FCC SAR Test Report

Equipment	:	**Notebook**
Brand Name	:	**EVGA**
Model No.	:	**EVGA SC17 1070 GAMING**
FCC ID	:	**2AG9J8260NG**
Standard	:	**FCC 47 CFR Part 2 (2.1093)** **IEEE C95.1-1992** **IEEE 1528-2013**
Applicant	:	**EVGA CORPORATION** **18F., No. 176, Jian 1st Rd., Zhonghe Dist., New Taipei City 235, Taiwan (R.O.C)**
Manufacturer	:	**MAINTEK COMPUTER (SUZHOU) CO.,LTD** **NO.233,Jinfeng RD., Suzhou Jiangsu, PRC China**

The product sample received on Mar. 23, 2016 and completely tested on May 12, 2016. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown the compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:

Kevin Liang / Assistant Manager

Testing Laboratory
1190

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Revision History

Report No.	Version	Description	Issued Date
FA5D3039-01	Rev. 02	Initial issue of report	Feb. 14, 2017
FA5D3039-01	Rev. 03	Add MIMO Test Channel	Apr. 28, 2017
FA5D3039-01	Rev. 04	Revised MIMO analyses	May. 03, 2017

1 Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing as follows.

Exposure Position	Frequency Band	Reported 1g SAR (W/kg)	Equipment Class
Body	WLAN5.2GHz Band	0.77	NII
	WLAN5.3GHz Band	0.45	
	WLAN5.6GHz Band	0.50	
	WLAN5.8GHz Band	0.48	
	WLAN2.4GHz Band	1.11	DTS

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2 (2.1093) and IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013.

1.1 Guidance Standard

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

- FCC 47 CFR Part 2 (2.1093)
- IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 616217 D04 SAR for laptop and tablets v01r02
- FCC KDB 248227 D01 For IEEE802.11(Wi-Fi)Transmitters v02r02

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1.2 Testing Location Information

Testing Laboratory	
Test Site	SPORTON INTERNATIONAL INC.
Test site Location	WEN SAN
Address	No 14-1,Lane 19,Wen San 3rd St. Kwei-Shan Hsiang, Tao Yuan City, Taiwan, R.O.C.
Contact Information	TEL : +886-3-318-0787 FAX : +886-3-318-0287

Customer Information		
Applicant	Company Name	EVGA CORPORATION
	Company Address	18F., No. 176, Jian 1st Rd., Zhonghe Dist. New Taipei City 235, Taiwan (R.O.C)

Customer Information		
Manufacturer	Company Name	MAINTEK COMPUTER (SUZHOU) CO.,LTD
	Company Address	NO.233, Jinfeng RD., Suzhou Jiangsu, PRC China

1.3 Device Category and SAR Limits

This device belongs to portable device category because its radiating structure is allowed to be used within 20 centimeters of the body of the user. Limit for General Population/Uncontrolled exposure should be applied for this device, it is 1.6W/kg as averaged over any 1 gram of tissue.

1.3.1 Test Conditions

Ambient Temperature	20 to 24 ℃
Humidity	< 60%

1.3.2 Test Configuration

During WLAN SAR testing EUT is configured with the WLAN continuous TX tool, and the transmission duty factor was monitored on the spectrum analyzer with zero-span setting Duty factor observed as below:

- 802.11b, 1Mbps : 100%
- 802.11g, 6Mbps : 100%
- 802.11n, MCS0 : 100%
- 802.11a, 6Mbps : 100%
- 802.11an, MCS0 : 100%
- 802.11ac, MCS0-NSS1:100%

For WLAN SAR testing, WLAN engineering testing software installed on the Support Notebook can provide continuous transmitting RF signal.

2 Equipment Under Test (EUT)

2.1 General Information

Product Feature & Specification				
Equipment Name	Notebook			
Brand Name	EVGA			
Model No.	EVGA SC17 1070 GAMING			
Antenna Type	PIFA			
Peak Gain(dBi)	Main Antenna :	2.4G : -0.24 , 5G : -3.63	Aux Antenna :	2.4G : -1.8 , 5G : -3.77
FCC ID	2AG9J8260NG			
Frequency Range	WLAN 2.4GHz Band : 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band : 5150 MHz ~ 5250 MHz WLAN 5.3GHz Band : 5250 MHz ~ 5350 MHz WLAN 5.6GHz Band : 5470 MHz ~ 5725 MHz WLAN 5.8GHz Band : 5725 MHz ~ 5850 MHz			
EUT Stage	Production Unit			

Accessories or 2nd Source or Key Part	Specification of Accessory				
	AC Adapter 1	Brand Name	EVGA	Model Name	E008-00-000069
		Power Rating	I/P:100 - 240 Vac, 3.5mA, O/P:19Vdc, 12.6mA		
	Audio cable 1	Signal Line	0.25 meter, non-shielded cable, with w/o ferrite core		
	USB Cable 1	0.15meter, non-shielded cable, with w/o ferrite core			

2.2 Product Details

The Difference:	Add second source of panel and SSD.

2.3 Simultaneous Transmission Condition

NO.	Simultaneous Transmission configurations	Combination
1.	WLAN(2.4G)+WLAN(2.4G)	Support
2.	WLAN(5G)+WLAN(5G)	Support
3.	WLAN(2.4G)+WLAN(5G)	Not Support
4.	WLAN2.4G+Bluetooth	Not Support
5.	WLAN5G+ Bluetooth	Not Support

Note: For more detail evaluation in clause 13.

3 RF Exposure Limits

3.1 Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

3.2 Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. The exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

4 Specific Absorption Rate (SAR)

4.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person’s awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

4.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

$$\mathrm{SAR} = \frac{d}{dt}\left(\frac{dW}{dm}\right) = \frac{d}{dt}\left(\frac{dW}{\rho dv}\right)$$

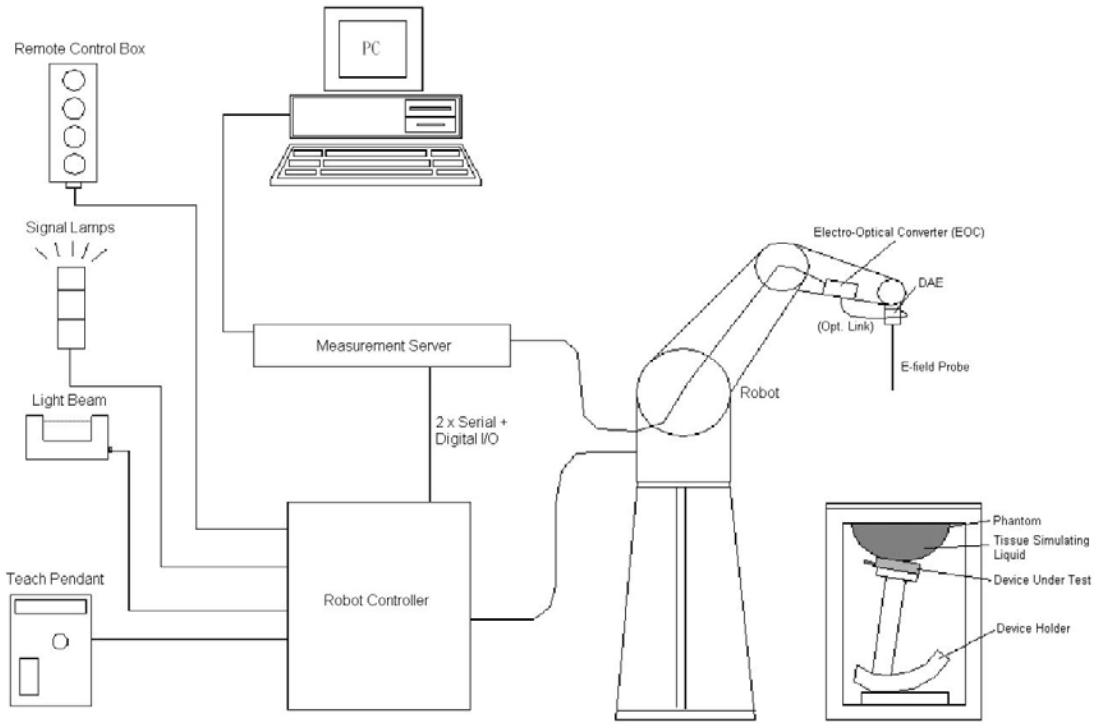
SAR is expressed in units of Watts per kilogram (W/kg)

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

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength.

5 System Description and Setup

The DASY system used 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 DASY5 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.

5.1 E-Field Probe

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

5.2 E-Field Probe Specification

<EX3DV4 Probe>

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Frequency	10 MHz to 6 GHz; Linearity: ± 0.2 dB
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: ± 0.2 dB (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

5.3 E-Field Probe Calibration

Each probe needs to be calibrated according to a dosimetric assessment procedure with accuracy better than ± 10%. The spherical isotropy shall be evaluated and within ± 0.25dB. The sensitivity parameters (NormX, NormY, and NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested. The calibration data can be referred to appendix C of this report.

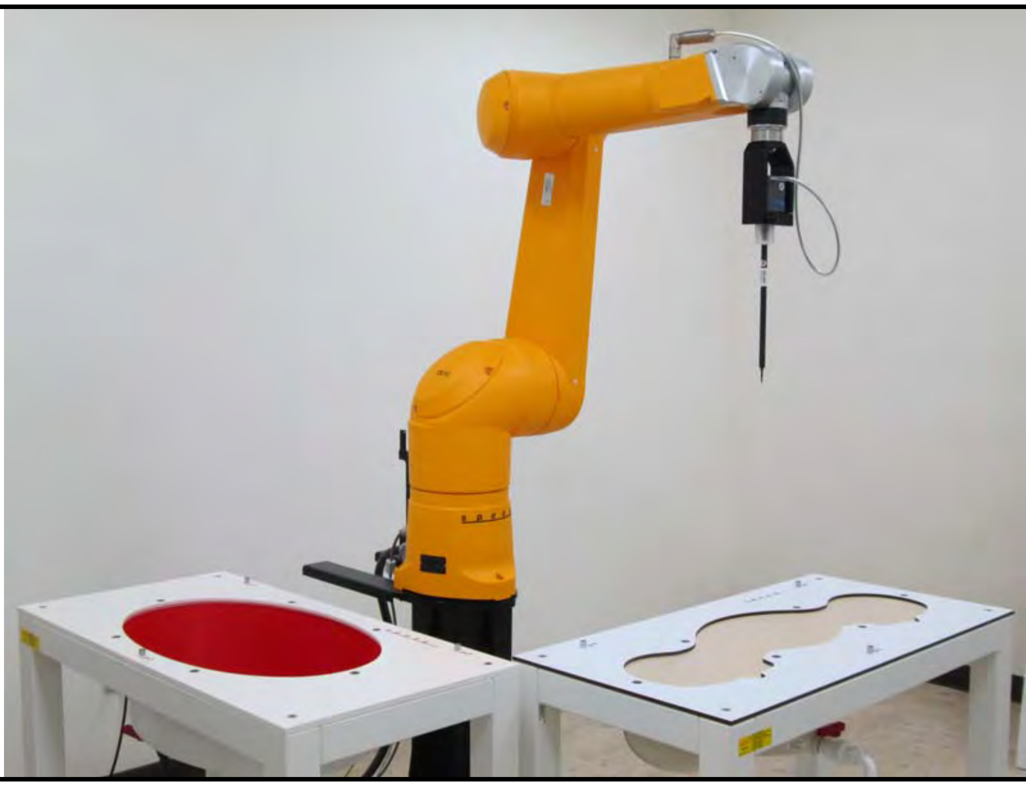
5.4 Data Acquisition Electronics (DAE)

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock. The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

5.5 Robot

The SPEAG DASY system uses the high precision robots (DASY4: RX90BL; DASY5: TX90XL) type from Stäubli SA (France). The Stäubli robot series have many features that are important for our application:

- High precision (repeatability ±0.035 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)



5.6 Measurement Server

The measurement server is based on a PC/104 CPU board with CPU (DASY5: 400 MHz, Intel Celeron), chipdisk (DASY5: 128 MB), RAM (DASY5: 128 MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O board, which is directly connected to the PC/104 bus of the CPU board. The measurement server performs all the real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operations.

5.7 Phantom

Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)
Filling Volume	Approx. 25 liters
Dimensions	Major ellipse axis: 1000 mm Minor axis: 500 mm

The bottom plate contains three pair of bolts of locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference makers are provided to identify the phantom position with respect to the robot.

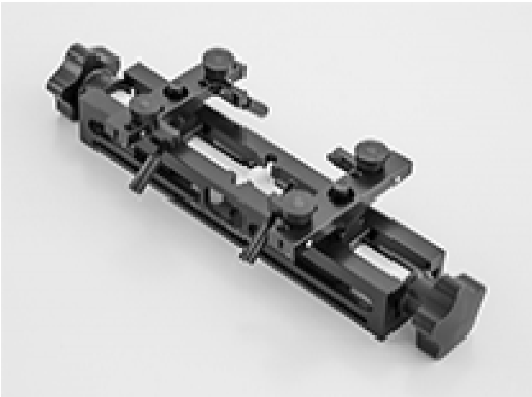
Shell Thickness	2 ± 0.2 mm (bottom plate)
Filling Volume	Approx. 30 liters
Dimensions	Major ellipse axis: 600 mm Minor axis: 400 mm

The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with standard and all known tissue simulating liquids.

5.8 Device Holder

<Mounting Device for Hand-Held Transmitter>

In combination with the Twin SAM V5.0/V5.0c or ELI phantoms, the Mounting Device for Hand-Held Transmitters enables rotation of the mounted transmitter device to specified spherical coordinates. At the heads, the rotation axis is at the ear opening. Transmitter devices can be easily and accurately positioned according to IEC 62209-1, IEEE 1528, FCC, or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat). And upgrade kit to Mounting Device to enable easy mounting of wider devices like big smart-phones, e-books, small tablets, etc. It holds devices with width up to 140 mm.



Mounting Device for Hand-Held Transmitter Mounting Device Adaptor for Wide-Phones

<Mounting Device for Laptop and Body-Worn Transmitter>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the Mounting device in place of the phone positioned. The extension is fully compatible with the SAM Twin and ELI Phantoms.

6 Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

(a) For WWAN power measurement, use base station simulator to configure EUT WWAN transmission in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
(b) Read the WWAN RF power level from the base station simulator.
(c) For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band
(d) Connect EUT RF port through RF cable to the power meter, and measure WLAN/BT output power

<SAR measurement>

(a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power, in the highest power channel.
(b) Place the EUT in the positions as Appendix D demonstrates.
(c) Set scan area, grid size and other setting on the DASY software.
(d) Measure SAR results for the highest power channel on each testing position.
(e) Find out the largest SAR result on these testing positions of each band
(f) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

(a) Area scan
(b) Power reference measurement
(c) Zoom scan
(d) Power drift measurement

6.1 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

(a) Extraction of the measured data (grid and values) from the Zoom Scan
(g) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
(b) Generation of a high-resolution mesh within the measured volume
(c) Interpolation of all measured values form the measurement grid to the high-resolution grid
(d) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
(e) Calculation of the averaged SAR within masses of 1g and 10g

6.2 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.

6.3 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 dB0 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 SAR measurement 100 MHz to 6 GHz

	$\leq$ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	$\frac{1}{2}\cdot\delta\cdot\ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	$\leq$ 2 GHz: $\leq$ 15 mm 2 – 3 GHz: $\leq$ 12 mm	3 – 4 GHz: $\leq$ 12 mm 4 – 6 GHz: $\leq$ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

6.4 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 SAR measurement 100 MHz to 6 GHz.

<table>
<tr><th colspan="3"></th><th>$\leq$ 3 GHz</th><th>> 3 GHz</th></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>$\leq$ 2 GHz: $\leq$ 8 mm
2 – 3 GHz: $\leq$ 5 mm*</td><td>3 – 4 GHz: $\leq$ 5 mm*
4 – 6 GHz: $\leq$ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>$\leq$ 5 mm</td><td>3 – 4 GHz: $\leq$ 4 mm
4 – 5 GHz: $\leq$ 3 mm
5 – 6 GHz: $\leq$ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>$\leq$ 4 mm</td><td>3 – 4 GHz: $\leq$ 3 mm
4 – 5 GHz: $\leq$ 2.5 mm
5 – 6 GHz: $\leq$ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>$\geq$ 30 mm</td><td>3 – 4 GHz: $\geq$ 28 mm
4 – 5 GHz: $\geq$ 25 mm
5 – 6 GHz: $\geq$ 22 mm</td></tr>
<tr><td colspan="5">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 <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is $\leq$ 1.4 W/kg, $\leq$ 8 mm, $\leq$ 7 mm and $\leq$ 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.</td></tr>
</table>

6.5 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.

6.6 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 Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	Data Acquisition Electronics	DAE4	1424	2016/2/16	2017/2/15
SPEAG	Data Acquisition Electronics	DAE3	577	2016/9/28	2017/9/27
SPEAG	Dosimetric E-Field Probe	EX3DV4	3976	2016/2/22	2017/2/21
SPEAG	Dosimetric E-Field Probe	EX3DV4	3931	2016/10/03	2017/10/02
SPEAG	2450MHz System Validation Kit	D2450V2	929	2016/2/9	2017/2/8
SPEAG	2450MHz System Validation Kit	D2450V2	926	2016/7/25	2017/7/24
SPEAG	5000MHz System Validation Kit	D5GHzV2	1171	2016/2/17	2017/2/16
SPEAG	5000MHz System Validation Kit	D5GHzV2	1126	2016/7/27	2017/7/26
SPEAG	Device Holder	N/A	N/A	NCR	NCR
Mini-Circuits	Power Amplifier	ZHL-42W+	15542	NCR	NCR
Mini-Circuits	Power Amplifier	ZVE-8G+	605601404	NCR	NCR
Agilent	ENA Series Network Analyzer	E5071C	MY46419201	2016/1/21	2017/1/20
Agilent	ENA Series Network Analyzer	E5071C	MY46419201	2017/1/27	2018/1/26
Agilent	EXA Signal Analyzer	N9010A	MY54200432	2015/8/12	2016/8/11
Agilent	EXA Signal Analyzer	N9010A	MY54200432	2016/8/18	2017/8/17
R&S	Signal Generator	SMB100A	175727	2015/10/5	2016/10/4
R&S	Signal Generator	SMB100A	175727	2016/10/11	2017/10/10
SPEAG	Dielectric Probe Kit	SM DAK 040CA	1146	NCR	NCR
Anritsu	Power Meter	ML2495A	1241002	2015/9/21	2016/9/20
Anritsu	Power sensor	MA2411B	1207366	2015/9/21	2016/9/20
Anritsu	Power Meter	ML2495A	0949003	2016/2/4	2017/2/3
Anritsu	Power sensor	MA2411B	0917017	2016/2/4	2017/2/3
Anritsu	Power Meter	ML2495A	1241002	2016/9/27	2017/9/26
Anritsu	Power sensor	MA2411B	1207366	2016/9/27	2017/9/26
SPEAG	Flat Phantom ELI5.0	QD OVA 002 AA	1238	NCR	NCR
Wisewind	Themometer	HTC1	HTC1	2015/12/24	2016/12/23
Wisewind	Themometer	YF-160A	130504609	2015/12/24	2016/12/23
Wisewind	Themometer	HTC1	HTC1	2016/12/26	2017/12/25
Wisewind	Themometer	YF-160A	130504609	2016/12/26	2017/12/25

General Note:

1. The calibration certificate of DASY can be referred to appendix C of this report.
2. The Insertion Loss calibration of Dual Directional Coupler and Attenuator were characterized via the network analyzer and compensated during system check.
3. In system check we need to monitor the level on the power meter, and adjust the power amplifier level to have precise power level to the dipole; the measured SAR will be normalized to 1W input power according to the ratio of 1W to the input power to the dipole. For system check, the calibration of the power amplifier is deemed not critically required for correct measurement; the power meter is critical and we do have calibration for it
4. Attenuator 1 insertion loss is calibrated by the network Analyzer, which the calibration is valid, before system check.
5. NCR: No calibration request.

8 System Verification

8.1 Tissue Simulating Liquids

For the measurement of the field distribution inside the phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm and 10 cm, which is shown in Fig. 8.1. & 8.2.

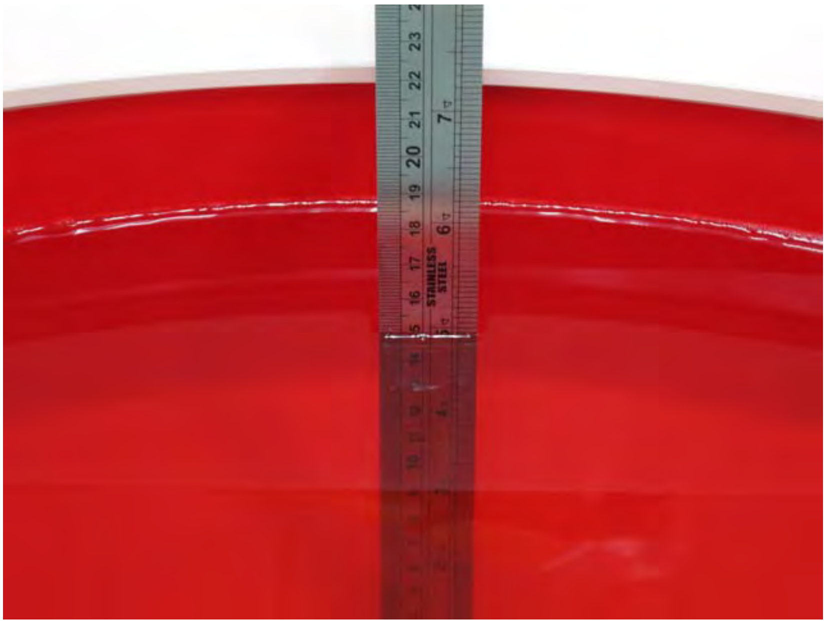


Fig 8.1 Photo of Liquid Height for Body Frequency 2450MHz

Fig 8.2 Photo of Liquid Height for Body Frequency 5GHz

8.2 Tissue Verification

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (εr)
For Body								
2450	68.6	0	0	0.1	0	31.8	1.95	52.7

Simulating Liquid for 5GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	64~78%
Mineral oil	11~18%
Emulsifiers	9~15%
Additives and Salt	2~3%

<Tissue Dielectric Parameter Check Results>

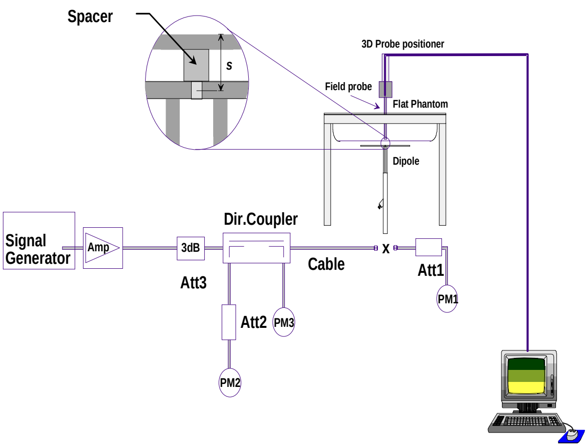
Frequency (MHz)	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (εr)	Conductivity Target (σ)	Permittivity Target (εr)	Delta (σ) (%)	Delta (εr) (%)	Limit (%)	Date
2450	21.2	1.941	52.669	1.95	52.7	-0.46	-0.06	±5	2016/3/23
2450	21.4	1.882	54.504	1.95	52.7	-3.49	3.42	±5	2016/3/29
2450	22.4	1.962	52.704	1.95	52.7	0.62	0.01	±5	2017/4/26
5200	21	5.347	48.561	5.3	49	0.89	-0.90	±5	2016/3/24
5250	22.4	5.51	46.995	5.358	48.946	2.84	-3.99	±5	2017/4/26
5300	20.3	5.502	49.675	5.42	48.9	1.51	1.58	±5	2016/3/25
5600	21.1	5.927	48.119	5.77	48.5	2.72	-0.79	±5	2016/3/28
5600	22.4	5.972	46.378	5.77	48.5	3.50	-4.38	±5	2017/4/26
5800	21.3	6.157	48.092	6	48.2	2.62	-0.22	±5	2016/3/29
5750	22.4	6.185	46.221	5.942	48.268	4.09	-4.24	±5	2017/4/26

1. The dielctric properties of the tissue is within ±5% of the target values.
2. Liquid temperature during dielectric property measurement by more than ±2 °C
3. The dielectric properties of the tissue-equivalent liquids shall be measured within 24 h before the SAR measurements.

8.3 System Performance Check Results

Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10 %. Below table shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix A of this report.

Date	Frequency (MHz)	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured SAR (W/kg)	Targeted SAR (W/kg)	Normalized SAR (W/kg)	Deviation (%)
2016/3/23	2450	250mW	929	3976	1424	13.1	49.8	52.40	5.221
2016/3/29	2450	250mW	929	3976	1424	12.7	49.8	50.80	2.008
2017/4/26	2450	250mW	926	3931	577	13.2	51.2	52.80	3.125
2016/3/24	5200	100mW	1171	3976	1424	7.31	73.6	73.10	-0.679
2016/3/25	5300	100mW	1171	3976	1424	7.36	76.3	73.60	-3.539
2017/4/26	5250	100mW	1128	3931	577	8.09	74.5	80.90	8.591
2016/3/28	5600	100mW	1171	3976	1424	7.85	79.8	78.50	-1.629
2017/4/26	5600	100mW	1128	3931	577	8.32	78	83.20	6.667
2016/3/29	5800	100mW	1171	3976	1424	7.43	75.6	74.30	-1.720
2017/4/26	5750	100mW	1128	3931	577	7.53	76.1	75.30	-1.051



System Performance Check Setup

Setup Photo

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9 <WLAN Conducted Power>

General Note:

1. Per KDB 242287 D01 SAR test reduction is determined according to 802.11 transmission mode configurations and certain exposure conditions with multiple test positions. In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. For OFDM, in both 2.4 and 5 GHz bands, an initial test configuration must be determined for each standalone and aggregated frequency band, according to the transmission mode configuration with the highest maximum output power specified for production units to perform SAR measurements. If the same highest maximum output power applies to different combinations of channel bandwidths, modulations and data rates, additional procedures (see 5.3.2) are applied to determine which test configurations require SAR measurement. When applicable, an initial test position may be applied to reduce the number of SAR measurements required for next to the ear, UMPC mini-tablet or hotspot mode configurations with multiple test positions.
2. For 2.4 GHz 802.11b DSSS, either the initial test position procedure for multiple exposure test positions or the DSSS procedure for fixed exposure position is applied; these are mutually exclusive. For 2.4 GHz and 5 GHz OFDM configurations, the initial test configuration is applied to measure SAR using either the initial test position procedure for multiple exposure test position configurations or the initial test configuration procedures for fixed exposure test conditions. Based on the *reported* SAR of the measured configurations and maximum output power of the transmission mode configurations that are not included in the initial test configuration, the subsequent test configuration and initial test position procedures are applied to determine if SAR measurements are required for the remaining OFDM transmission configurations. In general, the number of test channels that require SAR measurement is minimized based on maximum output power measured for the test sample(s).
3. For OFDM transmission configurations in the 2.4 GHz and 5 GHz bands, When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel for each frequency band.

