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检测
TESTING
CNAS L2264

SAR TEST REPORT

Applicant	TP-LINK TECHNOLOGIES CO., LTD.
FCC ID	TE7T2UHP
Product	AC600 High Power Wireless Dual Band USB Adapter
Brand	TP-LINK
Model	Archer T2UHP
Report No.	RXA1608-0178SAR01R1
Issue Date	November 22, 2016

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

Jiangpeng Lan　　Kai Xu

Performed by: Jiangpeng Lan　　*Approved by: Kai Xu*

TA Technology (Shanghai) Co., Ltd.

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Table of Contents

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1 Test Laboratory

1.1 Notes of the Test Report

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

1.2 Test facility

CNAS (accreditation number:L2264)

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

FCC (recognition number is 428261)

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

IC (recognition number is 8510A)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

VCCI (recognition number is C-4595, T-2154, R-4113, G-766)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

A2LA(Certificate Number: 3857.01)

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

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1.3 Testing Location

Company:	TA Technology (Shanghai) Co., Ltd.
Address:	No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China
City:	Shanghai
Post code:	201201
Country:	P. R. China
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E-mail:	xukai@ta-shanghai.com

1.4 Laboratory Environment

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

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2 Statement of Compliance

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

Table 2.1: Highest Reported SAR

Mode	Highest Reported SAR (W/kg)
	1g SAR (Separation 5mm)
Wi-Fi (2.4G)	1.491
Wi-Fi(5G, U-NII-1)	1.491
Wi-Fi(5G, U-NII-2A)	1.477
Wi-Fi(5G, U-NII-2C)	0.590
Wi-Fi(5G, U-NII-3)	1.496
Date of Testing:	November10, 2016~ November13, 2016
Note: The device is in compliance with SAR for Uncontrolled Environment /General Population exposure limits (1.6 W/kg) specified in ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013.	

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3 Description of Equipment under Test

Client Information

Applicant	TP-LINK TECHNOLOGIES CO., LTD.
Applicant address	Building 24(floors1,3,4,5) and 28(floors1-4) Central Science and Technology Park, Shennan Rd, Nanshan, Shenzhen, China
Manufacturer	TP-LINK TECHNOLOGIES CO., LTD.
Manufacturer address	Building 24(floors1,3,4,5) and 28(floors1-4) Central Science and Technology Park, Shennan Rd, Nanshan, Shenzhen, China

Host Product Details

Name	Model	Manufacturer	Note
PC	IBM T61	Lenovo	/

General Technologies

Application Purpose:	Original Grant
EUT Stage	Identical Prototype
Model:	Archer T2UHP
SN:	2164460001399
Antenna Type:	External Antenna

Wireless Technology and Frequency Range

Wireless Technology		Modulation	Operating mode	Tx (MHz)
Wi-Fi	2.4G	DSSS,OFDM	802.11b/g/n HT20	2412 ~2462
	2.4G	OFDM	802.11n HT40	2422 ~2452
	5G	OFDM	802.11a/n 20M/40M/ ac 20M/40M/80M	5150 ~ 5350 5470 ~ 5825
	Does this device support MIMO ☐Yes ☒No			

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4 Test Specification, Methods and Procedures

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

447498 D01 General RF Exposure Guidance v06
447498 D02 SAR Procedures for Dongle Xmtr v02r01
865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
865664 D02 RF Exposure Reporting v01r02
248227 D01 802 11 Wi-Fi SAR v02r02

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5 Operational Conditions during Test

5.1 General Description of Test Procedures

According to FCC inquiry reply to perform the test plan.(test setup refer toANNEX H)

5.2 Picture of Host Product

During the test, IBM T61laptop was used as an assistant to help to setup communication.

IBM T61 Close

IBM T61 Open

5.3 Measurement Variability

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

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

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

5.4 Test Configuration

5.4.1 Wi-Fi Test Configuration

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

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

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

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

A Wi-Fi device must be configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools for SAR measurement. This RF signal utilized in SAR measurement has almost 100% duty cycle and its crest factor is 1.

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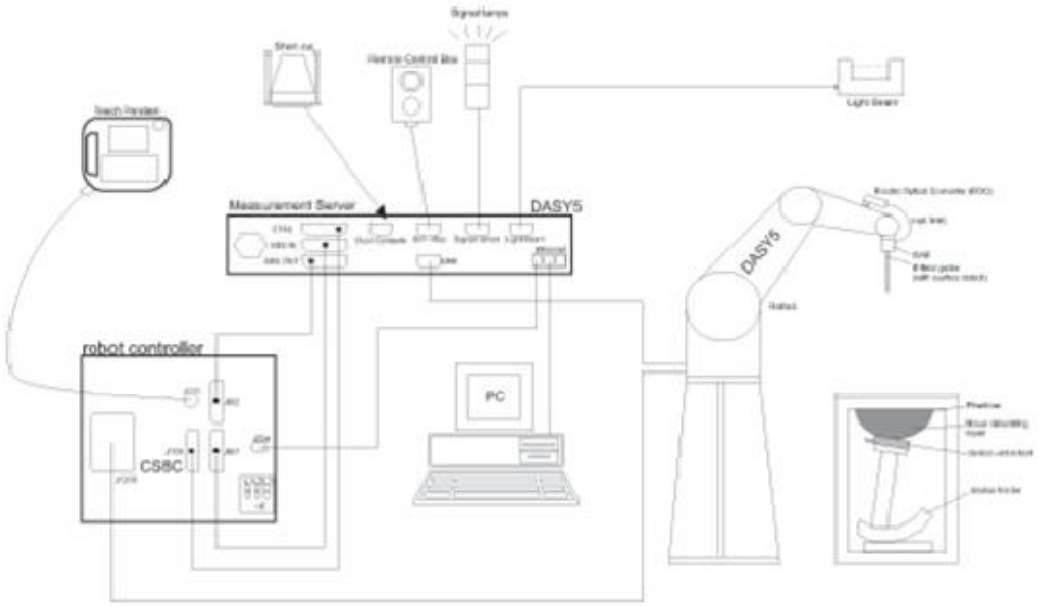
6 SAR Measurements System Configuration

6.1 SAR Measurement Set-up

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



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

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6.2 DASY5 E-field Probe System

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

EX3DV4 Probe Specification

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 μW/g to > 100 mW/g Linearity: ± 0.2dB (noise: typically < 1 μW/g)
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure Scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.

E-field Probe Calibration

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

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

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

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temperature probe is used in conjunction with the E-field probe.

$$SAR=C\Delta T/\Delta t$$

Where: Δt = Exposure time (30 seconds),

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

ΔT = Temperature increase due to RF exposure.

Or

$$SAR=|E|^2\sigma/\rho$$

Where: σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m^3).

6.3 SAR Measurement Procedure

Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

Area Scan

The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of zoom scans has to be increased accordingly.
Area scan parameters extracted from FCC KDB 865664 D01 SAR measurement 100 MHz to 6 GHz.

	≤3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: ΔxArea, ΔyArea	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

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Zoom Scan

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

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

<table>
<tr><td colspan="3"></td><td>≤3GHz</td><td>> 3 GHz</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: $\triangle x_{zoom} \triangle y_{zoom}$</td><td>≤2GHz: ≤8mm
2 – 3GHz: ≤5mm*</td><td>3 – 4GHz: ≤5mm*
4 – 6GHz: ≤4mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">Uniform grid: $\triangle z_{zoom}(n)$</td><td>≤5mm</td><td>3 – 4GHz: ≤4mm
4 – 5GHz: ≤3mm
5 – 6GHz: ≤2mm</td></tr>
<tr><td rowspan="2">Graded grid</td><td>$\triangle z_{zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤4mm</td><td>3 – 4GHz: ≤3mm
4 – 5GHz: ≤2.5mm
5 – 6GHz: ≤2mm</td></tr>
<tr><td>$\triangle z_{zoom}(n>1)$: between subsequent points</td><td colspan="2">≤1.5•$\triangle z_{zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">X, y, z</td><td>≥30mm</td><td>3 – 4GHz: ≥28mm
4 – 5GHz: ≥25mm
5 – 6GHz: ≥22mm</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 ≤ 1.4W/kg, ≤8mm, ≤7mm and ≤5mm zoom scan resolution may be applied, respectively, for 2GHz to 3GHz, 3GHz to 4GHz and 4GHz to 6GHz.</td></tr>
</table>

Volume Scan Procedures

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

Power Drift Monitoring

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

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7 Main Test Equipment

Name of Equipment	Manufacturer	Type/Model	Serial Number	Last Cal.	Cal. Due Date
Network analyzer	Agilent	E5071B	MY42404014	2016-05-21	2017-05-20
Dielectric Probe Kit	HP	85070E	US44020115	2016-05-21	2017-05-20
Power meter	Agilent	E4417A	GB41291714	2016-05-21	2017-05-20
Power sensor	Agilent	N8481H	MY50350004	2016-05-21	2017-05-20
Power sensor	Agilent	E9327A	US40441622	2016-05-21	2017-05-20
Dual directional coupler	Agilent	777D	50146	2016-05-21	2017-05-20
Amplifier	INDEXSAR	IXA-020	0401	2016-05-21	2017-05-20
Wideband radio communication tester	R&S	CMW 500	113645	2016-05-21	2017-05-20
E-field Probe	SPEAG	EX3DV4	3677	2015-12-10	2016-12-09
DAE	SPEAG	DAE4	871	2015-11-17	2016-11-16
Validation Kit 2450MHz	SPEAG	D2450V2	786	2014-09-01	2017-08-31
Validation Kit 5GHz	SPEAG	D5GHzV2	1151	2013-12-30	2016-12-29
Temperature Probe	Tianjin jinming	JM222	AA1009129	2016-05-21	2017-05-20
Hygrothermograph	Anymetr	NT-311	20150732	2016-05-21	2017-05-20

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8 Tissue Dielectric Parameter Measurements&System Verification

8.1 Tissue Verification

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within ± 2°C of the temperature when the tissue parameters are characterized. The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 – 4 days of use; or earlier if the dielectric parameters can become out of tolerance.

Target values

Frequency (MHz)		Water (%)	Salt (%)	Sugar (%)	Glycol (%)	Preventol (%)	Cellulose (%)	ε_r	σ(s/m)
Body	2450	73.2	0.1	0	26.7	0	0	52.7	1.95
Frequency (MHz)		**Water (%)**	**Diethylenglycol monohexylether**			**Triton X-100**		**ε_r**	**σ(s/m)**
Body	5200	72.52	13.74			13.74		49.0	5.30
	5300	72.52	13.74			13.74		48.9	5.42
	5600	72.52	13.74			13.74		48.5	5.77
	5800	72.52	13.74			13.74		48.2	6.00

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Measurements results

Frequency (MHz)		Test Date	Temp ℃	Measured Dielectric Parameters		Target Dielectric Parameters		Limit (Within ±5%)	
				ε_r	σ(s/m)	ε_r	σ(s/m)	Dev ε_r(%)	Dev σ(%)
2450	Body	11/11/2016	21.5	52.8	1.95	52.7	1.95	0.19	0.00
5200	Body	11/11/2016	21.5	46.9	5.34	49.0	5.30	-4.29	0.75
5300	Body	11/10/2016	21.5	46.6	5.49	48.9	5.42	-4.70	1.29
5600	Body	11/13/2016	21.5	47.5	5.96	48.5	5.77	-2.06	3.29
5800	Body	11/12/2016	21.5	47.6	6.14	48.2	6.00	-1.24	2.33
Note: The depth of tissue-equivalent liquid in a phantom must be ≥ 15.0 cm for SAR measurements ≤ 3 GHz and ≥ 10.0 cm for measurements > 3 GHz.									

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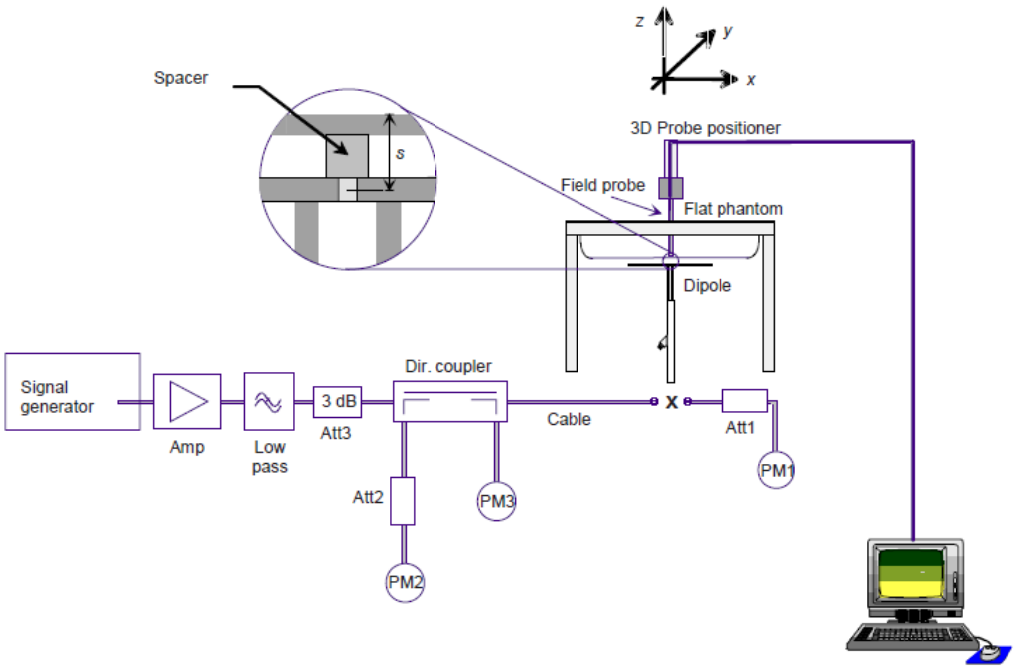
8.2 System Performance Check

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

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



Picture 1System Performance Check setup

Picture 2 Setup Photo

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Justification for Extended SAR Dipole Calibrations

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

Dipole		Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
Dipole D2450V2 SN: 786	Body Liquid	9/1/2014	-23.7	/	56.0	/
		8/31/2015	-24.0	1.3%	55.8	0.2Ω
		8/30/2016	-24.4	-1.6%	55.1	0.7Ω
Dipole D5GHzV2 SN: 1151 (5.2GHz)	Body Liquid	12/30/2013	-26.2	/	53.8	/
		12/29/2014	-26.7	1.9%	52.3	1.5Ω
		12/28/2015	-25.9	3.0%	53.0	0.7Ω
Dipole D5GHzV2 SN: 1151 (5.3GHz)	Body Liquid	12/30/2013	-25.8	/	46.4	/
		12/29/2014	-25.4	1.6%	45.6	0.8Ω
		12/28/2015	-25.9	2.0%	47.0	1.4Ω
Dipole D5GHzV2 SN: 1151 (5.6GHz)	Body Liquid	12/30/2013	-22.1	/	58.1	/
		12/29/2014	-22.8	3.2%	57.6	0.5Ω
		12/28/2015	-22.7	0.4%	58.3	0.7Ω
Dipole D5GHzV2 SN: 1151 (5.8GHz)	Body Liquid	12/30/2013	-21.2	/	47.9	/
		12/29/2014	-21.7	2.4%	47.6	0.3Ω
		12/28/2015	-21.4	1.4%	48.3	0.7Ω

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System Check results

Frequency (MHz)		Test Date	Temp ℃	250mW/100 mW Measured SAR_{1g}(W/kg)	1W Normalized SAR_{1g} (W/kg)	1WTarget SAR_{1g} (W/kg)	Δ % (Limit ±10%)	Plot No.
2450	Body	11/11/2016	21.5	12.50	50.00	52.40	-4.58%	1
5200	Body	11/11/2016	21.5	7.46	74.60	74.70	-0.13%	2
5300	Body	11/10/2016	21.5	7.75	77.50	76.90	0.78%	3
5600	Body	11/13/2016	21.5	8.10	81.00	80.70	0.37%	4
5800	Body	11/12/2016	21.5	7.15	71.50	72.50	-1.38%	5
Note：Target Values used derive from the calibration certificate Data Storage and Evaluation.								

