures outlined in FCC KDB 865664 D01 and IEEE 1528-2013. Since SAR probe calibrations are frequency dependent, each probe calibration point must be validated at a frequency within the valid frequency range of the probe calibration point, using the system that normally operates with the probe for routine SAR measurements and according to the required tissue-equivalent media.

A tabulated summary of the system validation status, measurement frequencies, SAR probes, calibrated signal type(s) and tissue dielectric parameters has been included.

Frequency [MHz]	Date	Probe SN	Probe Type	Probe Cal Point		PERM (Er)	COND (Σ)	CW Validation		
								Sensitivity	Probe Linearity	Probe Isotropy
2450	8/12/2021	3677	EX3DV4	2450	Head	38.19	1.83	PASS	PASS	PASS
5250	8/12/2021	3677	EX3DV4	5250	Head	35.36	4.83	PASS	PASS	PASS
5600	8/12/2021	3677	EX3DV4	5600	Head	34.43	5.29	PASS	PASS	PASS
5750	8/12/2021	3677	EX3DV4	5750	Head	34.07	5.47	PASS	PASS	PASS

NOTE: While the probes have been calibrated for both CW and modulated signals, all measurements were performed using communication systems calibrated for CW signals only. Modulations in the table above represent test configurations for which the measurement system has been validated per FCC KDB Publication 865664D01v01 for scenarios when CW probe calibrations are used with other signal types. SAR systems were validated for modulated signals with a periodic duty cycle, such as GMSK, or with a high peak to average ratio (>5dB), such as OFDM according to KDB 865664.

9 Normal and Maximum Output Power

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

9.1 WLAN Mode

Wi-Fi 2.4G Ant1 / Mode	Channel /Frequency(MHz)	Maximum Output Power (dBm) Tune-up	Meas.
802.11b (1M)	1/2412	17.00	15.21
	6/2437	17.00	15.19
	11/2462	17.00	**15.31**
802.11g (6M)	1/2412	14.00	12.73
	6/2437	14.00	12.53
	11/2462	14.00	12.71
802.11n-HT20 (MCS0)	1/2412	14.00	12.54
	6/2437	14.00	12.33
	11/2462	14.00	12.58
802.11n-HT40 (MCS0)	3/2422	14.00	12.35
	6/2437	14.00	12.20
	9/2452	14.00	12.13
Note: Initial test configuration is 802.11b mode.			

Wi-Fi 2.4G Ant2 / Mode	Channel /Frequency(MHz)	Maximum Output Power (dBm) Tune-up	Meas.
802.11b (1M)	1/2412	17.00	15.82
	6/2437	17.00	16.02
	11/2462	17.00	16.03
802.11g (6M)	1/2412	14.00	13.23
	6/2437	14.00	13.14
	11/2462	14.00	13.21
802.11n-HT20 (MCS0)	1/2412	14.00	13.06
	6/2437	14.00	13.02
	11/2462	14.00	13.04
802.11n-HT40 (MCS0)	3/2422	14.00	13.12
	6/2437	14.00	12.94
	9/2452	14.00	12.62
Note: Initial test configuration is 802.11b mode.			

Wi-Fi 5G Ant 1 (U-NII-1) Mode	Channel /Frequency(MHz)	Maximum Output Power (dBm)	
		Tune-up	Meas.
802.11a (6M)	36/5180	16	14.05
	40/5200	16	**14.17**
	44/5220	16	14.11
	48/5240	16	14.14
802.11n-HT20 (MCS0)	36/5180	14	12.17
	40/5200	14	12.08
	44/5220	14	12.10
	48/5240	14	12.04
802.11n-HT40 (MCS0)	38/5190	14	13.74
	46/5230	14	13.85
802.11ac-VHT20 (MCS0)	36/5180	12	10.61
	40/5200	12	10.89
	44/5220	12	10.96
	48/5240	12	11.10
802.11ac-VHT40 (MCS0)	38/5190	12	10.91
	46/5230	12	11.26
Note. Initial test configuration is 802.11a mode, since the highest maximum output power.			

Wi-Fi 5G Ant 2 (U-NII-1) Mode	Channel /Frequency(MHz)	Maximum Output Power (dBm)	
		Tune-up	Meas.
802.11a (6M)	36/5180	16	14.97
	40/5200	16	15.10
	44/5220	16	15.09
	48/5240	16	**15.15**
802.11n-HT20 (MCS0)	36/5180	14	12.78
	40/5200	14	12.91
	44/5220	14	12.96
	48/5240	14	13.03
802.11n-HT40 (MCS0)	38/5190	14	13.29
	46/5230	14	13.37
802.11ac-VHT20 (MCS0)	36/5180	12	10.49
	40/5200	12	10.87
	44/5220	12	10.94
	48/5240	12	11.02
802.11ac-VHT40 (MCS0)	38/5190	12	11.12
	46/5230	12	11.40

Note. Initial test configuration is 802.11a mode, since the highest maximum output power.

Wi-Fi 5G Ant 1 (U-NII-2A) Mode	Channel /Frequency(MHz)	Maximum Output Power (dBm)	
		Tune-up	Meas.
802.11a (6M)	52/5260	16	**14.33**
	56/5280	16	14.25
	60/5300	16	14.27
	64/5320	16	14.31
802.11n-HT20 (MCS0)	52/5260	14	12.18
	56/5280	14	12.10
	60/5300	14	12.06
	64/5320	14	12.07
802.11n-HT40 (MCS0)	54/5270	14	13.81
	62/5310	14	13.53
802.11ac-HT20 (MCS0)	52/5260	12	10.61
	56/5280	12	10.53
	60/5300	12	10.23
	64/5320	12	10.34
802.11ac-HT40 (MCS0)	54/5270	12	11.52
	62/5310	12	11.43
Note. Initial test configuration is 802.11a mode, since the highest maximum output power.			

Wi-Fi 5G Ant 2 (U-NII-2A) Mode	Channel /Frequency(MHz)	Maximum Output Power (dBm)	
		Tune-up	Meas.
802.11a (6M)	52/5260	16	**15.13**
	56/5280	16	15.03
	60/5300	16	14.97
	64/5320	16	14.98
802.11n-HT20 (MCS0)	52/5260	14	12.95
	56/5280	14	12.84
	60/5300	14	12.71
	64/5320	14	12.77
802.11n-HT40 (MCS0)	54/5270	14	13.41
	62/5310	14	13.34
802.11ac-HT20 (MCS0)	52/5260	12	10.94
	56/5280	12	10.65
	60/5300	12	10.58

	64/5320	12	10.69
802.11ac-HT40 (MCS0)	54/5270	12	11.47
	62/5310	12	11.17
Note. Initial test configuration is 802.11a mode, since the highest maximum output power.			

Wi-Fi 5G Ant 1 (U-NII-2C)	Channel /Frequency(MHz)	Maximum Output Power (dBm)	
Mode		Tune-up	Meas.
802.11a (6M)	100/5500	16	14.12
	116/5580	16	14.13
	132/5660	16	14.70
	140/5700	16	**14.74**
802.11n-HT20 (MCS0)	100/5500	14	12.18
	116/5580	14	12.11
	132/5660	14	12.44
	140/5700	14	12.52
802.11n-HT40 (MCS0)	102/5510	14	13.33
	110/5550	14	13.48
	118/5590	14	13.60
	134/5670	14	13.57
802.11ac-HT20 (MCS0)	100/5500	12	10.81
	116/5580	12	10.93
	132/5660	12	10.95
	140/5700	12	11.01
802.11ac-HT40 (MCS0)	102/5510	12	10.91
	110/5550	12	11.15
	118/5590	12	11.33
	134/5670	12	11.50
Note. Initial test configuration is 802.11a mode, since the highest maximum output power.			

Wi-Fi 5G Ant 2 (U-NII-2C)	Channel /Frequency(MHz)	Maximum Output Power (dBm)	
Mode		Tune-up	Meas.
802.11a (6M)	100/5500	16	**14.93**
	116/5580	16	14.92
	132/5660	16	14.86
	140/5700	16	14.84
802.11n-HT20 (MCS0)	100/5500	14	12.79
	116/5580	14	12.78

	132/5660	14	12.86
	140/5700	14	12.72
802.11n-HT40 (MCS0)	102/5510	14	13.27
	110/5550	14	13.26
	118/5590	14	13.24
	134/5670	14	13.42
802.11ac-HT20 (MCS0)	100/5500	12	10.67
	116/5580	12	10.59
	132/5660	12	10.63
	140/5700	12	10.72
802.11ac-HT40 (MCS0)	102/5510	12	10.82
	110/5550	12	10.95
	118/5590	12	11.15
	134/5670	12	11.31
Note. Initial test configuration is 802.11a mode, since the highest maximum output power.			