10 Maximum Tune-up Limit & Conducted RF Output Power (Unit: dBm)

<Bluetooth>

	Mode	Channel	Frequency (MHz)	Data Rate	Average Power (dBm)	Tune up Limit (dBm)
BT	v2.1 with BR	CH 0	2402	1Mbps	3.93	5.00
		CH 39	2441		4.48	
		CH 78	2480		4.49	
	v2.1 with EDR	CH 0	2402	3Mbps	4.02	5.00
		CH 39	2441		4.54	
		CH 78	2480		4.59	
	v4.0 with LE	CH 0	2402	1Mbps	4.72	5.00
		CH 19	2440		4.71	
		CH 39	2480		4.99	

Note:

For LE 2.4GHz Bluetooth SAR testing selected 1Mbps, due to its highest average power.

<2.4G>

Antenna A=Main

	Mode	Channel	Frequency (MHz)	Data Rate	Ant A Average Power (dBm)	Tune up Limit (dBm)
2.4GHz	802.11b	CH 1	2412	1Mbps	14.80	15.00
		CH 6	2437		14.83	
		CH 11	2462		14.84	
	802.11g	CH 1	2412	6Mbps	14.92	15.00
		CH 6	2437		14.86	
		CH 11	2462		14.84	
	802.11n_HT20	CH 1	2412	MCS0	14.84	15.00
		CH 6	2437		14.90	
		CH 11	2462		14.87	
	802.11n_HT40	CH 3	2422	MCS0	14.83	15.00
		CH 6	2437		14.87	
		CH 9	2452		14.94	

<5G>

	Mode	Channel	Frequency (MHz)	Data Rate	Ant A Average Power (dBm)	Tune up Limit (dBm)
5.2GHz	802.11a	CH 36	5180	6Mbps	13.43	13.50
		CH 40	5200		13.41	
		CH 44	5220		13.45	
		CH 48	5240		13.49	
	802.11n_HT20	CH 36	5180	MCS0	13.44	13.50
		CH 40	5200		13.45	
		CH 44	5220		13.36	
		CH 48	5240		13.46	
	802.11n_HT40	CH 38	5190	MCS0	13.47	13.50
		CH 46	5230		13.40	
	802.11ac_VHT20	CH 36	5180	MCS0-NSS1	13.38	13.50
		CH 40	5200		13.37	
		CH 44	5220		13.40	
		CH 48	5240		13.48	
	802.11ac_VHT40	CH 38	5190	MCS0-NSS1	13.47	13.50
		CH 46	5230		13.39	
	802.11ac_VHT80	CH 42	5210	MCS0-NSS1	13.43	13.50

	Mode	Channel	Frequency (MHz)	Data Rate	Ant A Average Power (dBm)	Tune up Limit (dBm)
5.3GHz	802.11a	CH 52	5260	6Mbps	13.42	13.50
		CH 56	5280		13.44	
		CH 60	5300		13.48	
		CH 64	5320		13.40	
	802.11n_HT20	CH 52	5260	MCS0	13.42	13.50
		CH 56	5280		13.48	
		CH 60	5300		13.39	
		CH 64	5320		13.38	
	802.11n_HT40	CH 54	5270	MCS0	13.46	13.50
		CH 62	5310		13.39	
	802.11ac_VHT20	CH 52	5260	MCS0-NSS1	13.42	13.50
		CH 56	5280		13.49	
		CH 60	5300		13.35	
		CH 64	5320		13.39	
	802.11ac_VHT40	CH 54	5270	MCS0-NSS1	13.43	13.50
		CH 62	5310		13.32	
	802.11ac_VHT80	CH 58	5290	MCS0-NSS1	13.42	13.50

	Mode	Channel	Frequency (MHz)	Data Rate	Ant A Average Power (dBm)	Tune up Limit (dBm)
5.6GHz	802.11a	CH 100	5500	6Mbps	13.49	13.50
		CH 104	5520		13.46	
		CH 108	5540		13.45	
		CH 112	5560		13.48	
		CH 116	5580		13.38	
		CH 132	5660		13.42	
		CH 136	5680		13.40	
		CH 140	5700		13.43	
	802.11a	CH 100	5500	MCS0	13.41	13.50
		CH 104	5520		13.44	
		CH 108	5540		13.47	
		CH 112	5560		13.45	
		CH 116	5580		13.40	
		CH 132	5660		13.42	
		CH 136	5680		13.42	
		CH 140	5700		13.42	
	802.11n_HT40	CH 102	5510	MCS0	13.40	13.50
		CH 110	5550		13.41	
		CH 134	5670		13.49	
	802.11ac_VHT20	CH 100	5500	MCS0-NSS1	13.50	13.50
		CH 104	5520		13.44	
		CH 108	5540		13.43	
		CH 112	5560		13.46	
		CH 116	5580		13.39	
		CH 132	5660		13.41	
		CH 136	5680		13.42	
		CH 140	5700		13.41	
	802.11ac_VHT40	CH 102	5510	MCS0-NSS1	13.41	13.50
		CH 110	5550		13.38	
		CH 134	5670		13.47	
	802.11ac_VHT80	CH 106	5530	MCS0-NSS1	13.44	13.50
		CH 138	5690		13.46	

	Mode	Channel	Frequency (MHz)	Data Rate	Ant A Average Power (dBm)	Tune up Limit (dBm)
5.8GHz	802.11a	CH 149	5745	6Mbps	13.46	13.50
		CH 153	5765		13.43	
		CH 157	5785		13.41	
		CH 161	5805		13.42	
		CH 165	5825		13.45	
	802.11n_HT20	CH 149	5745	MCS0	13.49	13.50
		CH 153	5765		13.46	
		CH 157	5785		13.47	
		CH 161	5805		13.41	
		CH 165	5825		13.45	
	802.11n_HT40	CH 151	5755	MCS0	13.38	13.50
		CH 159	5795		13.41	
	802.11ac_VHT20	CH 149	5745	MCS0-NSS1	13.46	13.50
		CH 153	5765		13.45	
		CH 157	5785		13.44	
		CH 161	5805		13.39	
		CH 165	5825		13.46	
	802.11ac_VHT40	CH 151	5755	MCS0-NSS1	13.34	13.50
		CH 159	5795		13.37	
	802.11ac_VHT80	CH 155	5775	MCS0-NSS1	13.44	13.50

<2.4G>

Antenna B=Aux

	Mode	Channel	Frequency (MHz)	Data Rate	Ant B Average Power (dBm)	Tune up Limit (dBm)
2.4GHz	802.11b	CH 1	2412	1Mbps	14.88	15.00
		CH 6	2437		14.83	
		CH 11	2462		14.86	
	802.11g	CH 1	2412	6Mbps	14.86	15.00
		CH 6	2437		14.85	
		CH 11	2462		14.92	
	802.11n_HT20	CH 1	2412	MCS0	14.88	15.00
		CH 6	2437		14.86	
		CH 11	2462		14.83	
	802.11n_HT40	CH 3	2422	MCS0	14.90	15.00
		CH 6	2437		14.84	
		CH 9	2452		14.89	

<5G>

	Mode	Channel	Frequency (MHz)	Data Rate	Ant B Average Power (dBm)	Tune up Limit (dBm)
5.2GHz	802.11a	CH 36	5180	6Mbps	13.43	13.50
		CH 40	5200		13.49	
		CH 44	5220		13.46	
		CH 48	5240		13.47	
	802.11n_HT20	CH 36	5180	MCS0	13.43	13.50
		CH 40	5200		13.47	
		CH 44	5220		13.43	
		CH 48	5240		13.48	
	802.11n_HT40	CH 38	5190	MCS0	13.40	13.50
		CH 46	5230		13.39	
	802.11ac_VHT20	CH 36	5180	MCS0-NSS1	13.42	13.50
		CH 40	5200		13.42	
		CH 44	5220		13.47	
		CH 48	5240		13.38	
	802.11ac_VHT40	CH 38	5190	MCS0-NSS1	13.46	13.50
		CH 46	5230		13.47	
	802.11ac_VHT80	CH 42	5210	MCS0-NSS1	13.45	13.50

	Mode	Channel	Frequency (MHz)	Data Rate	Ant B Average Power (dBm)	Tune up Limit (dBm)
5.3GHz	802.11a	CH 52	5260	6Mbps	13.49	13.50
		CH 56	5280		13.48	
		CH 60	5300		13.41	
		CH 64	5320		13.38	
	802.11n_HT20	CH 52	5260	MCS0	13.37	13.50
		CH 56	5280		13.45	
		CH 60	5300		13.40	
		CH 64	5320		13.37	
	802.11n_HT40	CH 54	5270	MCS0	13.39	13.50
		CH 62	5310		13.39	
	802.11ac_VHT20	CH 52	5260	MCS0-NSS1	13.39	13.50
		CH 56	5280		13.47	
		CH 60	5300		13.40	
		CH 64	5320		13.37	
	802.11ac_VHT40	CH 54	5270	MCS0-NSS1	13.40	13.50
		CH 62	5310		13.41	
	802.11ac_VHT80	CH 58	5290	MCS0-NSS1	13.45	13.50

	Mode	Channel	Frequency (MHz)	Data Rate	Ant B Average Power (dBm)	Tune up Limit (dBm)
5.6GHz	802.11a	CH 100	5500	6Mbps	13.38	13.50
		CH 104	5520		13.47	
		CH 108	5540		13.44	
		CH 112	5560		13.44	
		CH 116	5580		13.45	
		CH 132	5660		13.48	
		CH 136	5680		13.42	
		CH 140	5700		13.40	
	802.11a	CH 100	5500	MCS0	13.39	13.50
		CH 104	5520		13.41	
		CH 108	5540		13.42	
		CH 112	5560		13.45	
		CH 116	5580		13.47	
		CH 132	5660		13.41	
		CH 136	5680		13.41	
		CH 140	5700		13.39	
	802.11n_HT40	CH 102	5510	MCS0	13.39	13.50
		CH 110	5550		13.45	
		CH 134	5670		13.44	
	802.11ac_VHT20	CH 100	5500	MCS0-NSS1	13.48	13.50
		CH 104	5520		13.47	
		CH 108	5540		13.41	
		CH 112	5560		13.42	
		CH 116	5580		13.45	
		CH 132	5660		13.46	
		CH 136	5680		13.38	
		CH 140	5700		13.49	
	802.11ac_VHT40	CH 102	5510	MCS0-NSS1	13.38	13.50
		CH 110	5550		13.39	
		CH 134	5670		13.40	
	802.11ac_VHT80	CH 106	5530	MCS0-NSS1	13.45	13.50
		CH 138	5690		13.42	

	Mode	Channel	Frequency (MHz)	Data Rate	Ant B Average Power (dBm)	Tune up Limit (dBm)
5.8GHz	802.11a	CH 149	5745	6Mbps	13.48	13.50
		CH 153	5765		13.42	
		CH 157	5785		13.46	
		CH 161	5805		13.43	
		CH 165	5825		13.40	
	802.11n_HT20	CH 149	5745	MCS0	13.46	13.50
		CH 153	5765		13.41	
		CH 157	5785		13.49	
		CH 161	5805		13.43	
		CH 165	5825		13.41	
	802.11n_HT40	CH 151	5755	MCS0	13.48	13.50
		CH 159	5795		13.48	
	802.11ac_VHT20	CH 149	5745	MCS0-NSS1	13.44	13.50
		CH 153	5765		13.43	
		CH 157	5785		13.45	
		CH 161	5805		13.43	
		CH 165	5825		13.40	
	802.11ac_VHT40	CH 151	5755	MCS0-NSS1	13.36	13.50
		CH 159	5795		13.48	
	802.11ac_VHT80	CH 155	5775	MCS0-NSS1	13.47	13.50

<2.4G>

Antenna A+B=Main+Aux

	Mode	Channel	Frequency (MHz)	Data Rate	Ant A Average Power (dBm)	Ant B Average Power (dBm)	Average Total power (dBm)	Tune up Limit (dBm)
2.4GHz	802.11b	CH 1	2412	1Mbps	11.94	11.92	14.94	15.00
		CH 6	2437		11.94	11.75	14.86	
		CH 11	2462		11.94	11.72	14.84	
	802.11g	CH 1	2412	6Mbps	11.90	11.90	14.91	15.00
		CH 6	2437		11.99	11.78	14.90	
		CH 11	2462		12.02	11.88	14.96	
	802.11n_HT20	CH 1	2412	MCS0	11.88	11.87	14.89	15.00
		CH 6	2437		11.97	11.71	14.85	
		CH 11	2462		12.00	11.85	14.94	
	802.11n_HT40	CH 3	2422	MCS0	11.93	11.90	14.93	15.00
		CH 6	2437		11.86	11.85	14.87	
		CH 9	2452		11.93	11.94	14.95	

<5G>

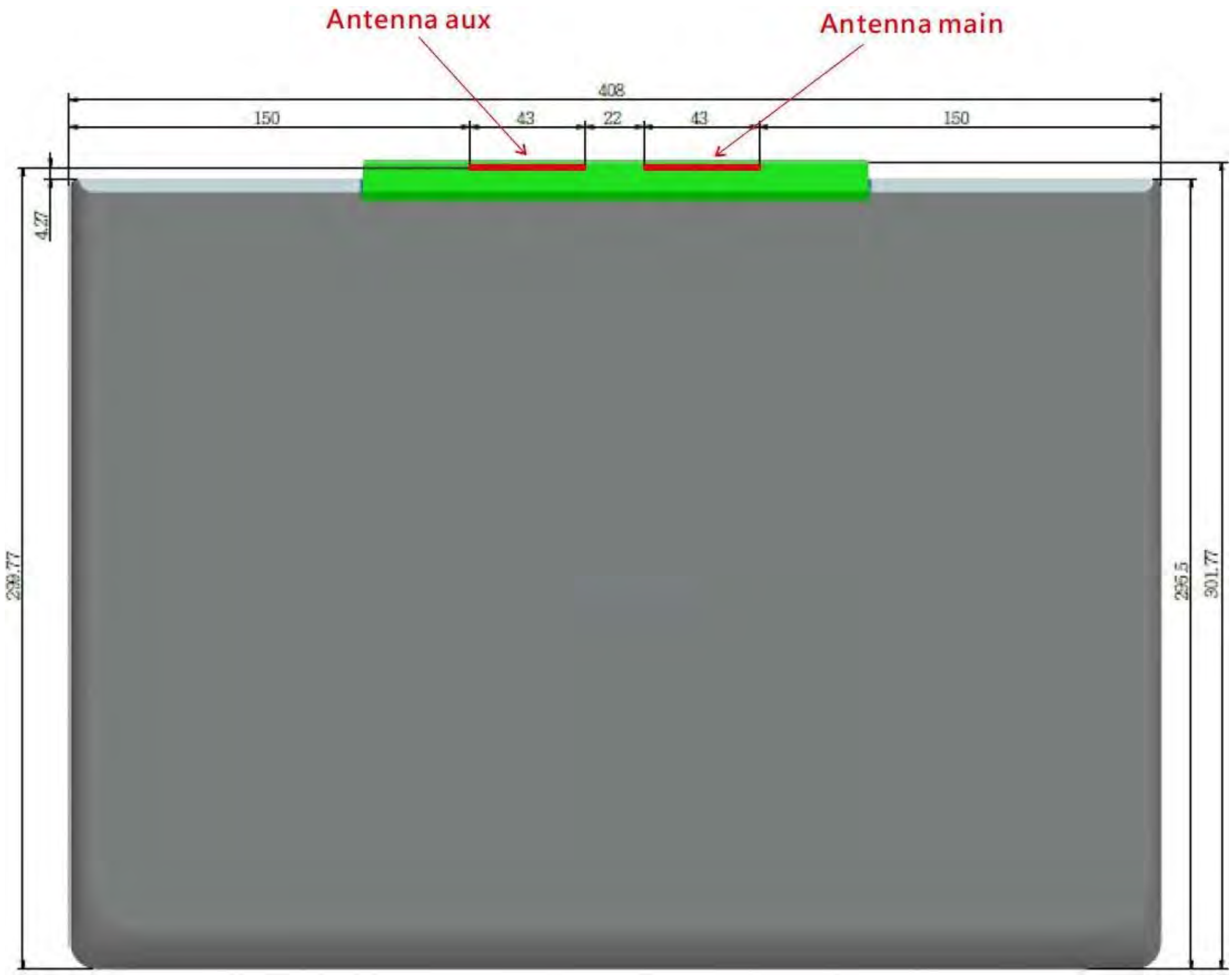
	Mode	Channel	Frequency (MHz)	Data Rate	Ant A Average Power (dBm)	Ant B Average Power (dBm)	Average Total power (dBm)	Tune up Limit (dBm)
5.2GHz	802.11a	CH 36	5180	6Mbps	10.56	10.32	13.45	13.50
		CH 40	5200		10.48	10.47	13.49	
		CH 44	5220		10.14	10.69	13.43	
		CH 48	5240		10.06	10.85	13.48	
	802.11n_HT20	CH 36	5180	MCS0	10.48	10.42	13.46	13.50
		CH 40	5200		10.40	10.55	13.49	
		CH 44	5220		10.15	10.66	13.42	
		CH 48	5240		10.00	10.85	13.46	
	802.11n_HT40	CH 38	5190	MCS0	10.46	10.49	13.49	13.50
		CH 46	5230		10.11	10.80	13.48	
	802.11ac_VHT20	CH 36	5180	MCS0-NSS1	10.40	10.42	13.42	13.50
		CH 40	5200		10.40	10.44	13.43	
		CH 44	5220		10.22	10.63	13.44	
		CH 48	5240		10.09	10.76	13.45	
	802.11ac_VHT40	CH 38	5190	MCS0-NSS1	10.46	10.36	13.42	13.50
		CH 46	5230		10.17	10.71	13.46	
	802.11ac_VHT80	CH 42	5210	MCS0-NSS1	10.46	10.34	13.41	13.50

	Mode	Channel	Frequency (MHz)	Data Rate	Ant A Average Power (dBm)	Ant B Average Power (dBm)	Average Total power (dBm)	Tune up Limit (dBm)
5.3GHz	802.11a	CH 52	5260	6Mbps	10.09	10.69	13.41	13.50
		CH 56	5280		10.10	10.65	13.39	
		CH 60	5300		10.23	10.57	13.41	
		CH 64	5320		10.22	10.62	13.43	
	802.11n_HT20	CH 52	5260	MCS0	10.23	10.58	13.42	13.50
		CH 56	5280		10.05	10.70	13.40	
		CH 60	5300		10.33	10.59	13.47	
		CH 64	5320		10.24	10.52	13.39	
	802.11n_HT40	CH 54	5270	MCS0	10.04	10.82	13.46	13.50
		CH 62	5310		10.28	10.59	13.45	
	802.11ac_VHT20	CH 52	5260	MCS0-NSS1	9.95	10.86	13.44	13.50
		CH 56	5280		10.21	10.72	13.48	
		CH 60	5300		10.31	10.60	13.47	
		CH 64	5320		10.24	10.56	13.41	
	802.11ac_VHT40	CH 54	5270	MCS0-NSS1	9.99	10.79	13.42	13.50
		CH 62	5310		10.24	10.56	13.41	
	802.11ac_VHT80	CH 58	5290	MCS0-NSS1	10.36	10.48	13.43	13.50

	Mode	Channel	Frequency (MHz)	Data Rate	Ant A Average Power (dBm)	Ant B Average Power (dBm)	Average Total power (dBm)	Tune up Limit (dBm)
5.6GHz	802.11a	CH 100	5500	6Mbps	10.14	10.79	13.49	13.50
		CH 104	5520		10.22	10.58	13.41	
		CH 108	5540		10.16	10.75	13.48	
		CH 112	5560		10.42	10.49	13.47	
		CH 116	5580		10.41	10.52	13.48	
		CH 132	5660		10.05	10.66	13.38	
		CH 136	5680		10.05	10.86	13.48	
		CH 140	5700		10.28	10.66	13.48	
	802.11n_HT20	CH 100	5500	MCS0	10.04	10.63	13.36	13.50
		CH 104	5520		10.11	10.79	13.47	
		CH 108	5540		10.36	10.51	13.45	
		CH 112	5560		10.29	10.43	13.37	
		CH 116	5580		10.62	10.24	13.44	
		CH 136	5680		10.34	10.59	13.48	
		CH 140	5700		10.24	10.69	13.48	
		CH 100	5500		10.04	10.63	13.36	
	802.11n_HT40	CH 102	5510	MCS0	10.00	10.84	13.45	13.50
		CH 110	5550		10.25	10.66	13.47	
		CH 134	5670		10.10	10.80	13.47	
	802.11ac_VHT20	CH 100	5500	MCS0-NSS1	10.13	10.67	13.42	13.50
		CH 104	5520		10.20	10.59	13.41	
		CH 108	5540		10.03	10.87	13.48	
		CH 112	5560		10.36	10.41	13.40	
		CH 116	5580		10.31	10.47	13.40	
		CH 132	5660		10.05	10.63	13.36	
		CH 136	5680		10.22	10.60	13.42	
		CH 140	5700		10.36	10.58	13.48	
	802.11ac_VHT40	CH 102	5510	MCS0-NSS1	10.26	10.59	13.44	13.50
		CH 110	5550		10.28	10.60	13.45	
		CH 134	5670		10.26	10.56	13.42	
	802.11ac_VHT80	CH 106	5530	MCS0-NSS1	10.06	10.73	13.42	13.50
		CH 138	5690		10.40	10.43	13.43	

	Mode	Channel	Frequency (MHz)	Data Rate	Ant A Average Power (dBm)	Ant B Average Power (dBm)	Average Total power (dBm)	Tune up Limit (dBm)
5.8GHz	802.11a	CH 149	5745	6Mbps	10.17	10.55	13.37	13.50
		CH 153	5765		10.25	10.52	13.40	
		CH 157	5785		10.04	10.75	13.42	
		CH 161	5805		10.07	10.74	13.43	
		CH 165	5825		10.17	9.79	12.99	
	802.11n_HT20	CH 149	5745	MCS0	10.40	10.41	13.42	13.50
		CH 153	5765		10.42	10.38	13.41	
		CH 157	5785		10.62	10.35	13.50	
		CH 161	5805		10.61	10.26	13.45	
		CH 165	5825		10.18	9.91	13.06	
	802.11n_HT40	CH 151	5755	MCS0	10.43	10.37	13.41	13.50
		CH 159	5795		10.70	10.22	13.48	
	802.11ac_VHT20	CH 149	5745	MCS0-NSS1	10.42	10.43	13.44	13.50
		CH 153	5765		10.44	10.39	13.43	
		CH 157	5785		10.65	10.28	13.48	
		CH 161	5805		10.72	10.21	13.48	
		CH 165	5825		9.20	8.80	12.01	
	802.11ac_VHT40	CH 151	5755	MCS0-NSS1	10.44	10.37	13.42	13.50
		CH 159	5795		10.60	10.35	13.49	
	802.11ac_VHT80	CH 155	5775	MCS0-NSS1	10.39	10.30	13.36	13.50

11 Antenna Location



<EUT Front View>

12 SAR Test Results

General Note:

4. Per KDB 447498, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
   c. Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor

5. Per KDB 447498 for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
   - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ≤ 0.6 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
   - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

6. Per KDB 616217, the additional separation introduced by the contour against a flat phantom is < 5 mm and reported SAR is < 1.2 W/kg, a curved or contoured back surface or edge SAR is not required, more detail information please refer to the setup photo.

7. Per KDB 248227D01 v02, the Wi-Fi transmission modes include all channel bandwidth, modulation and data rate combinations for the 802.11a/g/n/ac OFDM configurations in a standalone or aggregated frequency band. For 2.4 GHz, 802.11b DSSS and 802.11g/n OFDM configurations are considered separately.

8. Per KDB 248227D01 v02 5.1.1 Initial Test Position SAR Test Reduction Procedure.

9. When the WLAN transmission was verified using a spectrum analyzer.

12.1 Body SAR

<WLAN2.4G SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Antenna	Data Rate	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	Note
1	802.11b	-	Bottom	0	11	2462	A	1M	14.84	15	1.04	-0.03	0.853	0.89	
2	802.11b	-	Bottom	0	1	2412	B	1M	14.88	15	1.03	-0.02	0.993	1.02	
3	802.11b	-	Bottom	0	6	2437	A	1M	14.83	15	1.04	-0.05	1.07	1.11	
4	802.11b	-	Bottom	0	11	2462	B	1M	14.86	15	1.03	0	0.99	1.02	
5	802.11b	-	Bottom	0	1	2412	A+B	1M	14.94	15	1.01	-0.04	0.561	0.57	
23	802.11b	-	Bottom	0	6	2437	A	1M	14.83	15	1.04	-0.08	0.952	0.99	Repeated
30	802.11g	-	Bottom	0	11	2462	A+B	6M	14.96	15	1.01	0.02	0.588	0.59	

Note:

1. According to KDB248227 D01 V02r02, 5.2.1, 802.11b DSSS SAR Test Requirements.
2. According to KDB248227 D01 V02r02, 5.2.2, 2.4 GHz 802.11g/n OFDM SAR Test Exclusion Requirements.