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9 Normal and Maximum Output Power

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

9.1 WLAN Mode

Power Set by software			
Packet Type	**CH1**	**CH6**	**CH11**
802.11b	13	14	13
802.11g	0F	13	0F
802.11n HT20	0D	14	0E
Packet Type	**CH3**	**CH6**	**CH9**
802.11n HT40	0D	13	0C

Wi-Fi 2.4G	Channel	Frequency (MHz)	Average Conducted Power (dBm)	Tune-up Limit (dBm)
802.11b	1	2412	19.41	19.50
	6	2437	19.24	
	11	2462	19.31	
802.11g	1	2412	18.52	19.50
	6	2437	19.25	
	11	2462	18.24	
802.11n (HT20)	1	2412	17.61	19.50
	6	2437	19.38	
	11	2462	17.71	
802.11n (HT40)	3	2422	17.37	19.00
	6	2437	18.90	
	9	2452	16.58	

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Power Set by software								
Packet Type	802.11a	802.11n HT20	802.11ac HT20	Packet Type	802.11n HT40	802.11ac HT40	Packet Type	802.11ac HT80
CH36	1A	1A	1A	CH38	17	17	CH42	15
CH40	19	19	18	CH46	17	17	CH58	0A
CH44	18	18	18	CH54	14	1A	CH106	5
CH48	17	17	17	CH62	13	13	CH155	15
CH52	15	15	16	CH102	0B	0B	/	/
CH56	15	15	15	CH110	16	16	/	/
CH60	13	13	13	CH118	16	16	/	/
CH64	13	13	19	CH134	15	15	/	/
CH100	12	15	14	CH151	15	18	/	/
CH116	17	18	18	CH159	18	18	/	/
CH132	17	18	18	/	/	/	/	/
CH140	17	0E	0E	/	/	/	/	/
CH149	18	18	18	/	/	/	/	/
CH157	17	18	17	/	/	/	/	/
CH165	18	19	19	/	/	/	/	/

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Mode	Channel	Frequency(MHz)	Average Conducted Power (dBm)	Tune-upLimit(dBm)
802.11a (5GHz)	36	5180	19.24	19.50
	40	5200	19.05	
	44	5220	19.17	
	48	5240	19.29	
	52	5260	19.39	19.50
	56	5280	19.26	
	60	5300	19.31	
	64	5320	19.04	
	100	5500	21.42	21.50
	116	5580	21.31	
	132	5660	21.35	
	140	5700	21.38	
	149	5745	21.76	22.00
	157	5785	21.57	
	165	5825	21.35	
Mode	Channel	Frequency(MHz)	Average Conducted Power (dBm)	Tune-upLimit(dBm)
802.11nH T20 (5GHz)	36	5180	19.14	19.50
	40	5200	19.18	
	44	5220	19.07	
	48	5240	19.31	
	52	5260	19.11	19.50
	56	5280	19.24	
	60	5300	19.37	
	64	5320	19.45	
	100	5500	21.21	21.50
	116	5580	21.42	
	132	5660	20.92	
	140	5700	15.92	
	149	5745	21.81	22.00
	157	5785	21.62	
	165	5825	21.88	
Mode	Channel	Frequency(MHz)	Average Conducted Power (dBm)	Tune-upLimit(dBm)
802.11nH T40 (5GHz)	38	5190	18.05	19.50
	46	5230	19.04	
	54	5270	19.48	19.50
	62	5310	19.32	
	102	5510	16.20	21.00
	110	5550	20.89	

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	118	5590	20.30	
	134	5670	19.84	
	151	5755	21.85	22.00
	159	5795	21.78	
Mode	Channel	Frequency(MHz)	Average Conducted Power (dBm)	Tune-upLimit(dBm)
802.11ac 20M (5GHz)	36	5180	19.31	19.50
	40	5200	19.43	
	44	5220	19.05	
	48	5240	19.14	
	52	5260	19.43	19.50
	56	5280	19.13	
	60	5300	19.46	
	64	5320	19.48	
	100	5500	21.04	21.50
	116	5580	21.49	
	132	5660	20.95	
	140	5700	16.88	
	149	5745	21.88	22.00
	157	5785	21.73	
	165	5825	21.91	
Mode	Channel	Frequency(MHz)	Average Conducted Power (dBm)	Tune-upLimit(dBm)
802.11ac 40M (5GHz)	38	5190	18.31	19.50
	46	5230	18.91	
	54	5270	19.44	19.50
	62	5310	19.32	
	102	5510	16.19	21.00
	110	5550	20.71	
	118	5590	20.34	
	134	5670	19.87	
	151	5755	21.56	22.00
	159	5795	21.38	
Mode	Channel	Frequency(MHz)	Average Conducted Power (dBm)	Tune-upLimit(dBm)
802.11ac 80M (5GHz)	42	5210	19.38	19.50
	58	5290	14.16	15.00
	106	5530	13.31	14.00
	155	5775	19.76	20.00
Note. 1. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, each band is tested independently for SAR.				

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10 Measured and Reported (Scaled) SAR Results

10.1 Measured SAR Results

Table 1: Wi-Fi (2.4G)

Test Position	Cover Type	Channel/ Frequency (MHz)	Mode	Duty Cycle	Area Scan Max.SAR (W/Kg)	Tune-up limit (dBm)	Conducted Power (dBm)	Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Plot No.
Body SAR (Angle=0°, Distance 5mm)												
Back Side	standard	11/2462	802.11b	1:1	1.130	19.50	19.31	-0.054	1.140	1.04	1.191	/
		6/2437	802.11b	1:1	1.350	19.50	19.24	-0.130	1.370	1.06	1.455	/
		1/2412	802.11b	1:1	1.500	19.50	19.41	0.038	1.460	1.02	1.491	6
Front Side	standard	11/2462	802.11b	1:1	0.850	19.50	19.31	0.011	0.890	1.04	0.930	/
		6/2437	802.11b	1:1	1.060	19.50	19.24	0.020	1.110	1.06	1.178	/
		1/2412	802.11b	1:1	1.210	19.50	19.41	0.043	1.260	1.02	1.286	/
Left Side	standard	1/2412	802.11b	1:1	0.144	19.50	19.41	0.072	0.146	1.02	0.149	/
Right Side	standard	1/2412	802.11b	1:1	0.150	19.50	19.41	0.055	0.152	1.02	0.155	/
Top Side	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Back Side	Repeated	1/2412	802.11b	1:1	1.390	19.50	19.41	0.018	1.430	1.02	1.460	/
Back Side	standard	6/2437	802.11g	1:1	1.270	19.50	19.25	-0.114	1.230	1.06	1.303	/
Back Side	standard	6/2437	802.11n (20MHz)	1:1	1.280	19.50	19.38	-0.042	1.290	1.03	1.326	/
Back Side	standard	6/2437	802.11n (40MHz)	1:1	1.110	19.00	18.90	-0.040	1.100	1.02	1.126	/
Body SAR (Angle=90°, Distance 5mm)												
Back Side	standard	1/2412	802.11b	1:1	0.033	19.50	19.41	0.109	0.029	1.02	0.029	/
Front Side	standard	1/2412	802.11b	1:1	0.035	19.50	19.41	0.063	0.037	1.02	0.038	/
Left Side	standard	1/2412	802.11b	1:1	0.120	19.50	19.41	0.122	0.105	1.02	0.107	/
Right Side	standard	1/2412	802.11b	1:1	0.303	19.50	19.41	-0.010	0.281	1.02	0.287	/
Top Side	standard	11/2462	802.11b	1:1	0.711	19.50	19.31	0.010	0.697	1.04	0.728	/
		6/2437	802.11b	1:1	0.902	19.50	19.24	-0.021	0.902	1.06	0.958	/
		1/2412	802.11b	1:1	0.991	19.50	19.41	-0.040	0.964	1.02	0.984	7
Top Side	Repeated	1/2412	802.11b	1:1	0.97	19.50	19.41	-0.090	0.962	1.02	0.982	/
Note: 1. The value with blue color is the maximum SAR Value of each test band.												

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MAX Adjusted SAR							
Mode	Test Position	Channel/ Frequency(MHz)	MAX Measured SAR_{1g} (W/kg)	802.11b Tune-up limit (dBm)	Tune-up limit (dBm)	Scaling Factor	Adjusted SAR_{1g} (W/kg)
Angle=0°							
802.11g	Back Side	1/2412	1.510	19.50	19.50	1.00	**1.510**
802.11n HT20	Back Side	1/2412	1.510	19.50	19.50	1.00	**1.510**
802.11n HT40	Back Side	1/2412	1.510	19.50	19.00	0.89	**1.346**
Angle=90°							
802.11g	Top Side	1/2412	0.964	19.50	19.50	1.00	0.964
802.11n HT20	Top Side	1/2412	0.964	19.50	19.50	1.00	0.964
802.11n HT40	Top Side	1/2412	0.964	19.50	19.00	0.89	0.859
Note: SAR is required for OFDM when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is > 1.2 W/kg.							

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Table 2: Wi-Fi (5G,U-NII-1)

Test Position	Cover Type	Channel/ Frequency (MHz)	Mode 802.11ac HT80	Duty Cycle	Area Scan Max.SAR (W/Kg)	Tune-up limit (dBm)	Conducted Power (dBm)	Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Plot No.
Body SAR (Angle=0°, Distance 5mm)												
Back Side	standard	42/5210	OFDM	1:1	1.380	19.50	19.38	0.077	1.450	1.03	1.491	8
Front Side	standard	42/5210	OFDM	1:1	1.190	19.50	19.38	0.106	1.260	1.03	1.295	/
Left Side	standard	42/5210	OFDM	1:1	0.337	19.50	19.38	-0.160	0.329	1.03	0.338	/
Right Side	standard	42/5210	OFDM	1:1	0.351	19.50	19.38	0.112	0.311	1.03	0.320	/
Top Side	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Back Side	Repeated	42/5210	OFDM	1:1	1.410	19.50	19.38	0.040	1.390	1.03	1.429	/
Body SAR (Angle=90°, Distance 5mm)												
Back Side	standard	42/5210	OFDM	1:1	0.038	19.50	19.38	-0.070	0.021	1.03	0.022	/
Front Side	standard	42/5210	OFDM	1:1	0.166	19.50	19.38	0.043	0.159	1.03	0.163	/
Left Side	standard	42/5210	OFDM	1:1	0.342	19.50	19.38	-0.010	0.329	1.03	0.338	/
Right Side	standard	42/5210	OFDM	1:1	0.376	19.50	19.38	0.122	0.357	1.03	0.367	/
Top Side	standard	42/5210	OFDM	1:1	1.380	19.50	19.38	0.072	1.120	1.03	1.151	9
Top Side	Repeated	42/5210	OFDM	1:1	1.250	19.50	19.38	0.045	1.080	1.03	1.110	/
Note: 1. The value with blue color is the maximum SAR Value of each test band.												

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Table 3: Wi-Fi (5G,U-NII-2A)

Test Position	Cover Type	Channel/ Frequency (MHz)	Mode 802.11n HT40	Duty Cycle	Area Scan Max.SAR (W/Kg)	Tune-up limit (dBm)	Conducted Power (dBm)	Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Plot No.
Body SAR (Angle=0°, Distance 5mm)												
Back Side	standard	62/5310	OFDM	1:1	1.410	19.50	19.32	0.072	1.350	1.04	1.407	/
		54/5270	OFDM	1:1	1.500	19.50	19.48	-0.170	1.470	1.00	1.477	10
Front Side	standard	62/5310	OFDM	1:1	1.180	19.50	19.32	0.044	1.160	1.04	1.209	/
		54/5270	OFDM	1:1	1.250	19.50	19.48	0.013	1.210	1.00	1.216	/
Left Side	standard	54/5270	OFDM	1:1	0.331	19.50	19.48	0.060	0.296	1.00	0.297	/
Right Side	standard	54/5270	OFDM	1:1	0.315	19.50	19.48	-0.041	0.322	1.00	0.323	/
Top Side	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Back Side	Repeated	54/5270	OFDM	1:1	1.420	19.50	19.48	-0.102	1.390	1.00	1.396	/
Body SAR (Angle=90°, Distance 5mm)												
Back Side	standard	54/5270	OFDM	1:1	0.029	19.50	19.48	0.009	0.022	1.00	0.022	/
Front Side	standard	54/5270	OFDM	1:1	0.149	19.50	19.48	0.033	0.152	1.00	0.153	/
Left Side	standard	54/5270	OFDM	1:1	0.318	19.50	19.48	0.092	0.314	1.00	0.315	/
Right Side	standard	54/5270	OFDM	1:1	0.235	19.50	19.48	-0.030	0.282	1.00	0.283	/
Top Side	standard	62/5310	OFDM	1:1	1.020	19.50	19.32	0.012	1.170	1.04	1.220	/
	standard	54/5270	OFDM	1:1	1.250	19.50	19.48	0.144	1.330	1.00	1.336	11
Top Side	Repeated	54/5270	OFDM	1:1	1.19	19.50	19.48	0.011	1.210	1.00	1.216	/
Note: 1. The value with blue color is the maximum SAR Value of each test band.												

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Table 4: Wi-Fi (5G,U-NII-2C)

Test Position	Cover Type	Channel/ Frequency (MHz)	Mode 802.11a	Duty Cycle	Area Scan Max.SAR (W/Kg)	Tune-up limit (dBm)	Conducted Power (dBm)	Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Plot No.
Body SAR (Angle=0°, Distance 5mm)												
Back Side	standard	100/5500	OFDM	1:1	0.580	21.50	21.42	-0.072	0.579	1.02	0.590	12
Front Side	standard	100/5500	OFDM	1:1	0.333	21.50	21.42	0.130	0.321	1.02	0.327	/
Left Side	standard	100/5500	OFDM	1:1	0.240	21.50	21.42	0.037	0.191	1.02	0.195	/
Right Side	standard	100/5500	OFDM	1:1	0.272	21.50	21.42	0.103	0.257	1.02	0.262	/
Top Side	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Body SAR (Angle=90°, Distance 5mm)												
Back Side	standard	100/5500	OFDM	1:1	0.060	21.50	21.42	-0.103	0.052	1.02	0.053	/
Front Side	standard	100/5500	OFDM	1:1	0.110	21.50	21.42	0.049	0.102	1.02	0.104	/
Left Side	standard	100/5500	OFDM	1:1	0.276	21.50	21.42	0.030	0.255	1.02	0.260	/
Right Side	standard	100/5500	OFDM	1:1	0.313	21.50	21.42	0.112	0.282	1.02	0.287	/
Top Side	standard	100/5500	OFDM	1:1	0.553	21.50	21.42	0.160	0.518	1.02	0.528	13
Note: 1. The value with blue color is the maximum SAR Value of each test band.												