Wi-Fi 5G Ant 1 (U-NII-3)	Channel /Frequency(MHz)	Maximum Output Power (dBm)	
Mode		Tune-up	Meas.
802.11a (6M)	149/5745	16	**14.54**
	157/5785	16	14.22
	165/5825	16	14.25
802.11n-HT20 (MCS0)	149/5745	14	12.34
	157/5785	14	12.02
	165/5825	14	12.05
802.11n-HT40 (MCS0)	151/5755	14	13.76
	159/5795	14	13.94
802.11ac-HT20 (MCS0)	149/5745	12	10.69
	157/5785	12	10.88
	165/5825	12	11.21
802.11ac-HT40 (MCS0)	151/5755	12	11.43
	159/5795	12	11.51
Note. Initial test configuration is 802.11a mode, since the highest maximum output power.			

Wi-Fi 5G Ant 1 (U-NII-3)	Channel /Frequency(MHz)	Maximum Output Power (dBm)	
Mode		Tune-up	Meas.
802.11a (6M)	149/5745	16	15.04
	157/5785	16	15.33

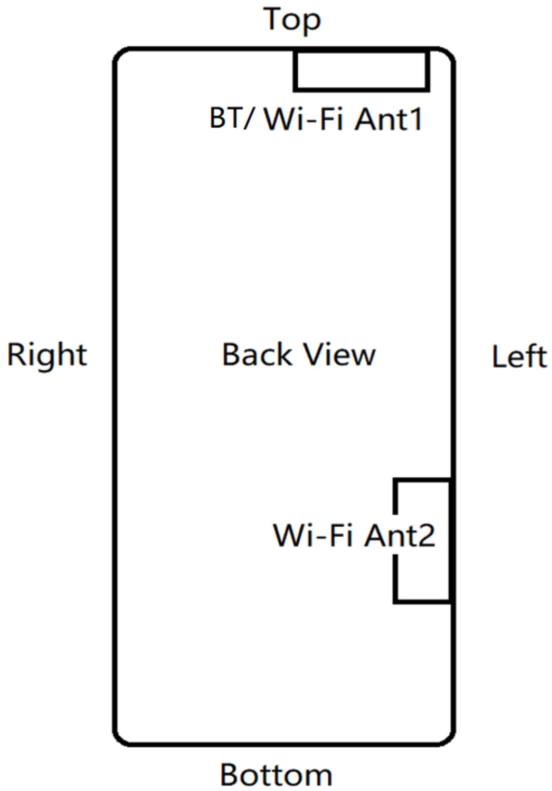
	165/5825	16	**15.75**
802.11n-HT20 (MCS0)	149/5745	14	12.91
	157/5785	14	13.24
	165/5825	14	13.67
802.11n-HT40 (MCS0)	151/5755	14	13.39
	159/5795	14	13.75
802.11ac-HT20 (MCS0)	149/5745	12	10.81
	157/5785	12	11.12
	165/5825	12	11.65
802.11ac-HT40 (MCS0)	151/5755	12	11.48
	159/5795	12	11.70
Note. Initial test configuration is 802.11a mode, since the highest maximum output power.			

9.2 Bluetooth Mode

BT	Conducted Power(dBm)			Tune-up Limit (dBm)
	Channel/Frequency(MHz)			
	Ch 0/2402 MHz	Ch 39/2441 MHz	Ch 78/2480 MHz	
GFSK	6.08	4.68	5.55	6.50
π/4DQPSK	5.04	3.66	4.85	5.50
8DPSK	5.61	4.05	5.17	6.00
BLE	Ch 0/2402 MHz	Ch 19/2440 MHz	Ch 39/2480 MHz	Tune-up Limit (dBm)
GFSK	5.33	4.40	5.89	2.00

10 Measured and Reported (Scaled) SAR Results

10.1 EUT Antenna Locations



Overall (Length x Width): 174 mm x 92 mm Overall Diagonal: 185 mm/Display Diagonal: 149mm						
Distance of the Antenna to the EUT surface/edge						
Antenna	Back Side	Front side	Left Edge	Right Edge	Top Edge	Bottom Edge
BT/Wi-Fi Ant1	＜25mm	＜25mm	＜25mm	＞25mm	＜25mm	＞25mm
Wi-Fi Ant2	＜25mm	＜25mm	＜25mm	＞25mm	＞25mm	＞25mm
Hotspot mode, Positions for SAR tests						
Mode	Back Side	Front side	Left Edge	Right Edge	Top Edge	Bottom Edge
BT/Wi-Fi Ant1	Yes	Yes	Yes	N/A	Yes	N/A
Wi-Fi Ant2	Yes	Yes	Yes	N/A	N/A	N/A

Note: 1. Per KDB 941225 D06, when the overall device length and width are ≥ 9cm*5cm, the test distance is 10mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.

3. Per FCC KDB 447498 D01, for each exposure position, testing of other requised 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:

a) ≤0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100MHz

b) ≤0.6 W/kg or 1.5 W/kg, for1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz.

c) ≤ 0.4 W/kg or 1.0 Wkg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz.

4. When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.

10.2 Measured SAR Results

Note: 1.The value with blue color is the maximum SAR Value of each test band.

Body worn

Band	Antenna	Test Position	Dist. (mm)	Mode	Duty Cycle	Ch./Freq. (MHz)	Tune-up (dBm)	Measured power (dBm)	Measured SAR10g	Measured SAR1g	Power Drift (dB)	Scaling Factor	Report SAR1g	Plot No.
2.4G	ANT1	Back Side	15	802.11b	99.0%	11/2462	17.00	15.31	0.001	0.002	0.032	1.49	0.003	/
		Front Side	15	802.11b	99.0%	11/2462	17.00	15.31	0.000	0.000	0.023	1.49	0.000	/
	ANT2	Back Side	15	802.11b	99.0%	11/2462	17.00	16.03	0.008	0.013	0.170	1.26	0.016	/
		Front Side	15	802.11b	99.0%	11/2462	17.00	16.03	0.010	0.022	0.000	1.26	0.028	/
	ANT2	Front Side	15	802.11b	99.0%	1/2412	17.00	15.82	0.009	0.020	0.012	1.33	0.027	/
		Front Side	15	802.11b	99.0%	6/2437	17.00	16.02	0.012	0.023	0.032	1.27	0.029	5
U-NII-1	ANT1	Back Side	15	802.11a	98.0%	40/5200	16.00	14.17	0.028	0.063	0.019	1.56	0.098	/
		Front Side	15	802.11a	98.0%	40/5200	16.00	14.17	0.022	0.070	0.035	1.56	0.109	/
	ANT2	Back Side	15	802.11a	98.0%	48/5240	16.00	15.15	0.036	0.090	0.186	1.24	0.111	/
		Front Side	15	802.11a	98.0%	48/5240	16.00	15.15	0.020	0.061	0.021	1.24	0.076	/
	ANT2	Front Side	15	802.11a	98.0%	36/5180	16.00	14.05	0.024	0.059	-0.110	1.60	0.094	/
		Front Side	15	802.11a	98.0%	48/5240	16.00	14.14	0.024	0.066	-0.120	1.57	0.103	/
U-NII-2A	ANT1	Back Side	15	802.11a	98.0%	52/5260	16.00	14.33	0.054	0.142	0.065	1.50	0.213	/
		Front Side	15	802.11a	98.0%	52/5260	16.00	14.33	0.021	0.072	0.012	1.50	0.108	/
	ANT2	Back Side	15	802.11a	98.0%	52/5260	16.00	15.13	0.049	0.115	0.018	1.25	0.143	/
		Front Side	15	802.11a	98.0%	52/5260	16.00	15.13	0.050	0.113	0.099	1.25	0.141	/
	ANT1	Back Side	15	802.11a	98.0%	56/5280	16.00	14.25	0.041	0.105	-0.010	1.53	0.160	/
		Back Side	15	802.11a	98.0%	64/5320	16.00	14.31	0.045	0.110	0.110	1.51	0.166	/
U-NII-2C	ANT1	Back Side	15	802.11a	98.0%	140/5700	16.00	14.74	0.036	0.100	-0.040	1.36	0.136	/
		Front Side	15	802.11a	98.0%	140/5700	16.00	14.74	0.027	0.080	0.070	1.36	0.109	/
	ANT2	Back Side	15	802.11a	98.0%	100/5500	16.00	14.93	0.033	0.074	0.012	1.31	0.097	/
		Front Side	15	802.11a	98.0%	100/5500	16.00	14.93	0.063	0.152	0.099	1.31	0.198	/
	ANT1	Back Side	15	802.11a	98.0%	116/5580	16.00	14.13	0.058	0.153	0.115	1.57	0.240	6
		Back Side	15	802.11a	98.0%	100/5500	16.00	14.12	0.038	0.090	-0.180	1.57	0.142	/
U-NII-3	ANT1	Back Side	15	802.11a	98.0%	149/5745	16.00	14.54	0.035	0.102	0.011	1.43	0.146	/
		Front Side	15	802.11a	98.0%	149/5745	16.00	14.54	0.024	0.078	0.020	1.43	0.111	/
	ANT2	Back Side	15	802.11a	98.0%	165/5825	16.00	15.75	0.023	0.064	-0.027	1.08	0.069	/
		Front Side	15	802.11a	98.0%	165/5825	16.00	15.75	0.044	0.117	0.099	1.08	0.126	/
	ANT1	Back Side	15	802.11a	98.0%	157/5785	16.00	14.22	0.050	0.146	0.077	1.54	0.224	/
		Back Side	15	802.11a	98.0%	165/5825	16.00	14.25	0.039	0.114	0.089	1.53	0.174	/
Bluetooth	BT	Back Side	15	DH5	77.0%	0/2402	6.50	6.08	0.004	0.008	-0.020	1.43	0.012	7
		Front Side	15	DH5	77.0%	0/2402	6.50	6.08	0.003	0.007	0.017	1.43	0.011	/