<WLAN5G SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Antenna	Data Rate	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
6	802.11a	-	Bottom	0	48	5240	A	6M	13.49	13.50	1.00	-0.05	0.689	0.69
7	802.11a	-	Bottom	0	40	5200	B	6M	13.49	13.50	1.00	-0.1	0.553	0.55
8	802.11ac	VHT80	Bottom	0	42	5210	A	MCS0-NSS1	13.43	13.50	1.02	-0.08	0.761	0.77
9	802.11ac	VHT80	Bottom	0	42	5210	B	MCS0-NSS1	13.45	13.50	1.01	-0.01	0.424	0.43
31	802.11a	-	Bottom	0	40	5240	A+B	6M	13.49	13.50	1.00	-0.1	0.487	0.49
10	802.11ac	VHT20	Bottom	0	56	5280	A	MCS0-NSS1	13.49	13.50	1.00	0.03	0.45	0.45
11	802.11ac	VHT20	Bottom	0	56	5280	B	MCS0-NSS1	13.47	13.50	1.00	-0.05	0.326	0.33
12	802.11ac	VHT80	Bottom	0	58	5290	A	MCS0-NSS1	13.42	13.50	1.02	-0.07	0.437	0.45
13	802.11ac	VHT80	Bottom	0	58	5290	B	MCS0-NSS1	13.45	13.50	1.01	-0.12	0.379	0.38
32	802.11ac	VHT20	Bottom	0	56	5280	A+B	MCS0-NSS1	13.48	13.50	1.00	-0.01	0.329	0.33
14	802.11ac	VHT20	Bottom	0	100	5500	A	MCS0-NSS1	13.50	13.50	1.00	-0.02	0.468	0.47
15	802.11ac	VHT20	Bottom	0	140	5700	B	MCS0-NSS1	13.49	13.50	1.01	0.01	0.413	0.41
16	802.11ac	VHT80	Bottom	0	138	5690	A	MCS0-NSS1	13.46	13.50	1.02	-0.06	0.499	0.50
17	802.11ac	VHT80	Bottom	0	106	5530	B	MCS0-NSS1	13.45	13.50	1.01	0.01	0.286	0.29
33	802.11a	-	Bottom	0	100	5500	A+B	6M	13.49	13.50	1.00	0.14	0.395	0.40
18	802.11n	HT20	Bottom	0	149	5745	A	MCS0	13.49	13.50	1.00	-0.1	0.435	0.44
19	802.11n	HT20	Bottom	0	157	5785	B	MCS0	13.46	13.50	1.01	0.01	0.44	0.44
20	802.11ac	VHT80	Bottom	0	155	5775	A	MCS0-NSS1	13.44	13.50	1.01	-0.04	0.47	0.48
21	802.11ac	VHT80	Bottom	0	155	5775	B	MCS0-NSS1	13.47	13.50	1.01	0.03	0.414	0.42
34	802.11n	HT20	Bottom	0	157	5785	A+B	MCS0	13.50	13.50	1.00	-0.04	0.323	0.323

13 Simultaneous Evaluation MIMO

Antennas that qualify for standalone SAR test exclusion must apply the estimated standalone SAR to determine simultaneous transmission test exclusion.

• The [Σ of (the highest measured or estimated SAR for each standalone antenna configuration, adjusted for maximum tune-up tolerance) / 1.6 W/kg] + [Σ of MPE ratios] is ≤ 1.0.

• The SAR to peak location separation ratios of all simultaneous transmitting antenna pairs operating in portable exposure conditions are all ≤ 0.04 and the [Σ of MPE ratios] is ≤ 1.0.

MEASUREMEMENT RESULTS							
Frequency		Modulation	Frequency		Modulation	Antenna A+B Report SAR	Evaluation
MHz	Ch.		MHz	Ch.			
2412	1	DSSS	2412	1	DSSS	0.57	0.019
2462	11	OFDM	2462	11	OFDM	0.59	0.021
5240	40	OFDM	5240	40	OFDM	0.49	0.016
5280	56	OFDM	5280	56	OFDM	0.33	0.009
5500	100	OFDM	5500	100	OFDM	0.40	0.011
5785	157	OFDM	5785	157	OFDM	0.323	0.008

Note:

To calculate the separation ratio following formula is used:

$(SAR_1+SAR_2)^{1.5}/R_i$ Where R_i is in mm must be≤ 0.04

For each of the pairs, the following calculations show the separation ratio at the 22mm.

14 Uncertainty Assessment

The component of uncertainly may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainly by the statistical analysis of a series of observations is termed a Type An evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience, and knowledge of the behavior and properties of relevant materials and instruments, manufacture's specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in Table 14.1

Uncertainty Distributions	Normal	Rectangular	Triangular	U-Shape
Multi-plying Factor[(a)]	1/k[(b)]	$1/\sqrt{3}$	$1/\sqrt{6}$	$1/\sqrt{2}$

(a) standard uncertainty is determined as the product of the multiplying factor and the estimated range of variations in the measured quantity

(b) κ is the coverage factor

Standard Uncertainty for Assumed Distribution

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is shown in the following tables.

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	Ci (1g)	Standard Uncertainty (±%) (1g)
Measurement System					
Probe Calibration	6.0	Normal	1.0	1.0	6.0
Axial Isotropy	4.7	Rectangular	√3	0.7	1.9
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	3.9
Boundary effects	1.0	Rectangular	√3	1.0	0.6
Linearity	4.7	Rectangular	√3	1.0	2.7
System Detection Limits	1.0	Rectangular	√3	1.0	0.6
Modulation Response	2.4	Rectangular	√3	1.0	1.4
Readout Electronics	0.3	Normal	1.0	1.0	0.3
Response Time	0.8	Rectangular	√3	1.0	0.5
Integration Time	2.6	Rectangular	√3	1.0	1.5
RF Ambient Noise	3.0	Rectangular	√3	1.0	1.7
RF Ambient Reflections	3.0	Rectangular	√3	1.0	1.7
Probe Positioner	0.4	Rectangular	√3	1.0	0.2
Probe Positioning	2.9	Rectangular	√3	1.0	1.7
Max. SAR Eval.	2.0	Rectangular	√3	1.0	1.2
Dipole Related					
Device Positioning	2.9	Normal	1.0	1.0	2.9
Device Holder	3.6	Normal	1.0	1.0	3.6
Power Drift	5.0	Rectangular	√3	1.0	2.9
Power Scaling	0.0	Rectangular	√3	1.0	0.0
Phantom and Tissue parameters					
Phantom Uncertainty	6.1	Rectangular	√3	1.0	3.5
SAR correction	1.9	Normal	1.0	1.0	1.9
Liquid Conductivity (measurement)	2.0	Normal	1.0	0.8	1.6
Liquid Permittivity (measurement)	2.1	Normal	1.0	0.3	0.5
Temp. unc. - Conduct	3.4	Rectangular	√3	0.8	1.5
Temp. unc. - Permittivity	0.4	Rectangular	√3	0.2	0.1
Combined Standard Uncertainty					11.2
Coverage Factor for 95 %					Kp=2
Expanded Uncertainty					22.4

Uncertainty Budget for frequency range 30 MHz to 3 GHz

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	Ci (1g)	Standard Uncertainty (±%) (1g)
Measurement System					
Probe Calibration	6.6	Normal	1.0	1.0	6.6
Axial Isotropy	4.7	Rectangular	√3	0.7	1.9
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	3.9
Boundary effects	2.0	Rectangular	√3	1.0	1.2
Linearity	4.7	Rectangular	√3	1.0	2.7
System Detection Limits	1.0	Rectangular	√3	1.0	0.6
Modulation Response	2.4	Rectangular	√3	1.0	1.4
Readout Electronics	0.3	Normal	1.0	1.0	0.3
Response Time	0.8	Rectangular	√3	1.0	0.5
Integration Time	2.6	Rectangular	√3	1.0	1.5
RF Ambient Noise	3.0	Rectangular	√3	1.0	1.7
RF Ambient Reflections	3.0	Rectangular	√3	1.0	1.7
Probe Positioner	0.8	Rectangular	√3	1.0	0.5
Probe Positioning	6.7	Rectangular	√3	1.0	3.9
Max. SAR Eval.	4.0	Rectangular	√3	1.0	2.3
Dipole Related					
Device Positioning	2.9	Normal	1.0	1.0	2.9
Device Holder	3.6	Normal	1.0	1.0	3.6
Power Drift	5.0	Rectangular	√3	1.0	2.9
Power Scaling	0.0	Rectangular	√3	1.0	0.0
Phantom and Tissue parameters					
Phantom Uncertainty	6.6	Rectangular	√3	1.0	3.8
SAR corrction	1.9	Normal	1.0	1.0	1.9
Liquid Conductivity (measurement)	2.0	Normal	1.0	0.8	1.6
Liquid Permittivity (measurement)	2.1	Normal	1.0	0.3	0.5
Temp. unc. - Conduct	3.4	Rectangular	√3	0.8	1.5
Temp. unc. - Permittivity	0.4	Rectangular	√3	0.2	0.1
Combined Standard Uncertainty					12.3
Coverage Factor for 95 %					Kp=2
Expanded Uncertainty					24.7

Uncertainty Budget for frequency range 3 GHz to 6 GHz

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	Ci (1g)	Standard Uncertainty (±%) (1g)
Measurement System					
Probe Calibration	6.0	Normal	1.0	1.0	6.6
Axial Isotropy	4.7	Rectangular	√3	0.7	1.9
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	3.9
Boundary effects	1.0	Rectangular	√3	1.0	0.6
Linearity	4.7	Rectangular	√3	1.0	2.7
System Detection Limits	1.0	Rectangular	√3	1.0	0.6
Modulation Response	0.0	Rectangular	√3	1.0	0.0
Readout Electronics	0.3	Normal	1.0	1.0	0.3
Response Time	0.0	Rectangular	√3	1.0	0.0
Integration Time	2.6	Rectangular	√3	1.0	1.5
RF Ambient Noise	3.0	Rectangular	√3	1.0	1.7
RF Ambient Reflections	3.0	Rectangular	√3	1.0	1.7
Probe Positioner	0.4	Rectangular	√3	1.0	0.2
Probe Positioning	2.9	Rectangular	√3	1.0	1.7
Max. SAR Eval.	2.0	Rectangular	√3	1.0	1.2
Dipole Related					
Device Of experimental dipole	5.5	Normal	1.0	1.0	5.5
Dipole Axis to Liquid Distance	2.0	Rectangular	√3	1.0	1.2
Input Power & SAR Drift	3.4	Rectangular	√3	1.0	2.0
Phantom and Tissue parameters					
Phantom Uncertainty	6.1	Rectangular	√3	1.0	3.5
SAR correction	1.9	Normal	√3	1.0	1.1
Liquid Conductivity (measurement)	2.0	Normal	1.0	0.8	1.6
Liquid Permittivity (measurement)	2.1	Normal	1.0	0.2	0.5
Temp. unc. - Conduct	3.4	Rectangular	√3	0.8	1.5
Temp. unc. - Permittivity	0.4	Rectangular	√3	0.2	0.1
Combined Standard Uncertainty					9.2
Coverage Factor for 95 %					Kp=2
Expanded Uncertainty					18.4

Uncertainty Budget for System Validation for the 0.3-6 GHz range

15 References

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Appendix A. Plots of System Performance Check

System Check_B2450_160323

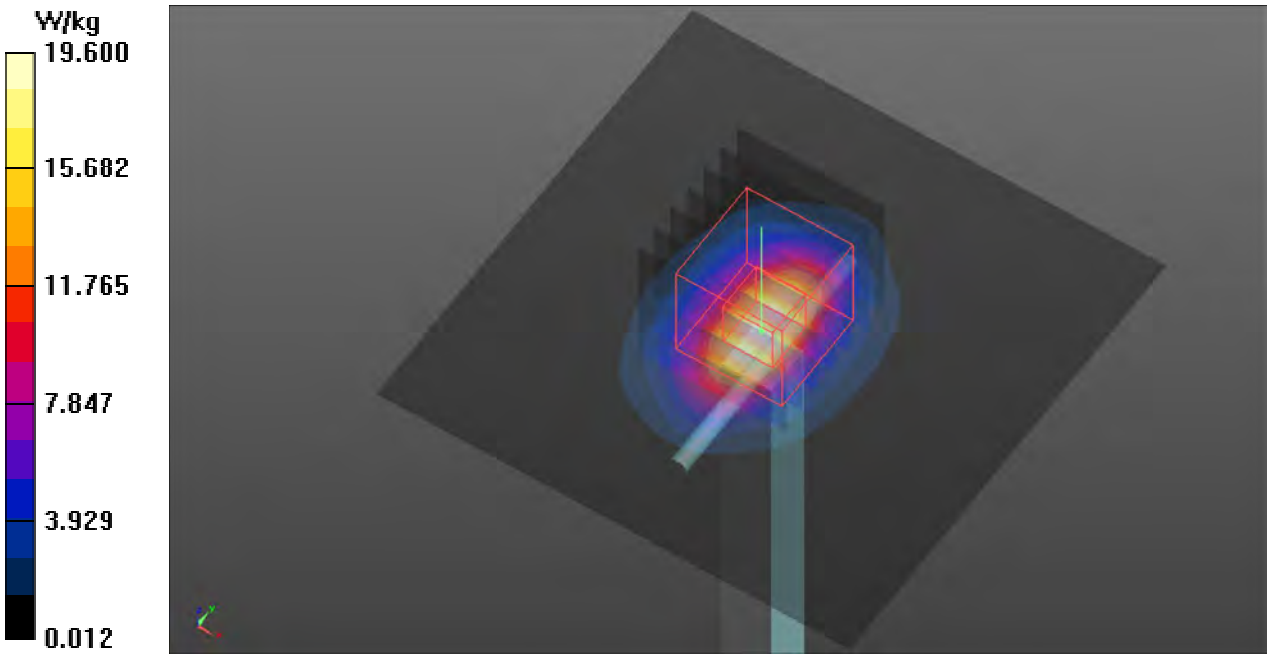
DUT: Dipole 2450MHz D2450V2_ SN: 929

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: B2450_160323 Medium parameters used: f = 2450 MHz; σ = 1.941 S/m; ε_r = 52.669; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; **Liquid Temperature**：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(7.45, 7.45, 7.45); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 19.6 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 98.68 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 27.2 W/kg
SAR(1 g) = 13.1 W/kg; SAR(10 g) = 5.98 W/kg
Maximum value of SAR (measured) = 20.1 W/kg



System Check_B2450_160329

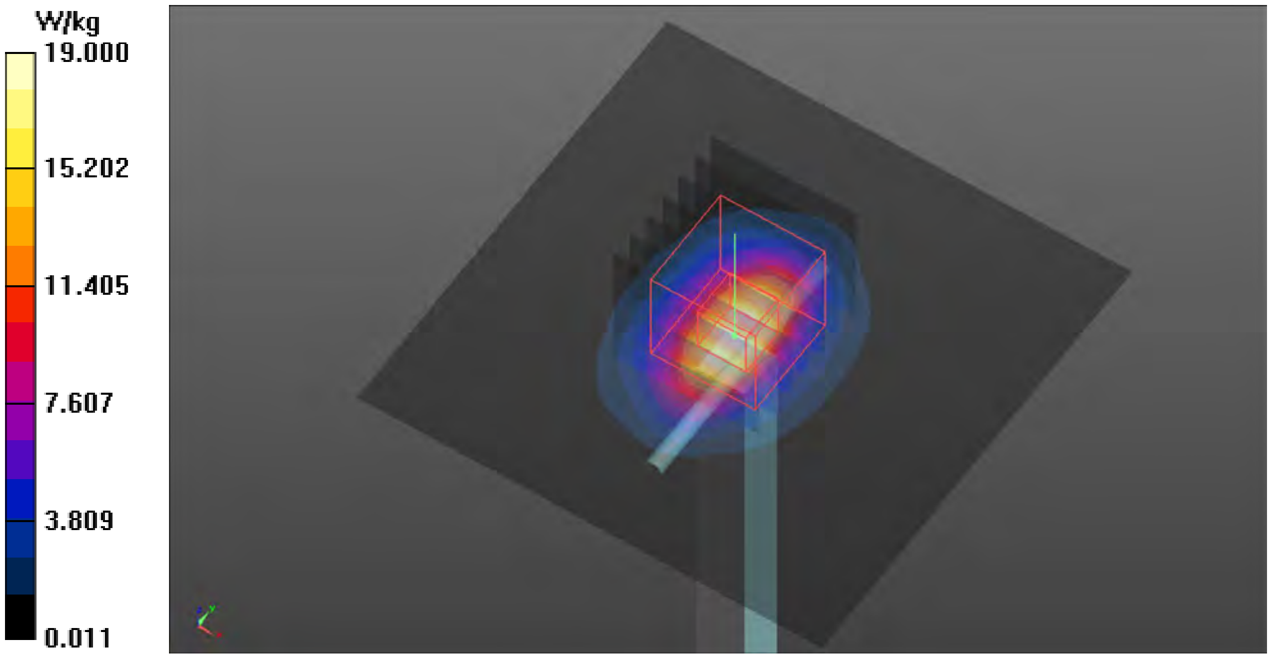
DUT: Dipole 2450MHz D2450V2_ SN: 929

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: B2450_160329 Medium parameters used: f = 2450 MHz; σ = 1.882 S/m; ε_r = 54.504; ρ = 1000 kg/m^3
Ambient Temperature：22.6 ℃; **Liquid Temperature**：21.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(7.45, 7.45, 7.45); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 19.0 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 98.68 V/m; Power Drift = 0.36 dB
Peak SAR (extrapolated) = 26.3 W/kg
SAR(1 g) = 12.7 W/kg; SAR(10 g) = 5.8 W/kg
Maximum value of SAR (measured) = 19.5 W/kg



System Check_B2450_170426

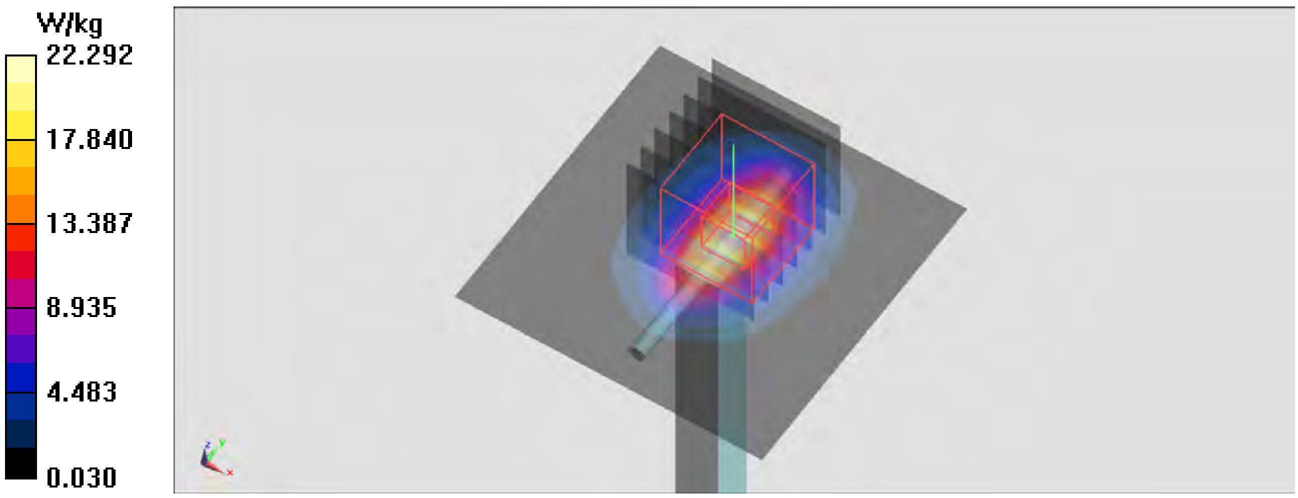
DUT: **2450MHz D2450V2_-926**

Communication System: CW ; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: B2450_170426 Medium parameters used: f = 2450 MHz; σ = 1.962 S/m; ε_r = 52.704; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3931; ConvF(7.73, 7.73, 7.73); Calibrated: 2016/10/3;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2016/9/28
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1227
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7373)

Pin=250mW/Ar **ea Scan (61x61x1):** Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 22.3 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 103.2 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 26.7 W/kg
SAR(1 g) = 13.2 W/kg; SAR(10 g) = 6.2 W/kg
Maximum value of SAR (measured) = 21.8 W/kg



System Check_B5200_160324

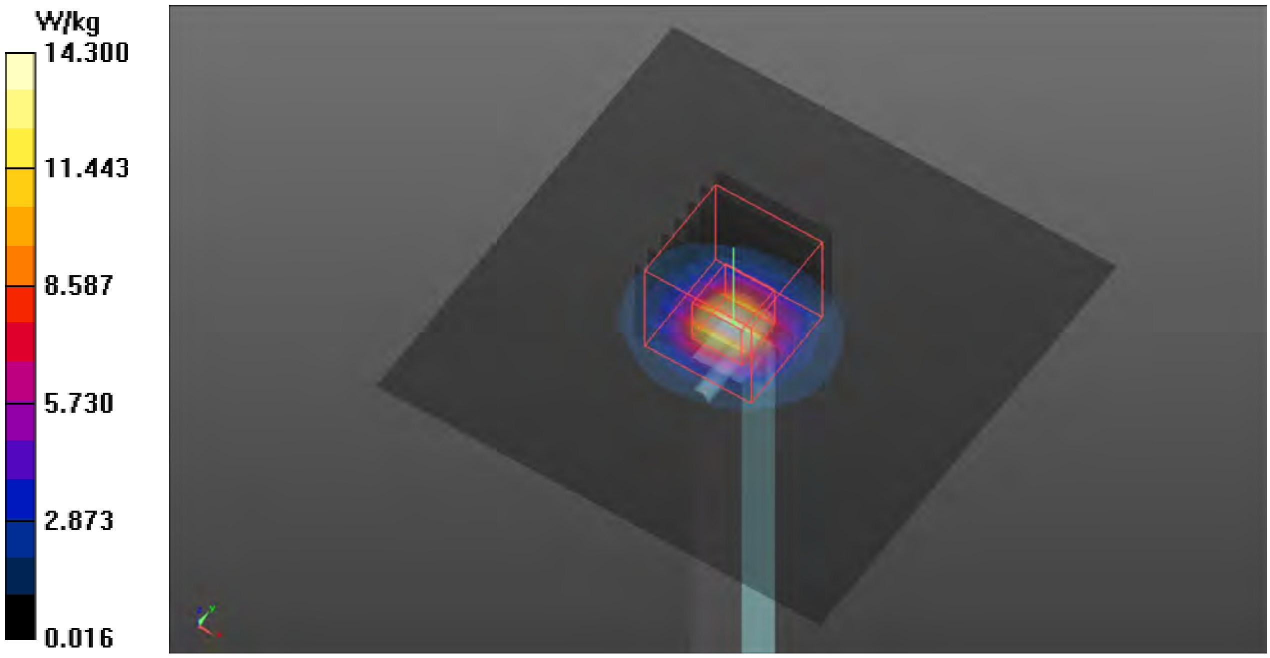
DUT: Dipole D5GHzV2_ SN: 1171

Communication System: CW; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: B5G_160324 Medium parameters used: f = 5200 MHz; σ = 5.347 S/m; ε_r = 48.561; ρ = 1000 kg/m^3
Ambient Temperature：22.2 ℃; **Liquid Temperature**：21 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(4.4, 4.4, 4.4); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 14.3 W/kg

Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 56.63 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 29.7 W/kg
SAR(1 g) = 7.31 W/kg; SAR(10 g) = 2.08 W/kg
Maximum value of SAR (measured) = 15.3 W/kg



System Check_B5300_160325

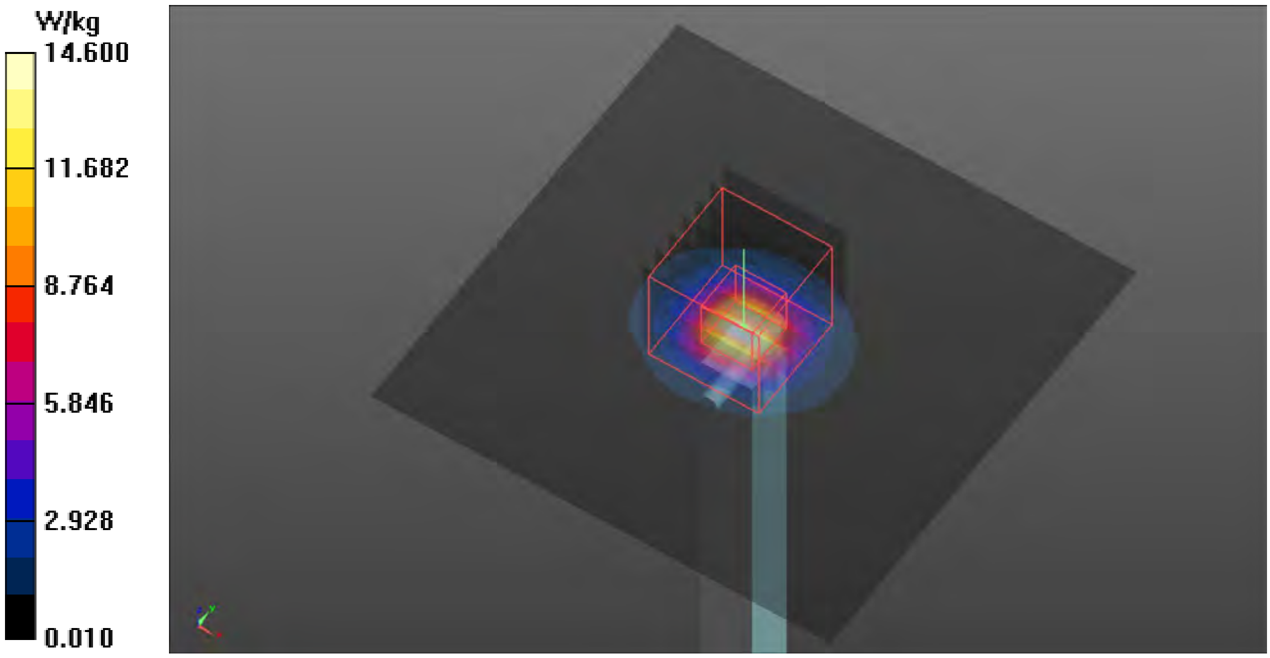
DUT: Dipole D5GHzV2_ SN: 1171

Communication System: CW; Frequency: 5300 MHz;Duty Cycle: 1:1
Medium: B5G_160325 Medium parameters used: f = 5300 MHz; σ = 5.502 S/m; ε_r = 49.675; ρ = 1000 kg/m^3
Ambient Temperature：21.2 ℃; **Liquid Temperature**：20.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(4.4, 4.4, 4.4); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 14.6 W/kg

Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 57.18 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 29.7 W/kg
SAR(1 g) = 7.36 W/kg; SAR(10 g) = 2.09 W/kg
Maximum value of SAR (measured) = 15.4 W/kg