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Table 5: Wi-Fi (5G,U-NII-3)

Test Position	Cover Type	Channel/ Frequency (MHz)	Mode 802.11n HT40	Duty Cycle	Area Scan Max.SAR (W/Kg)	Tune-up limit (dBm)	Conducted Power (dBm)	Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Plot No.
Body SAR (Angle=0°, Distance 5mm)												
Back Side	standard	159/5795	OFDM	1:1	1.110	22.00	21.78	0.015	1.070	1.05	1.126	/
		151/5755	OFDM	1:1	1.250	22.00	21.85	-0.027	1.250	1.04	1.294	14
Front Side	standard	159/5795	OFDM	1:1	1.017	22.00	21.78	0.072	0.952	1.05	1.001	/
		151/5755	OFDM	1:1	1.390	22.00	21.85	0.088	1.150	1.04	1.190	/
Left Side	standard	151/5755	OFDM	1:1	0.292	22.00	21.85	-0.001	0.274	1.04	0.284	/
Right Side	standard	151/5755	OFDM	1:1	0.333	22.00	21.85	0.107	0.315	1.04	0.326	/
Top Side	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Back Side	Repeated	151/5755	OFDM	1:1	1.260	22.00	21.85	0.190	1.170	1.04	1.211	/
Body SAR (Angle=90°, Distance 5mm)												
Back Side	standard	151/5755	OFDM	1:1	0.042	22.00	21.85	0.056	0.021	1.04	0.022	/
Front Side	standard	151/5755	OFDM	1:1	0.151	22.00	21.85	0.112	0.104	1.04	0.108	/
Left Side	standard	151/5755	OFDM	1:1	0.373	22.00	21.85	0.127	0.366	1.04	0.379	/
Right Side	standard	151/5755	OFDM	1:1	0.311	22.00	21.85	-0.078	0.293	1.04	0.303	/
Top Side	standard	159/5795	OFDM	1:1	1.220	22.00	21.78	0.044	1.380	1.05	1.452	/
		151/5755	OFDM	1:1	1.420	22.00	21.85	0.011	1.445	1.04	1.496	15
Top Side	Repeated	151/5755	OFDM	1:1	1.310	22.00	21.85	0.085	1.420	1.04	1.470	/
Note: 1. The value with blue color is the maximum SAR Value of each test band.												

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11 Measurement Uncertainty

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

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ANNEX A: Test Layout

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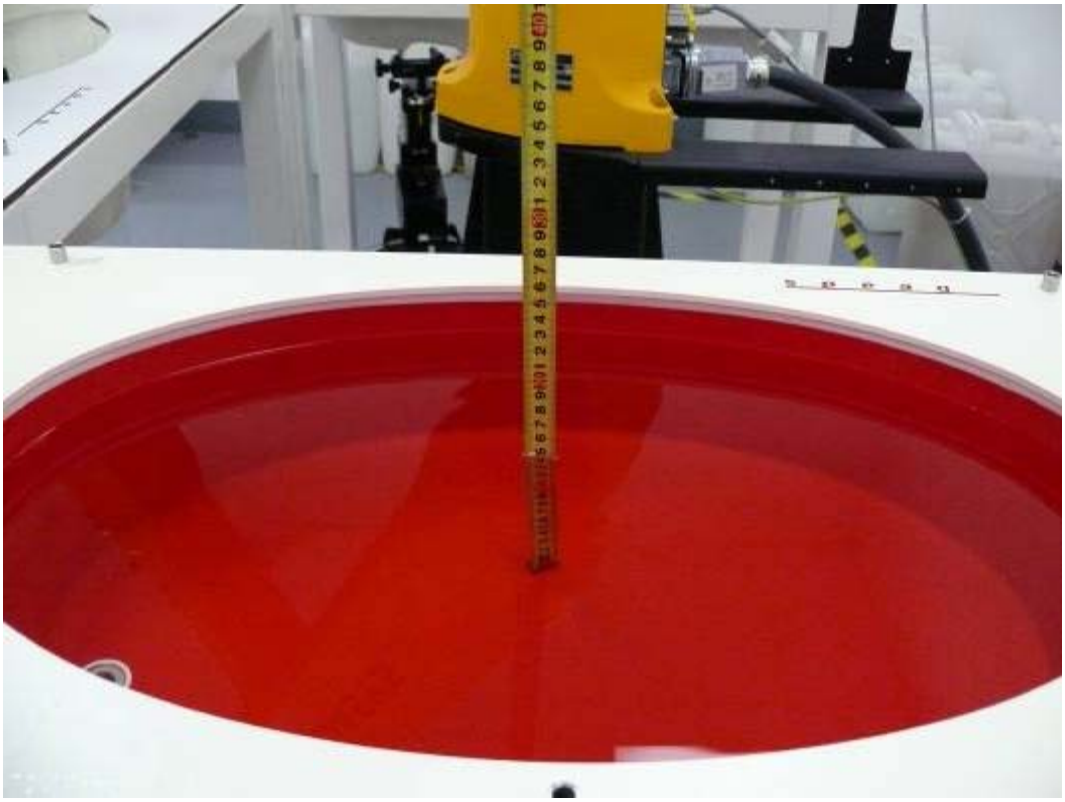
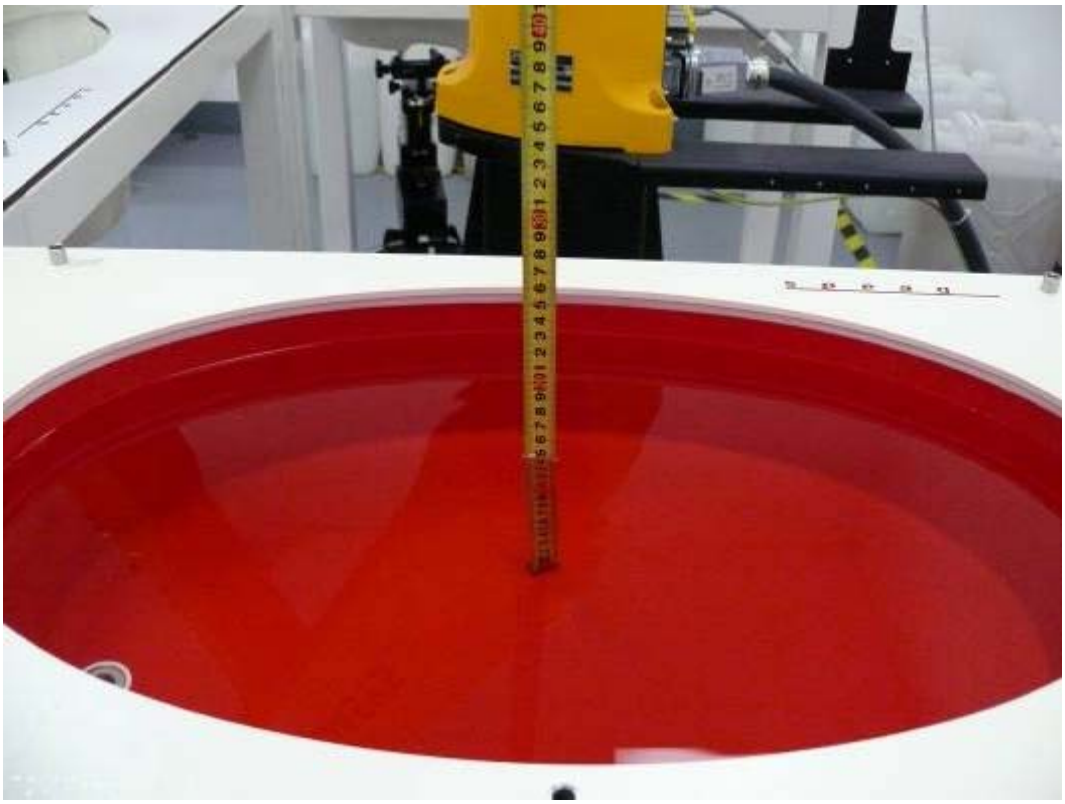


Picture 3: Liquid depth in the flat Phantom (2450 MHz, 15.3cm depth)



Picture 4: Liquid depth in the flat Phantom (5200 MHz, 15.3cm depth)

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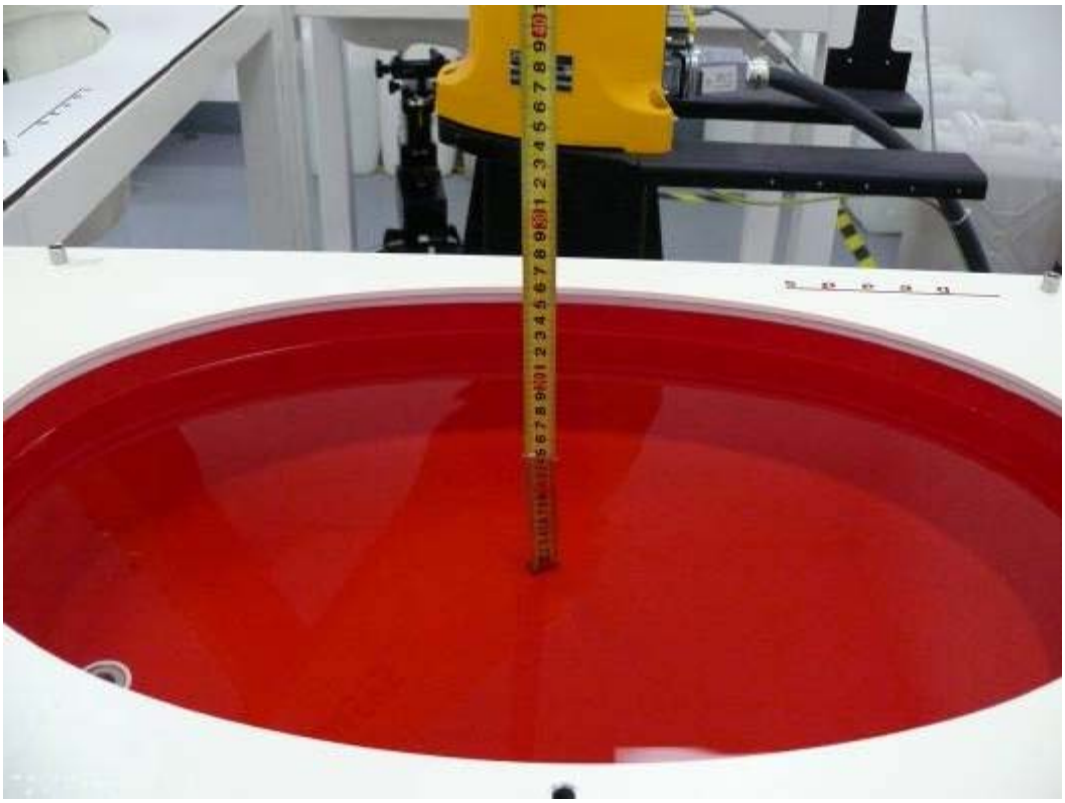
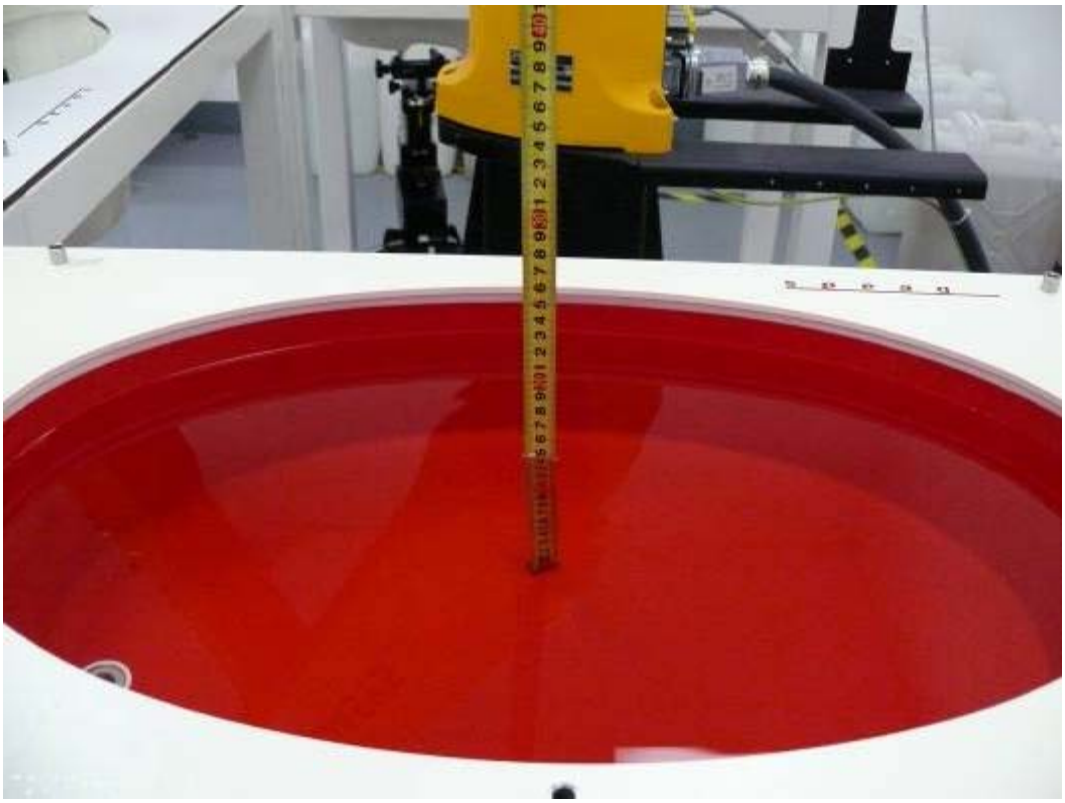


Picture 5: Liquid depth in the flat Phantom (5300 MHz, 15.3cm depth)



Picture 6: Liquid depth in the flat Phantom (5600 MHz, 15.3cm depth)

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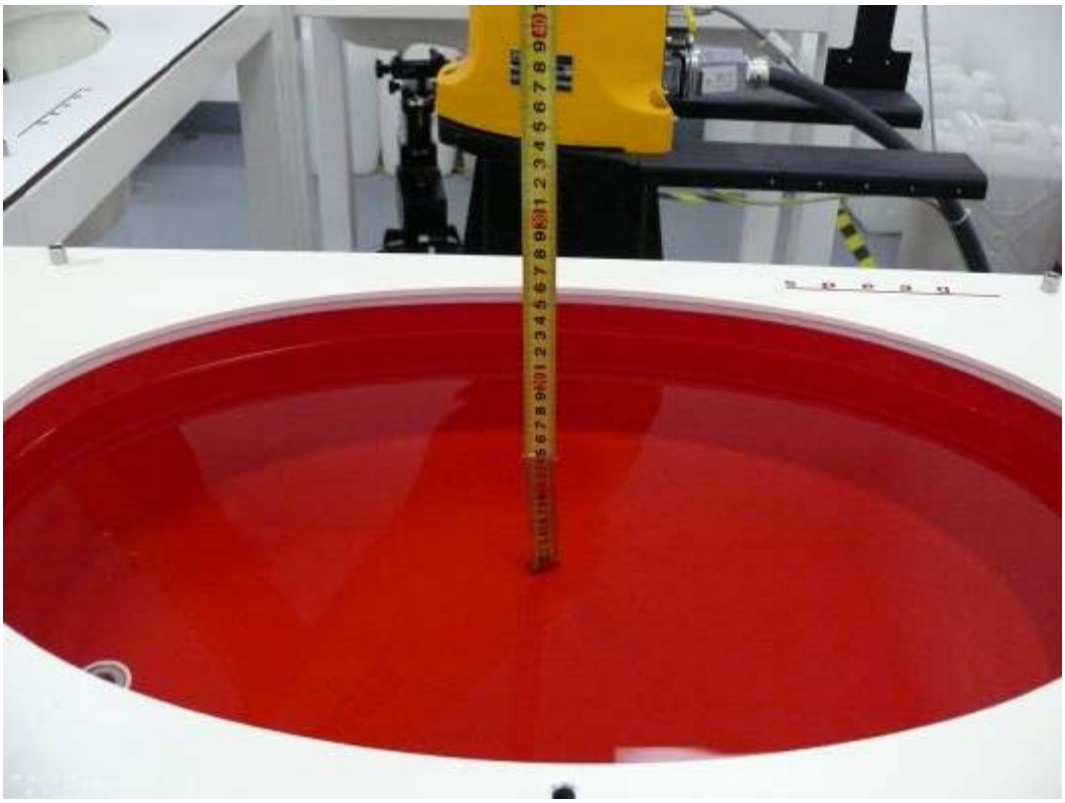