Product Specific 10-g SAR

Band	Antenna	Test Position	Dist. (mm)	Mode	Duty Cycle	Ch./Freq. (MHz)	Tune-up (dBm)	Measured power (dBm)	Measured SAR10g	Measured SAR1g	Power Drift (dB)	Scaling Factor	Report SAR1g	Plot No.
2.4G	ANT1	Back Side	0	802.11b	99.0%	11/2462	17.00	15.31	0.077	0.016	0.000	1.49	0.115	/
		Front Side	0	802.11b	99.0%	11/2462	17.00	15.31	0.031	0.071	0.040	1.49	0.046	/
		Left Edge	0	802.11b	99.0%	11/2462	17.00	15.31	0.052	0.132	-0.110	1.49	0.077	/
		Right Edge	0	802.11b	99.0%	11/2462	17.00	15.31	0.000	0.002	0.046	1.49	0.000	/
		Top Edge	0	802.11b	99.0%	11/2462	17.00	15.31	0.031	0.068	0.053	1.49	0.045	/
		Bottom Edge	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	/
	ANT2	Back Side	0	802.11b	99.0%	11/2462	17.00	16.03	0.025	0.048	0.020	1.26	0.032	/
		Front Side	0	802.11b	99.0%	11/2462	17.00	16.03	0.046	0.100	0.156	1.26	0.058	/
		Left Edge	0	802.11b	99.0%	11/2462	17.00	16.03	0.142	0.332	0.160	1.26	0.179	8
		Right Edge	0	802.11b	99.0%	11/2462	17.00	16.03	0.015	0.028	0.032	1.26	0.019	/
		Top Edge	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	/
		Bottom Edge	0	802.11b	99.0%	11/2462	17.00	16.03	0.049	0.106	-0.050	1.26	0.062	/
	ANT2	Left Edge	0	802.11b	99.0%	1/2412	17.00	15.82	0.130	0.286	0.033	1.33	0.172	/
		Left Edge	0	802.11b	99.0%	6/2437	17.00	16.02	0.122	0.269	0.036	1.27	0.154	/
U-NII-1	ANT1	Back Side	0	802.11a	98.0%	40/5200	16.00	14.17	0.083	0.199	0.032	1.56	0.129	/
		Front Side	0	802.11a	98.0%	40/5200	16.00	14.17	0.083	0.201	0.073	1.56	0.130	/
		Left Edge	0	802.11a	98.0%	40/5200	16.00	14.17	0.196	0.523	-0.044	1.56	0.305	/
		Right Edge	0	802.11a	98.0%	40/5200	16.00	14.17	0.007	0.012	0.088	1.56	0.011	/
		Top Edge	0	802.11a	98.0%	40/5200	16.00	14.17	0.267	0.829	0.055	1.56	0.415	/
		Bottom Edge	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	/
	ANT2	Back Side	0	802.11a	98.0%	48/5240	16.00	15.15	0.066	0.161	0.102	1.24	0.082	/
		Front Side	0	802.11a	98.0%	48/5240	16.00	15.15	0.039	0.092	0.068	1.24	0.048	/
		Left Edge	0	802.11a	98.0%	48/5240	16.00	15.15	0.141	0.435	0.032	1.24	0.175	/
		Right Edge	0	802.11a	98.0%	48/5240	16.00	15.15	0.011	0.024	0.078	1.24	0.014	/
		Top Edge	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	/
		Bottom Edge	0	802.11a	98.0%	48/5240	16.00	15.15	0.021	0.054	0.064	1.24	0.026	/
	ANT1	Top Edge	0	802.11a	98.0%	44/5220	16.00	14.11	0.316	0.998	0.062	1.58	0.498	/
		Top Edge	0	802.11a	98.0%	48/5240	16.00	14.14	0.334	1.040	0.055	1.57	0.523	/
U-NII-2A	ANT1	Back Side	0	802.11a	98.0%	52/5260	16.00	14.33	0.089	0.217	0.188	1.50	0.134	/
		Front Side	0	802.11a	98.0%	52/5260	16.00	14.33	0.093	0.224	0.057	1.50	0.139	/
		Left Edge	0	802.11a	98.0%	52/5260	16.00	14.33	0.212	0.569	0.099	1.50	0.318	/
		Right Edge	0	802.11a	98.0%	52/5260	16.00	14.33	0.009	0.016	0.026	1.50	0.013	/
		Top Edge	0	802.11a	98.0%	52/5260	16.00	14.33	0.343	1.080	0.041	1.50	0.514	/
		Bottom Edge	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	/
	ANT2	Back Side	0	802.11a	98.0%	52/5260	16.00	15.13	0.069	0.165	0.161	1.25	0.086	/
		Front Side	0	802.11a	98.0%	52/5260	16.00	15.13	0.037	0.088	0.191	1.25	0.046	/
		Left Edge	0	802.11a	98.0%	52/5260	16.00	15.13	0.139	0.428	0.037	1.25	0.173	/
		Right Edge	0	802.11a	98.0%	52/5260	16.00	15.13	0.009	0.020	0.103	1.25	0.012	/
		Top Edge	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	/