Test Laboratory: Sporton International Inc. SAR Testing Lab Date: 2016/3/28

System Check_B5600_160328

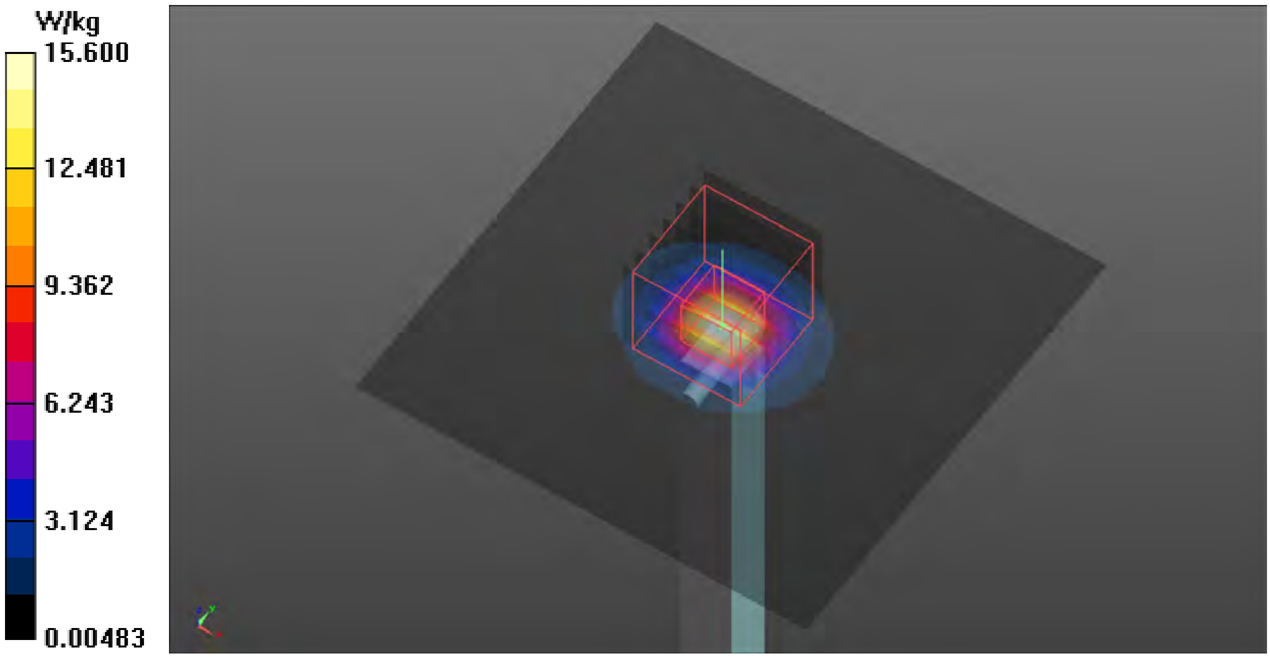
DUT: Dipole D5GHzV2_ SN: 1171

Communication System: CW; Frequency: 5600 MHz;Duty Cycle: 1:1
Medium: B5G_160328 Medium parameters used: f = 5600 MHz; σ = 5.927 S/m; ε_r = 48.119; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃; **Liquid Temperature**：21.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(3.78, 3.78, 3.78); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 15.6 W/kg

Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 58.59 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 32.8 W/kg
SAR(1 g) = 7.85 W/kg; SAR(10 g) = 2.22 W/kg
Maximum value of SAR (measured) = 16.6 W/kg



System Check_B5600_170426

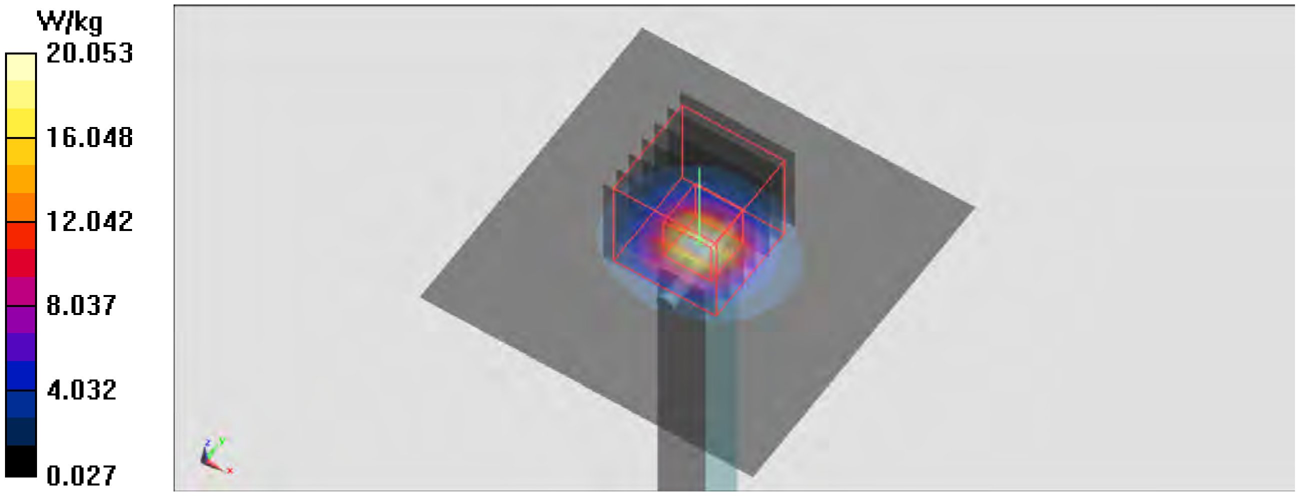
DUT**: Dipole D5GHzV2-1128**

Communication System: CW; Frequency: 5600 MHz;Duty Cycle: 1:1
Medium: B5G_170426 Medium parameters used: f = 5600 MHz; σ = 5.972 S/m; ε_r = 46.378; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3931; ConvF(3.71, 3.71, 3.71); Calibrated: 2016/10/3;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2016/9/28
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1227
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7373)

Pin=100mW/Ar **ea Scan (71x71x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 20.1 W/kg

Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 70.11 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 35.0 W/kg
SAR(1 g) = 8.32 W/kg; SAR(10 g) = 2.31 W/kg
Maximum value of SAR (measured) = 21.9 W/kg



System Check_B5800_160329

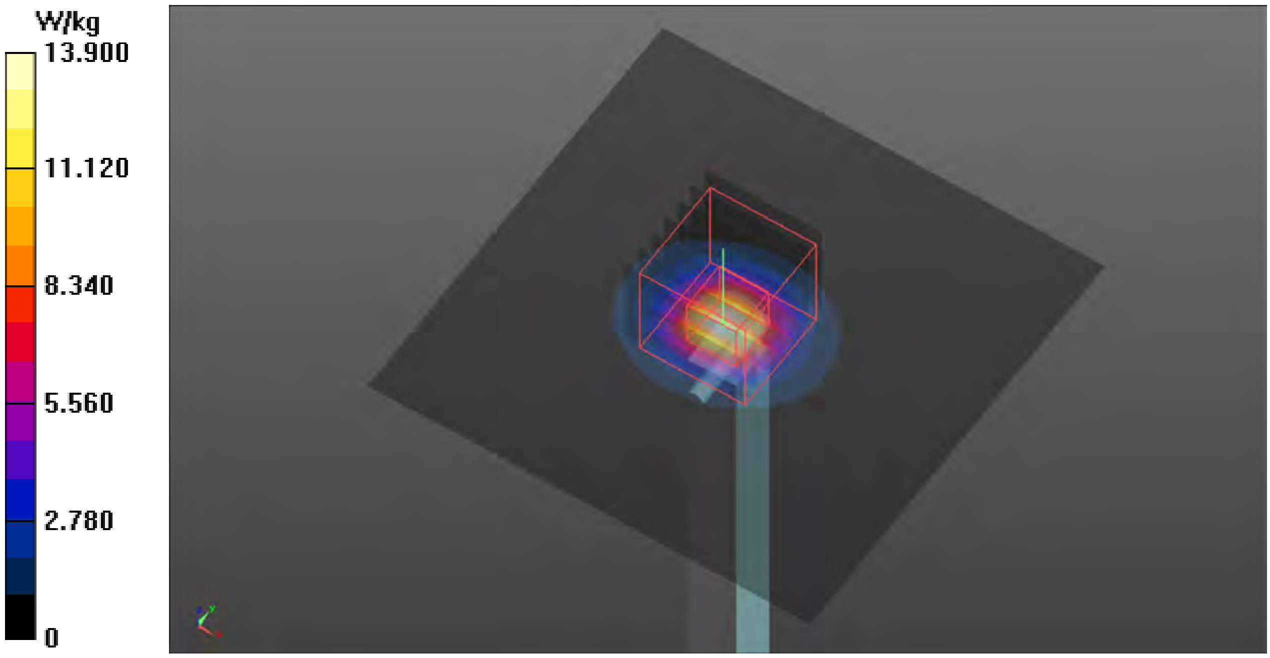
DUT: Dipole D5GHzV2_ SN: 1171

Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: B5G_160329 Medium parameters used: f = 5800 MHz; σ = 6.157 S/m; ε_r = 48.092; ρ = 1000 kg/m^3
Ambient Temperature：22.6 ℃; **Liquid Temperature**：21.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(3.96, 3.96, 3.96); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 13.9 W/kg

Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 53.07 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 31.4 W/kg
SAR(1 g) = 7.43 W/kg; SAR(10 g) = 2.09 W/kg
Maximum value of SAR (measured) = 15.9 W/kg



System Check_B5750_170426

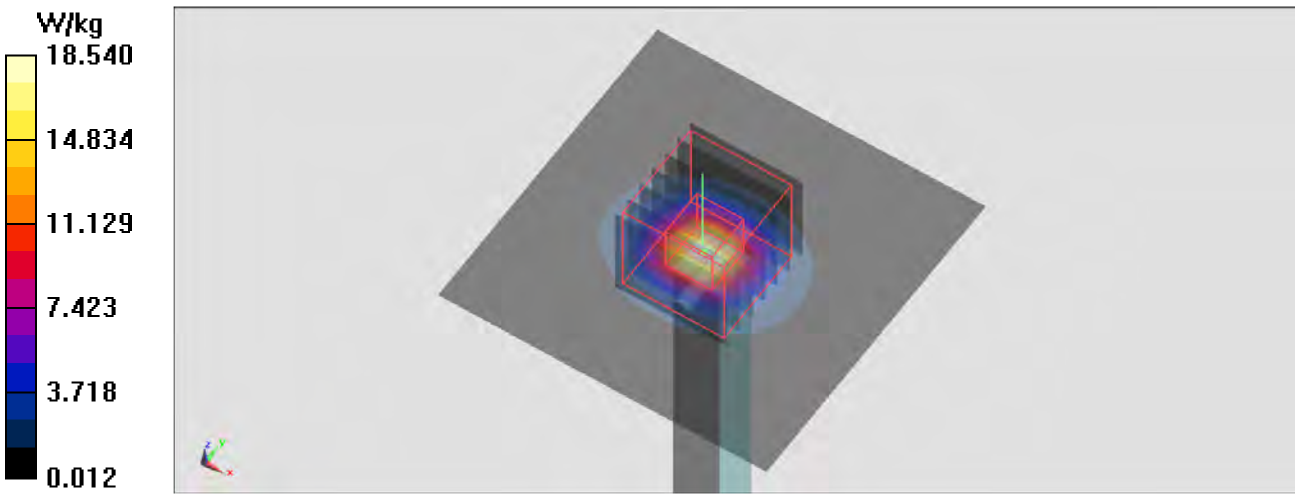
DUT: **D5GHzV2-1128**

Communication System: CW; Frequency: 5750 MHz;Duty Cycle: 1:1
Medium: B5G_170426 Medium parameters used: f = 5750 MHz; σ = 6.185 S/m; ε_r = 46.221; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3931; ConvF(4.01, 4.01, 4.01); Calibrated: 2016/10/3;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2016/9/28
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1227
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7373)

Pin=100mW/Ar **ea Scan (71x71x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 18.5 W/kg

Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 66.03 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 32.0 W/kg
SAR(1 g) = 7.53 W/kg; SAR(10 g) = 2.1 W/kg
Maximum value of SAR (measured) = 19.1 W/kg



Appendix B. Plots of SAR Measurement

P01 802.11b_Bottom_0cm_Ch11_Ant A

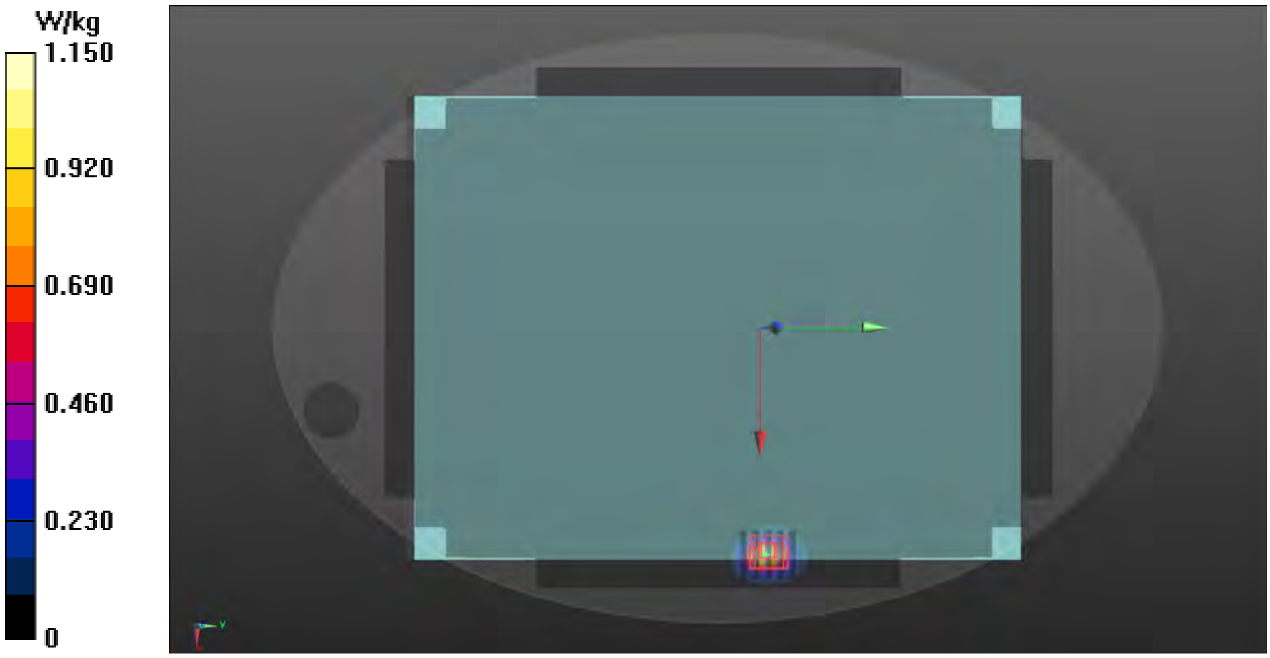
DUT: 5D3039-01

Communication System: WLAN_2.4G; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: B2450_160323 Medium parameters used: f = 2462 MHz; σ = 1.955 S/m; ε_r = 52.632; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; **Liquid Temperature**：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(7.45, 7.45, 7.45); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch11/Area Scan (281x371x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.15 W/kg

Ch11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.89 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.75 W/kg
SAR(1 g) = 0.853 W/kg; SAR(10 g) = 0.377 W/kg
Maximum value of SAR (measured) = 1.21 W/kg



P02 802.11b_Bottom_0cm_Ch1_Ant B

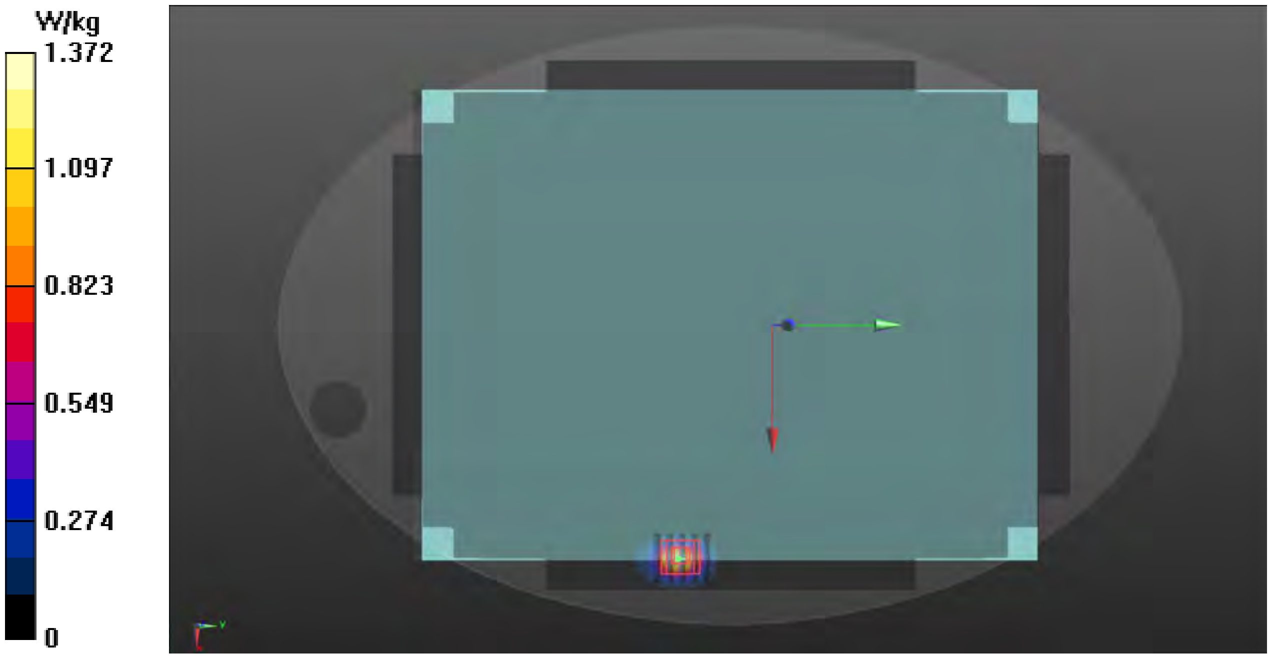
DUT: 5D3039-01

Communication System: WLAN_2.4G; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: B2450_160323 Medium parameters used: f = 2412 MHz; σ = 1.901 S/m; ε_r = 52.822; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; **Liquid Temperature**：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(7.45, 7.45, 7.45); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch1/Area Scan (281x371x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.37 W/kg

Ch1/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.59 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.99 W/kg
SAR(1 g) = 0.993 W/kg; SAR(10 g) = 0.444 W/kg
Maximum value of SAR (measured) = 1.40 W/kg



P03 802.11b_Bottom_0cm_Ch6_Ant A

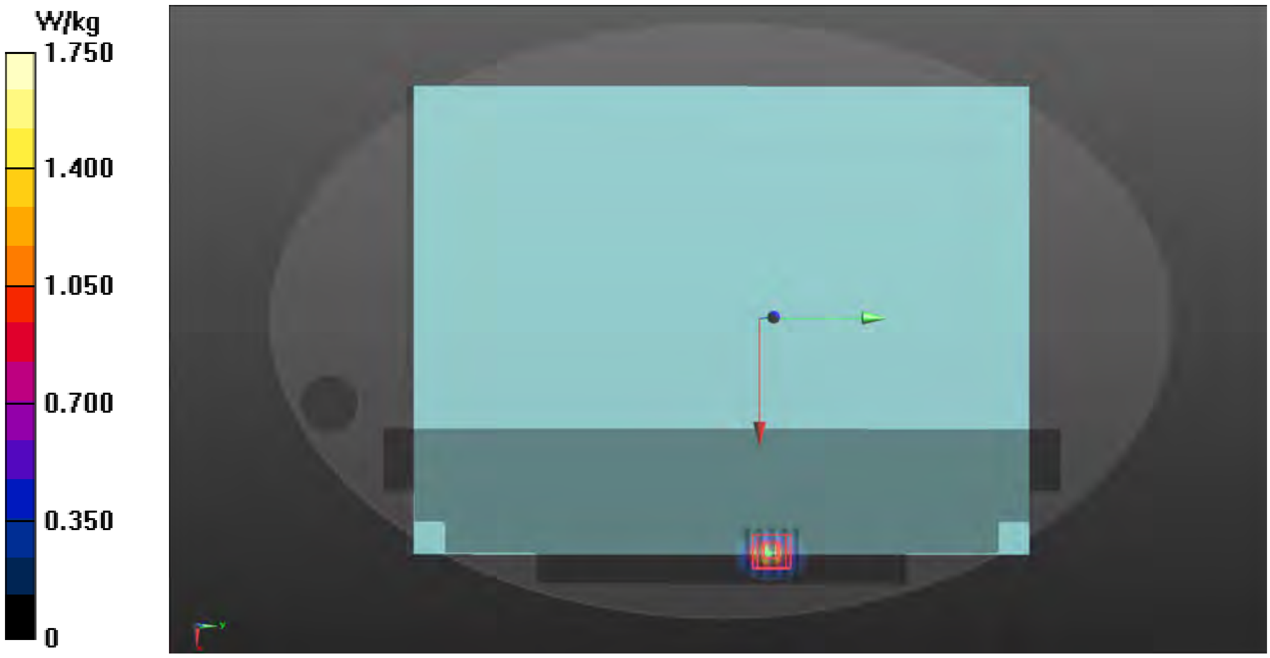
DUT: 5D3039-01

Communication System: WLAN_2.4G; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: B2450_160323 Medium parameters used: f = 2437 MHz; σ = 1.926 S/m; ε_r = 52.715; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; **Liquid Temperature**：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(7.45, 7.45, 7.45); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch6/Area Scan (81x371x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.75 W/kg

Ch6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.96 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 2.16 W/kg
SAR(1 g) = 1.07 W/kg; SAR(10 g) = 0.478 W/kg
Maximum value of SAR (measured) = 1.56 W/kg



P04 802.11b_Bottom_0cm_Ch11_Ant B

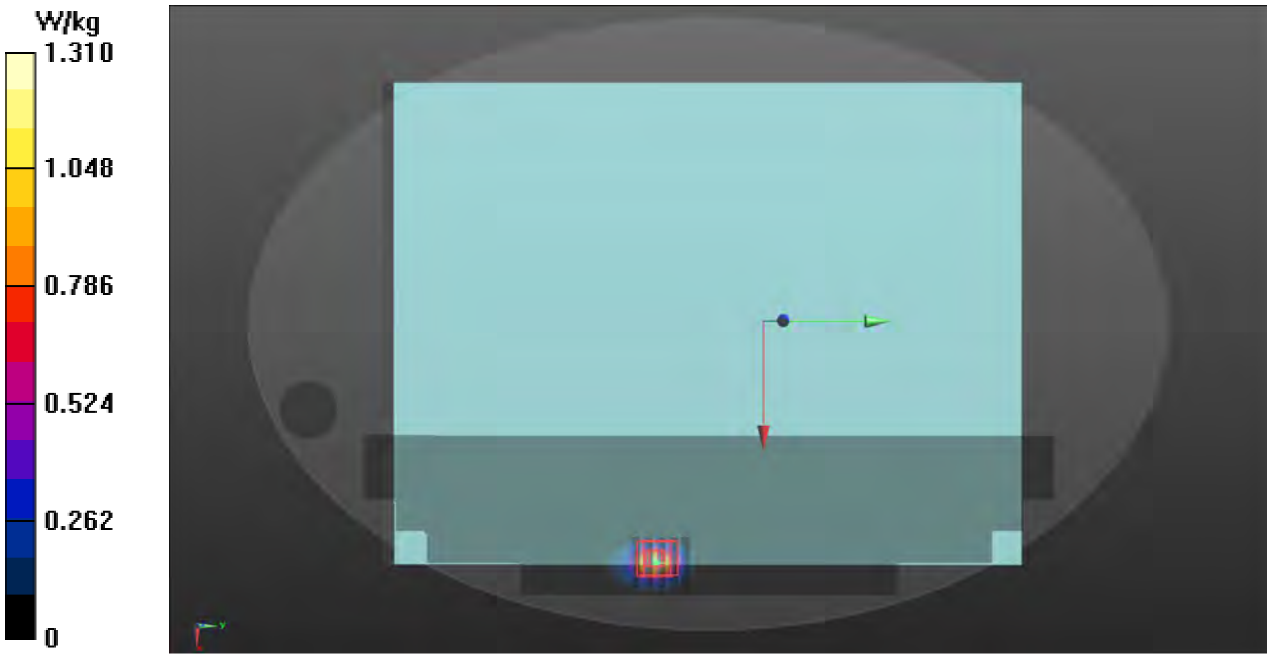
DUT: 5D3039-01

Communication System: WLAN_2.4G; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: B2450_160323 Medium parameters used: f = 2462 MHz; σ = 1.955 S/m; ε_r = 52.632; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; **Liquid Temperature**：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(7.45, 7.45, 7.45); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch11/Area Scan (81x371x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.31 W/kg

Ch11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 2.07 W/kg
SAR(1 g) = 0.990 W/kg; SAR(10 g) = 0.425 W/kg
Maximum value of SAR (measured) = 1.33 W/kg