Picture 7: Liquid depth in the flat Phantom (5800 MHz, 15.0cm depth)

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ANNEX B: System Check Results

Plot 1System Performance Check at 2450 MHz Body TSL

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

Date: 11/11/2016

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

Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.22, 7.22, 7.22); Calibrated: 12/10/2015;

Electronics: DAE4 Sn871; Calibrated: 11/17/2015

Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA;

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 16 mW/g

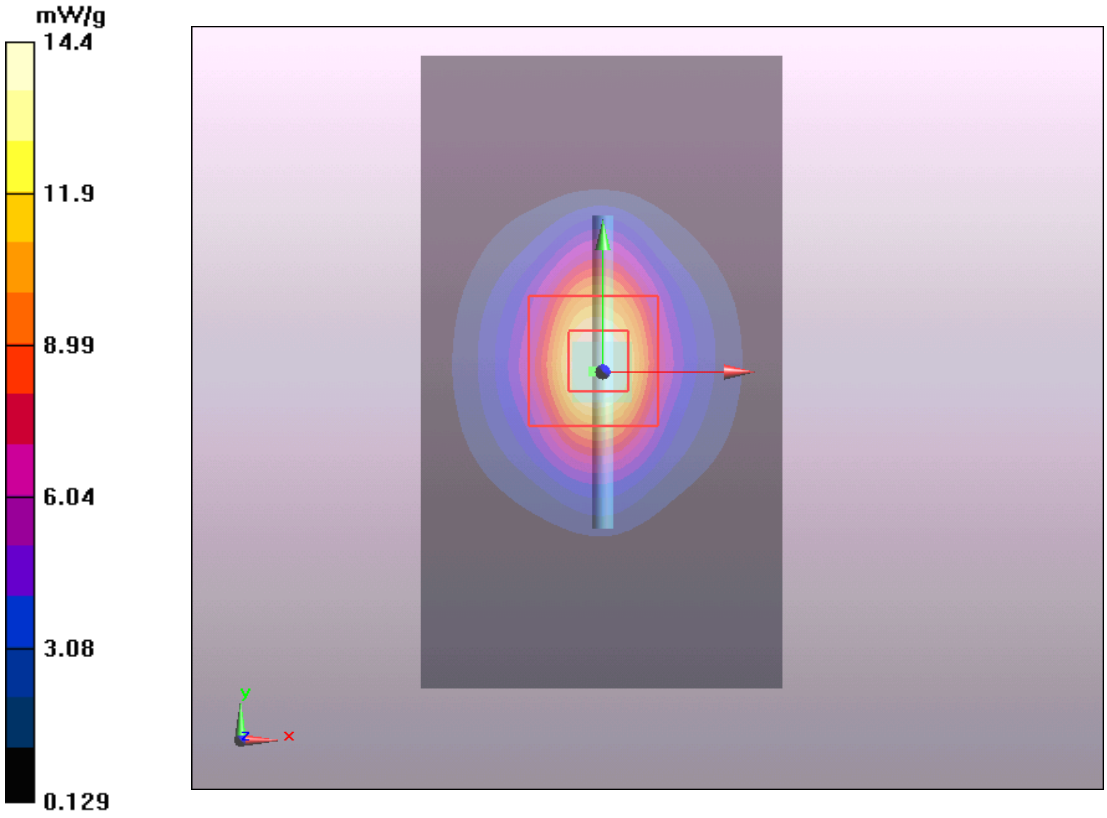
d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 81.2 V/m; Power Drift = 0.003 dB

Peak SAR (extrapolated) = 25.4 W/kg

SAR(1 g) = 12.5 mW/g; SAR(10 g) = 6.20 mW/g

Maximum value of SAR (measured) = 14.4 mW/g



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Plot 2System Performance Check at 5200 MHz Body TSL

DUT: Dipole 5200 MHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1151

Date: 11/11/2016

Communication System: CW; Frequency: 5200 MHz;Duty Cycle: 1:1

Medium parameters used: f = 5200 MHz; σ = 5.34 mho/m; ε_r = 46.9; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(4.93, 4.93, 4.93); Calibrated: 12/10/2015;

Electronics: DAE4 Sn871; Calibrated: 11/17/2015

Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA;

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (61x101x1): Measurement grid: dx=1.000mm, dy=1.000mm

Maximum value of SAR (interpolated) = 7.69 mW/g

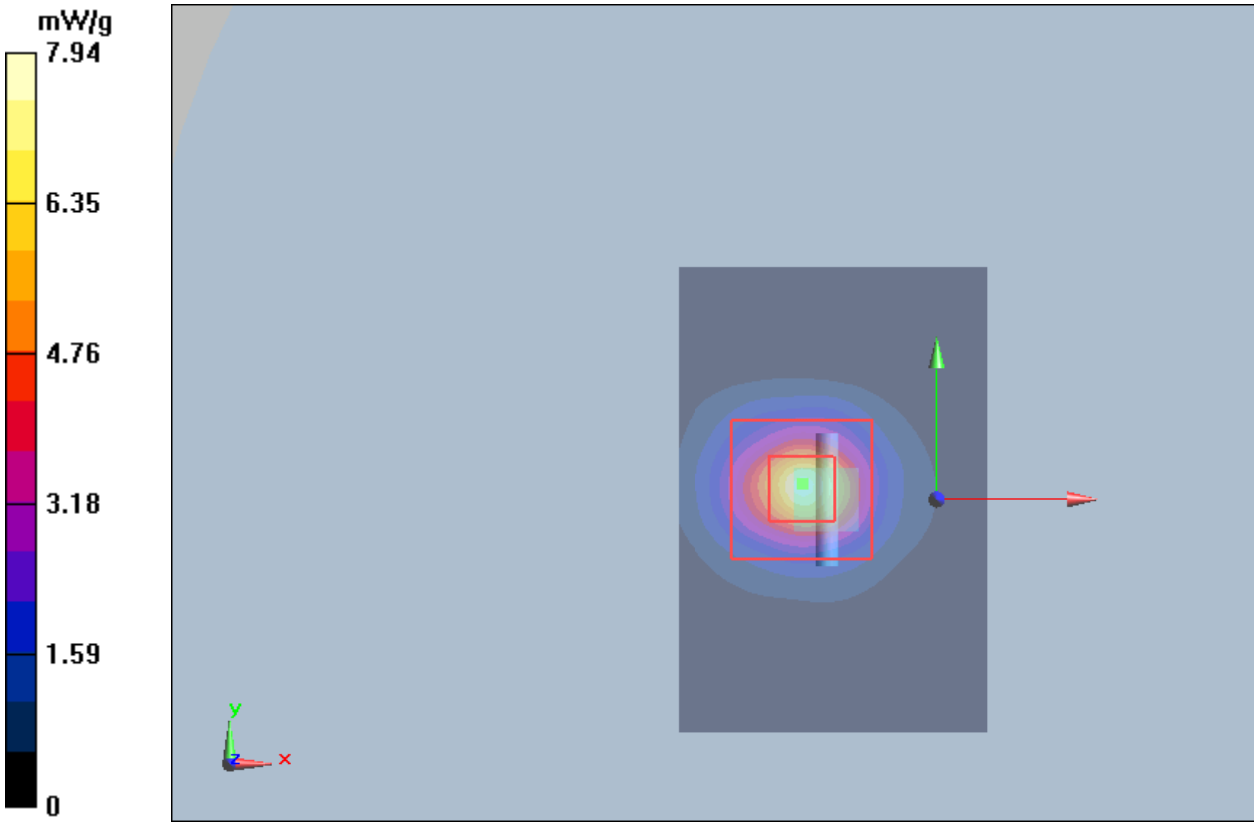
d=10mm, Pin=250mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 36.3 V/m; Power Drift = 0.0277 dB

Peak SAR (extrapolated) = 47.7 W/kg

SAR(1 g) = 7.46 mW/g; SAR(10 g) = 2.26 mW/g

Maximum value of SAR (measured) = 7.94 mW/g



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Plot 3System Performance Check at 5300 MHz Body TSL

DUT: Dipole 5300 MHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1151

Date: 11/10/2016

Communication System: CW; Frequency: 5300 MHz;Duty Cycle: 1:1

Medium parameters used: f = 5300 MHz; σ = 5.49 mho/m; ε_r = 46.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(4.69, 4.69, 4.69); Calibrated: 12/10/2015;

Electronics: DAE4 Sn871; Calibrated: 11/17/2015

Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA;

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (61x101x1): Measurement grid: dx=1.000mm, dy=1.000mm

Maximum value of SAR (interpolated) = 7.11 mW/g

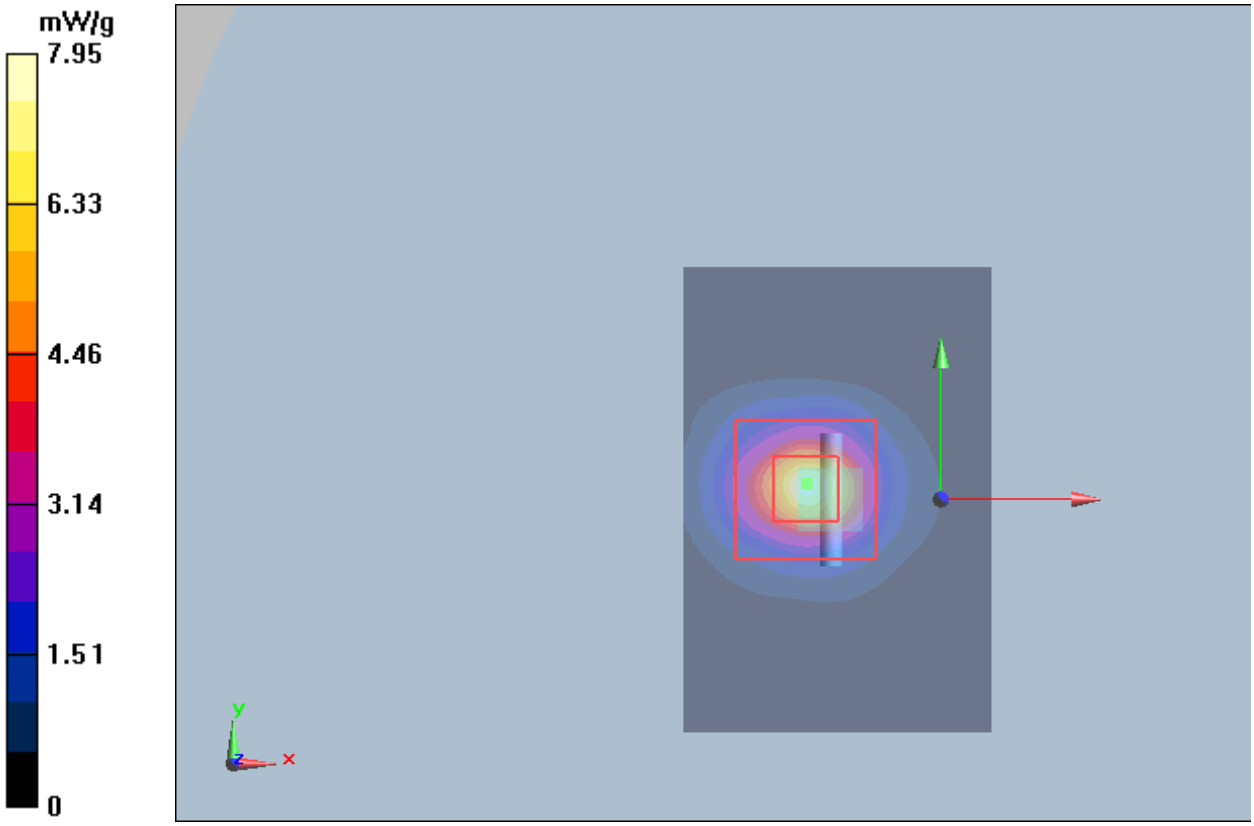
d=10mm, Pin=250mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 35.7 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 47.1 W/kg

SAR(1 g) = 7.75 mW/g; SAR(10 g) = 2.34 mW/g

Maximum value of SAR (measured) = 7.95 mW/g



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Plot 4System Performance Check at 5600 MHz Body TSL

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

Date: 11/13/2016

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

Medium parameters used: f = 5600 MHz; σ = 5.96 mho/m; ε_r = 47.5; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(4.18, 4.18, 4.18); Calibrated: 12/10/2015;

Electronics: DAE4 Sn871; Calibrated: 11/17/2015

Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA;

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (61x101x1): Measurement grid: dx=1.000mm, dy=1.000mm

Maximum value of SAR (interpolated) = 7.84 mW/g

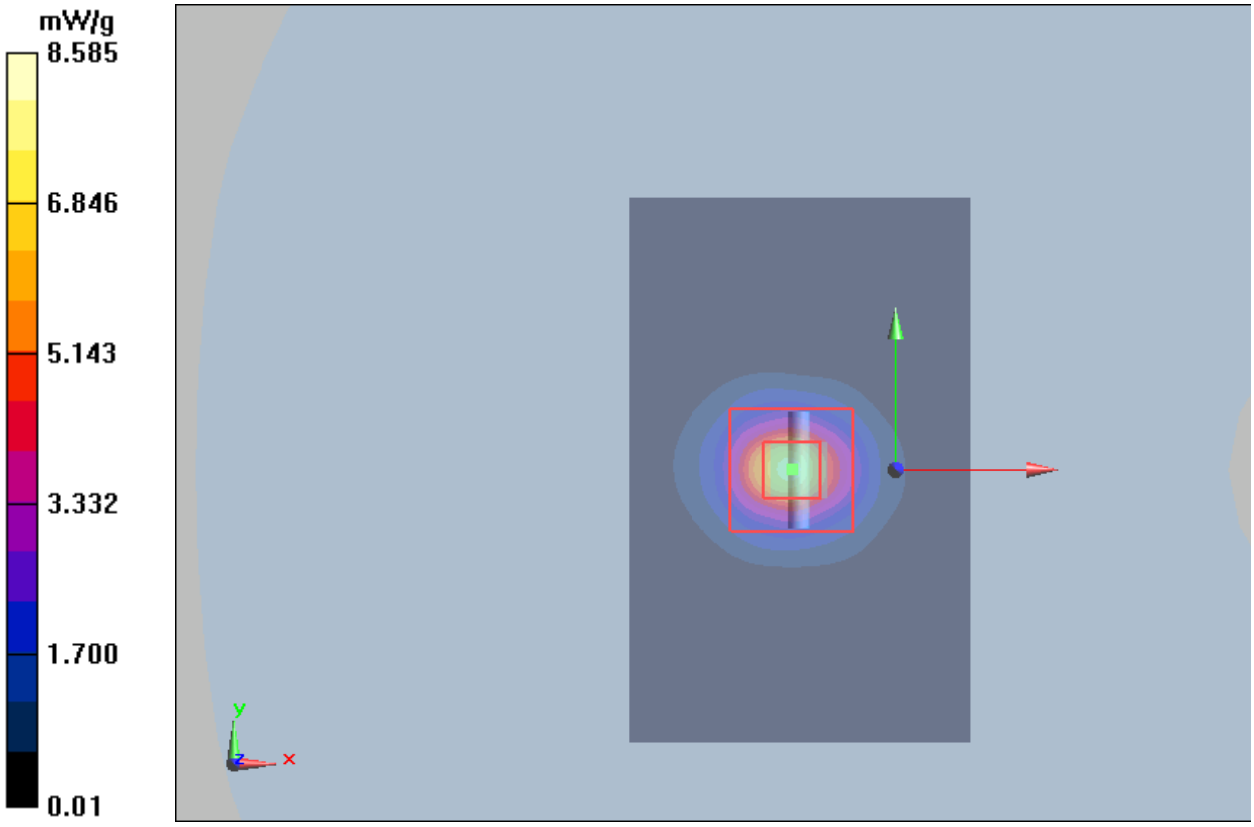
d=10mm, Pin=250mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 38 V/m; Power Drift = -0.018 dB