		Bottom Edge	0	802.11a	98.0%	52/5260	16.00	15.13	0.023	0.064	0.089	1.25	0.029	/
	ANT1	Top Edge	0	802.11a	98.0%	56/5280	16.00	14.25	0.362	1.140	0.073	1.53	0.553	/
		Top Edge	0	802.11a	98.0%	60/5300	16.00	14.27	0.378	1.190	0.072	1.52	0.574	/
U-NII-2C	ANT1	Back Side	0	802.11a	98.0%	140/5700	16.00	14.74	0.072	0.175	0.037	1.36	0.098	/
		Front Side	0	802.11a	98.0%	140/5700	16.00	14.74	0.073	0.159	0.032	1.36	0.100	/
		Left Edge	0	802.11a	98.0%	140/5700	16.00	14.74	0.178	0.500	0.032	1.36	0.243	/
		Right Edge	0	802.11a	98.0%	140/5700	16.00	14.74	0.011	0.017	0.152	1.36	0.015	/
		Top Edge	0	802.11a	98.0%	140/5700	16.00	14.74	0.385	1.280	0.022	1.36	0.525	/
		Bottom Edge	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	/
	ANT2	Back Side	0	802.11a	98.0%	100/5500	16.00	14.93	0.079	0.193	0.026	1.31	0.103	/
		Front Side	0	802.11a	98.0%	100/5500	16.00	14.93	0.040	0.108	0.196	1.31	0.052	/
		Left Edge	0	802.11a	98.0%	100/5500	16.00	14.93	0.119	0.382	0.051	1.31	0.155	/
		Right Edge	0	802.11a	98.0%	100/5500	16.00	14.93	0.010	0.023	0.042	1.31	0.013	/
		Top Edge	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	/
		Bottom Edge	0	802.11a	98.0%	100/5500	16.00	14.93	0.026	0.069	0.032	1.31	0.034	/
	ANT1	Top Edge	0	802.11a	98.0%	116/5580	16.00	14.13	0.461	1.500	0.090	1.57	0.724	9
		Top Edge	0	802.11a	98.0%	132/5660	16.00	14.70	0.457	1.450	0.046	1.38	0.629	/
U-NII-3	ANT1	Back Side	0	802.11a	98.0%	149/5745	16.00	14.54	0.070	0.160	0.059	1.43	0.101	/
		Front Side	0	802.11a	98.0%	149/5745	16.00	14.54	0.065	0.139	0.087	1.43	0.092	/
		Left Edge	0	802.11a	98.0%	149/5745	16.00	14.54	0.166	0.464	0.050	1.43	0.237	/
		Right Edge	0	802.11a	98.0%	149/5745	16.00	14.54	0.001	0.004	0.000	1.43	0.002	/
		Top Edge	0	802.11a	98.0%	149/5745	16.00	14.54	0.325	1.090	-0.028	1.43	0.464	/
		Bottom Edge	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	/
	ANT2	Back Side	0	802.11a	98.0%	165/5825	16.00	15.75	0.083	0.191	0.100	1.08	0.090	/
		Front Side	0	802.11a	98.0%	165/5825	16.00	15.75	0.034	0.072	0.062	1.08	0.037	/
		Left Edge	0	802.11a	98.0%	165/5825	16.00	15.75	0.126	0.390	0.099	1.08	0.136	/
		Right Edge	0	802.11a	98.0%	165/5825	16.00	15.75	0.005	0.018	0.040	1.08	0.006	/
		Top Edge	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	/
		Bottom Edge	0	802.11a	98.0%	165/5825	16.00	14.93	0.025	0.072	0.099	1.31	0.033	/
	ANT1	Top Edge	0	802.11a	98.0%	157/5785	16.00	14.22	0.331	1.100	0.131	1.54	0.509	/
		Top Edge	0	802.11a	98.0%	165/5825	16.00	14.25	0.343	1.160	-0.020	1.53	0.524	/
Bluetooth	BT	Back Side	0	DH5	77.0%	0/2402	6.50	6.08	0.024	0.053	0.012	1.43	0.034	/
		Front Side	0	DH5	77.0%	0/2402	6.50	6.08	0.020	0.048	-0.036	1.43	0.029	/
		Left Edge	0	DH5	77.0%	0/2402	6.50	6.08	0.035	0.074	-0.024	1.43	0.050	/
		Right Edge	0	DH5	77.0%	0/2402	6.50	6.08	0.008	0.016	0.026	1.43	0.011	/
		Top Edge	0	DH5	77.0%	0/2402	6.50	6.08	0.054	0.091	0.015	1.43	0.077	10
		Bottom Edge	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	/

10.3 Simultaneous Transmission Analysis

Simultaneous Transmission Configurations	Body-worn	Product Specific 10-g SAR
Wi-Fi 2.4GHz + Bluetooth	Yes	Yes
Wi-Fi 5GHz + Bluetooth	Yes	Yes
Wi-Fi 2.4GHz + Wi-Fi 5GHz	Yes	Yes

General Note:

1. The Scaled SAR summation is calculated based on the same configuration and test position.
2. Per KDB 447498 D01, simultaneous transmission SAR is compliant if,
   i) Scalar SAR summation < 1.6W/kg, simultaneously transmission SAR measurement is not necessary.
   ii) SPLSR = $(SAR1 + SAR2)^{1.5}$ / (min. separation distance, mm), and the peak separation distance is determined from the square root of $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$, where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
   iii) If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary.

About Wi-Fi 2.4G and Wi-Fi 5G and Bluetooth

Test Position \ $SAR_{1g/10g}$(W/kg)		Wi-Fi 2.4G	Wi-Fi (U-NII-1)	Wi-Fi (U-NII-2A)	Wi-Fi (U-NII-2C)	Wi-Fi (U-NII-3)	Bluetooth	MAX. ΣSAR_{1g}
Body worn	Back Side	0.016	0.111	0.213	0.240	0.224	0.012	0.268
	Front Side	0.029	0.109	0.141	0.198	0.126	0.011	0.238
Product Specific 10-g SAR	Back Side	0.115	0.129	0.134	0.103	0.101	0.034	0.283
	Front Side	0.058	0.130	0.139	0.100	0.092	0.029	0.226
	Left Edge	0.179	0.305	0.318	0.243	0.237	0.050	0.547
	Right Edge	0.019	0.014	0.013	0.015	0.006	0.011	0.045
	Top Edge	0.045	0.523	0.574	0.724	0.524	0.077	0.846
	Bottom Edge	0.062	0.026	0.029	0.034	0.033	N/A	0.096
Note: 1.The value with blue color is the maximum $\Sigma SAR_{1g/10g}$ Value. 2.MAX. $\Sigma SAR_{1g/10g}$ =Unlicensed SAR_{MAX} +Licensed SAR_{MAX}								

MAX. ΣSAR_{1g} = 0.268W/kg<1.6W/kg and MAX. ΣSAR_{10g} = 0.846W/kg<4 W/kg, so the Simultaneous transimition SAR with volum scan are not required for Wi-Fi 2.4G and Wi-Fi 5G and Bluetooth.

11 Measurement Uncertainty

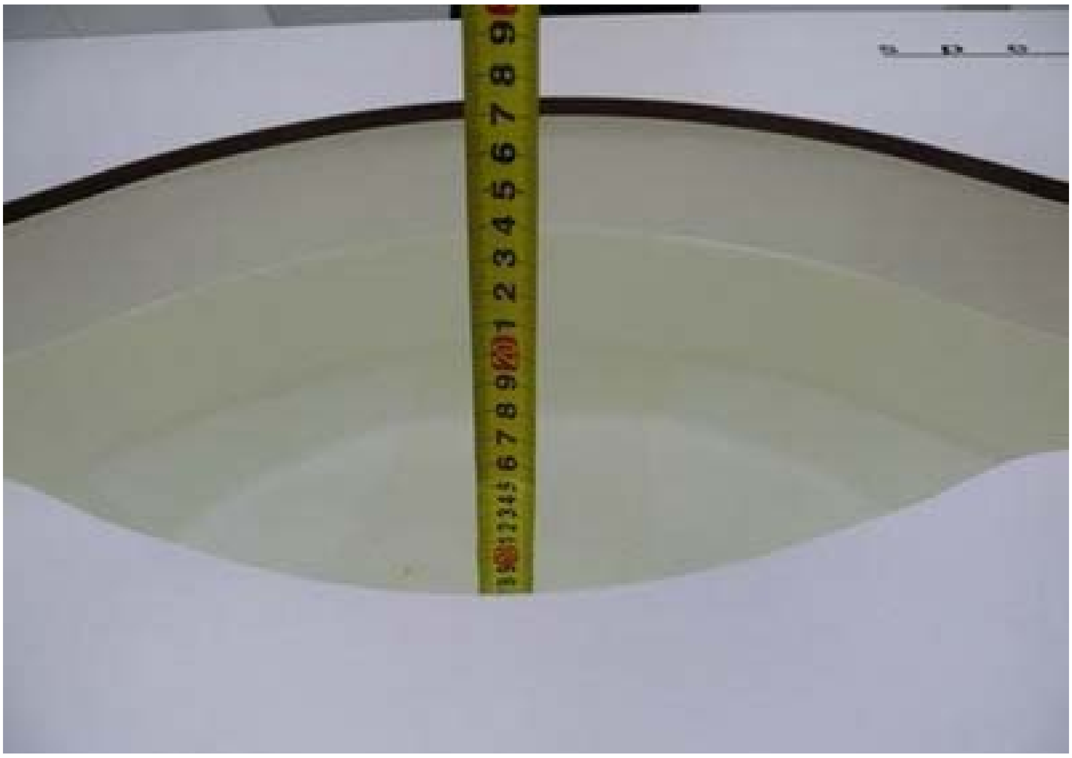
Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528- 2013 is not required in SAR reports submitted for equipment approval. This also applies to the 10-g SAR required for phablets in KDB Publication 648474.

********END OF REPORT ********

ANNEX A: Test Layout

Tissue Simulating Liquids

For the measurement of the field distribution inside the flat phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For Head and Body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Picture 3.