P05 802.11b_Bottom_0cm_Ch1_Ant A+B

DUT: 5D3039-01

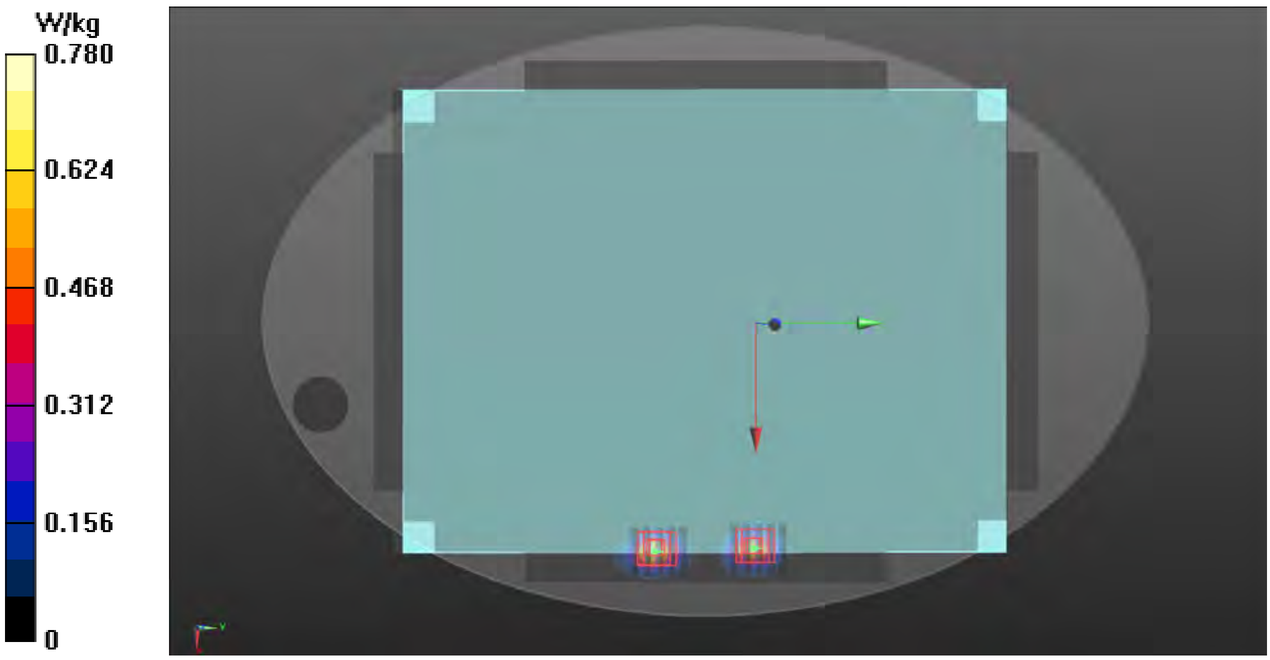
Communication System: WLAN_2.4G; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: B2450_160323 Medium parameters used: f = 2412 MHz; σ = 1.901 S/m; ε_r = 52.822; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; **Liquid Temperature**：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(7.45, 7.45, 7.45); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch1/Area Scan (281x371x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.780 W/kg

Ch1/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.09 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.14 W/kg
SAR(1 g) = 0.561 W/kg; SAR(10 g) = 0.247 W/kg
Maximum value of SAR (measured) = 0.773 W/kg

Ch1/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.09 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.00 W/kg
SAR(1 g) = 0.494 W/kg; SAR(10 g) = 0.219 W/kg
Maximum value of SAR (measured) = 0.702 W/kg



P23 802.11b_Bottom_0cm_Ch6_Ant A_Repeated

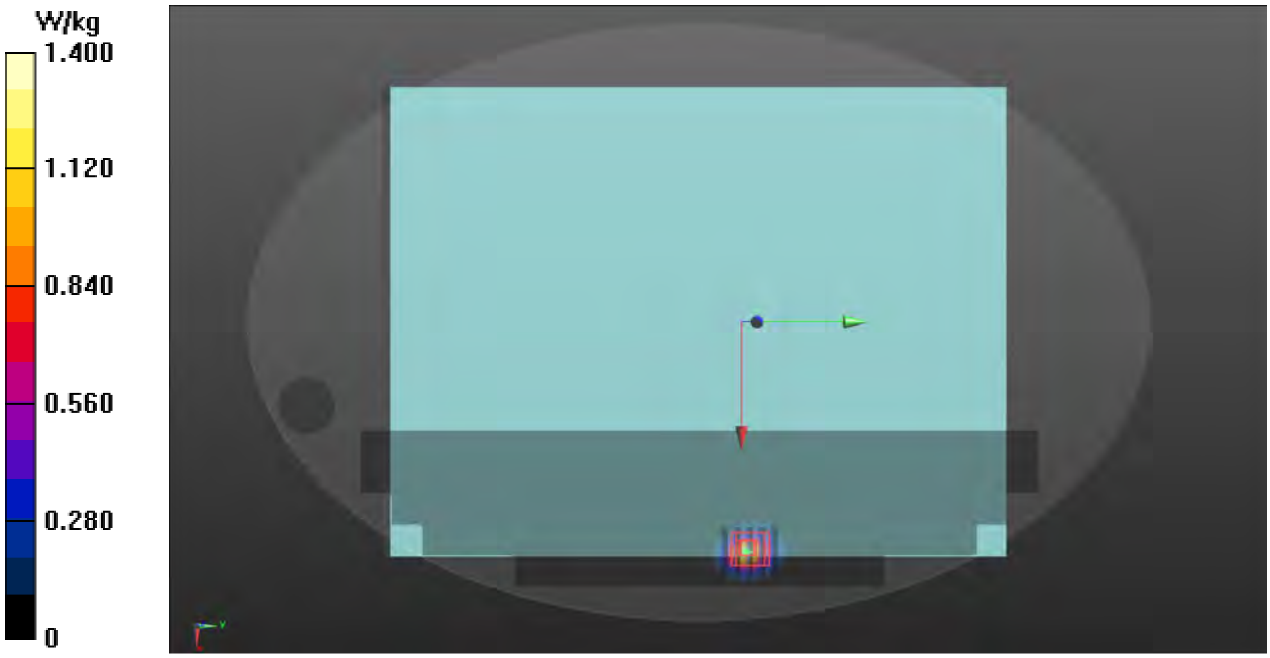
DUT: 5D3039-01

Communication System: WLAN_2.4G; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: B2540_160329 Medium parameters used: f = 2437 MHz; σ = 1.869 S/m; ε_r = 54.544; ρ = 1000 kg/m^3
Ambient Temperature：22.6 ℃; **Liquid Temperature**：21.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(7.45, 7.45, 7.45); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch6/Area Scan (81x371x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.40 W/kg

Ch6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.97 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 1.95 W/kg
SAR(1 g) = 0.952 W/kg; SAR(10 g) = 0.421 W/kg
Maximum value of SAR (measured) = 1.32 W/kg



P30 802.11g_Bottom_0cm_Ch1 1_Ant A+B

DUT: **5D3039-01**

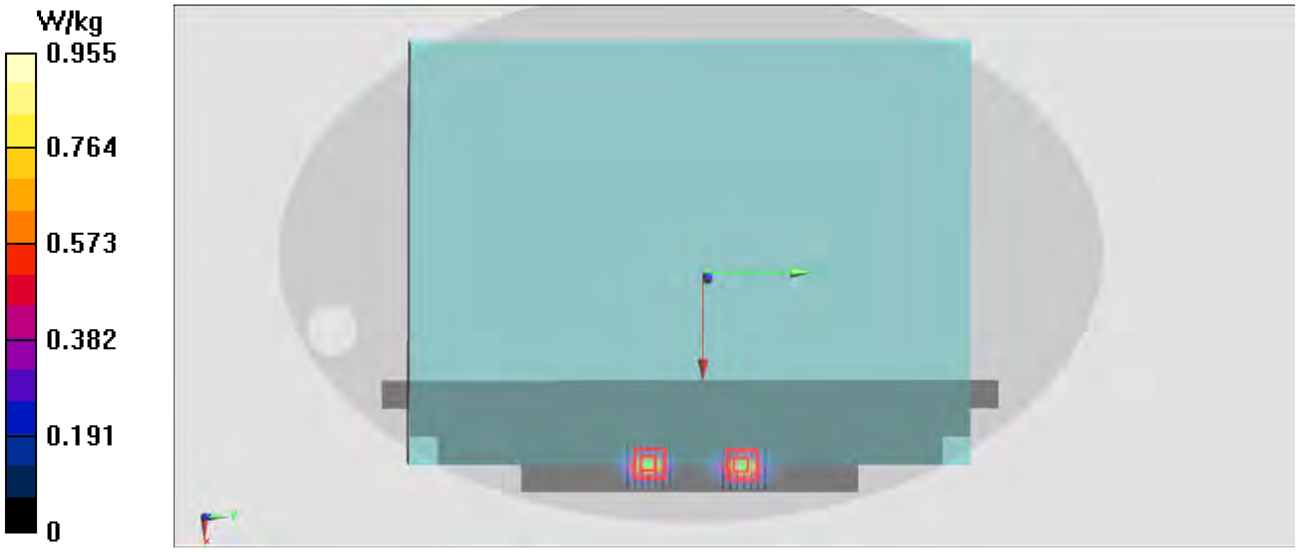
Communication System: WLAN_2.4G ; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: B2450_170426 Medium parameters used: f = 2462 MHz; σ = 1.978 S/m; ε_r = 52.663; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3931; ConvF(7.73, 7.73, 7.73); Calibrated: 2016/10/3;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2016/9/28
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1227
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7373)

Ch11/Area Scan (81x371x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.955 W/kg

Ch11/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 20.97 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.18 W/kg
SAR(1 g) = 0.588 W/kg; SAR(10 g) = 0.257 W/kg
Maximum value of SAR (measured) = 0.901 W/kg

Ch11/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 20.97 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.02 W/kg
SAR(1 g) = 0.507 W/kg; SAR(10 g) = 0.226 W/kg
Maximum value of SAR (measured) = 0.835 W/kg



Test Laboratory: Sporton International Inc. SAR Testing Lab Date: 2016/3/24

P06 802.11a_Bottom_0cm_Ch48_Ant A

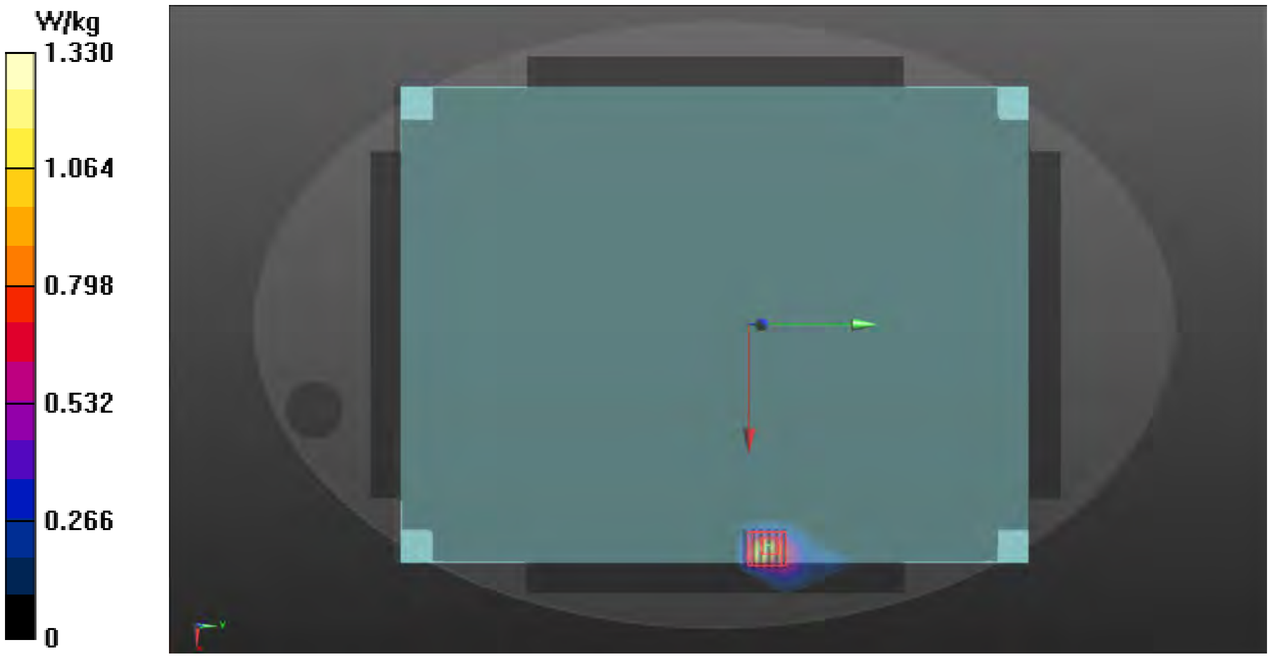
DUT: 5D3039-01

Communication System: WLAN_5G; Frequency: 5240 MHz;Duty Cycle: 1:1
Medium: B5G_160324 Medium parameters used: f = 5240 MHz; σ = 5.42 S/m; ε_r = 48.475; ρ = 1000 kg/m^3
Ambient Temperature：22.2 ℃; **Liquid Temperature**：21 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(4.4, 4.4, 4.4); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch48/Area Scan (341x441x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.33 W/kg

Ch48/Zoom Scan (6x6x12)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm
Reference Value = 12.19 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 2.54 W/kg
SAR(1 g) = 0.689 W/kg; SAR(10 g) = 0.242 W/kg
Maximum value of SAR (measured) = 1.28 W/kg



P07 802.11a_Bottom_0cm_Ch40_Ant B

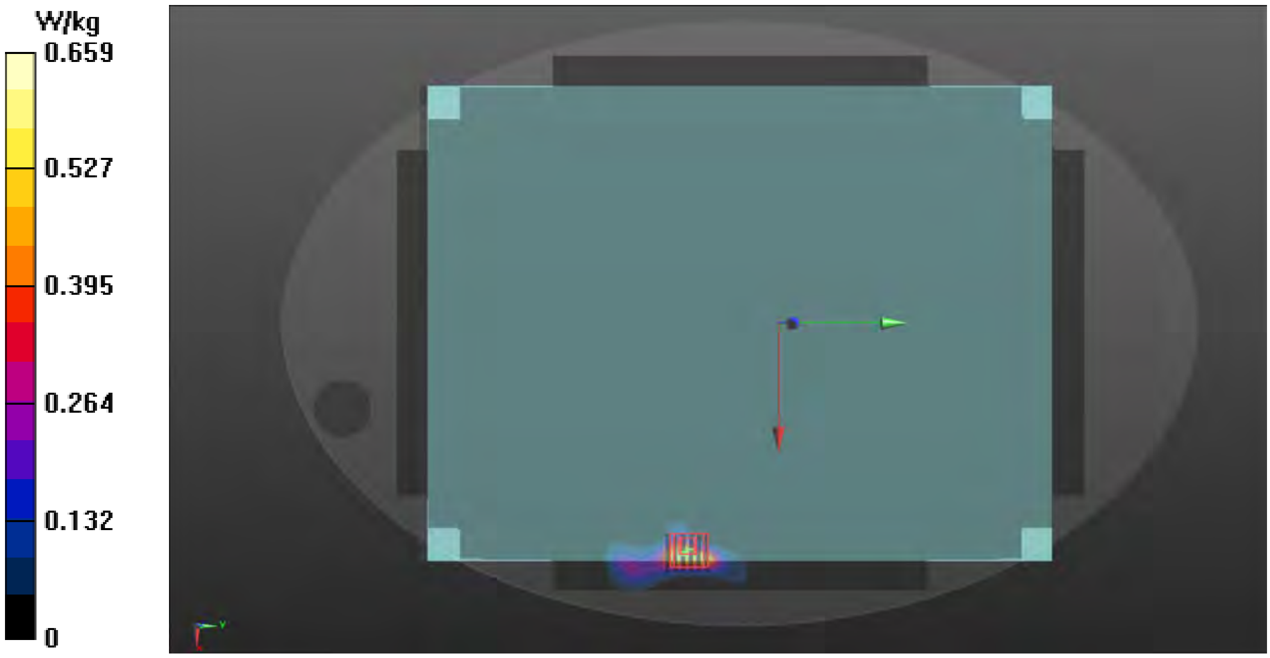
DUT: 5D3039-01

Communication System: WLAN_5G; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: B5G_160324 Medium parameters used: f = 5200 MHz; σ = 5.347 S/m; ε_r = 48.561; ρ = 1000 kg/m^3
Ambient Temperature：22.2 ℃; **Liquid Temperature**：21 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(4.4, 4.4, 4.4); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch40/Area Scan (341x441x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.659 W/kg

Ch40/Zoom Scan (6x6x12)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm
Reference Value = 11.17 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 2.03 W/kg
SAR(1 g) = 0.553 W/kg; SAR(10 g) = 0.195 W/kg
Maximum value of SAR (measured) = 0.987 W/kg



P08 802.11ac_VHT80_Bottom_0cm_Ch42_Ant A

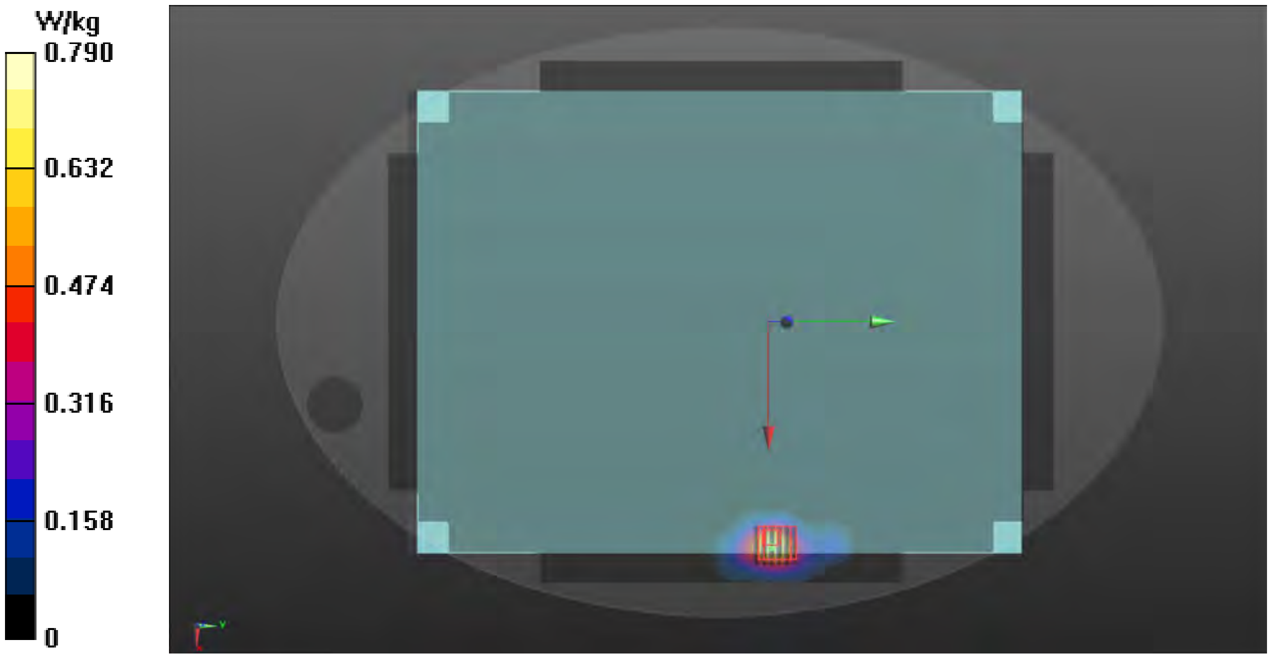
DUT: 5D3039-01

Communication System: WLAN_5G; Frequency: 5210 MHz;Duty Cycle: 1:1
Medium: B5G_160324 Medium parameters used: f = 5210 MHz; σ = 5.363 S/m; ε_r = 48.531; ρ = 1000 kg/m^3
Ambient Temperature：22.2 ℃; **Liquid Temperature**：21 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(4.4, 4.4, 4.4); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch42/Area Scan (341x441x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.790 W/kg

Ch42/Zoom Scan (6x6x12)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm
Reference Value = 12.61 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 4.66 W/kg
SAR(1 g) = 0.761 W/kg; SAR(10 g) = 0.251 W/kg
Maximum value of SAR (measured) = 1.35 W/kg



P09 802.11ac_VHT80_Bottom_0cm_Ch42_Ant B

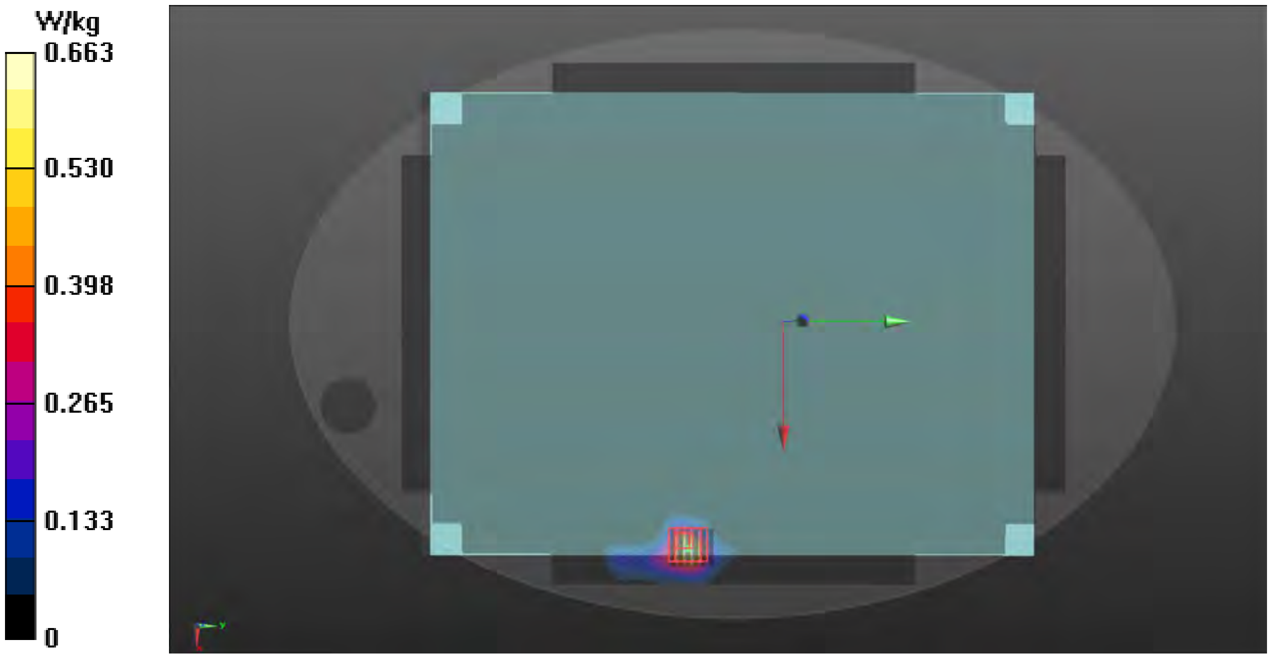
DUT: 5D3039-01

Communication System: WLAN_5G; Frequency: 5210 MHz;Duty Cycle: 1:1
Medium: B5G_160324 Medium parameters used: f = 5210 MHz; σ = 5.363 S/m; ε_r = 48.531; ρ = 1000 kg/m^3
Ambient Temperature：22.2 ℃; **Liquid Temperature**：21 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(4.4, 4.4, 4.4); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch42/Area Scan (341x441x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.663 W/kg

Ch42/Zoom Scan (6x6x12)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm
Reference Value = 9.368 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.53 W/kg
SAR(1 g) = 0.424 W/kg; SAR(10 g) = 0.149 W/kg
Maximum value of SAR (measured) = 0.773 W/kg



P31 802.11a_Bottom_0cm_Ch40_Ant A+B

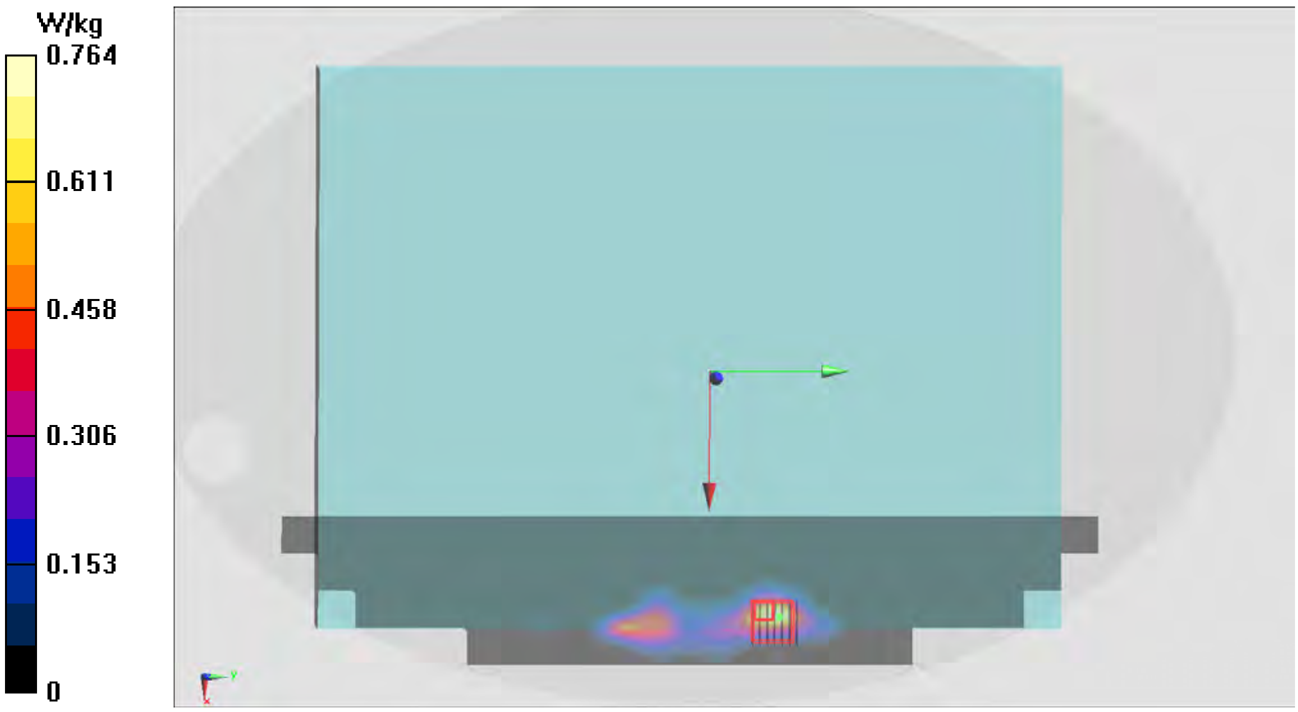
DUT: **5D3039-01**

Communication System: WLAN_5G ; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: B5G_170426 Medium parameters used: f = 5200 MHz; σ = 5.448 S/m; ε_r = 47.124; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3931; ConvF(4.57, 4.57, 4.57); Calibrated: 2016/10/3;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2016/9/28
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1227
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7373)

Ch40/Ar **ea Scan (81x441x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.764 W/kg

Ch40/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 9.133 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 2.84 W/kg
SAR(1 g) = 0.487 W/kg; SAR(10 g) = 0.152 W/kg
Maximum value of SAR (measured) = 1.09 W/kg