Peak SAR (extrapolated) = 22.6 W/kg

SAR(1 g) = 8.10 mW/g; SAR(10 g) = 2.11 mW/g

Maximum value of SAR (measured) = 8.585 mW/g



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Plot 5System Performance Check at 5800 MHz Body TSL

DUT: Dipole 5800 MHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1151

Date: 11/12/2016

Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1

Medium parameters used: f = 5800 MHz; σ = 6.14 mho/m; ε_r = 47.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(4.23, 4.23, 4.23); Calibrated: 12/10/2015;

Electronics: DAE4 Sn871; Calibrated: 11/17/2015

Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA;

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (61x101x1): Measurement grid: dx=1.000mm, dy=1.000mm

Maximum value of SAR (interpolated) = 7.84 mW/g

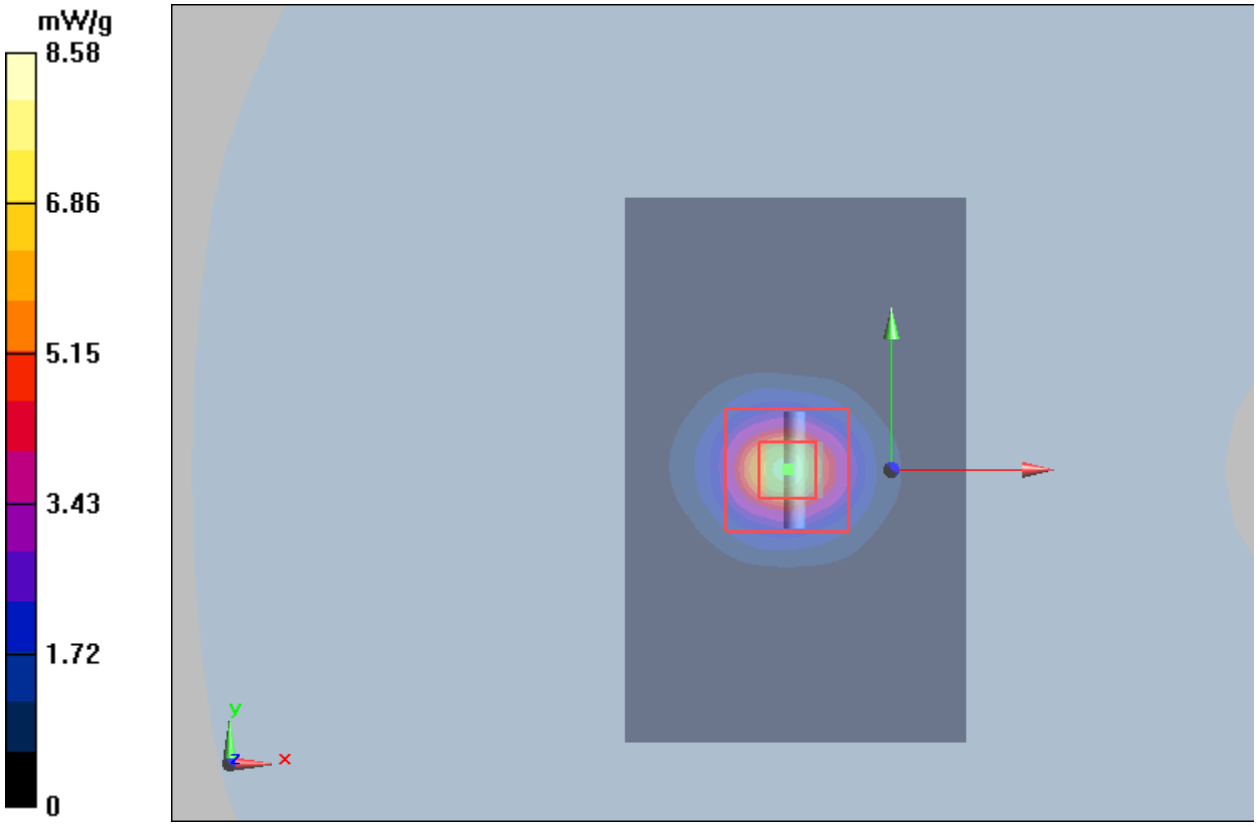
d=10mm, Pin=250mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 38 V/m; Power Drift = -0.018 dB

Peak SAR (extrapolated) = 22.6 W/kg

SAR(1 g) = 7.15 mW/g; SAR(10 g) = 1.99 mW/g

Maximum value of SAR (measured) = 8.58 mW/g



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ANNEX C: Highest Graph Results

Plot 6802.11b Back Side Low (Angle=0°, Distance 5mm)

Date: 11/11/2016

Communication System: UID 0, WiFi (0); Frequency: 2412 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2412 MHz; σ = 1.9 S/m; ε_r = 51.22; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.22, 7.22, 7.22); Calibrated: 12/10/2015;

Electronics: DAE4 Sn871; Calibrated: 11/17/2015

Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA;

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Back Side Low/Area Scan (81x201x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 1.49 W/kg

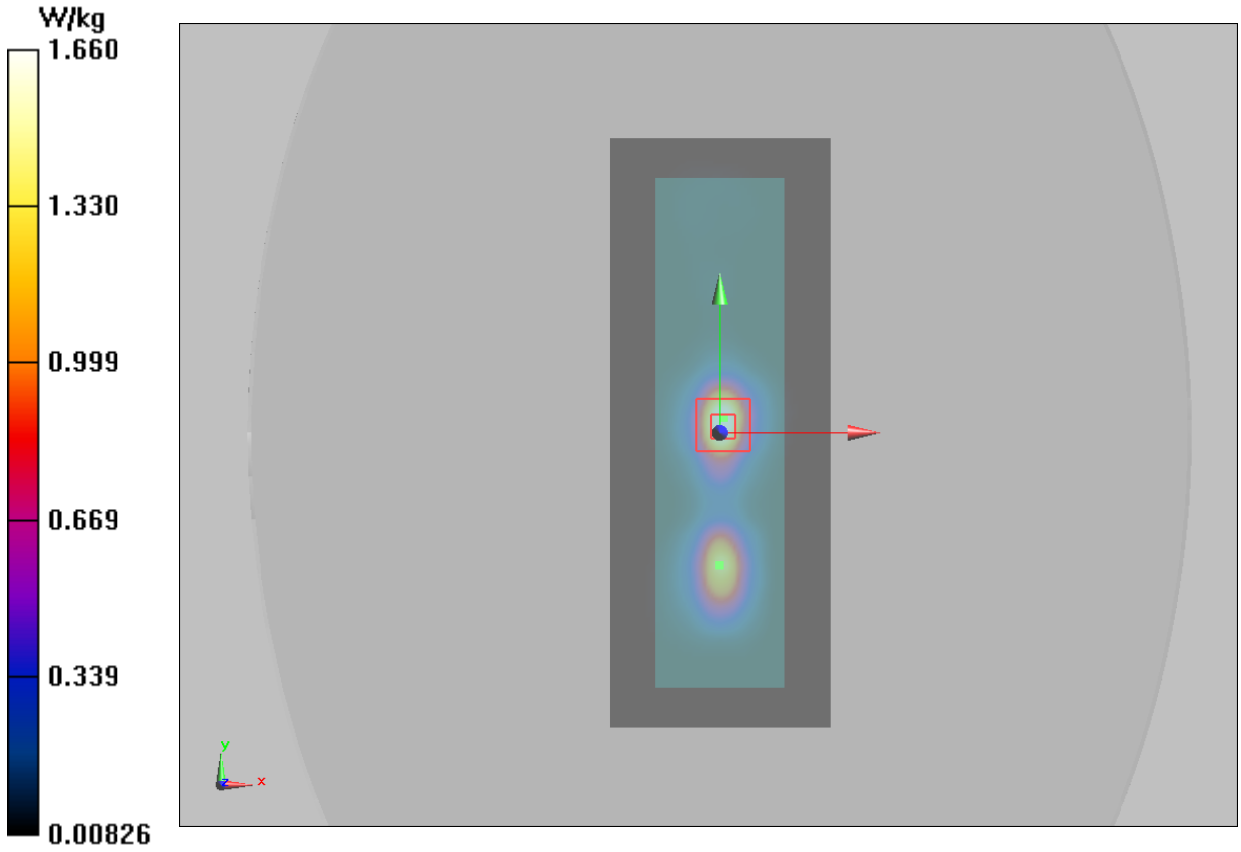
Back Side Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 29.12 V/m; Power Drift = 0.038 dB

Peak SAR (extrapolated) = 2.77 W/kg

SAR(1 g) = 1.46 W/kg; SAR(10 g) = 0.613 W/kg

Maximum value of SAR (measured) = 1.66 W/kg



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Plot 7802.11b Top Side Low (Angle=90°, Distance 5mm)

Date: 11/11/2016

Communication System: UID 0, WiFi (0); Frequency: 2412 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2412 MHz; σ = 1.9 S/m; ε_r = 51.22; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.22, 7.22, 7.22); Calibrated: 12/10/2015;

Electronics: DAE4 Sn871; Calibrated: 11/17/2015

Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA;

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Top Side Low/Area Scan (41x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 1.22 W/kg

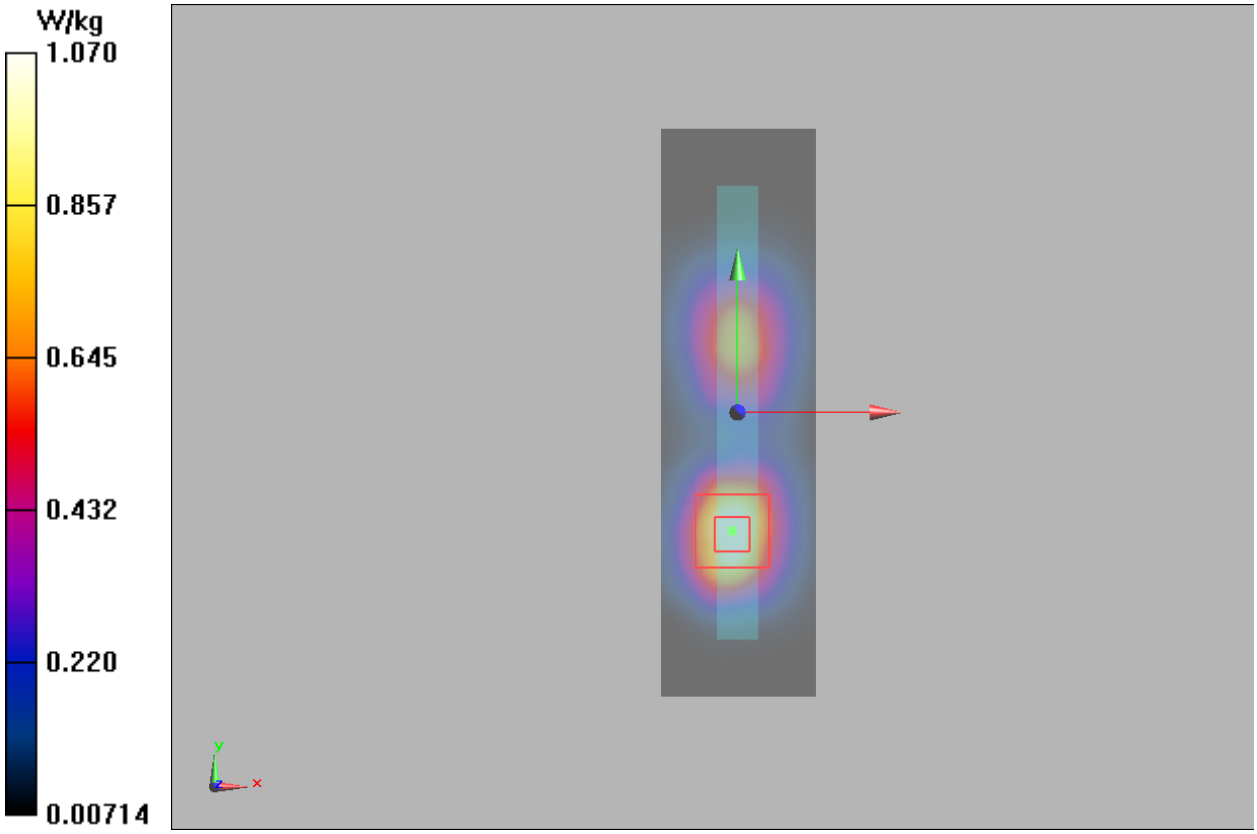
Top Side Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.75 V/m; Power Drift = -0.040 dB

Peak SAR (extrapolated) = 1.82 W/kg

SAR(1 g) = 0.964 W/kg; SAR(10 g) = 0.471 W/kg

Maximum value of SAR (measured) = 1.07 W/kg



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Plot 8802.11ac HT80U-NII-1 Back Side CH42 (Angle=0°, Distance 5mm)

Date: 11/11/2016

Communication System: UID 0, 802.11ac (0); Frequency: 5210 MHz;Duty Cycle: 1:1

Medium parameters used: f = 5210 MHz; σ = 5.352 S/m; ε_r = 46.833; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(4.93, 4.93, 4.93); Calibrated: 12/10/2015;

Electronics: DAE4 Sn871; Calibrated: 11/17/2015

Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA;

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Back Side CH42/Area Scan (91x241x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