Picture 3: Liquid depth in the flat Phantom

ANNEX B: System Check Results

Plot 1 System Performance Check at 2450 MHz TSL

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 786

Date: 2022/1/5

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2450 MHz; σ = 1.81 S/m; ε_r = 38.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.50, 7.50, 7.50); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

d=10mm, Pin=250mW/Area Scan (4x7x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 18.2 mW/g

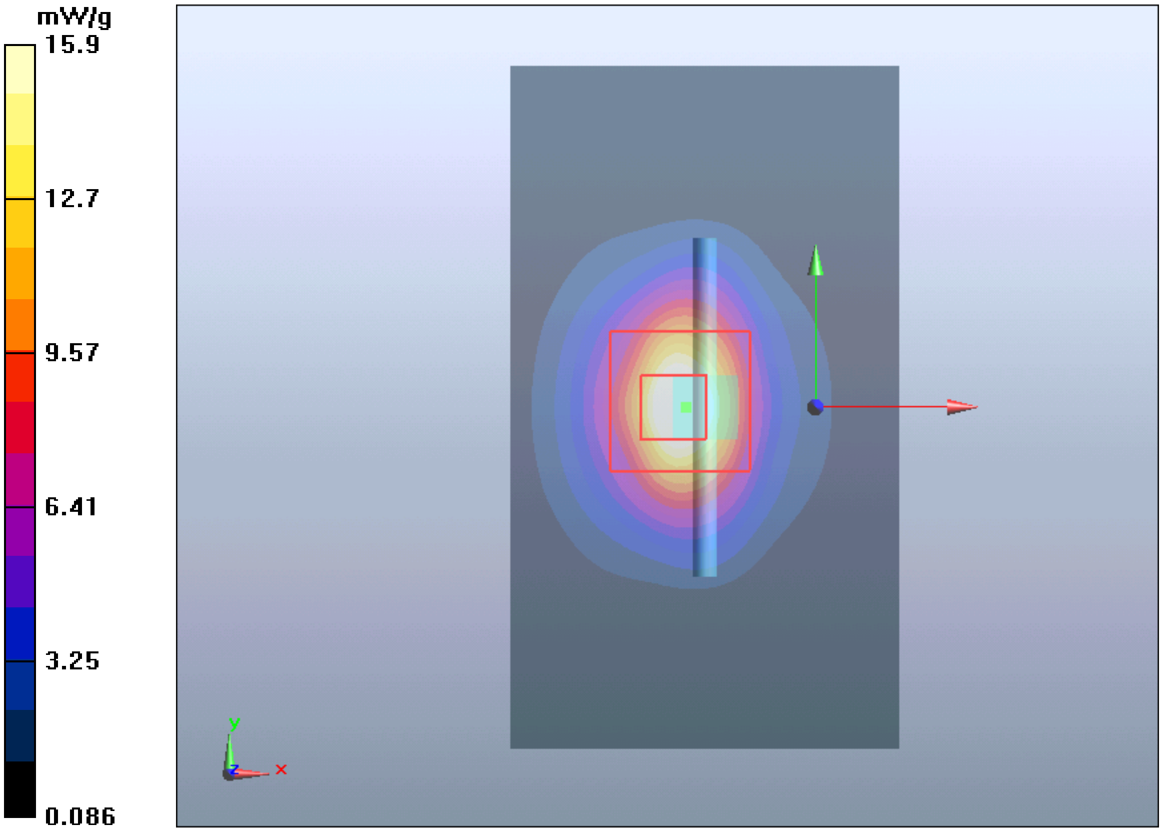
d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.8 V/m; Power Drift = 0.075 dB

Peak SAR (extrapolated) = 30 W/kg

SAR(1 g) = 13.7 mW/g; SAR(10 g) = 6.22 mW/g

Maximum value of SAR (measured) = 15.9 mW/g



Plot 2 System Performance Check at 5250 MHz TSL

DUT: Dipole 5250 MHz; Type: D5GHzV2; Serial: 1151

Date: 2022/1/6

Communication System: CW; Frequency: 5250 MHz;Duty Cycle: 1:1

Medium parameters used: f = 5250 MHz; σ = 4.80 S/m; ε_r = 35.5; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.45, 5.45, 5.45); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

d=10mm, Pin=100mW/Area Scan (6x10x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 9.14 mW/g

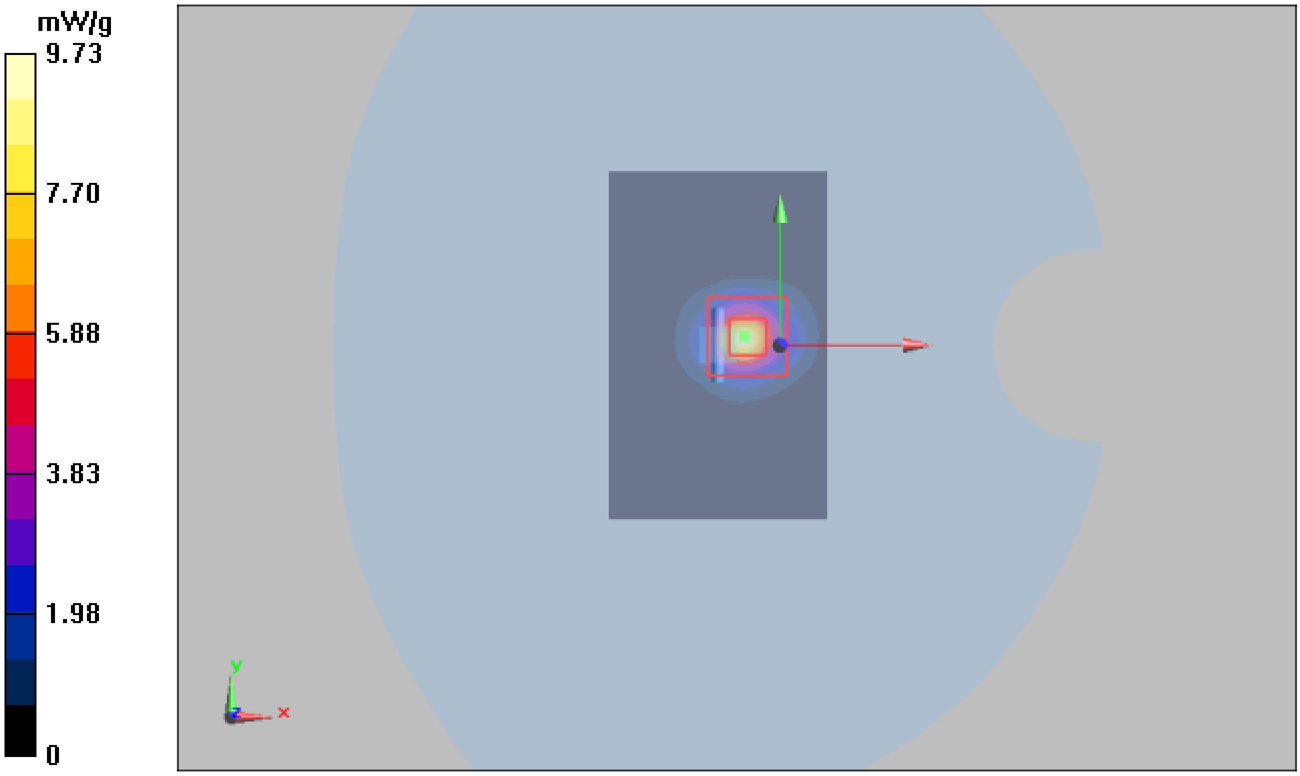
d=10mm, Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 33.6 V/m; Power Drift = -0.095 dB

Peak SAR (extrapolated) = 52.2 W/kg

SAR(1 g) = 7.87 mW/g; SAR(10 g) = 2.25 mW/g

Maximum value of SAR (measured) = 9.73 mW/g



Plot 3 System Performance Check at 5600 MHz TSL

DUT: Dipole 5600 MHz; Type: D5GHzV2; Serial: 1151

Date: 2022/1/8

Communication System: CW; Frequency: 5600 MHz;Duty Cycle: 1:1

Medium parameters used: f = 5600 MHz; σ = 5.21 S/m; ε_r = 34.2; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.00, 5.00, 5.00); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

d=10mm, Pin=100mW/Area Scan (6x10x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 8.25 mW/g