P10 802.11ac_VHT20_Bottom_0cm_Ch56_Ant A

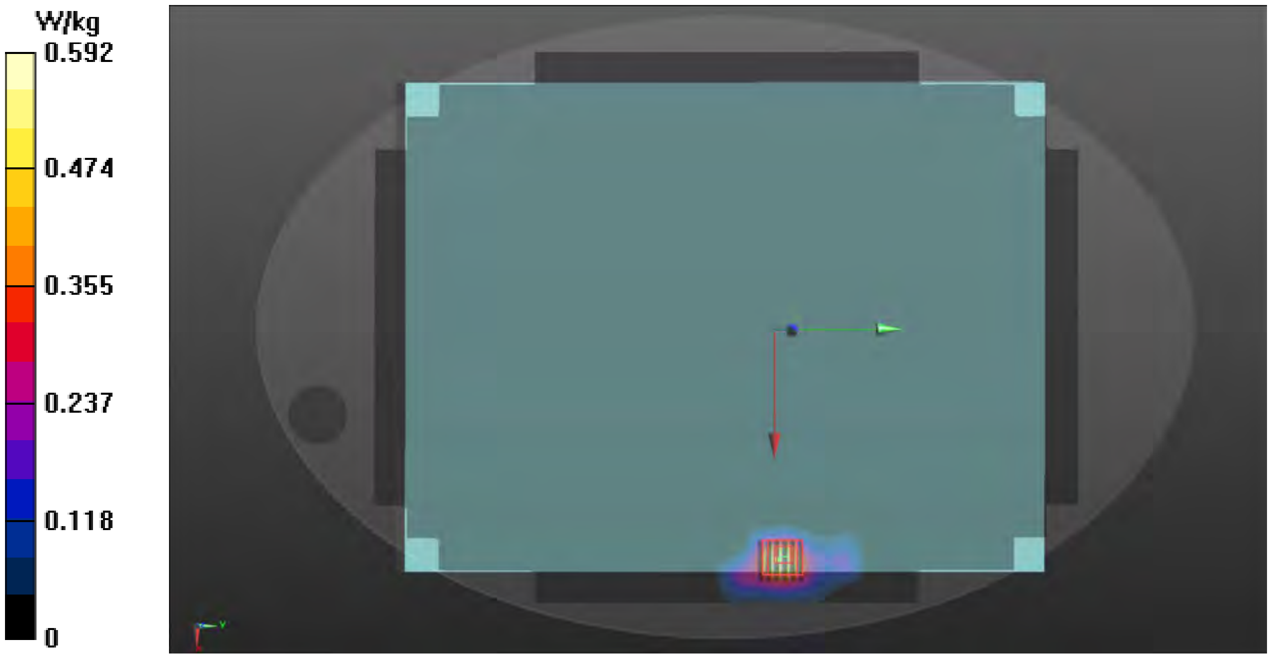
DUT: 5D3039-01

Communication System: WLAN_5G; Frequency: 5280 MHz;Duty Cycle: 1:1
Medium: B5G_160325 Medium parameters used: f = 5280 MHz; σ = 5.491 S/m; ε_r = 49.735; ρ = 1000 kg/m^3
Ambient Temperature：21.2 ℃; **Liquid Temperature**：20.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(4.4, 4.4, 4.4); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch56/Area Scan (341x441x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.592 W/kg

Ch56/Zoom Scan (6x6x12)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm
Reference Value = 10.28 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.63 W/kg
SAR(1 g) = 0.450 W/kg; SAR(10 g) = 0.163 W/kg
Maximum value of SAR (measured) = 0.820 W/kg



P11 802.11ac_VHT20_Bottom_0cm_Ch56_Ant B

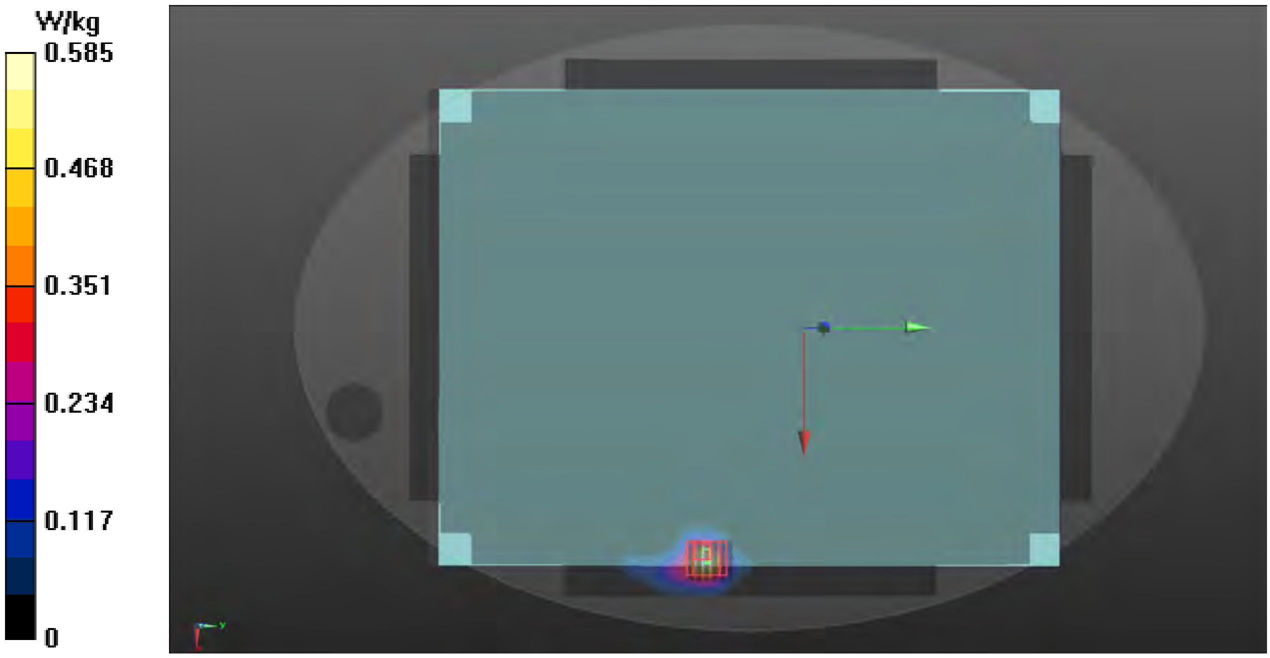
DUT: 5D3039-01

Communication System: WLAN_5G; Frequency: 5280 MHz;Duty Cycle: 1:1
Medium: B5G_160325 Medium parameters used: f = 5280 MHz; σ = 5.491 S/m; ε_r = 49.735; ρ = 1000 kg/m^3
Ambient Temperature：21.2 ℃; **Liquid Temperature**：20.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(4.4, 4.4, 4.4); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch56/Area Scan (341x441x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.585 W/kg

Ch56/Zoom Scan (6x6x12)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm
Reference Value = 9.044 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.18 W/kg
SAR(1 g) = 0.326 W/kg; SAR(10 g) = 0.118 W/kg
Maximum value of SAR (measured) = 0.613 W/kg



P12 802.11ac_VHT80_Bottom_0cm_Ch58_Ant A

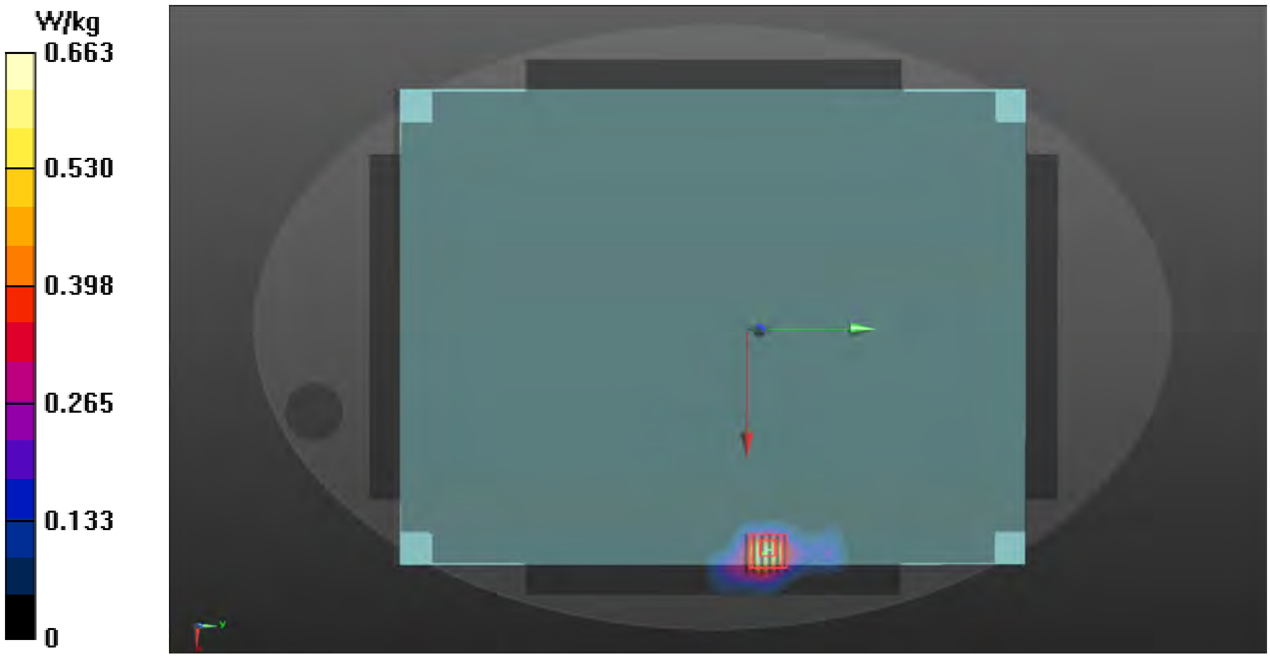
DUT: 5D3039-01

Communication System: WLAN_5G; Frequency: 5290 MHz;Duty Cycle: 1:1
Medium: B5G_160325 Medium parameters used: f = 5290 MHz; σ = 5.496 S/m; ε_r = 49.711; ρ = 1000 kg/m^3
Ambient Temperature：21.2 ℃; **Liquid Temperature**：20.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(4.4, 4.4, 4.4); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch58/Area Scan (341x441x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.663 W/kg

Ch58/Zoom Scan (6x6x12)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm
Reference Value = 9.964 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 1.66 W/kg
SAR(1 g) = 0.437 W/kg; SAR(10 g) = 0.157 W/kg
Maximum value of SAR (measured) = 0.805 W/kg



P13 802.11ac_VHT80_Bottom_0cm_Ch58_Ant B

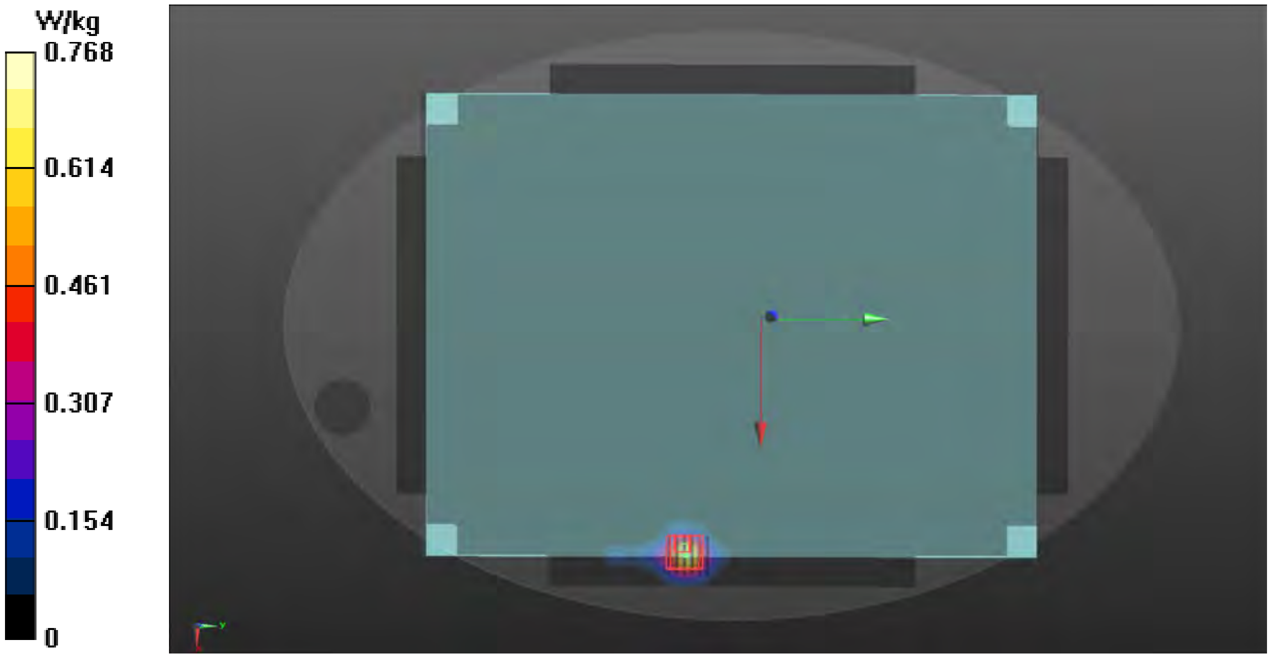
DUT: 5D3039-01

Communication System: WLAN_5G; Frequency: 5290 MHz;Duty Cycle: 1:1
Medium: B5G_160325 Medium parameters used: f = 5290 MHz; σ = 5.496 S/m; ε_r = 49.711; ρ = 1000 kg/m^3
Ambient Temperature：21.2 ℃; **Liquid Temperature**：20.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(4.4, 4.4, 4.4); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch58/Area Scan (341x441x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.768 W/kg

Ch58/Zoom Scan (6x6x12)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm
Reference Value = 9.975 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 1.40 W/kg
SAR(1 g) = 0.379 W/kg; SAR(10 g) = 0.130 W/kg
Maximum value of SAR (measured) = 0.720 W/kg



P32 802.11ac_VHT20_Bottom_0cm_Ch56_Ant A+B

DUT: **5D3039-01**

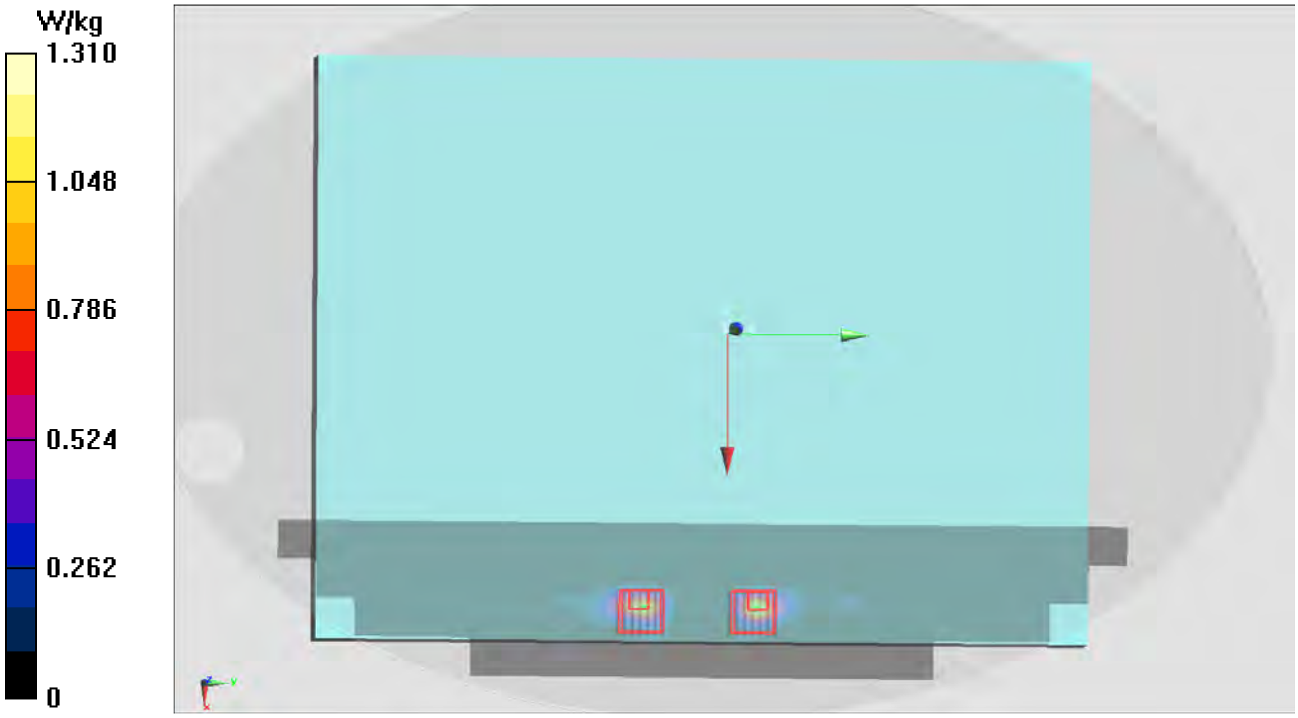
Communication System: WLAN_5G ; Frequency: 5280 MHz;Duty Cycle: 1:1
Medium: B5G_170426 Medium parameters used: f = 5280 MHz; $\sigma = 5.556$ S/m; $\varepsilon_r = 46.962$; $\rho = 1000$ kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3931; ConvF(4.57, 4.57, 4.57); Calibrated: 2016/10/3;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2016/9/28
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1227
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7373)

Ch56/Ar **ea Scan (81x441x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.31 W/kg

Ch56/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 11.03 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.31 W/kg
SAR(1 g) = 0.329 W/kg; SAR(10 g) = 0.099 W/kg
Maximum value of SAR (measured) = 0.769 W/kg

Ch56/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 11.03 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 2.67 W/kg
SAR(1 g) = 0.305 W/kg; SAR(10 g) = 0.088 W/kg
Maximum value of SAR (measured) = 0.700 W/kg



P14 802.11ac_VHT20_Bottom_0cm_Ch100_Ant A

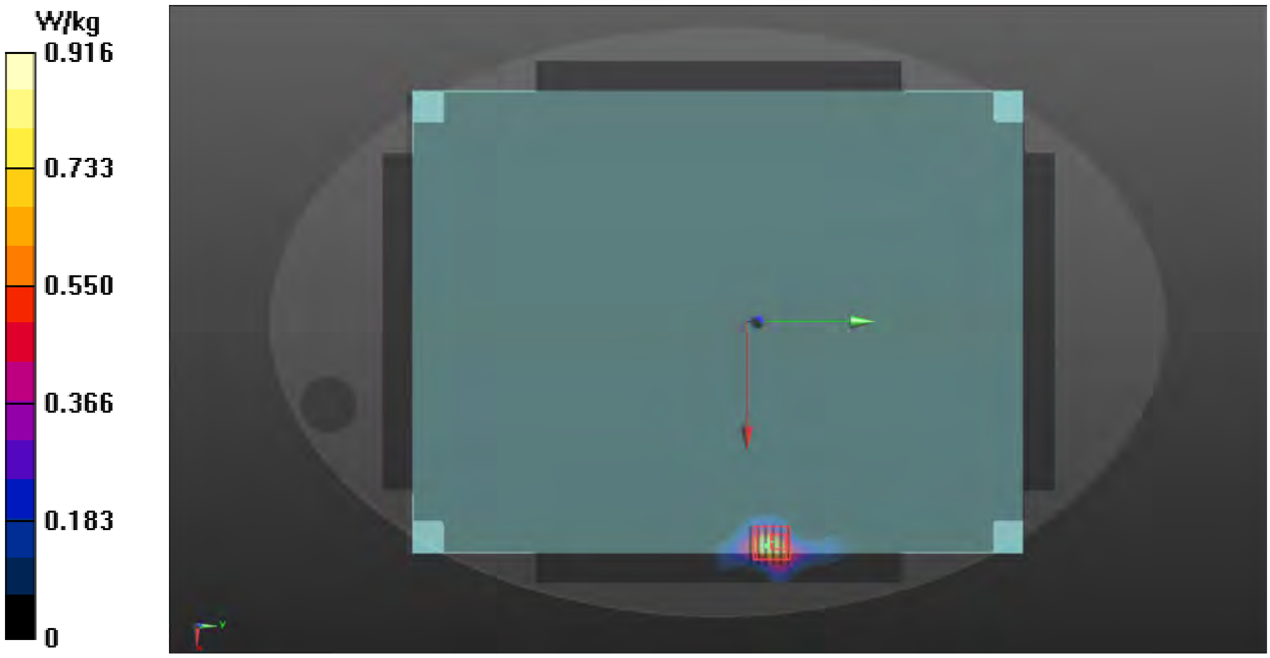
DUT: 5D3039-01

Communication System: WLAN_5G; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium: B5G_160328 Medium parameters used: f = 5500 MHz; σ = 5.784 S/m; ε_r = 48.394; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃; **Liquid Temperature**：21.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(3.78, 3.78, 3.78); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch100/Area Scan (341x441x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.916 W/kg

Ch100/Zoom Scan (6x6x12)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm
Reference Value = 11.73 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.73 W/kg
SAR(1 g) = 0.468 W/kg; SAR(10 g) = 0.168 W/kg
Maximum value of SAR (measured) = 0.891 W/kg



P15 802.11ac_VHT20_Bottom_0cm_Ch140_Ant B

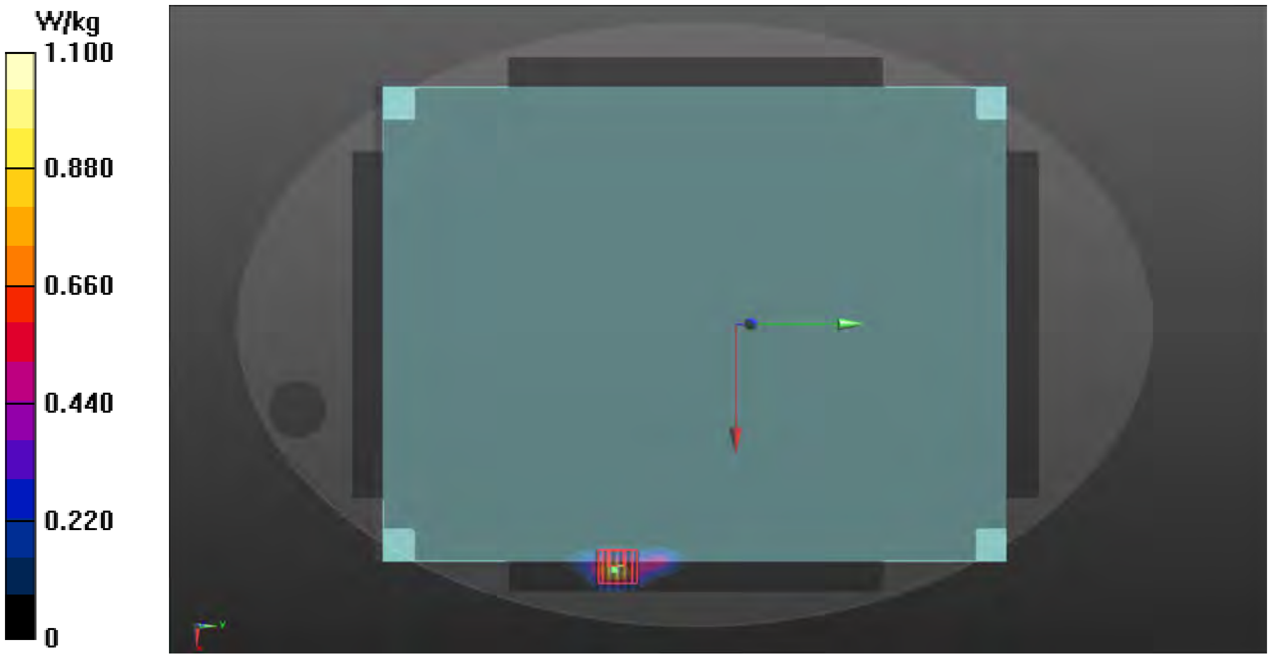
DUT: 5D3039-01

Communication System: WLAN_5G; Frequency: 5700 MHz;Duty Cycle: 1:1
Medium: B5G_160328 Medium parameters used: f = 5700 MHz; σ = 6.04 S/m; ε_r = 47.898; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃; **Liquid Temperature**：21.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(3.78, 3.78, 3.78); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch140/Area Scan (341x441x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.10 W/kg

Ch140/Zoom Scan (6x6x12)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm
Reference Value = 10.11 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.61 W/kg
SAR(1 g) = 0.413 W/kg; SAR(10 g) = 0.124 W/kg
Maximum value of SAR (measured) = 0.795 W/kg



P16 802.11ac_VHT80_Bottom_0cm_Ch138_Ant A

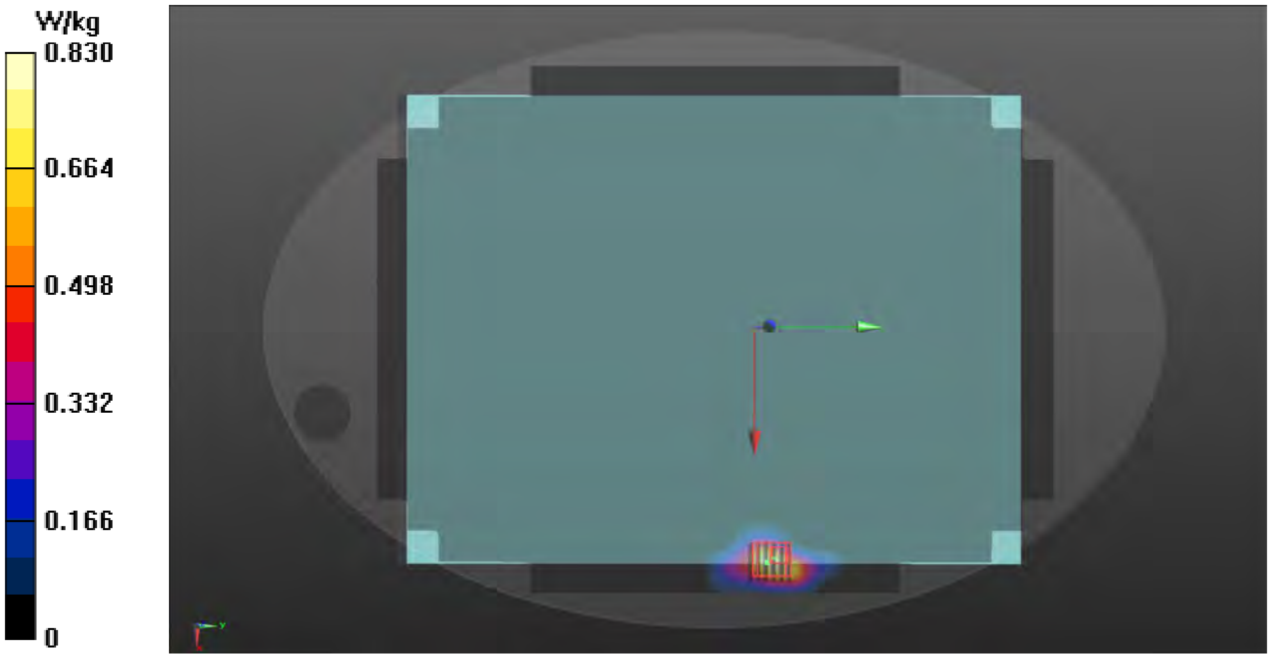
DUT: 5D3039-01

Communication System: WLAN_5G; Frequency: 5690 MHz;Duty Cycle: 1:1
Medium: B5G_160328 Medium parameters used: f = 5690 MHz; σ = 6.01 S/m; ε_r = 47.921; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃; **Liquid Temperature**：21.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(3.78, 3.78, 3.78); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch138/Area Scan (241x441x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.830 W/kg