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

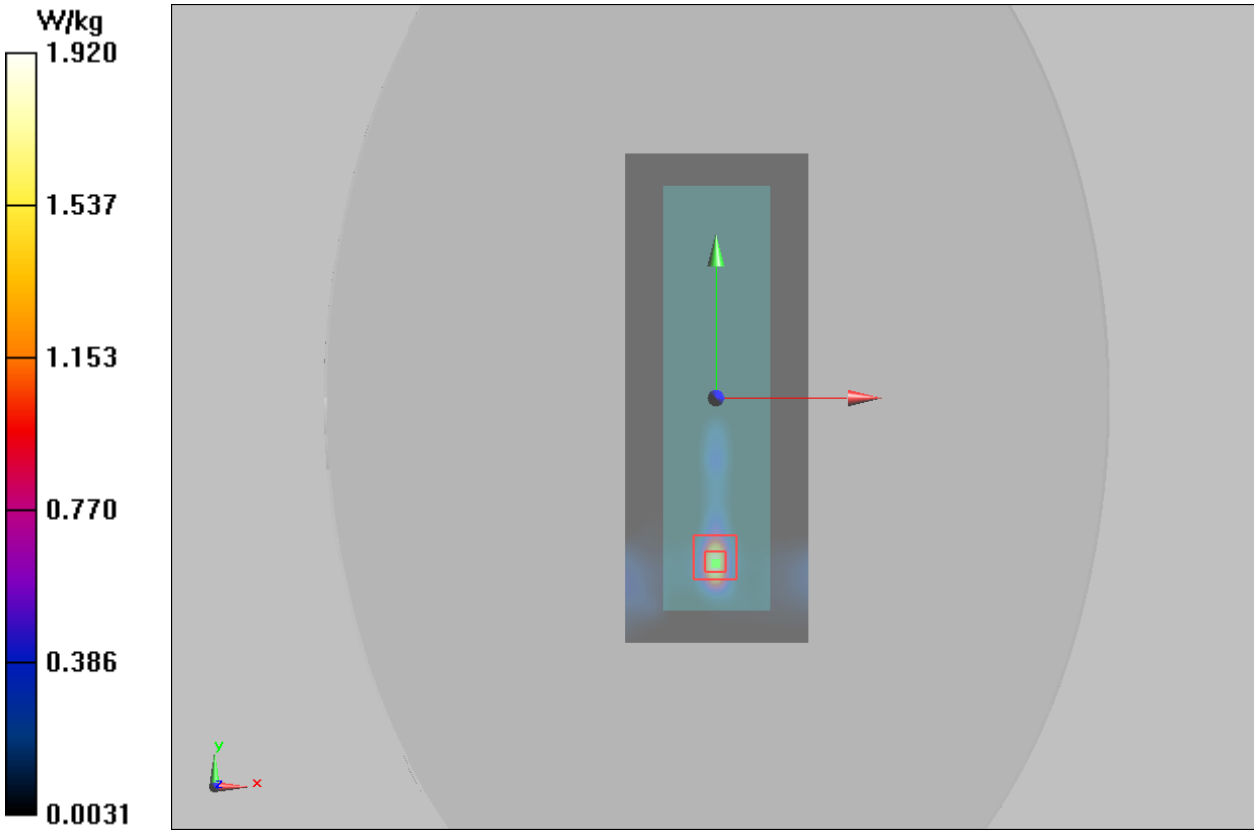
Back Side CH42/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 4.715 V/m; Power Drift = 0.077 dB

Peak SAR (extrapolated) = 4.20 W/kg

SAR(1 g) = 1.45 W/kg; SAR(10 g) = 0.473 W/kg

Maximum value of SAR (measured) = 1.92 W/kg



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Plot 9802.11ac HT80U-NII-1 Top Side CH42 (Angle=90°, Distance 5mm)

Date: 11/11/2016

Communication System: UID 0, 802.11ac (0); Frequency: 5210 MHz;Duty Cycle: 1:1

Medium parameters used: f = 5210 MHz; σ = 5.352 S/m; ε_r = 46.833; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(4.93, 4.93, 4.93); Calibrated: 12/10/2015;

Electronics: DAE4 Sn871; Calibrated: 11/17/2015

Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA;

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Top Side CH42 /Area Scan (51x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.53 W/kg

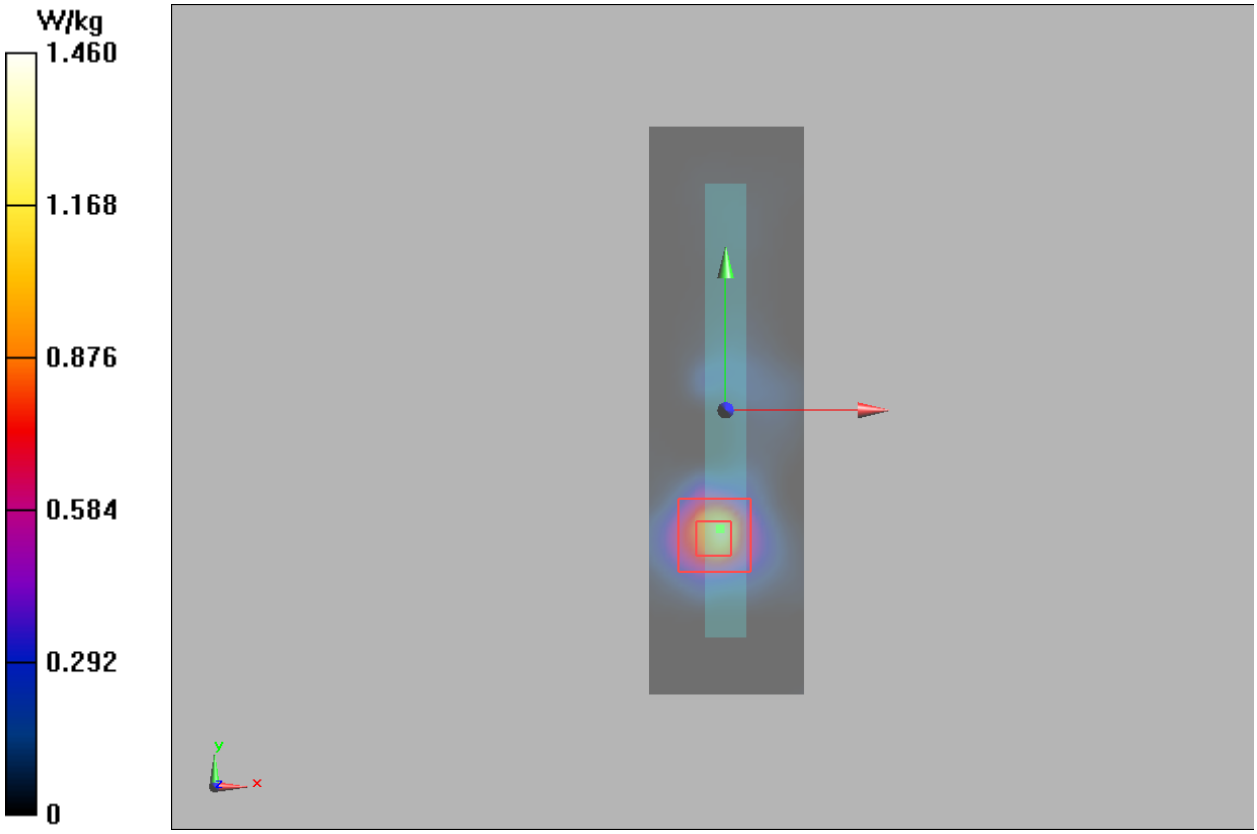
Top Side CH42 /Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 4.215 V/m; Power Drift = 0.072 dB

Peak SAR (extrapolated) = 3.43 W/kg

SAR(1 g) = 1.12 W/kg; SAR(10 g) = 0.375 W/kg

Maximum value of SAR (measured) = 1.46 W/kg



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Plot 10802.11n HT40U-NII-2A Back Side CH54 (Angle=0°, Distance 5mm)

Date: 11/10/2016

Communication System: UID 0, WiFi 802.11 n (0); Frequency: 5270 MHz;Duty Cycle: 1:1

Medium parameters used: f = 5270 MHz; σ = 5.45 S/m; ε_r = 46.654; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(4.69, 4.69, 4.69); Calibrated: 12/10/2015;

Electronics: DAE4 Sn871; Calibrated: 11/17/2015

Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA;

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Back Side CH54 /Area Scan (91x241x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 2.16 W/kg

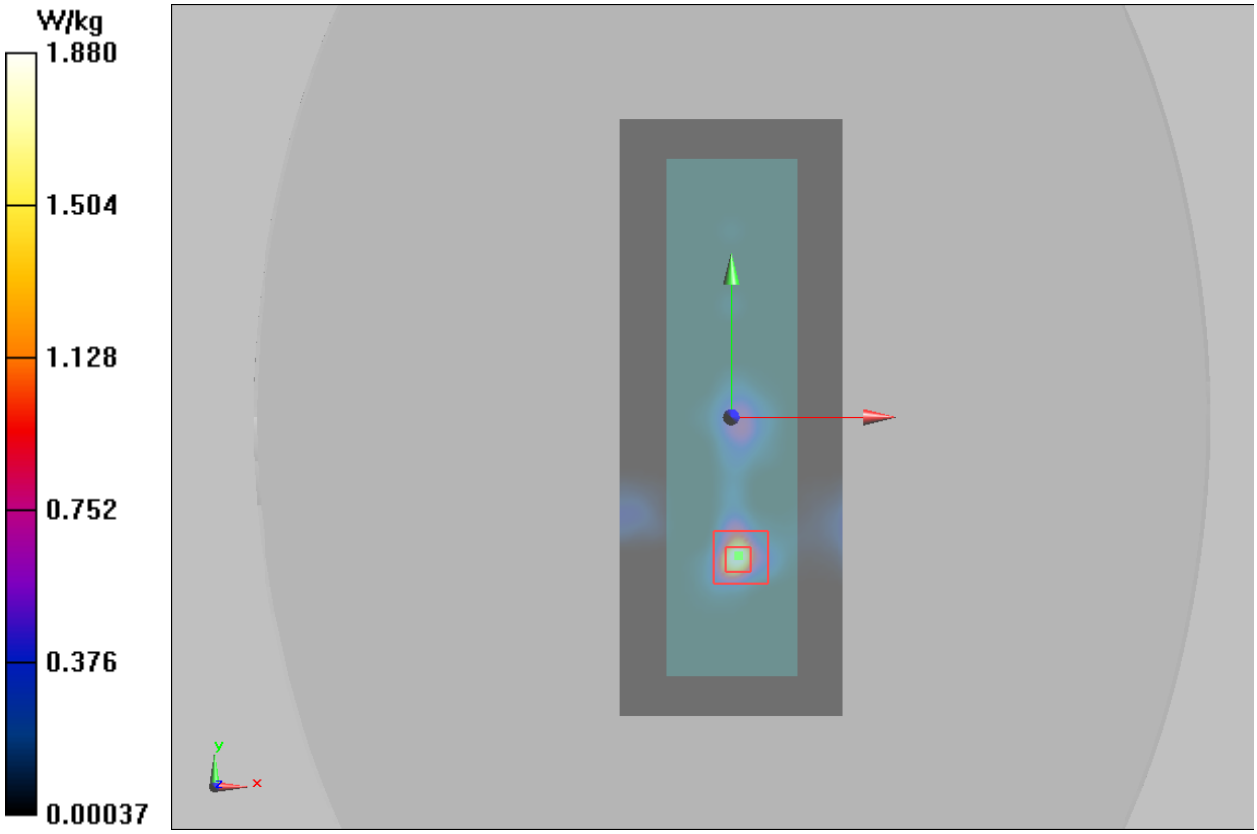
Back Side CH54 /Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 10.36 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 4.22 W/kg

SAR(1 g) = 1.47 W/kg; SAR(10 g) = 0.447 W/kg

Maximum value of SAR (measured) = 1.88 W/kg



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Plot 11802.11n HT40U-NII-2A Top Side CH54 (Angle=90°, Distance 5mm)

Date: 11/10/2016

Communication System: UID 0, WiFi 802.11 n (0); Frequency: 5270 MHz;Duty Cycle: 1:1

Medium parameters used: f = 5270 MHz; σ = 5.45 S/m; ε_r = 46.654; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(4.69, 4.69, 4.69); Calibrated: 12/10/2015;

Electronics: DAE4 Sn871; Calibrated: 11/17/2015

Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA;

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Top Side CH54 /Area Scan (51x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.51 W/kg

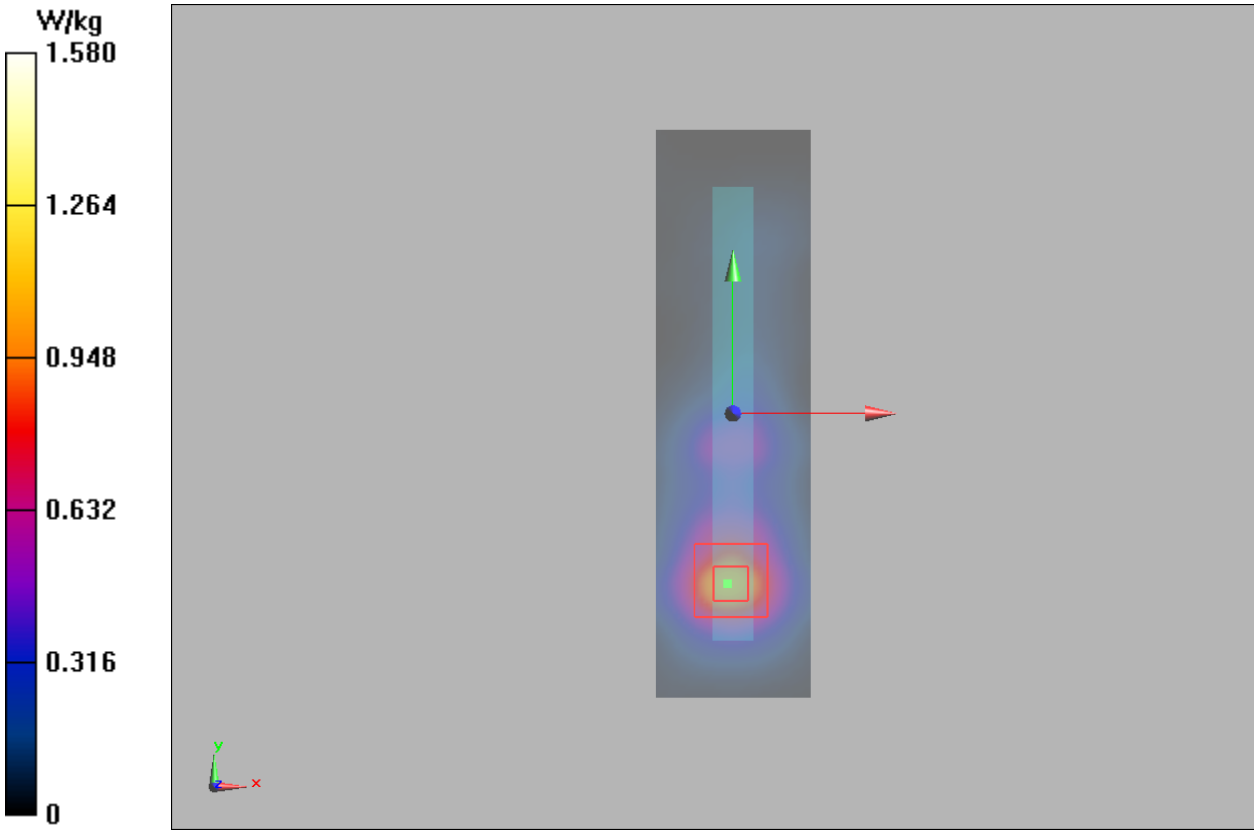
Top Side CH54 /Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 4.400 V/m; Power Drift = -0.144 dB

Peak SAR (extrapolated) = 3.64 W/kg

SAR(1 g) = 1.33 W/kg; SAR(10 g) = 0.397 W/kg

Maximum value of SAR (measured) = 1.58 W/kg



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Plot 12802.11aU-NII-2C Back Side CH100 (Angle=0°, Distance 5mm)

Date: 11/13/2016

Communication System: UID 0, 802.11a (0); Frequency: 5500 MHz;Duty Cycle: 1:1

Medium parameters used: f = 5500 MHz; σ = 5.793 S/m; ε_r = 47.753; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(4.18, 4.18, 4.18); Calibrated: 12/10/2015;

Electronics: DAE4 Sn871; Calibrated: 11/17/2015

Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA;

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Back Side CH100 /Area Scan (91x241x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.04 W/kg