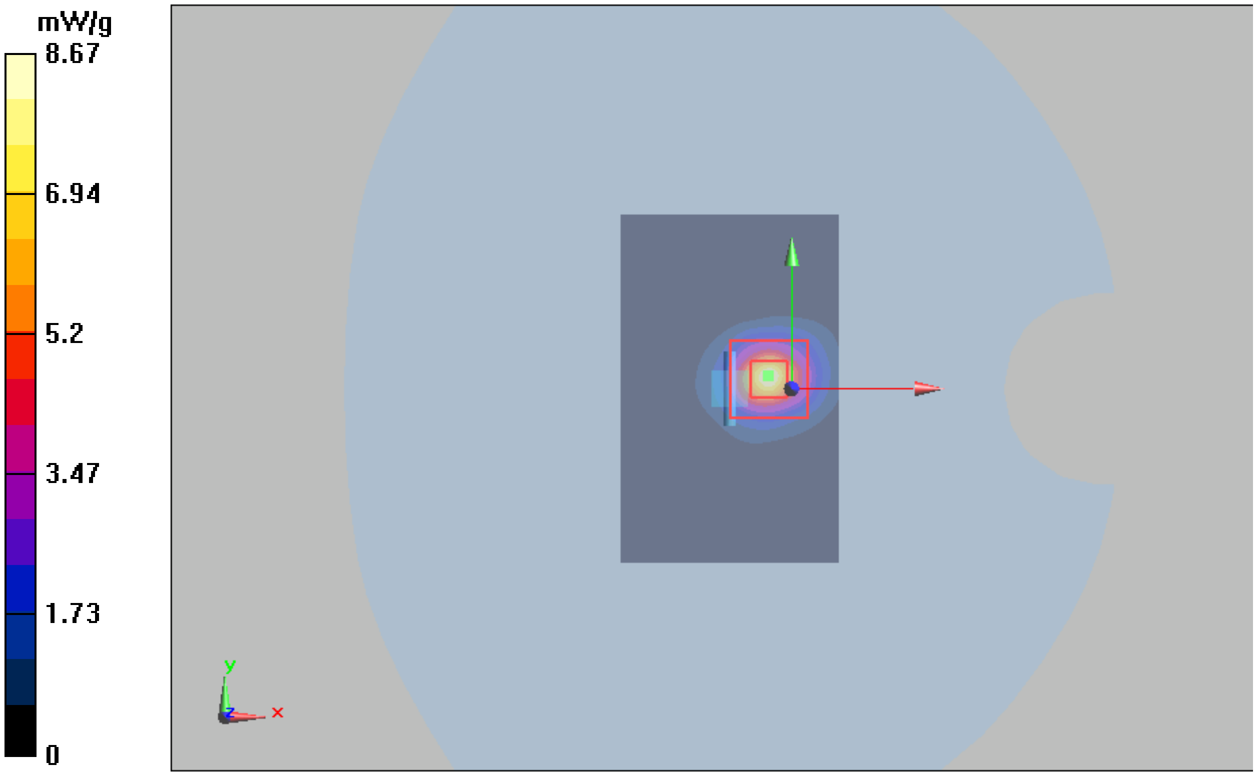
d=10mm, Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 23.1 V/m; Power Drift = -0.028 dB

Peak SAR (extrapolated) = 22.9 W/kg

SAR(1 g) = 7.67 mW/g; SAR(10 g) = 2.27 mW/g

Maximum value of SAR (measured) = 8.67 mW/g



Plot 4 System Performance Check at 5750 MHz TSL

DUT: Dipole 5750 MHz; Type: D5GHzV2; Serial: 1151

Date: 2022/1/7

Communication System: CW; Frequency: 5750 MHz;Duty Cycle: 1:1

Medium parameters used: f = 5750 MHz; σ = 5.21 S/m; ε_r = 34.9; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.04, 5.04, 5.04); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

d=10mm, Pin=100mW/Area Scan (6x10x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 8.31 mW/g

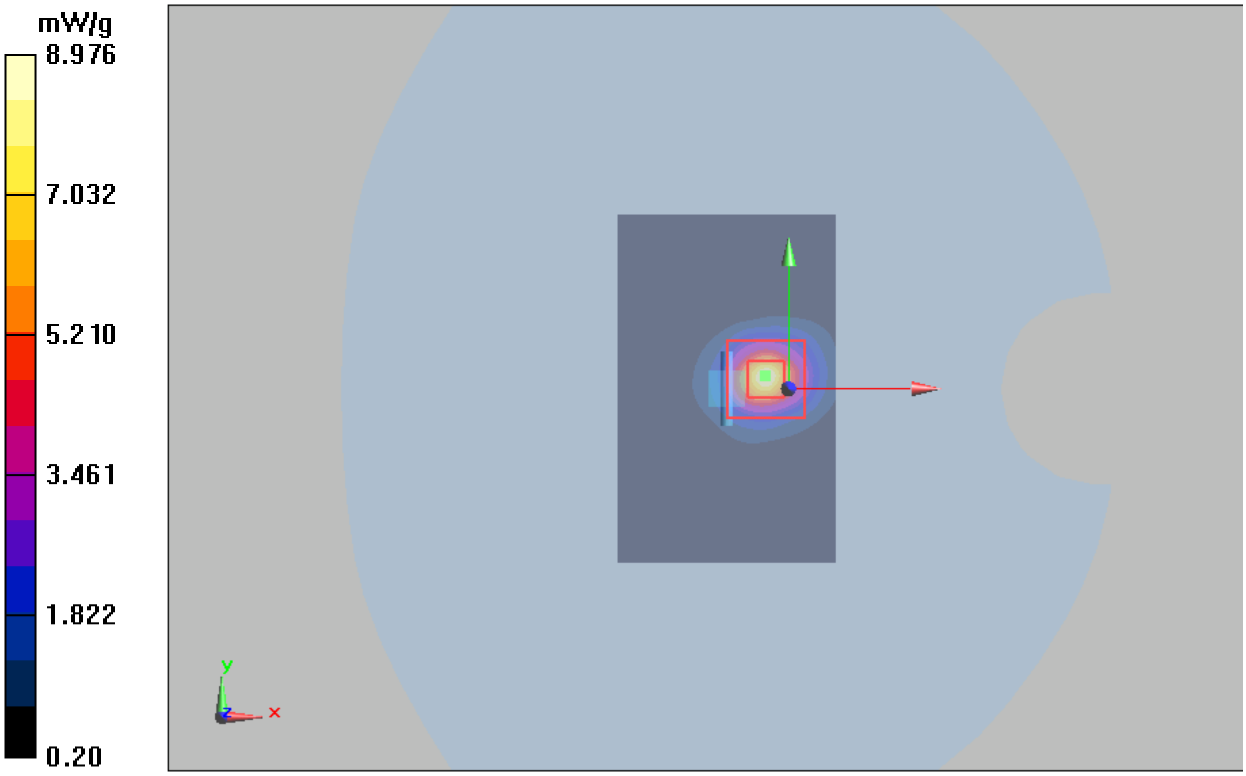
d=10mm, Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 23.1 V/m; Power Drift = 0.044 dB

Peak SAR (extrapolated) = 23.4 W/kg

SAR(1 g) = 7.66 mW/g; SAR(10 g) = 2.27 mW/g

Maximum value of SAR (measured) = 8.976 mW/g



ANNEX C: Highest Graph Results

Plot 5 802.11b Front Side Middle (Distance 15mm)

Date: 2022/1/5

Communication System: UID 0, 802.11b (0); Frequency: 2437 MHz;Duty Cycle: 1:1.01

Medium parameters used: f = 2437 MHz; σ = 1.831 S/m; ε_r = 37.663; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.50, 7.50, 7.50); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Front Side Middle/Area Scan (12x18x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.037 W/kg

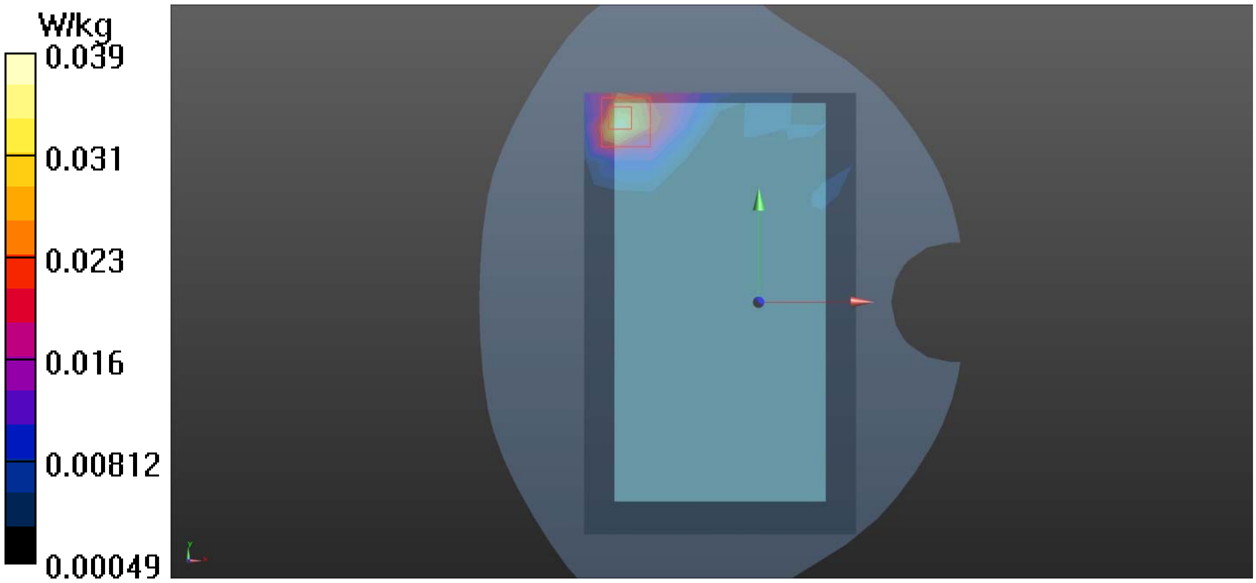
Front Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0 V/m; Power Drift = 0.032 dB

Peak SAR (extrapolated) = 0.069 W/kg

SAR(1 g) = 0.023 W/kg; SAR(10 g) = 0.012 W/kg

Maximum value of SAR (measured) = 0.039 W/kg



Plot 6 802.11a U-NII-2C Back Side High (Distance 15mm)

Date: 2022/1/8

Communication System: UID 0, 802.11a (0); Frequency: 5580 MHz;Duty Cycle: 1:1.02

Medium parameters used: f = 5580 MHz; σ = 5.258 S/m; ε_r = 35.664; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.00, 5.00, 5.00); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Back Side High/Area Scan (14x21x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.312 W/kg

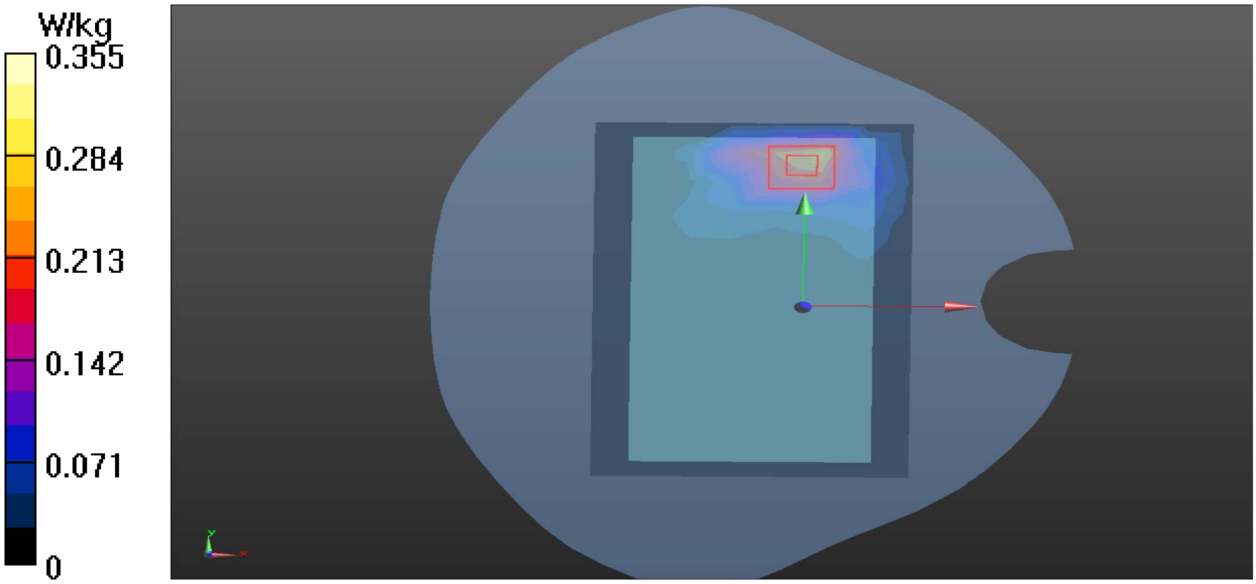
Back Side High/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 1.186 V/m; Power Drift = 0.115 dB

Peak SAR (extrapolated) = 0.735 W/kg

SAR(1 g) = 0.153 W/kg; SAR(10 g) = 0.058 W/kg

Maximum value of SAR (measured) = 0.355 W/kg



Plot 7 Bluetooth Back Side High (Distance 15mm)

Date: 2022/1/5

Communication System: UID 0, BT (0); Frequency: 2402 MHz;Duty Cycle: 1:1.31

Medium parameters used: f = 2402 MHz; σ = 1.789 S/m; ε_r = 37.77; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.45, 5.45, 5.45); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Back Side High/Area Scan (12x18x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.00695 W/kg

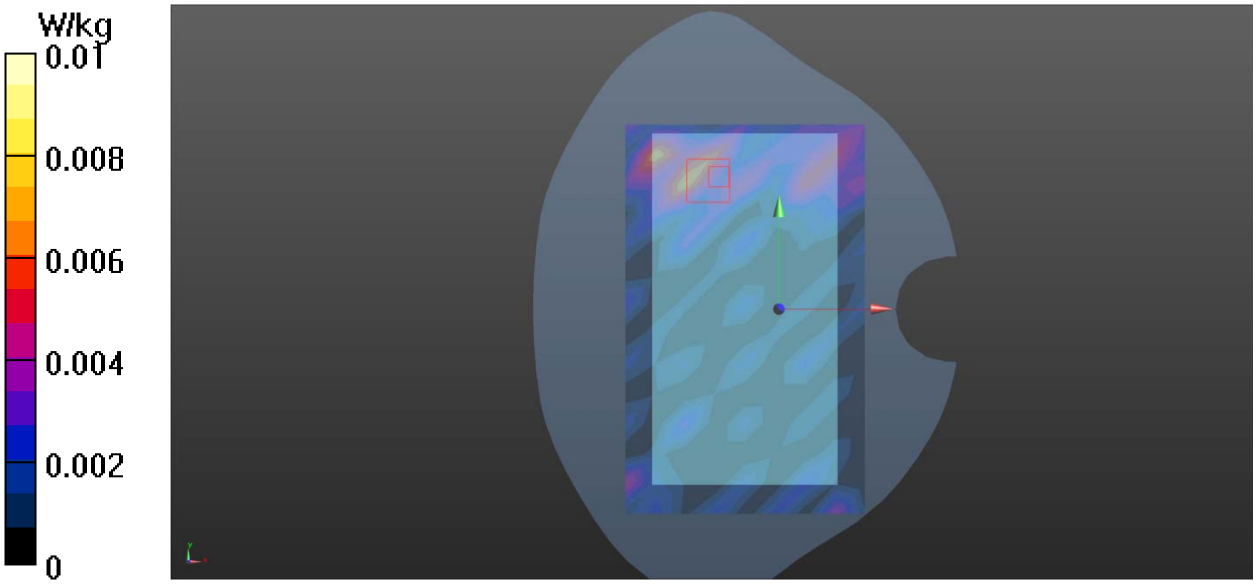
Back Side High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0.6780 V/m; Power Drift = -0.020 dB

Peak SAR (extrapolated) = 0.0110 W/kg

SAR(1 g) = 0.008 W/kg; SAR(10 g) = 0.004 W/kg

Maximum value of SAR (measured) = 0.01 W/kg



Plot 8 802.11b Left Edge High (Distance 0mm)

Date: 2022/1/5

Communication System: UID 0, 802.11b (0); Frequency: 2462 MHz;Duty Cycle: 1:1.01

Medium parameters used: f = 2462 MHz; σ = 1.859 S/m; ε_r = 37.58; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.45, 5.45, 5.45); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Left Edge High/Area Scan (7x18x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.404 W/kg

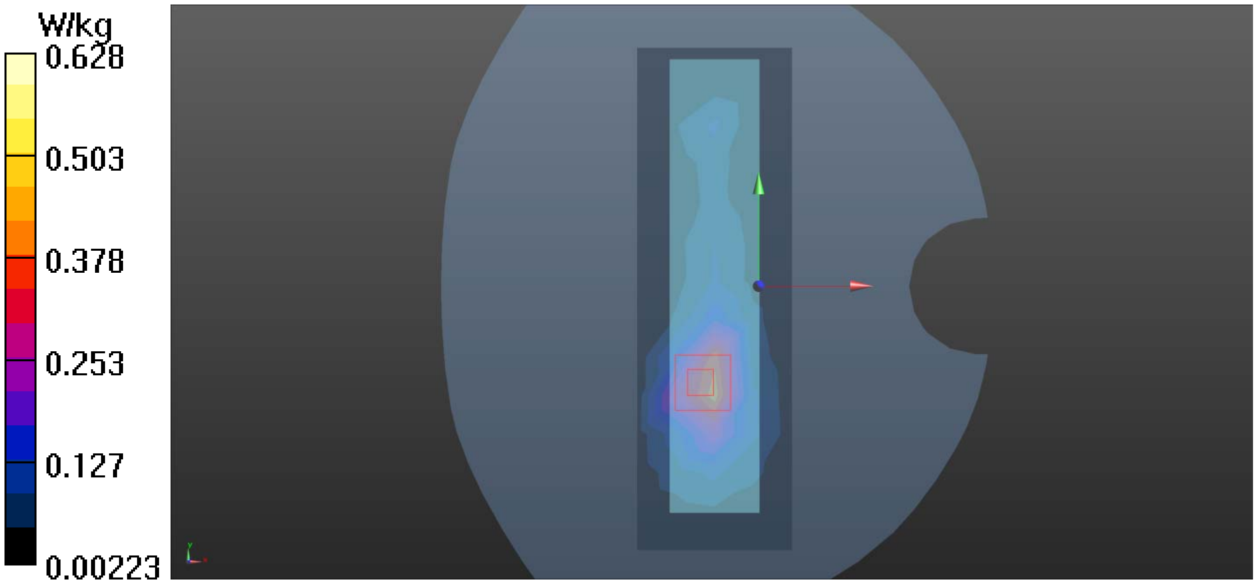
Left Edge High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.902 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 0.814 W/kg

SAR(1 g) = 0.332 W/kg; SAR(10 g) = 0.142 W/kg

Maximum value of SAR (measured) = 0.628 W/kg



Plot 9 802.11a U-NII-2C Top Edge Low (Distance 0mm)

Date: 2022/1/8

Communication System: UID 0, 802.11a (0); Frequency: 5580 MHz;Duty Cycle: 1:1.02

Medium parameters used: f = 5580 MHz; σ = 5.258 S/m; ε_r = 35.664; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.00, 5.00, 5.00); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Top Edge Low/Area Scan (8x21x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.980 W/kg

Top Edge Low/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 2.511 V/m; Power Drift = 0.090 dB

Peak SAR (extrapolated) = 4.75 W/kg

SAR(1 g) = 1.500 W/kg; SAR(10 g) = 0.461 W/kg

Maximum value of SAR (measured) = 1.910 W/kg

Plot 10 Bluetooth Top Edge High (Distance 0mm)

Date: 2022/1/5

Communication System: UID 0, BT (0); Frequency: 2402 MHz;Duty Cycle: 1:1.30

Medium parameters used: f = 2402 MHz; σ = 1.789 S/m; ε_r = 37.77; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.45, 5.45, 5.45); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Top Edge High/Area Scan (7x10x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.092 W/kg

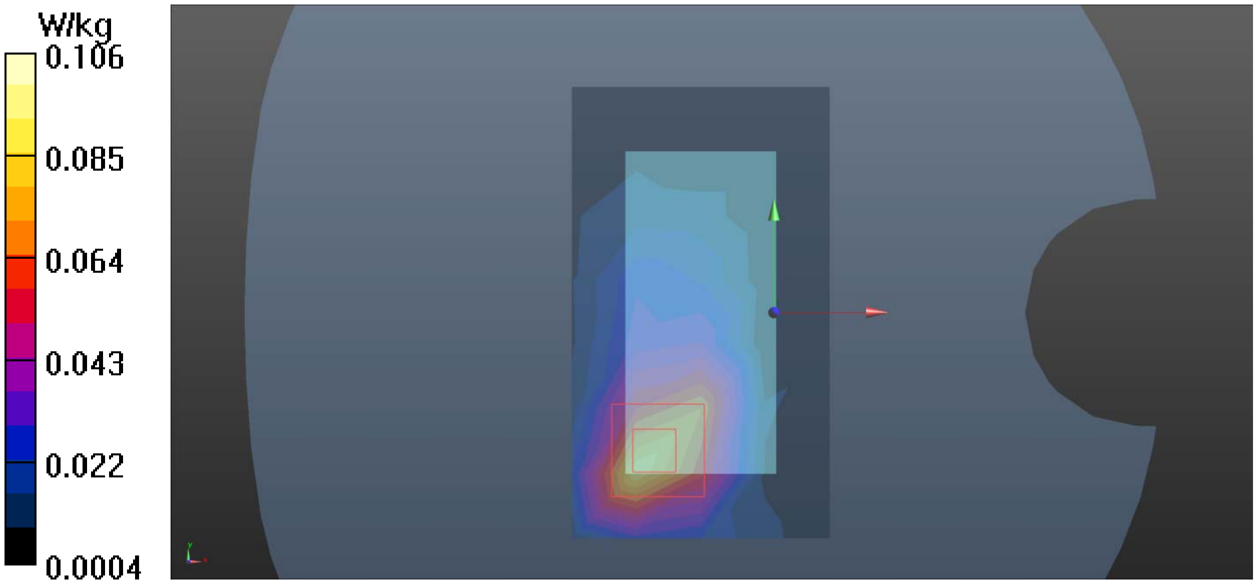
Top Edge High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.214 V/m; Power Drift = 0.015 dB

Peak SAR (extrapolated) = 0.144 W/kg

SAR(1 g) = 0.091 W/kg; SAR(10 g) = 0.054 W/kg

Maximum value of SAR (measured) = 0.106 W/kg



ANNEX D: Probe Calibration Certificate

In Collaboration with s p e a g CALIBRATION LABORATORY
中国认可 国际互认 校准 CALIBRATION CNAS L0570
Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China
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Client TA(Shanghai) Certificate No: Z21-60285

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN : 3677

Calibration Procedure(s): FF-Z11-004-02
Calibration Procedures for Dosimetric E-field Probes

Calibration date: August 12, 2021

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	15-Jun-21(CTTL, No.J21X04466)	Jun-22
Power sensor NRP-Z91	101547	15-Jun-21(CTTL, No.J21X04466)	Jun-22
Power sensor NRP-Z91	101548	15-Jun-21(CTTL, No.J21X04466)	Jun-22
Reference 10dBAttenuator	18N50W-10dB	10-Feb-20(CTTL, No.J20X00525)	Feb-22
Reference 20dBAttenuator	18N50W-20dB	10-Feb-20(CTTL, No.J20X00526)	Feb-22
Reference Probe EX3DV4	SN 3617	27-Jan-21(SPEAG, No.EX3-3617_Jan21)	Jan-22
DAE4	SN 1556	15-Jan-21(SPEAG, No.DAE4-1556_Jan21)	Jan-22

Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
SignalGenerator MG3700A	6201052605	16-Jun-21(CTTL, No.J21X04467)	Jun-22
Network Analyzer E5071C	MY46110673	21-Jan-21(CTTL, No.J20X00515)	Jan-22

	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: August 14, 2021

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Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A,B,C,D	modulation dependent linearization parameters
Polarization Φ	Φ rotation around probe axis
Polarization θ	θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i θ=0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016

c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010

d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization θ=0 (f≤900MHz in TEM-cell; f>1800MHz: waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below ConvF).
- *NORM(f)x,y,z = NORMx,y,z* frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics.
- *Ax,y,z; Bx,y,z; Cx,y,z;VRx,y,z:*A,B,C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f≤800MHz) and inside waveguide using analytical field distributions based on power measurements for f >800MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty valued are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from±50MHz to±100MHz.
- *Spherical isotropy (3D deviation from isotropy):* In a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset:* The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle:* The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

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DASY/EASY – Parameters of Probe: EX3DV4 – SN:3677

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (*k*=2)
Norm(μV/(V/m)^2)[A]	0.41	0.46	0.40	±10.0%
DCP(mV)[B]	99.3	101.9	101.5	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (*k*=2)
0	CW	X	0.0	0.0	1.0	0.00	158.2	±2.0%
		Y	0.0	0.0	1.0		170.4	
		Z	0.0	0.0	1.0		156.9	

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

[A] The uncertainties of Norm X, Y, Z do not affect the E^2-field uncertainty inside TSL (see Page 4).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainly is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.