Ch138/Zoom Scan (6x6x12)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm
Reference Value = 12.61 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 2.02 W/kg
SAR(1 g) = 0.499 W/kg; SAR(10 g) = 0.159 W/kg
Maximum value of SAR (measured) = 1.02 W/kg



Test Laboratory: Sporton International Inc. SAR Testing Lab Date: 2016/3/28

P17 802.11ac_VHT80_Bottom_0cm_Ch106_Ant B

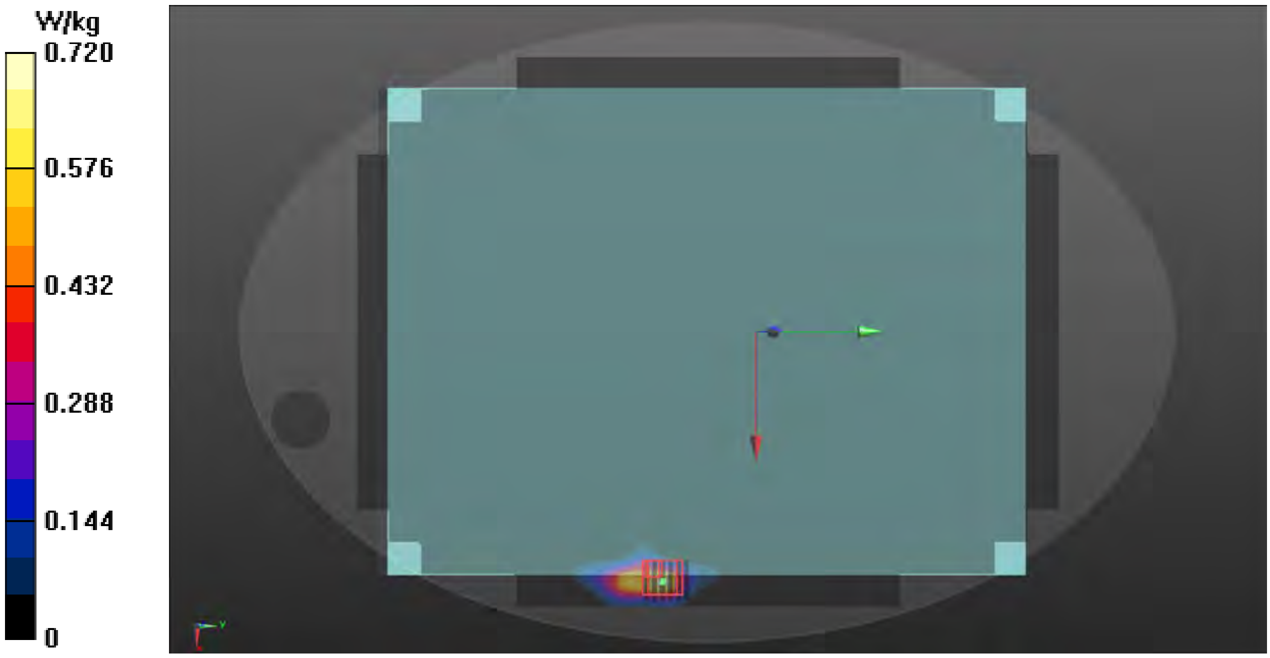
DUT: 5D3039-01

Communication System: WLAN_5G; Frequency: 5530 MHz;Duty Cycle: 1:1
Medium: B5G_160328 Medium parameters used: f = 5530 MHz; σ = 5.79 S/m; ε_r = 48.351; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃; **Liquid Temperature**：21.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(3.78, 3.78, 3.78); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch106/Area Scan (341x441x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.720 W/kg

Ch106/Zoom Scan (6x6x12)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm
Reference Value = 10.20 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.24 W/kg
SAR(1 g) = 0.286 W/kg; SAR(10 g) = 0.097 W/kg
Maximum value of SAR (measured) = 0.631 W/kg



Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab

Date: 2017/4/26

P33 802.11a_Bottom_0cm_Ch100_Ant A+B

DUT: 5D3039-01

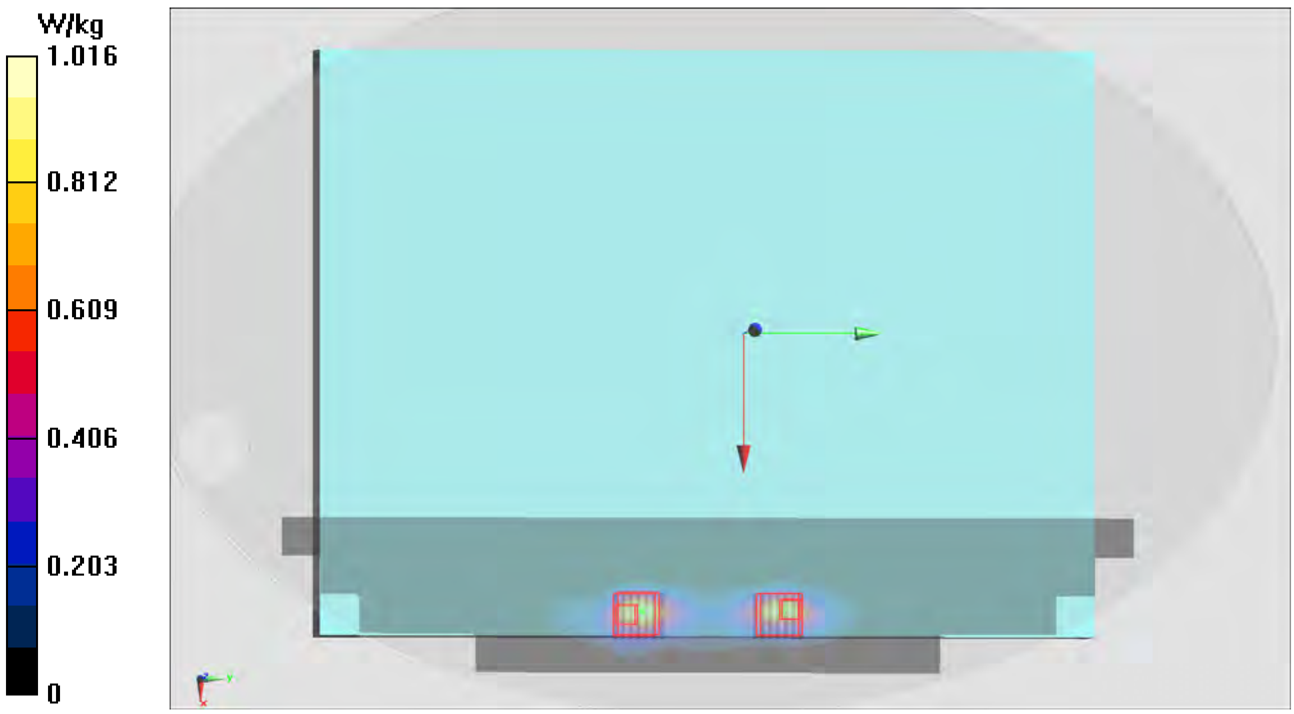
Communication System:WLAN_5G; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium: B5G_170426 Medium parameters used: f = 5500 MHz; σ = 5.839 S/m; ε_r = 46.578; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3931; ConvF(3.71, 3.71, 3.71); Calibrated: 2016/10/3;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2016/9/28
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1227
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7373)

Ch100/Area Scan (81x441x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm Maximum value of SAR (interpolated) = 1.02 W/kg

Ch100/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 9.083 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 1.34 W/kg
SAR(1 g) = 0.395 W/kg; SAR(10 g) = 0.135 W/kg
Maximum value of SAR (measured) = 0.871 W/kg

Ch100/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 9.083 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 1.61 W/kg
SAR(1 g) = 0.311 W/kg; SAR(10 g) = 0.110 W/kg
Maximum value of SAR (measured) = 0.708 W/kg



P18 802.11ac_HT20_Bottom_0cm_Ch149_Ant A

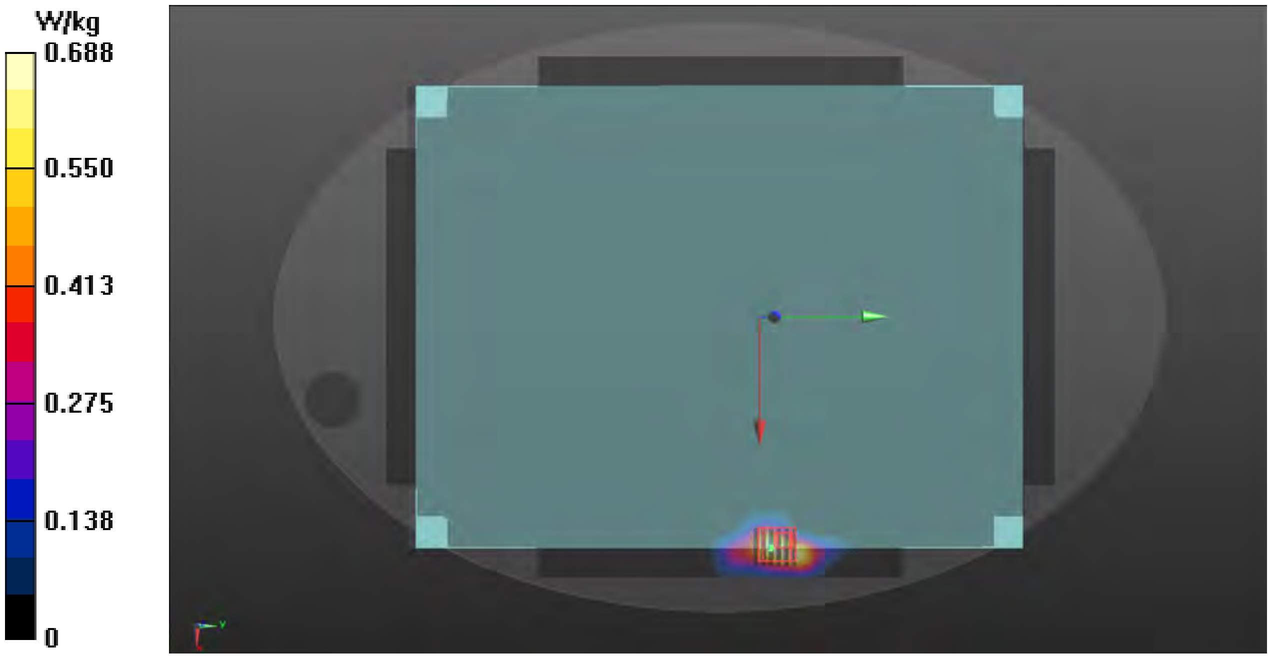
DUT: 5D3039-01

Communication System: WLAN_5G; Frequency: 5745 MHz;Duty Cycle: 1:1
Medium: B5G_160329 Medium parameters used: f = 5745 MHz; σ = 6.117 S/m; ε_r = 48.332; ρ = 1000 kg/m^3
Ambient Temperature：22.6 ℃; **Liquid Temperature**：21.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(3.96, 3.96, 3.96); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch149/Area Scan (341x441x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.688 W/kg

Ch149/Zoom Scan (6x6x12)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm
Reference Value = 11.59 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 1.83 W/kg
SAR(1 g) = 0.435 W/kg; SAR(10 g) = 0.135 W/kg
Maximum value of SAR (measured) = 0.945 W/kg



P19 802.11ac_HT20_Bottom_0cm_Ch157_Ant B

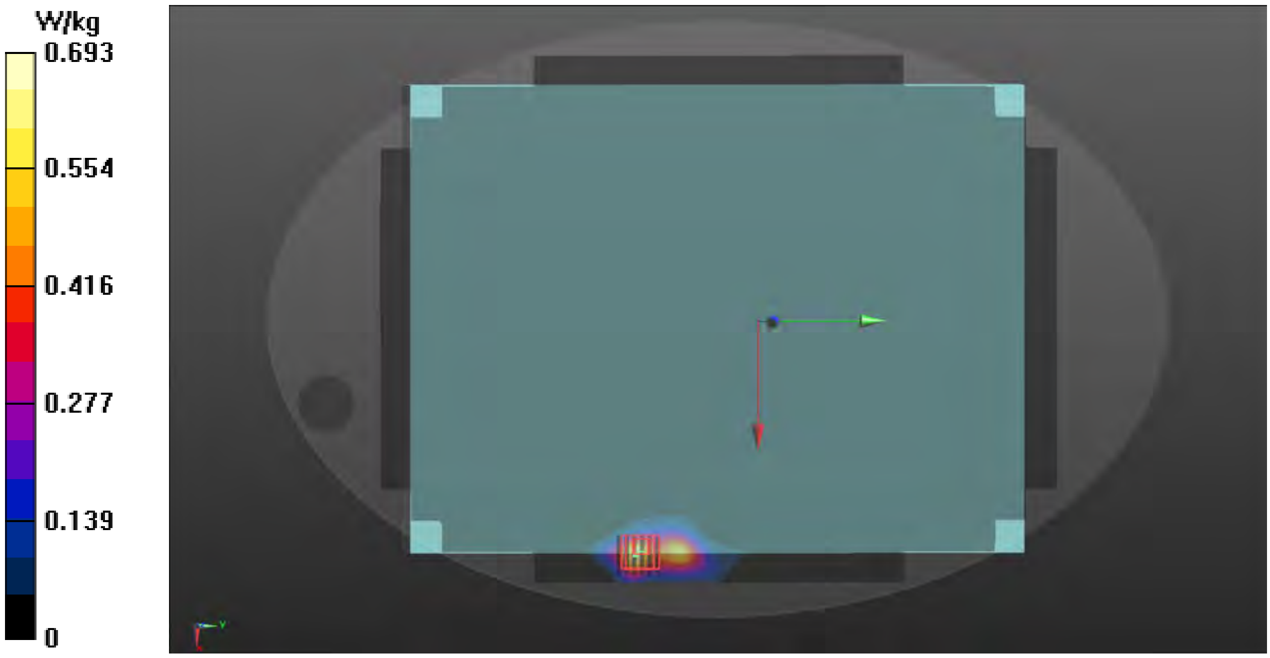
DUT: 5D3039-01

Communication System: WLAN_5G; Frequency: 5785 MHz;Duty Cycle: 1:1
Medium: B5G_160329 Medium parameters used: f = 5785 MHz; σ = 6.126 S/m; ε_r = 48.187; ρ = 1000 kg/m^3
Ambient Temperature：22.6 ℃; **Liquid Temperature**：21.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(3.96, 3.96, 3.96); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch157/Area Scan (341x441x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.693 W/kg

Ch157/Zoom Scan (6x6x12)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm
Reference Value = 10.23 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.61 W/kg
SAR(1 g) = 0.440 W/kg; SAR(10 g) = 0.148 W/kg
Maximum value of SAR (measured) = 0.818 W/kg



P20 802.11ac_VHT80_Bottom_0cm_Ch155_Ant A

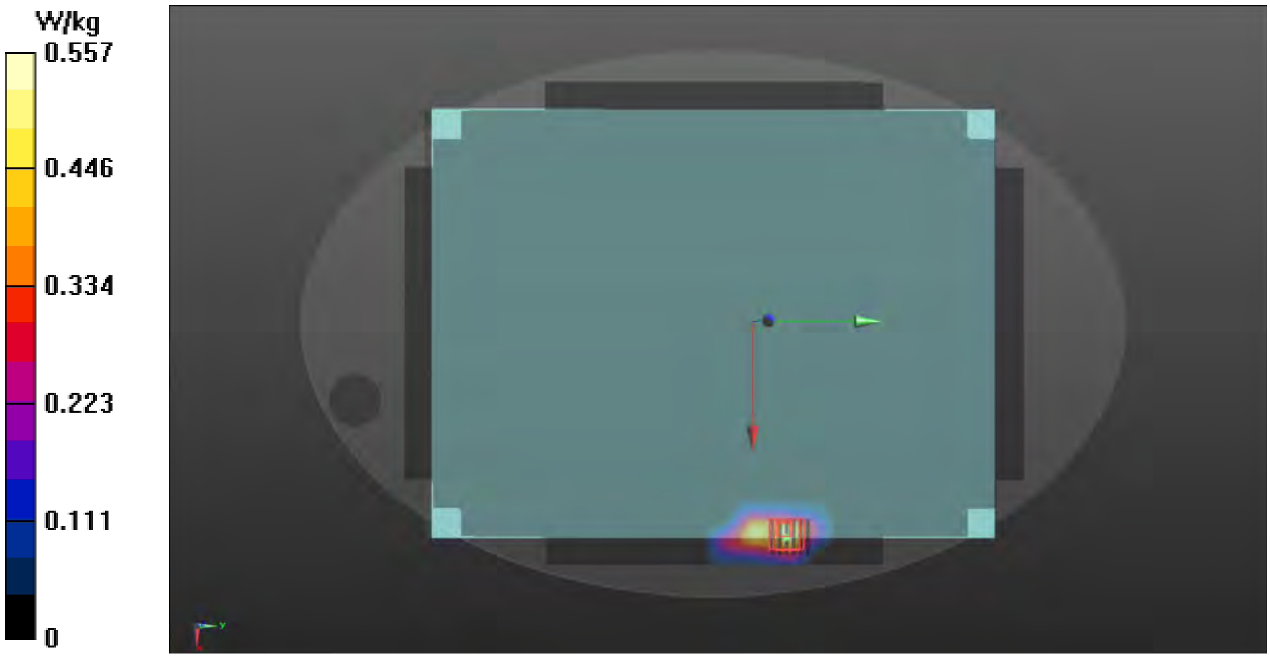
DUT: 5D3039-01

Communication System: WLAN_5G; Frequency: 5775 MHz;Duty Cycle: 1:1
Medium: B5G_160329 Medium parameters used: f = 5775 MHz; σ = 6.118 S/m; ε_r = 48.25; ρ = 1000 kg/m^3
Ambient Temperature：22.6 ℃; **Liquid Temperature**：21.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(3.96, 3.96, 3.96); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch155/Area Scan (371x441x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.557 W/kg

Ch155/Zoom Scan (6x6x12)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm
Reference Value = 9.555 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.71 W/kg
SAR(1 g) = 0.470 W/kg; SAR(10 g) = 0.160 W/kg
Maximum value of SAR (measured) = 0.884 W/kg



P21 802.11ac_VHT80_Bottom_0cm_Ch155_Ant B

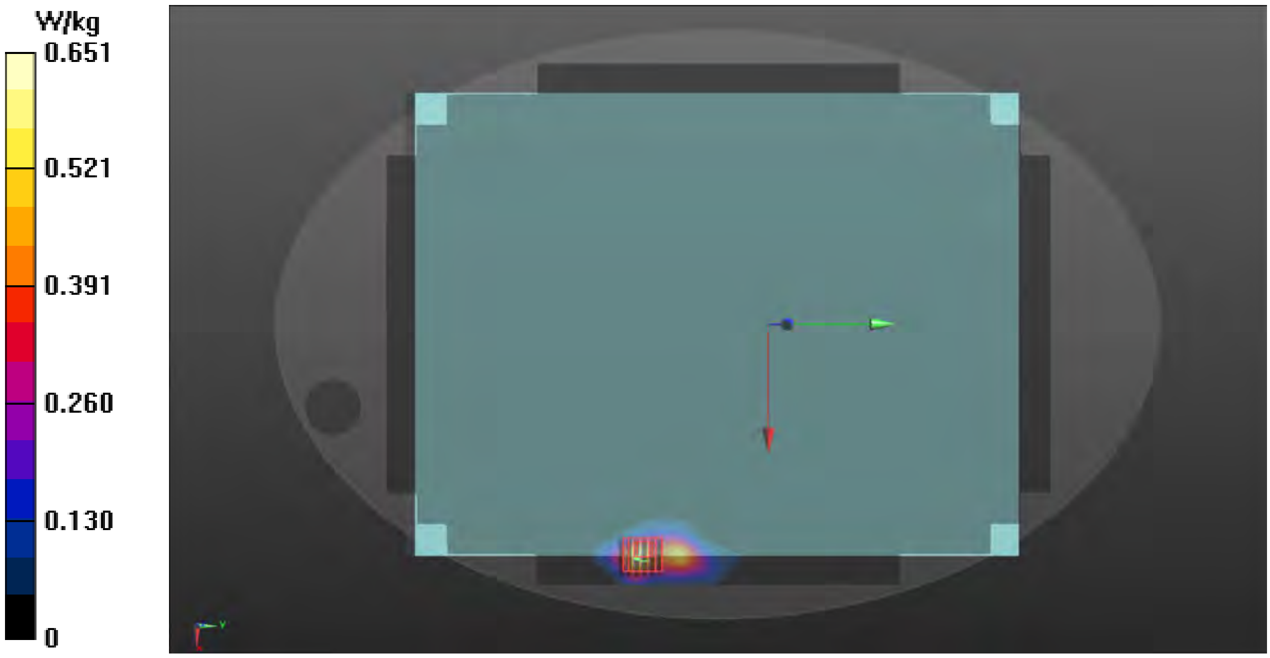
DUT: 5D3039-01

Communication System: WLAN_5G; Frequency: 5775 MHz;Duty Cycle: 1:1
Medium: B5G_160329 Medium parameters used: f = 5775 MHz; σ = 6.118 S/m; ε_r = 48.25; ρ = 1000 kg/m^3
Ambient Temperature：22.6 ℃; **Liquid Temperature**：21.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3976; ConvF(3.96, 3.96, 3.96); Calibrated: 2016/2/22;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1424; Calibrated: 2016/2/16
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1238
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch155/Area Scan (341x441x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.651 W/kg

Ch155/Zoom Scan (6x6x12)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm
Reference Value = 9.775 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.50 W/kg
SAR(1 g) = 0.414 W/kg; SAR(10 g) = 0.140 W/kg
Maximum value of SAR (measured) = 0.767 W/kg



P34 802.11n_HT0_Bottom_0cm_Ch157_Ant A+B

DUT: **5D3039-01**

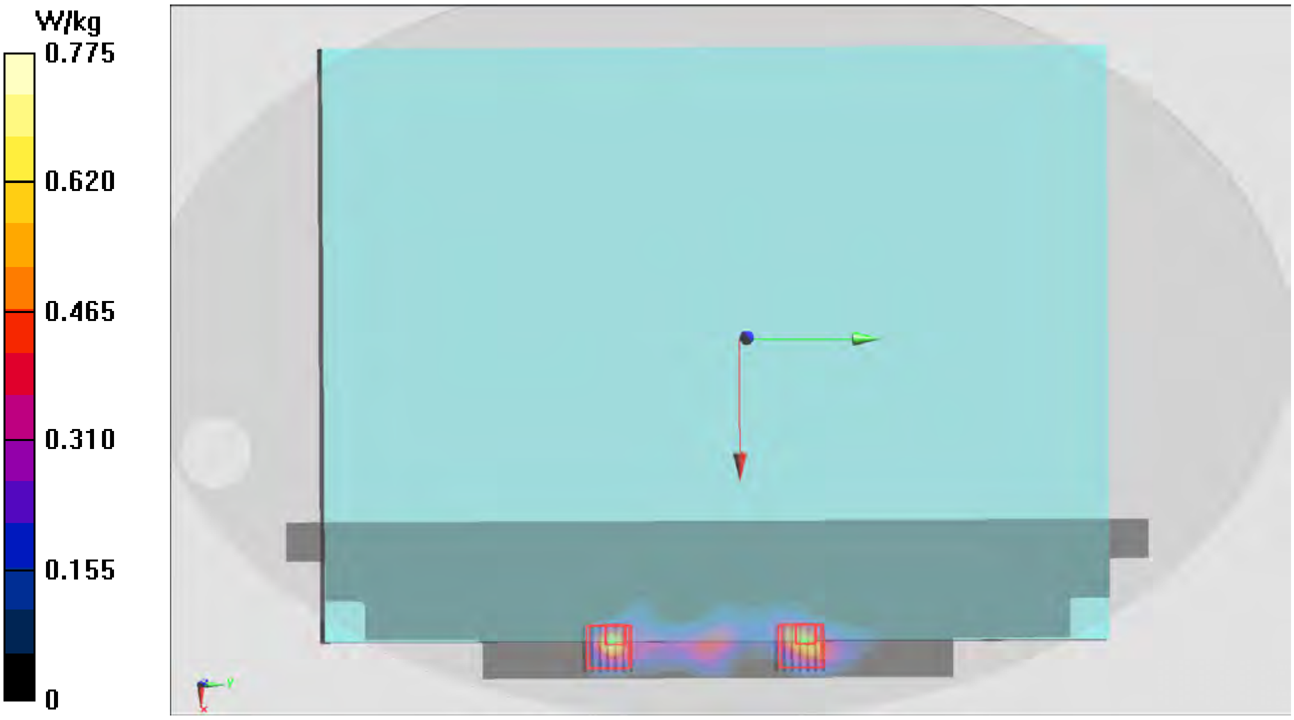
Communication System: 802.11a ; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium: B5G_170426 Medium parameters used: f = 5500 MHz; σ = 5.839 S/m; ε_r = 46.578; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3931; ConvF(3.71, 3.71, 3.71); Calibrated: 2016/10/3;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 2016/9/28
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1227
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7373)

Ch100/Area Scan (81x441x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.02 W/kg

Ch100/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 9.083 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 1.34 W/kg
SAR(1 g) = 0.395 W/kg; SAR(10 g) = 0.135 W/kg
Maximum value of SAR (measured) = 0.871 W/kg

Ch100/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 9.083 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 1.61 W/kg
SAR(1 g) = 0.311 W/kg; SAR(10 g) = 0.110 W/kg
Maximum value of SAR (measured) = 0.708 W/kg



Appendix C. DASY Calibration Certificate

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Phone +41 44 245 9700, Fax +41 44 245 9779
info@speag.com, http://www.speag.com

1424

IMPORTANT NOTICE

USAGE OF THE DAE 4

The DAE unit is a delicate, high precision instrument and requires careful treatment by the user. There are no serviceable parts inside the DAE. Special attention shall be given to the following points:

Battery Exchange: The battery cover of the DAE4 unit is closed using a screw, over tightening the screw may cause the threads inside the DAE to wear out.