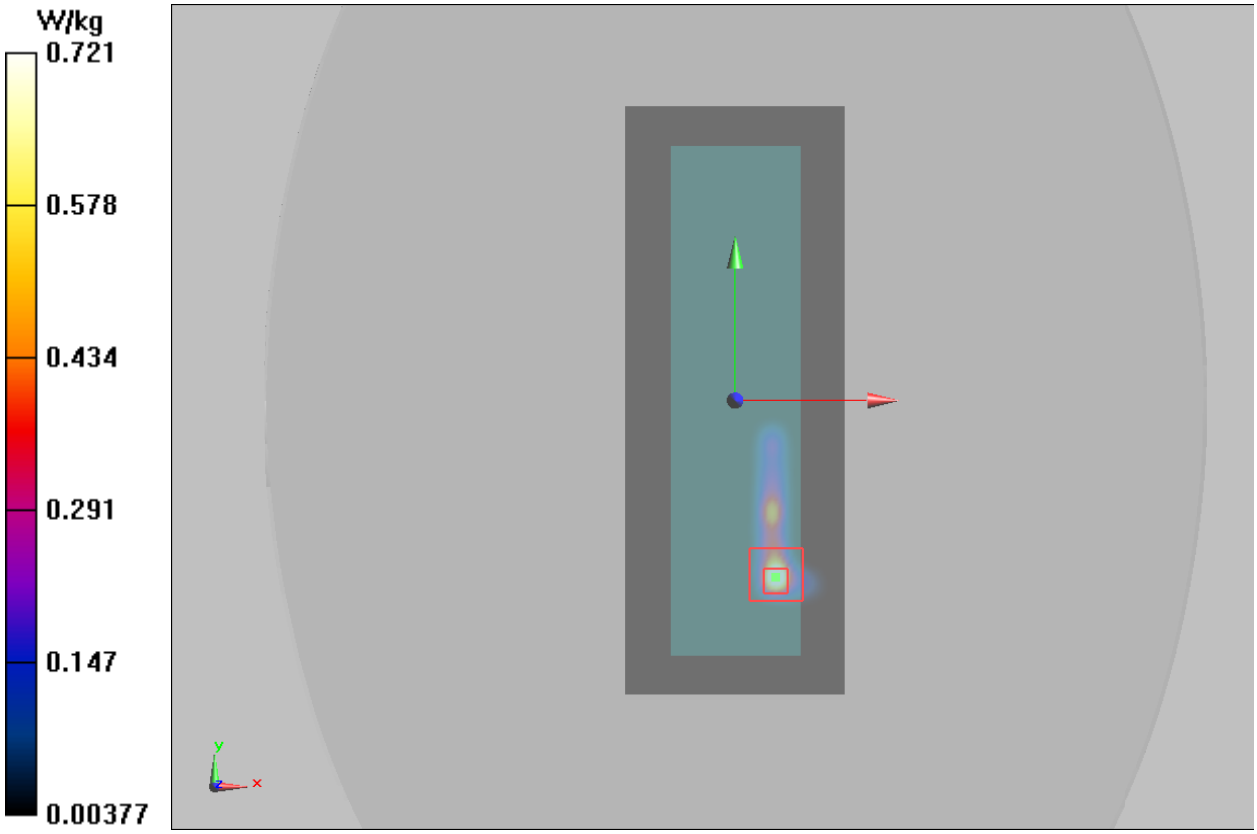
Back Side CH100 /Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 1.882 V/m; Power Drift = -0.072 dB

Peak SAR (extrapolated) = 1.70 W/kg

SAR(1 g) = 0.579 W/kg; SAR(10 g) = 0.192 W/kg

Maximum value of SAR (measured) = 0.721 W/kg



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Plot 13802.11aU-NII-2C Top Side CH100 (Angle=90°, Distance 5mm)

Date: 11/13/2016

Communication System: UID 0, 802.11a (0); Frequency: 5500 MHz;Duty Cycle: 1:1

Medium parameters used: f = 5500 MHz; σ = 5.793 S/m; ε_r = 47.753; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(4.18, 4.18, 4.18); Calibrated: 12/10/2015;

Electronics: DAE4 Sn871; Calibrated: 11/17/2015

Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA;

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Top Side CH100 /Area Scan (51x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.652 W/kg

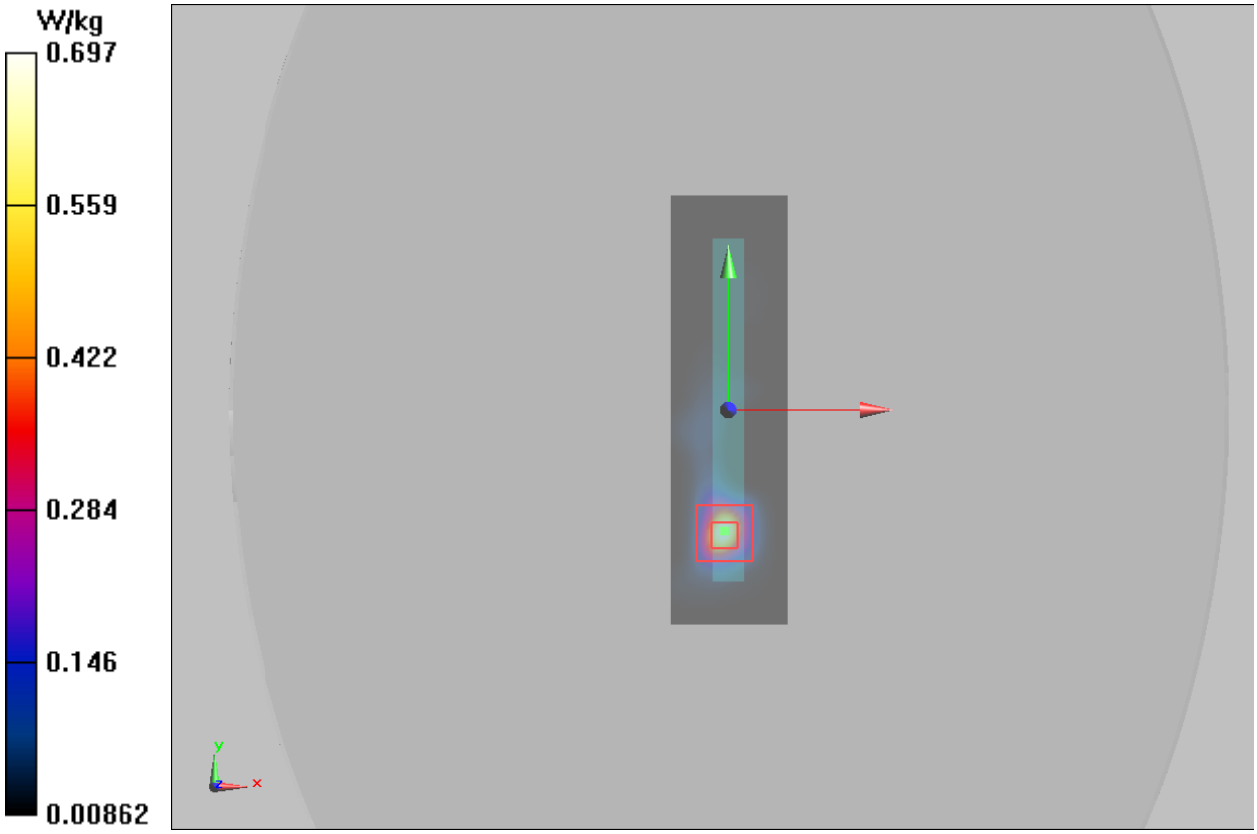
Top Side CH100 /Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 2.233 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 1.19 W/kg

SAR(1 g) = 0.518 W/kg; SAR(10 g) = 0.244 W/kg

Maximum value of SAR (measured) = 0.697 W/kg



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Plot 14802.11n HT40U-NII-3 Back Side CH151 (Angle=0°, Distance 5mm)

Date: 11/12/2016

Communication System: UID 0, WiFi 802.11 n (0); Frequency: 5755 MHz;Duty Cycle: 1:1

Medium parameters used: f = 5755 MHz; σ = 6.071 S/m; ε_r = 47.721; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(4.23, 4.23, 4.23); Calibrated: 12/10/2015;

Electronics: DAE4 Sn871; Calibrated: 11/17/2015

Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA;

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Back Side CH151/Area Scan (91x241x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.77 W/kg

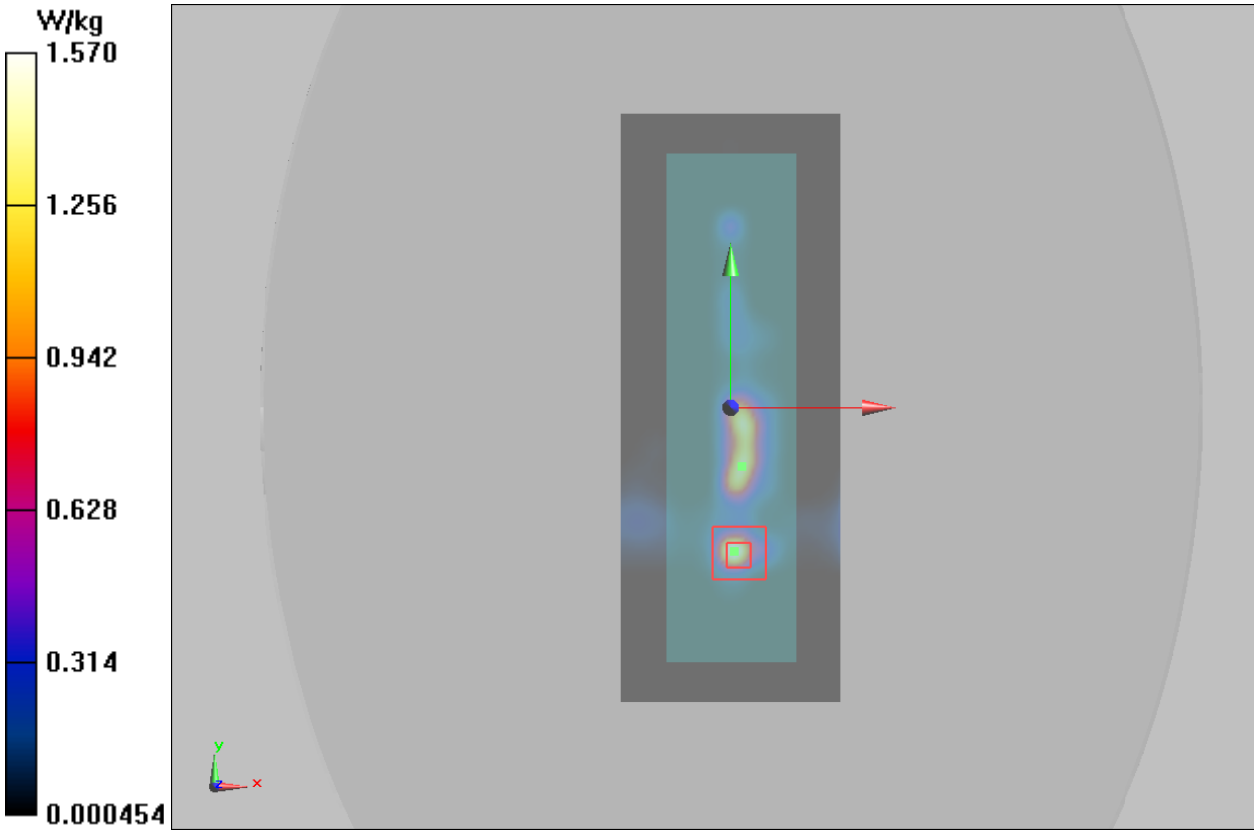
Back Side CH151/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 11.63 V/m; Power Drift = -0.027 dB

Peak SAR (extrapolated) = 3.80 W/kg

SAR(1 g) = 1.25 W/kg; SAR(10 g) = 0.349 W/kg

Maximum value of SAR (measured) = 1.57 W/kg



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Plot 15802.11n HT40U-NII-3 Top Side CH151 (Angle=90°, Distance 5mm)

Date: 11/12/2016

Communication System: UID 0, WiFi 802.11 n (0); Frequency: 5755 MHz;Duty Cycle: 1:1

Medium parameters used: f = 5755 MHz; σ = 6.071 S/m; ε_r = 47.721; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(4.23, 4.23, 4.23); Calibrated: 12/10/2015;

Electronics: DAE4 Sn871; Calibrated: 11/17/2015

Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA;

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Top Side CH151/Area Scan (51x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.58 W/kg

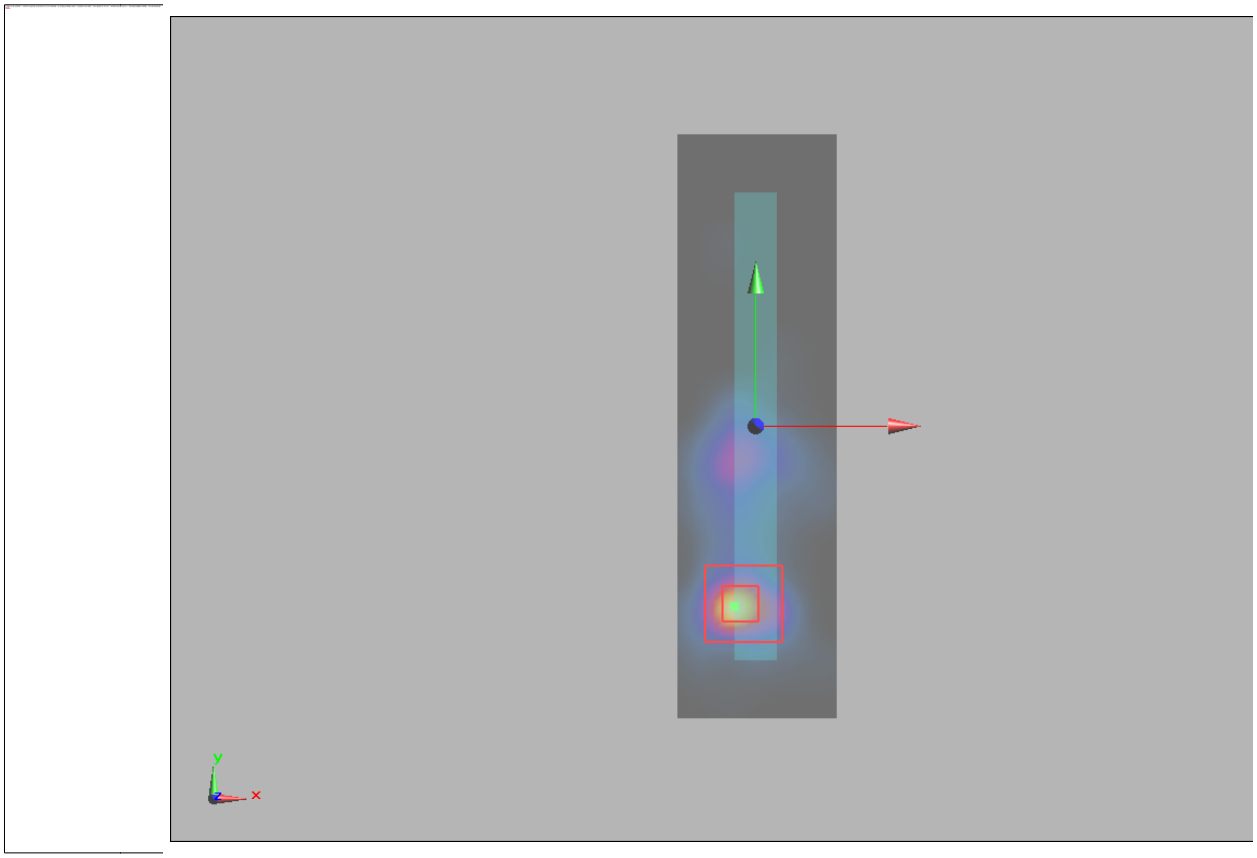
Top Side CH151/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value =5.52 V/m; Power Drift = 0.011 dB

Peak SAR (extrapolated) = 3.18 W/kg

SAR(1 g) = 1.445 W/kg; SAR(10 g) = 0.462 W/kg

Maximum value of SAR (measured) = 1.52 W/kg



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ANNEX D: Probe Calibration Certificate

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CALIBRATION No. L0570

Client TA(Shanghai) Certificate No: Z15-97193

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:3677

Calibration Procedure(s) FD-Z11-2-004-01
Calibration Procedures for Dosimetric E-field Probes

Calibration date: December 10, 2015

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(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	01-Jul-15 (CTTL, No.J15X04256)	Jun-16
Power sensor NRP-Z91	101547	01-Jul-15 (CTTL, No.J15X04256)	Jun-16
Power sensor NRP-Z91	101548	01-Jul-15 (CTTL, No.J15X04256)	Jun-16
Reference10dBAttenuator	18N50W-10dB	13-Mar-14(TMC,No.JZ14-1103)	Mar-16
Reference20dBAttenuator	18N50W-20dB	13-Mar-14(TMC,No.JZ14-1104)	Mar-16
Reference Probe EX3DV4	SN 7307	27-Feb-15(SPEAG,No.EX3-7307_Feb15)	Feb-16
DAE4	SN 771	27-Jan-15(SPEAG, No.DAE4-771_Jan15)	Jan -16
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
SignalGeneratorMG3700A	6201052605	01-Jul-15 (CTTL, No.J15X04255)	Jun-16
Network Analyzer E5071C	MY46110673	03-Feb-15 (CTTL, No.J15X00728)	Feb-16

	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	
Reviewed by:	Qi Dianyuan	SAR Project Leader	
Approved by:	Lu Bingsong	Deputy Director of the laboratory	

Issued: December 11, 2015

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Certificate No: Z15-97193 Page 1 of 11

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Glossary:

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

Calibration is Performed According to the Following Standards:

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

b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3GHz)", February 2005

Methods Applied and Interpretation of Parameters:

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

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Probe EX3DV4

SN: 3677

Calibrated: December 10, 2015

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

Certificate No: Z15-97193 Page 3 of 11

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm(μV/(V/m)^2)^A	0.40	0.46	0.40	±10.8%
DCP(mV)^B	100.6	103.2	101.6	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc^E (k=2)
0	CW	X	0.0	0.0	1.0	0.00	172.8	±2.1%
		Y	0.0	0.0	1.0		187.6	
		Z	0.0	0.0	1.0		171.1	

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

^{A} The uncertainties of Norm X, Y, Z do not affect the E^2-field uncertainty inside TSL (see Page 5 and Page 6).
^{B} Numerical linearization parameter: uncertainty not required.
^{E} Uncertainly is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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

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)	Unct. (k=2)
750	41.9	0.89	9.69	9.69	9.69	0.13	1.00	±12%
850	41.5	0.92	9.35	9.35	9.35	0.14	1.23	±12%
1750	40.1	1.37	7.98	7.98	7.98	0.17	1.21	±12%
1900	40.0	1.40	7.96	7.96	7.96	0.13	1.52	±12%
2300	39.5	1.67	7.60	7.60	7.60	0.44	0.74	±12%
2450	39.2	1.80	7.39	7.39	7.39	0.51	0.72	±12%
2600	39.0	1.96	7.18	7.18	7.18	0.27	1.20	±12%
5200	36.0	4.66	5.58	5.58	5.58	0.38	1.25	±13%
5300	35.9	4.76	5.34	5.34	5.34	0.37	1.23	±13%
5600	35.5	5.07	4.85	4.85	4.85	0.40	1.10	±13%
5800	35.3	5.27	4.81	4.81	4.81	0.40	1.32	±13%

[C] Frequency validity of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequency 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 the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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

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)	Unct. (k=2)
750	55.5	0.96	9.71	9.71	9.71	0.20	1.00	±12%
850	55.2	0.99	9.42	9.42	9.42	0.15	1.52	±12%
1750	53.4	1.49	7.65	7.65	7.65	0.15	1.52	±12%
1900	53.3	1.52	7.42	7.42	7.42	0.15	1.42	±12%
2300	52.9	1.81	7.39	7.39	7.39	0.42	0.85	±12%
2450	52.7	1.95	7.22	7.22	7.22	0.29	1.27	±12%
2600	52.5	2.16	6.95	6.95	6.95	0.32	1.07	±12%
5200	49.0	5.30	4.93	4.93	4.93	0.40	1.30	±13%
5300	48.9	5.42	4.69	4.69	4.69	0.40	1.20	±13%
5600	48.5	5.77	4.18	4.18	4.18	0.42	1.30	±13%
5800	48.2	6.00	4.23	4.23	4.23	0.42	1.20	±13%

[C] Frequency validity of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequency 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 the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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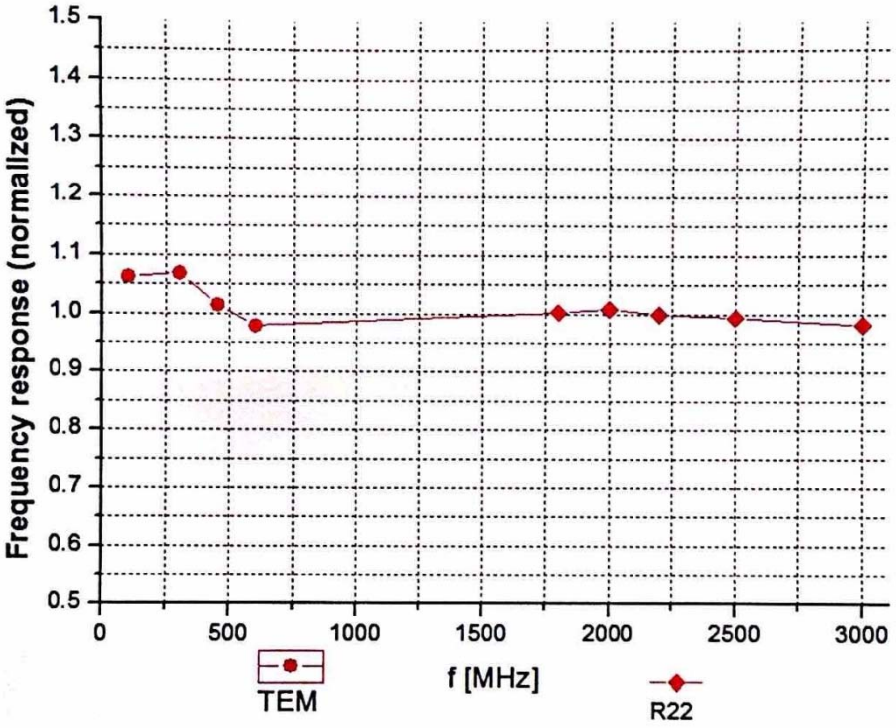
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ±7.5% (k=2)

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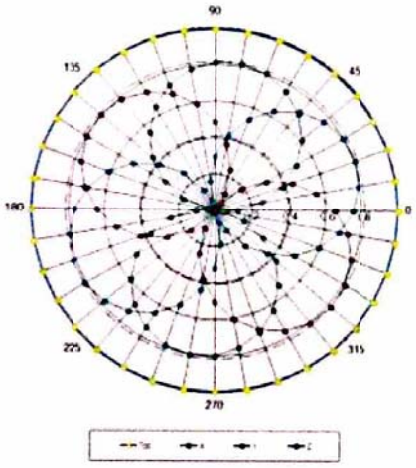
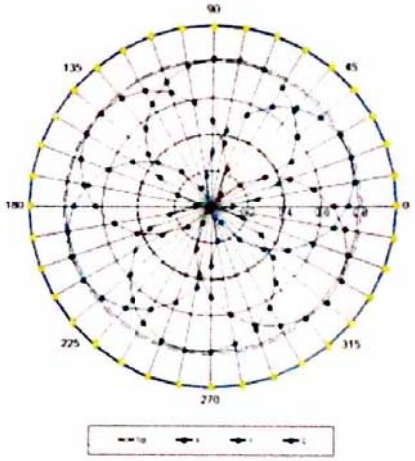
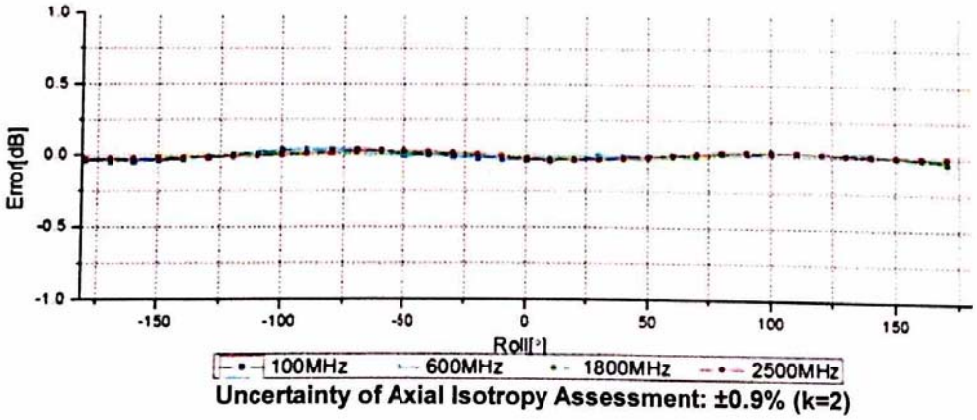
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM



f=1800 MHz, R22





Uncertainty of Axial Isotropy Assessment: ±0.9% (k=2)

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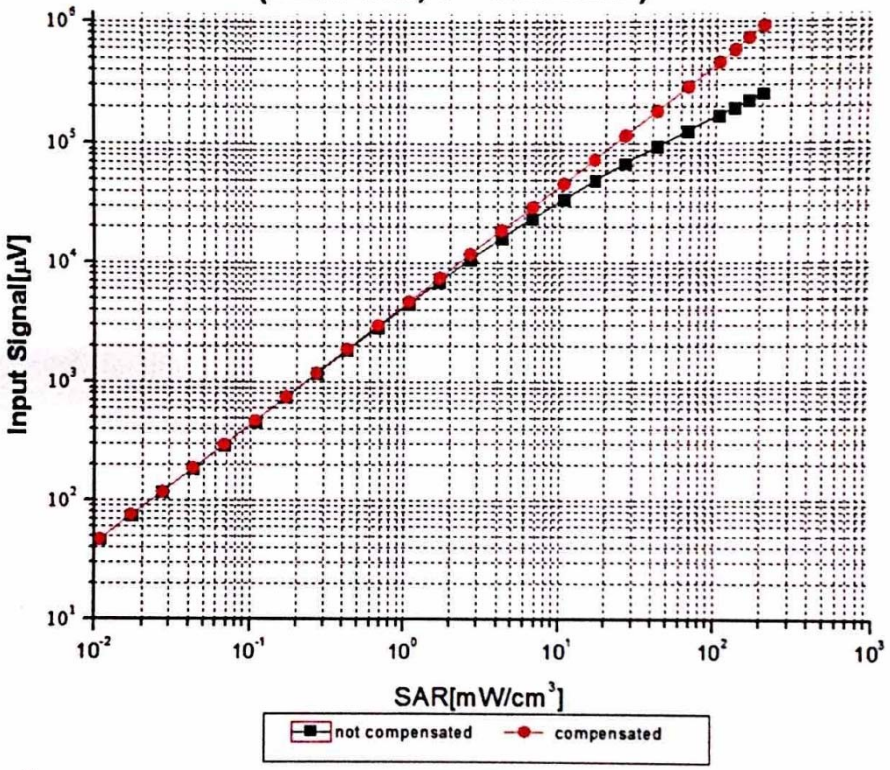
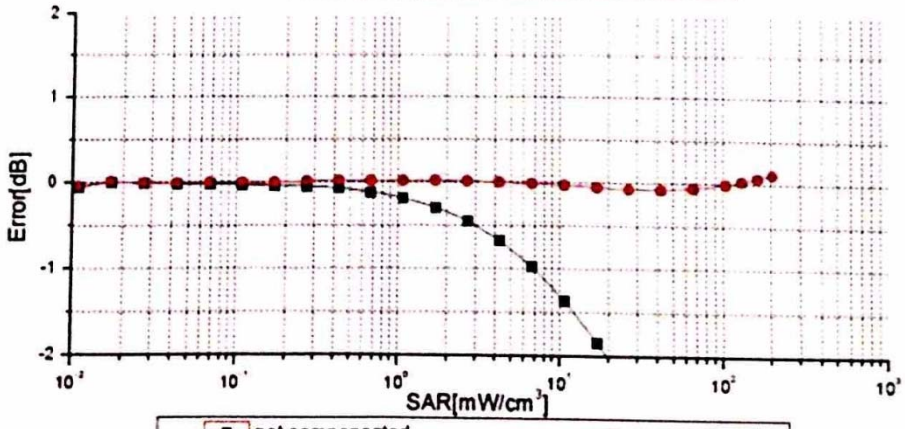
Dynamic Range f(SAR$_{head}$)
(TEM cell, f = 900 MHz)





Uncertainty of Linearity Assessment: ±0.9% (k=2)

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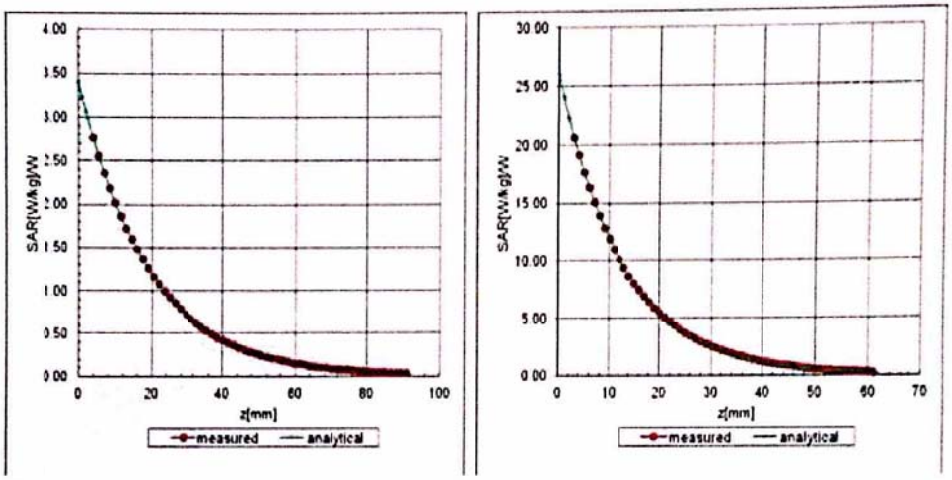
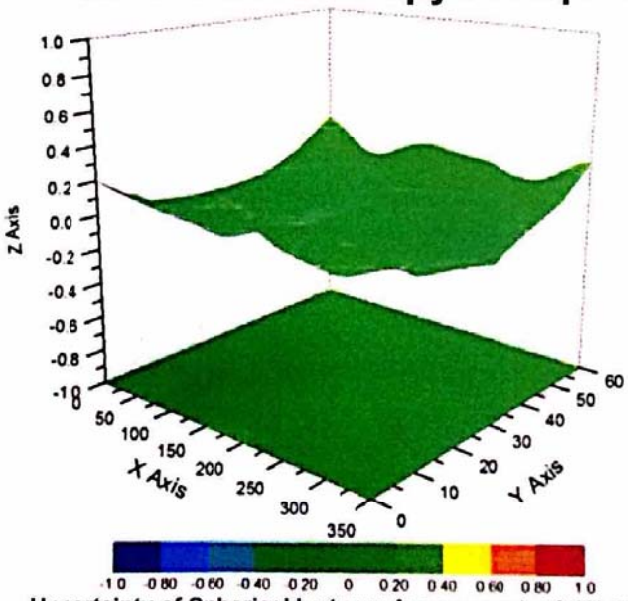
Conversion Factor Assessment

f=850 MHz, WGLS R9(H_convF) **f=1750 MHz, WGLS R22(H_convF)**



Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment: ±2.8% (K=2)

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