Shipping of the DAE: Before shipping the DAE to SPEAG for calibration, remove the batteries and pack the DAE in an antistatic bag. This antistatic bag shall then be packed into a larger box or container which protects the DAE from impacts during transportation. The package shall be marked to indicate that a fragile instrument is inside.

E-Stop Failures: Touch detection may be malfunctioning due to broken magnets in the E-stop. Rough handling of the E-stop may lead to damage of these magnets. Touch and collision errors are often caused by dust and dirt accumulated in the E-stop. To prevent E-stop failure, the customer shall always mount the probe to the DAE carefully and keep the DAE unit in a non-dusty environment if not used for measurements.

Repair: Minor repairs are performed at no extra cost during the annual calibration. However, SPEAG reserves the right to charge for any repair especially if rough unprofessional handling caused the defect.

DASY Configuration Files: Since the exact values of the DAE input resistances, as measured during the calibration procedure of a DAE unit, are not used by the DASY software, a nominal value of 200 MOhm is given in the corresponding configuration file.

Important Note:
Warranty and calibration is void if the DAE unit is disassembled partly or fully by the Customer.

Important Note:
Never attempt to grease or oil the E-stop assembly. Cleaning and readjusting of the E-stop assembly is allowed by certified SPEAG personnel only and is part of the annual calibration procedure.

Important Note:
To prevent damage of the DAE probe connector pins, use great care when installing the probe to the DAE. Carefully connect the probe with the connector notch oriented in the mating position. Avoid any rotational movement of the probe body versus the DAE while turning the locking nut of the connector. The same care shall be used when disconnecting the probe from the DAE.

Calibration Laboratory of
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Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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

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

Accreditation No.: SCS 0108

Client **Sporton - ICC (Auden)**

Certificate No: DAE4-1424_Feb16

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BM - SN: 1424
Calibration procedure(s)	QA CAL-06.v29 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	February 16, 2016

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	09-Sep-15 (No:17153)	Sep-16
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Auto DAE Calibration Unit	SE UWS 053 AA 1001	05-Jan-16 (in house check)	In house check: Jan-17
Calibrator Box V2.1	SE UMS 006 AA 1002	05-Jan-16 (in house check)	In house check: Jan-17

	Name	Function	Signature
Calibrated by:	Eric Hainfeld	Technician	
Approved by:	Fin Bomholt	Deputy Technical Manager	i.V.

Issued: February 16, 2016

Glossary

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
  - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
  - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
  - *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
  - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
  - *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1μV , full range = -100...+300 mV

Low Range: 1LSB = 61nV , full range = -1.......+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	403.115 ± 0.02% (k=2)	403.593 ± 0.02% (k=2)	403.165 ± 0.02% (k=2)
Low Range	3.96879 ± 1.50% (k=2)	3.99597 ± 1.50% (k=2)	3.98373 ± 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	358.5 ° ± 1 °

Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	200030.11	-0.54	-0.00
Channel X	+ Input	20005.39	1.52	0.01
Channel X	- Input	-20004.18	1.46	-0.01
Channel Y	+ Input	200029.89	-0.75	-0.00
Channel Y	+ Input	20003.08	-0.74	-0.00
Channel Y	- Input	-20006.82	-1.12	0.01
Channel Z	+ Input	200029.36	-1.53	-0.00
Channel Z	+ Input	20003.05	-0.71	-0.00
Channel Z	- Input	-20006.58	-0.86	0.00

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2000.50	0.09	0.00
Channel X	+ Input	200.58	0.30	0.15
Channel X	- Input	-199.66	-0.22	0.11
Channel Y	+ Input	2000.78	0.49	0.02
Channel Y	+ Input	199.77	-0.58	-0.29
Channel Y	- Input	-200.27	-0.74	0.37
Channel Z	+ Input	2000.21	0.02	0.00
Channel Z	+ Input	199.29	-0.91	-0.46
Channel Z	- Input	-201.23	-1.59	0.80

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	-0.82	-2.06
	- 200	2.72	1.54
Channel Y	200	-13.08	-13.46
	- 200	12.33	11.90
Channel Z	200	-8.84	-8.96
	- 200	6.20	6.09

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	3.30	-3.61
Channel Y	200	8.63	-	3.78
Channel Z	200	9.24	6.81	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15955	15472
Channel Y	15879	15883
Channel Z	15879	14240

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.90	-0.12	1.64	0.38
Channel Y	0.29	-0.72	2.16	0.44
Channel Z	-1.12	-2.05	-0.03	0.36

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	–0.01	-8	-9

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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Swiss Calibration Service

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

Accreditation No.: SCS 0108

Client Sporton - TW (Auden)

Certificate No: DAE3-577_Sep16

CALIBRATION CERTIFICATE

Object	DAE3 - SD 000 D03 AA - SN: 577
Calibration procedure(s)	QA CAL-06.v29 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	September 28, 2016

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	09-Sep-16 (No:19065)	Sep-17
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Auto DAE Calibration Unit	SE UWS 053 AA 1001	05-Jan-16 (in house check)	In house check: Jan-17
Calibrator Box V2.1	SE UMS 006 AA 1002	05-Jan-16 (in house check)	In house check: Jan-17

	Name	Function	Signature
Calibrated by:	Eric Hainfeld	Technician	
Approved by:	Fin Bomholt	Deputy Technical Manager	i.V.

Issued: September 28, 2016

Glossary

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
  - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
  - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
  - *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
  - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
  - *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1μV , full range = -100…+300 mV

Low Range: 1LSB = 61nV , full range = -1…….+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	**X**	**Y**	**Z**
High Range	403.533 ± 0.02% (k=2)	403.512 ± 0.02% (k=2)	403.819 ± 0.02% (k=2)
Low Range	3.92648 ± 1.50% (k=2)	3.94206 ± 1.50% (k=2)	3.96074 ± 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	190.0 ° ± 1 °

Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	200038.14	2.56	0.00
Channel X	+ Input	20010.51	5.45	0.03
Channel X	- Input	-20002.01	3.17	-0.02
Channel Y	+ Input	200032.33	-3.18	-0.00
Channel Y	+ Input	20006.38	1.35	0.01
Channel Y	- Input	-20004.73	0.65	-0.00
Channel Z	+ Input	200031.49	-4.11	-0.00
Channel Z	+ Input	20005.92	0.98	0.00
Channel Z	- Input	-20007.03	-1.64	0.01

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2001.00	-0.10	-0.01
Channel X	+ Input	201.47	0.40	0.20
Channel X	- Input	-198.57	0.28	-0.14
Channel Y	+ Input	2001.38	0.31	0.02
Channel Y	+ Input	200.40	-0.54	-0.27
Channel Y	- Input	-199.63	-0.73	0.37
Channel Z	+ Input	2000.35	-0.56	-0.03
Channel Z	+ Input	199.97	-0.93	-0.46
Channel Z	- Input	-200.50	-1.56	0.79

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	-2.76	-4.30
	- 200	6.04	3.73
Channel Y	200	-14.29	-14.35
	- 200	12.74	12.77
Channel Z	200	3.10	2.81
	- 200	-5.90	-5.65

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	-1.07	-3.44
Channel Y	200	8.43	-	0.12
Channel Z	200	5.44	4.83	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	16132	16062
Channel Y	16099	16321
Channel Z	16116	15372

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.37	-1.07	1.49	0.43
Channel Y	1.21	-0.41	3.21	0.59
Channel Z	-1.38	-2.63	-0.30	0.45

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	−0.01	-8	-9

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Swiss Calibration Service

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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **Sporton-ICC (Auden)**

Certificate No: EX3-3976_Feb16

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3976
Calibration procedure(s)	QA CAL-01.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6 Calibration procedure for dosimetric E-field probes
Calibration date:	February 22, 2016

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	01-Apr-15 (No. 217-02128)	Mar-16
Power sensor E4412A	MY41498087	01-Apr-15 (No. 217-02128)	Mar-16
Reference 3 dB Attenuator	SN: S5054 (3c)	01-Apr-15 (No. 217-02129)	Mar-16
Reference 20 dB Attenuator	SN: S5277 (20x)	01-Apr-15 (No. 217-02132)	Mar-16
Reference 30 dB Attenuator	SN: S5129 (30b)	01-Apr-15 (No. 217-02133)	Mar-16
Reference Probe ES3DV2	SN: 3013	31-Dec-15 (No. ES3-3013_Dec15)	Dec-16
DAE4	SN: 660	23-Dec-15 (No. DAE4-660_Dec15)	Dec-16
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: February 22, 2016

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

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.e., 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, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
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 ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect 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 with CW signal (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; Dx,y,z; VRx,y,z: A, B, C, D* 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 ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values 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 ± 50 MHz to ± 100 MHz.
- *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).

Probe EX3DV4

SN:3976

Manufactured: November 5, 2013
Calibrated: February 22, 2016

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3976

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.49	0.51	0.56	± 10.1 %
DCP (mV)[B]	102.3	101.2	102.3	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B $dB\sqrt{\mu V}$	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	192.1	±3.3 %
		Y	0.0	0.0	1.0		217.0	
		Z	0.0	0.0	1.0		197.5	

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 Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3976

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	41.9	0.89	10.44	10.44	10.44	0.56	0.80	± 12.0 %
835	41.5	0.90	10.21	10.21	10.21	0.51	0.80	± 12.0 %
900	41.5	0.97	9.94	9.94	9.94	0.48	0.83	± 12.0 %
1750	40.1	1.37	8.67	8.67	8.67	0.47	0.80	± 12.0 %
1900	40.0	1.40	8.33	8.33	8.33	0.43	0.85	± 12.0 %
2000	40.0	1.40	8.22	8.22	8.22	0.39	0.80	± 12.0 %
2300	39.5	1.67	7.82	7.82	7.82	0.39	0.80	± 12.0 %
2450	39.2	1.80	7.48	7.48	7.48	0.38	0.84	± 12.0 %
2600	39.0	1.96	7.32	7.32	7.32	0.35	0.96	± 12.0 %
5250	35.9	4.71	5.20	5.20	5.20	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.77	4.77	4.77	0.45	1.80	± 13.1 %
5750	35.4	5.22	4.84	4.84	4.84	0.45	1.80	± 13.1 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

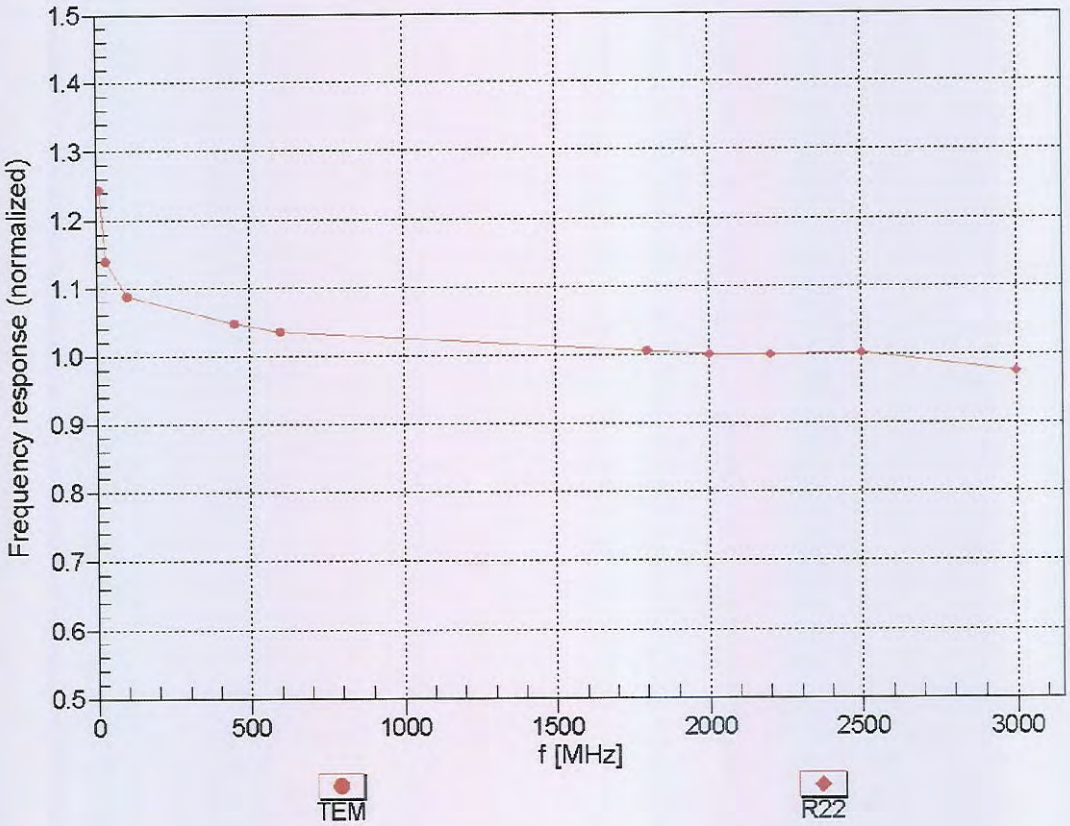
DASY/EASY - Parameters of Probe: EX3DV4 - SN:3976

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	55.5	0.96	10.13	10.13	10.13	0.32	1.08	± 12.0 %
835	55.2	0.97	9.93	9.93	9.93	0.47	0.85	± 12.0 %
900	55.0	1.05	9.92	9.92	9.92	0.46	0.80	± 12.0 %
1750	53.4	1.49	8.34	8.34	8.34	0.41	0.83	± 12.0 %
1900	53.3	1.52	8.06	8.06	8.06	0.41	0.80	± 12.0 %
2000	53.3	1.52	7.99	7.99	7.99	0.27	1.01	± 12.0 %
2300	52.9	1.81	7.60	7.60	7.60	0.41	0.80	± 12.0 %
2450	52.7	1.95	7.45	7.45	7.45	0.32	0.86	± 12.0 %
2600	52.5	2.16	7.20	7.20	7.20	0.28	0.90	± 12.0 %
5250	48.9	5.36	4.40	4.40	4.40	0.50	1.90	± 13.1 %
5600	48.5	5.77	3.78	3.78	3.78	0.55	1.90	± 13.1 %
5750	48.3	5.94	3.96	3.96	3.96	0.60	1.90	± 13.1 %

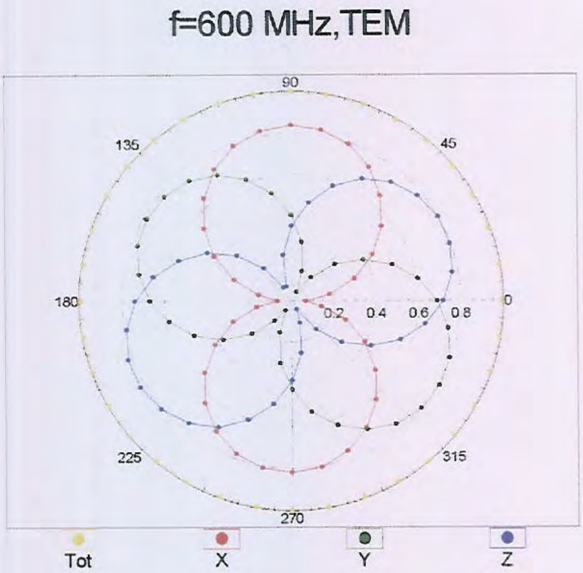
[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

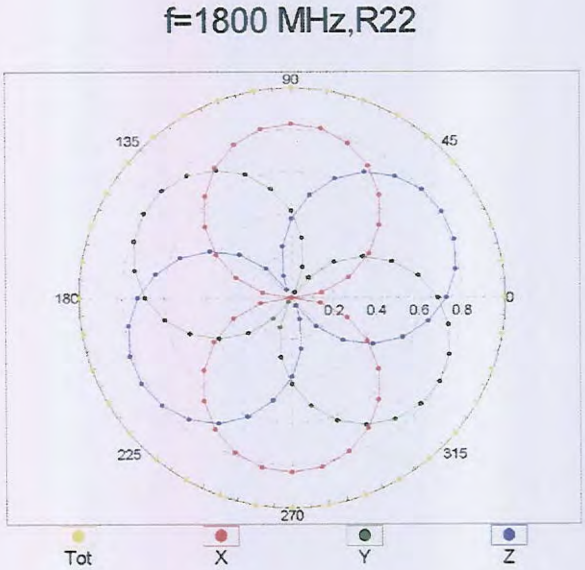
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)

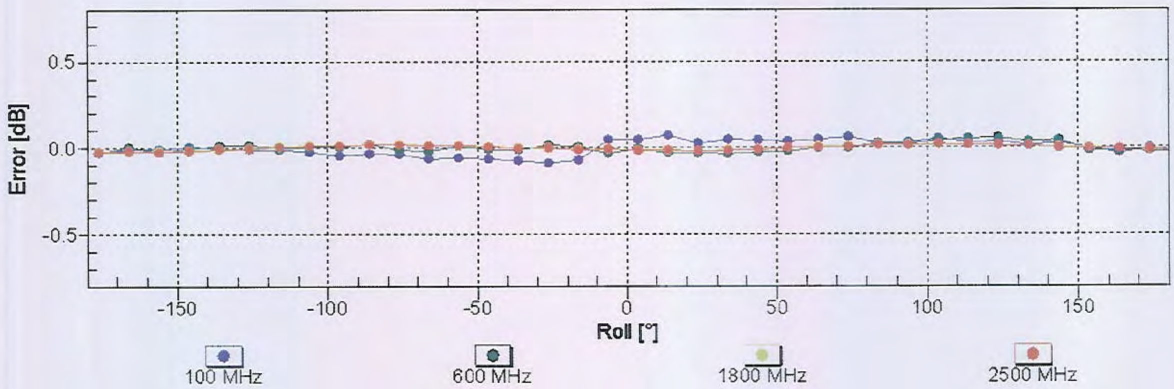


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), $\vartheta = 0°$



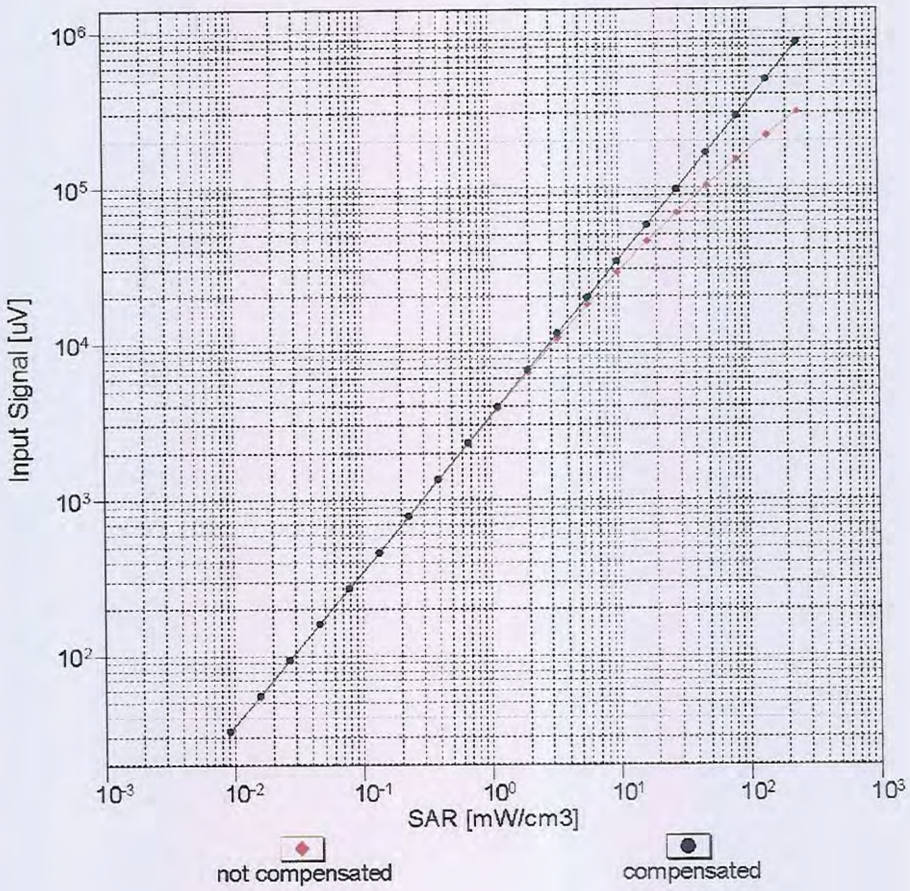


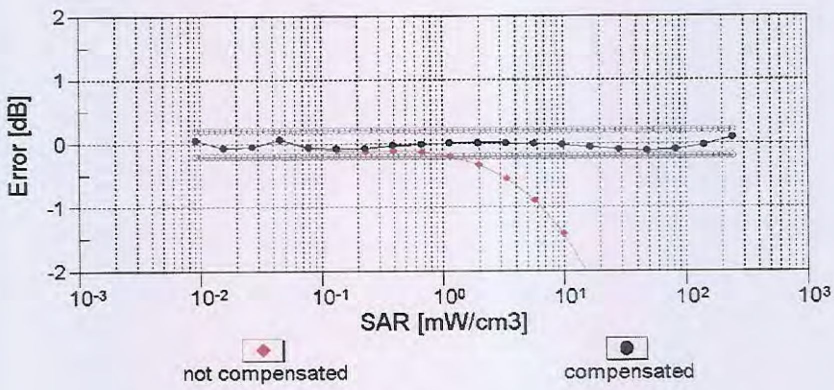


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

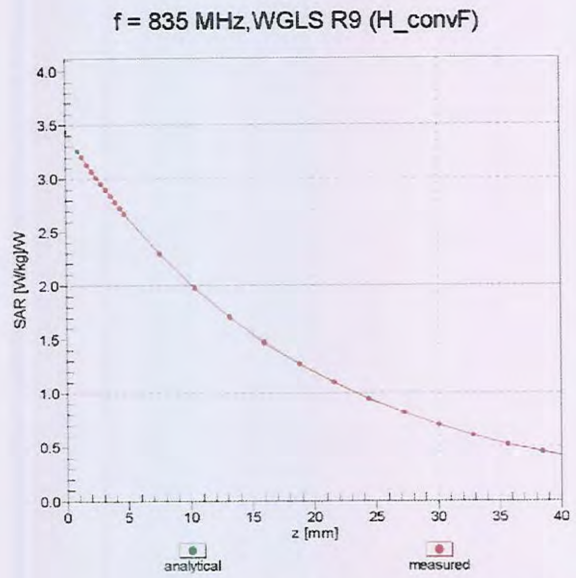
(TEM cell , f_{eval}= 1900 MHz)

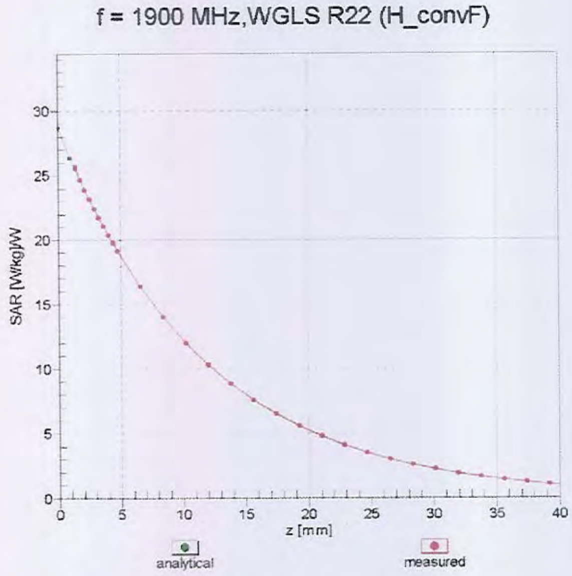




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

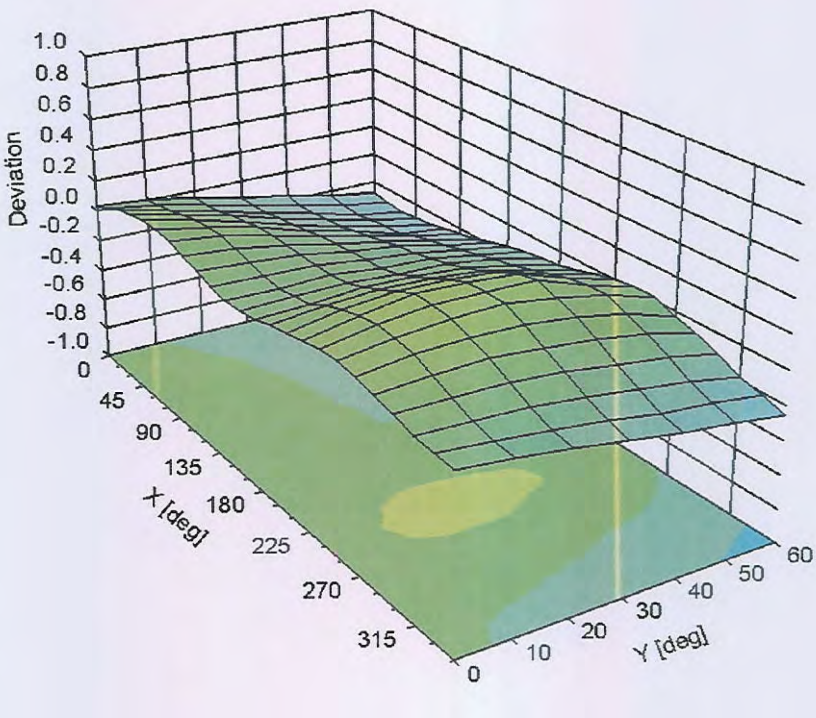
Conversion Factor Assessment

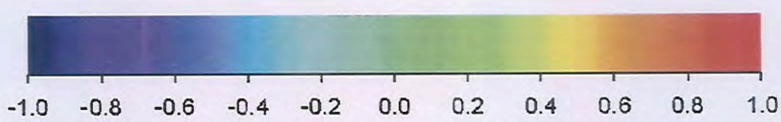




Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3976

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-6.2
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm