FCC SAR Test Report

FCC ID: NDD9577221420

Project No.	:	1412C013
Equipment	:	AC1200 11ac Wireless Dual Band USB Adapter
Model Name	:	EW-7722UAC，GWU-H722UAC
Applicant	:	EDIMAX TECHNOLOGY CO., LTD.
Address	:	No.3,Wu-Chuan 3rd Road, Wu-Ku Industrial Park, New Taipei City, Taiwan
Date of Receipt	:	Dec. 22, 2014
Date of Test	:	Feb. 08, 2015 ~ Mar. 03,2015
Issued Date	:	Mar. 11, 2015
Tested by	:	BTL Inc.

Testing Engineer :

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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (**NML**), or National Institute of Standards and Technology (**NIST**) .

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REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCC-SAR-1412C013	Original Issue.	Mar. 11, 2015

1. GENERAL SUMMARY

Equipment	AC1200 11ac Wireless Dual Band USB Adapter
Model Name	EW-7722UAC，GWU-H722UAC; 525725
Brand Name	Edimax; Manhattan
Model Difference	N/A
Manufacturer	EDIMAX TECHNOLOGY CO., LTD.
Address	No.3,Wu-Chuan 3rd Road, Wu-Ku Industrial Park, New Taipei City, Taiwan
Factory	EDIMAX TECHNOLOGY CO., LTD.
Address	No.3,Wu-Chuan 3rd Road, Wu-Ku Industrial Park, New Taipei City, Taiwan
Standard(s)	**FCC 47CFR §2.1093** Radio frequency Radiation Exposure Evaluation: Portable Devices **ANSI C95.1, 1999** Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.(IEEE Std C95.1-1999) **KDB 248227 D01 v01r02 SAR meas for 802 11 a b g v01r02:** SAR Measurement Procedures for 802.11a/b/g Transmitters **KDB 447498 D01 General RF Exposure Guidance v05r02**: Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies. **KDB 447498 D02 v02** SAR Measurement Procedures for USB Dongle Transmitters **KDB 865664 D01 SAR measurement 100 MHz to 6GHz v01r03:** SAR Measurement Requirements for 100MHz to 6GHz

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.
The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCC-SAR-1412C013) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).

2. RF EMISSIONS MEASUREMENT

2.1 TEST FACILITY

The test facilities used to collect the test data in this report is **SAR room** at the location of No.3,Jinshagang 1st Road, ShiXia, Dalang Town, Dong Guan, China.523792

2.2 MEASUREMENT UNCERTAINTY

Uncertainty Conponent	Uncertainty Value	Probability Distribution	Divisor	C_i (1g)	Standard Uncertainty ±1%	V_i or V_{eff}
Measurement System						
Probe Calibration (*k*=1)	5.9	Normal	1	1	5.9	∞
Axial Isotropy	4.7	Rectangular	$\sqrt{3}$	$\sqrt{0.5}$	1.9	∞
Hemispherical Isotropy	9.6	Rectangular	$\sqrt{3}$	$\sqrt{0.5}$	3.9	∞
Boundary Effect	1.0	Rectangular	$\sqrt{3}$	1	0.6	∞
Linearity	4.7	Rectangular	$\sqrt{3}$	1	2.7	∞
System Detection Limit	1.0	Rectangular	$\sqrt{3}$	1	0.6	∞
Readout Electronics	0.3	Normal	1	1	0.3	∞
Response Time	0.8	Rectangular	$\sqrt{3}$	1	0.5	∞
Integration Time	2.6	Rectangular	$\sqrt{3}$	1	1.5	∞
RF Ambient Conditions-Noise	3.0	Rectangular	$\sqrt{3}$	1	1.7	∞
RF Ambient Reflections	3.0	Rectangular	$\sqrt{3}$	1	1.7	∞
Probe Positioner Mechanical Tolerance	0.4	Rectangular	$\sqrt{3}$	1	0.2	∞
Probe Positioning with respect to Phantom Shell	2.9	Rectangular	$\sqrt{3}$	1	1.7	∞
Extrapolation, interpolation and integration Algorithms for Max. SAR Evaluation	1.0	Rectangular	$\sqrt{3}$	1	0.6	∞
Test Sample Related						
Test sample Positioning	2.9	Normal	1	1	2.9	145
Device Holder Uncertainty	3.6	Normal	1	1	3.6	5
Output Power Variation - SAR drift measurement	5.0	Rectangular	$\sqrt{3}$	1	2.9	∞
Phantom and Setup						
Phantom Uncertainty (shape and thickness tolerances)	4.0	Rectangular	$\sqrt{3}$	1	2.3	∞
Liquid Conductivity - deviation from target values	5.0	Rectangular	$\sqrt{3}$	0.64	1.8	∞
Liquid Conductivity - measurement uncertainty	2.5	Normal	1	0.64	1.6	∞
Liquid Permittivity - deviation from target values	5.0	Rectangular	$\sqrt{3}$	0.6	1.7	∞
Liquid Permittivity - measurement uncertainty	2.5	Normal	1	0.6	1.5	∞
Combined standard uncertainty		RSS	-	-	10.9	387
Expanded uncertainty		*k*=2	-	-	21.9	-

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Operation Frequency	2412MHz~2462 MHz 5150MHz~5250MHz 5745 MHz~5825MHz
Modulation Technology	802.11a:OFDM 802.11b:DSSS 802.11g:OFDM 802.11n:OFDM 802.11ac:OFDM
Bit Rate of Transmitter	802.11a (OFDM) 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11b (DSSS, CCK) 1, 2, 5.5, 11 Mbps 802.11g (OFDM) 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n (OFDM, MCS 0-7) 6.5, 7.2, 13.0, 14.4, 19.5, 21.7, 26.0, 28.9, 39.0, 43.3, 52.0, 57.8, 58.5, 65.0, 72.2 up to 300 Mbps 802.11ac (OFDM, MCS 0-9) 32.5, 65, 97.5, 130, 195, 260, 292.5, 325, 433.3 up to 866.7 Mbps
Number Of Channel	Please refer to note 1 (Page 9)
Antenna Type	Please refer to note 2 (Page 9)

Note:

1. Number Of Channel(WIFI)

802.11b / g / n 20MHz / n 40MHz							
CH 01 – CH 11 for 802.11b, 802.11g, 802.11n(20MHz) CH 03 – CH 09 for 802.11n(40MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	04	2427	07	2442	10	2457
02	2417	05	2432	08	2447	11	2462
03	2422	06	2437	09	2452		

802.11a / 802.11n/ac 20MHz				802.11n/ac 40MHz			
Band 1				Band 1			
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220	38	5190		
40	5200	48	5240	46	5230		

802.11a / 802.11n/ac 20MHz				802.11n/ac 40MHz			
Band 4				Band 4			
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	161	5805	151	5755		
153	5765	165	5825	159	5795		
157	5785						

802.11ac 80MHz		802.11ac 80MHz	
Band 1		Band 4	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
42	5210	151	5755

2. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)		Note
					2.4G	5G	
Ant1/Ant2	N/A	ALU140-222030	PIFA	N/A	3.55 dBi	3.99 dBi	TX/RX

3.2 THE MAXIMUM SAR_{1G} VALUES

Body SAR Configuration

Test Mode	Frequency (MHz)	Test Position	Separation Distance	Reported Result SAR_{1g} (W/kg)	Limit SAR_{1g} (W/kg)
802.11a	5200	Test Position 1	5mm	1.540	1.6

3.3 LABORATORY ENVIRONMENT

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

3.4 MAIN TEST INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Data Acquisition Electronics	Speag	DAE4	1390	Sep. 15, 2015
2	E-field Probe	Speag	EX3DV4	3932	Jan. 30, 2016
3	Electro Optical Converter	Speag	ECO90	1151	N/A
4	SAM Twin Phantom	Speag	SAM	1784	N/A
5	System Validation Dipole	Speag	D2450V2	919	Sep. 17, 2015
6	System Validation Dipole	Speag	D5GHzV2	1160	Nov. 04, 2015
7	Power Amplifier	Speag	ZHL-42W	N/A	N/A
8	Power Amplifier	Speag	ZVE-8G	N/A	N/A
9	ENA Network Analyzer	Agilent	E5071C	MY46102965	Mar. 29, 2015
10	Dielectric Probe Kit	Agilent	85070E	2593	N/A
11	P-series power meter	Agilent	N1911A	MY45100473	Mar. 29, 2015
12	wideband power sensor	Agilent	N1921A	MY51100041	Mar. 29, 2015
13	Power Meter	Anritsu	ML2487A	6K00004714	Mar. 16, 2015
14	Power Meter Sensor	Anritsu	MA2491A	34138	Mar. 16, 2015
15	MXG Analog Signal Generator	Agilent	N5181A	MY49060710	Nov. 02, 2015
16	Low pass filter	Mini-Circuits	SLP-2950+	M108294	Mar. 29, 2015
17	Attenuator	Mini-Circuits	VAT-10+	31317-1	Mar. 29, 2015
18	Attenuator	Mini-Circuits	VAT-10+	31317-2	Mar. 29, 2015
19	Attenuator	MEB	300-affn-03	314	Mar. 29, 2015
20	Dual directional coupler	Agilent	777D	50208	Mar. 29, 2015

Remark: ” N/A” denotes no model name, serial No. or calibration specified.
All calibration period of equipment list is one year.

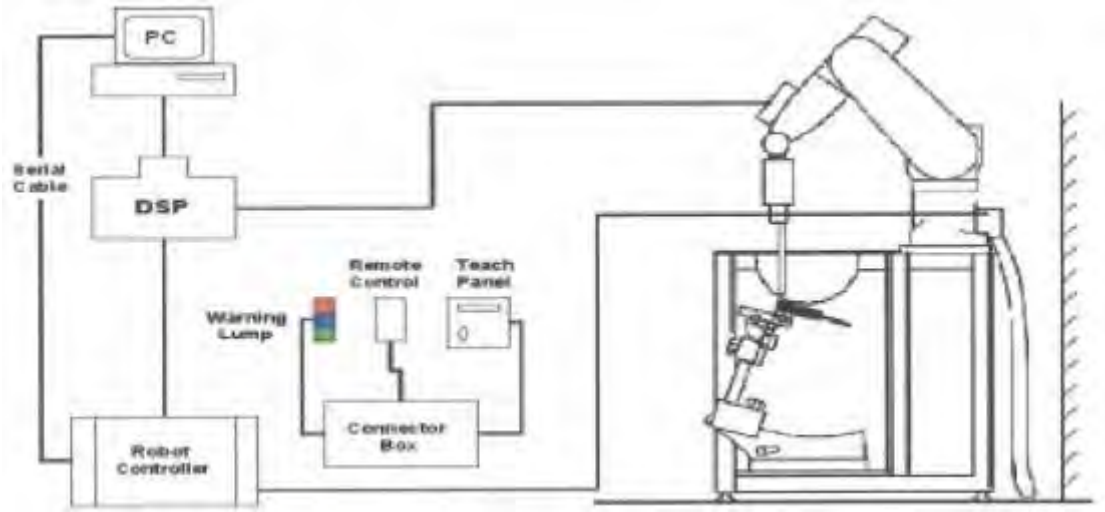
4. SAR MEASUREMENTS SYSTEM CONFIGURATION

4.1 SAR MEASUREMENT SET-UP

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

1. A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).
2. A dosimetric probe, i.e. an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
3. A data acquisition electronic (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
4. A unit to operate the optical surface detector which is connected to the EOC.
5. The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY5 measurement server.
6. The DASY5 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows 7
7. DASY5 software and SEMCAD data evaluation software.
8. Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
9. The generic twin phantom enabling the testing of left-hand and right-hand usage.
10. The device holder for handheld mobile phones.
11. Tissue simulating liquid mixed according to the given recipes.
12. System validation dipoles allowing to validate the proper functioning of the system.

4.1.1 Test Setup Layout



4.2 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.

4.2.1 EX3DV4 PROBE SPECIFICATION

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available
Frequency	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
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Distance from probe tip to dipole centers: 1.0 mm

EX3DV4 E-field Probe

4.2.2 E-FIELD PROBE CALIBRATION

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

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

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

$$\mathbf{SAR} = \mathbf{C}\frac{\Delta T}{\Delta t}$$

Where: Δt = Exposure time (30 seconds),

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

ΔT = Temperature increase due to RF exposure.

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

Where: σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m3).

4.2.3 OTHER TEST EQUIPMENT

4.2.3.1. Device Holder for Transmitters

Construction: Simple but effective and easy-to-use extension for Mounting Device that facilitates the testing of larger devices (e.g., laptops, cameras, etc.) It is lightweight and fits easily on the upper part of the Mounting Device in place of the phone positioner. The extension is fully compatible with the Twin SAM, ELI4 and SAM v6.0 Phantoms.
Material: POM, Acrylic glass, Foam

4.2.3.2 Phantom

The SAM twin phantom is a berglass shell phantom with 2mm shell thickness (except the ear region, where shell thickness increases to 6 mm). The phantom has three measurement areas:

_ Left hand
_ Right hand
_ Flat phantom

The bottom plate contains three pairs of bolts for 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 cover the phantom during o -periods to prevent water evaporation and changes in the liquid parameters. Free space scans of devices on top of this phantom cover are possible.

SAM twin Phantom

4.2.4 SCANNING PROCEDURE

The DASY5 installation includes predefined files with recommended procedures for measurements and validation. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the DUT’s output power and should vary max. ± 5 %.

The “surface check” measurement tests the optical surface detection system of the DASY5 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1mm). To prevent wrong results tests are only executed when the liquid is free of air bubbles. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within ± 30°.)

- Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values before running a detailed measurement around the hot spot.Before starting the area scan a grid spacing of 10 mm x 10 mm is set. During the scan the distance of the probe to the phantom remains unchanged. After finishing area scan, the field maxima within a range of 2 dB will be ascertained.

- Zoom Scan

Zoom Scans are used to estimate the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The default Zoom Scan is done by 7x7x7 points within a cube whose base is centered around the maxima found in the preceding area scan.

- Spatial Peak Detection

The procedure for spatial peak SAR evaluation has been implemented and can determine values of masses of 1g and 10g, as well as for user-specific masses.The DASY5 system allows evaluations that combine measured data and robot positions, such as:
• maximum search
• extrapolation
• boundary correction
• peak search for averaged SAR

During a maximum search, global and local maxima searches are automatically performed in 2-D after each Area Scan measurement with at least 6 measurement points. It is based on the evaluation of the local SAR gradient calculated by the Quadratic Shepard’s method. The algorithm will find the global maximum and all local maxima within -2 dB of the global maxima for all SAR distributions.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. Several measurements at different distances are necessary for the extrapolation. Extrapolation routines require at least 10 measurement points in 3-D space. They are used in the Zoom Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard’s method for extrapolation. For a grid using 7x7x7 measurement points with 5mm resolution amounting to 343 measurement points, the uncertainty of the extrapolation routines is less than 1% for 1g and 10g cubes.

4.2.5 DATA STORAGE AND EVALUATION

4.2.5.1 Data Storage

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DAE4". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

4.4.2 Data Evaluation by SEMCAD

The SEMCAD software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters:	Sensitivity	Normi, a_{i0}, a_{i1}, a_{i2}
	Conversion factor	$ConvF_i$
	Diode compression point	Dcp_i
Device parameters:	Frequency	f
	Crest factor	cf
Media parameters:	Conductivity	
	Density	

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY5 components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.

If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot cf / dcp_i$$

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

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

cf = crest factor of exciting field (DASY parameter)

dcp_i = diode compression point (DASY parameter)

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

E-field probes: $E_i = (V_i / Norm_i \cdot ConvF)^{1/2}$

H-field probes: $H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1} f + a_{i2} f^2) / f$

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

$Norm_i$ = sensor sensitivity of channel i (i = x, y, z)
[mV/(V/m)^2] for E-field Probes

$ConvF$ = sensitivity enhancement in solution

aij = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

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

H_i = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = (E_X^2 + E_Y^2 + E_Z^2)^{1/2}$$

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

$$SAR = (E_{tot})^2 \cdot \sigma / (\rho \cdot 1000)$$

With SAR = local specific absorption rate in mW/g

E_{tot} = total field strength in V/m

σ = conductivity in [mho/m] or [Siemens/m]

ρ = equivalent tissue density in g/cm^3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.

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

With P_{pwe} = equivalent power density of a plane wave in mW/cm^2

E_{tot} = total field strength in V/m

H_{tot} = total magnetic field strength in A/m

5. TISSUE-EQUIVALENT LIQUID

5.1 TISSUE-EQUIVALENT LIQUID INGREDIENTS

The liquid is consisted of water, salt and Glycol. The liquid has previously been proven to be suited for worst-case. The Table 2 shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed

Composition of the body Tissue Equivalent Matter

MIXTURE%	FREQUENCY 2450MHz
Water	73.2
Glycol	26.7
Salt	0.1
Dielectric Parameters Target Value	f=2450MHzε=52.70 σ=1.95

Simulating Liquids for 5GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	78
Mineral oil	11
Emulsifiers	9
Additives and Salt	2

5.2 TISSUE-EQUIVALENT LIQUID PROPERTIES

Dielectric Performance of Tissue Simulating Liquid

Frequency (MHz)	Description	Dielectric Parameters		Temp ℃
		ε_r	σ(s/m)	
2450	Target value ±5% within	52.70 50.07-55.34	1.95 1.85-2.048	22.0
	Measurement value 2015-02-08	51.41	2.01	20.4
5200	Target value ±5% within	49.00 46.55~51.45	5.30 5.04~5.57	22.0
	Measurement value 2015-02-12	49.52	5.36	21.2
5800	Target value ±5% within	48.20 45.79~50.61	6.00 5.70~6.30	22.0
	Measurement value 2015-02-13	47.96	5.92	21.2

6. SYSTEM CHECK

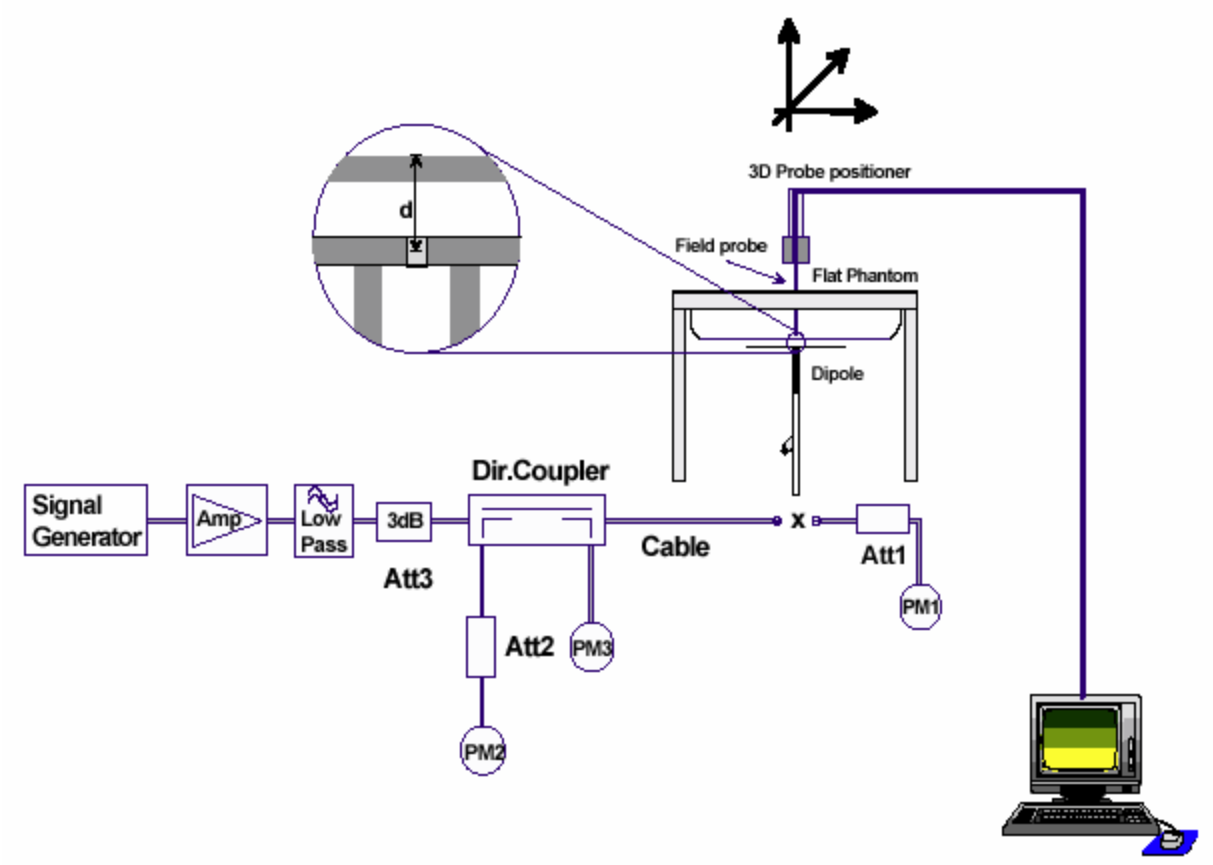
6.1 DESCRIPTION OF SYSTEM CHECK

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulants were measured every day using the dielectric probe kit and the network analyzer. A system check measurement was made following the determination of the dielectric parameters of the simulant, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. The system check results (dielectric parameters and SAR values) are given in the 6.2.

System check results have to be equal or near the values determined during dipole calibration with the relevant liquids and test system (±10 %).

System check is performed regularly on all frequency bands where tests are performed with the DASY5 system.

System Check Set-up



6.2 DESCRIPTION OF SYSTEM CHECK

System Check in Tissue Simulating Liquid

Frequency (MHz)	Test Date	Dielectric Parameters		Temp	250mW Measured SAR_{1g}	1W Normalized SAR_{1g}	1W Target SAR_{1g} (±10% deviation)
		εr	σ(s/m)	(℃)	(W/kg)		
2450	2015-02-08	51.41	2.01	20.40	12.7	50.8	49.30 (44.37~54.23)
Frequency (MHz)	Test Date	Dielectric Parameters		Temp	100mW Measured SAR_{1g}	1W Normalized SAR_{1g}	1W Target SAR_{1g} (±10% deviation)
		εr	σ(s/m)	(℃)	(W/kg)		
5200	2015-02-12	49.52	5.36	21.20	7.24	72.40	74.00 (66.60~81.40)
5800	2015-02-13	47.96	5.92	21.20	7.72	77.2	72.50 (65.25~79.75)

Note: 1. The graph results see Appendix 2.
2. Target Value derives from the calibration certificate

7. OPERATIONAL CONDITIONS DURING TEST

7.1 General Description of Test Procedures

For WLAN SAR testing, WLAN engineering testing software installed on the DUT can provide continuous transmitting RF signal. This RF signal utilized in SAR measurement has almost 100% duty cycle and its crest factor is 1.

For the 802.11b/g/n SAR tests, a communication link is set up with the test mode software for WIFI mode test. During the test, at the each test frequency channel, the EUT is operated at the RF continuous emission mode. Each channel should be tested at the lowest data rate. Testing at higher data rates is not required when the maximum average output power is less than 0.25dB higher than those measured at the lowest data rate.

802.11b/g operating modes are tested independently according to the service requirements in each frequency band.802.11b/g modes are tested on channels1,6,11; however, if output power reduction is necessary for channels 1 and /or 11 to meet restricted band requirements the highest output channels closest to each of these channels must be tested instead.

SAR is not required for 802.11g/n channels when the maximum average output power is less than 0.25dB higher than that measured on the corresponding 802.11b channels.

7.1.1 Test Position

Per KDB 447498 D02, Test all USB orientations [see figure below: (A) Horizontal-Up, (B) Horizontal-Down, (C) Vertical-Front, and (D) Vertical-Back] with a device-to-phantom separation distance of 5 mm or less, according to KDB 447498 requirements. These test orientations are intended for the exposure conditions found in typical laptop/notebook/netbook or tablet computers with either horizontal or vertical USB connector configurations at various locations in the keyboard section of the computer. Current generation portable host computers should be used to establish the required SAR measurement separation distance. The same test separation distance must be used to test all frequency bands and modes in each USB orientation. The typical Horizontal-Up USB connection (A), found in the majority of host computers, must be tested using an appropriate host computer. A host computer with either Vertical-Front (C) or Vertical-Back (D) USB connection should be used to test one of the vertical USB orientations. If a suitable host computer is not available for testing the Horizontal-Down (B) or the remaining Vertical USB orientation, a high quality USB cable, 12 inches or less, may be used for testing these other orientations. It must be documented that the USB cable does not influence the radiating characteristics and output power of the transmitter.

(A) Horizontal-Up (B) Horizontal-Down (C) Vertical-Front (D) Vertical-Back

USB Connector Orientations Implemented on Laptop Computers

8. TEST RESULT

8.1 CONDUCTED POWER RESULTS

WiFi 2.4G	Ant	Data Rate (Mbps) / Frequency (MHz)	Test Results (dBm)							
			Conducted AV							
			1	2	5.5	11				
802.11b	Ant 1	2412	15.78	15.74	15.68	15.63				
		2437	15.93	15.35	15.31	15.25				
		2462	15.73	15.56	15.47	15.41				

WiFi 2.4G	Ant	Data Rate (Mbps) / Frequency (MHz)	Test Results (dBm)							
			Conducted AV							
			6	9	12	18	24	36	48	54
802.11g	Ant 1	2412	12.35	12.27	12.25	12.18	12.11	12.07	12.01	11.95
		2437	14.98	14.93	14.87	14.81	14.77	14.71	14.67	14.59
		2462	14.87	14.68	14.54	14.49	14.44	14.31	14.27	14.13

WiFi 2.4G	Ant	Data Rate (Mbps) / Frequency (MHz)	Test Results (dBm)							
			Conducted AV							
			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11n HT20	Ant 1	2412	12.58	12.55	12.5	12.44	12.48	12.49	12.43	12.39
		2437	16.07	16.04	15.98	15.94	15.92	15.91	15.87	15.89
		2462	15.23	15.17	15.12	15.07	15.08	15.03	15.06	15.02
	Ant 2	2412	13.15	13.15	13.14	13.09	13.11	13.12	13.1	13.09
		2437	14.98	17.95	14.96	14.93	14.93	14.92	14.91	14.9
		2462	14.78	14.79	14.76	14.77	14.75	14.76	14.72	14.76

WiFi 2.4G	Ant	Data Rates / Frequency (MHz)	Average Power (dBm)							
			MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
802.11n HT20	Ant 1	2412	12.31	12.29	12.23	12.21	12.25	12.18	12.14	12.08
		2437	15.88	15.81	15.82	15.79	15.74	15.68	15.64	15.59
		2462	15.03	14.93	14.86	14.92	14.87	14.82	14.77	14.68
	Ant 2	2412	13.12	13.08	13.09	13.05	13.01	12.98	12.94	12.89

		2437	14.89	14.86	14.85	14.83	14.82	14.81	14.78	14.74
		2462	14.75	14.73	14.68	14.65	14.67	14.62	14.58	14.54
	Sum	**2412**	13.58	15.71	15.69	15.66	15.66	15.61	15.57	15.51
		2437	18.42	18.37	18.37	18.35	18.31	18.28	18.24	18.20
		2462	17.90	17.84	17.78	17.80	17.78	17.73	17.69	17.62

WiFi 2.4G	**Ant**	**Data Rate (Mbps) / Frequency (MHz)**	**Test Results (dBm)**							
			Conducted AV							
			MCS0	**MCS1**	**MCS2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**	**MCS7**
802.11n HT40	Ant 1	**2422**	10.34	10.28	10.23	10.17	10.25	10.29	10.23	10.18
		2437	15.94	15.92	15.93	15.93	15.91	15.9	15.91	15.9
		2452	15.78	15.79	15.76	15.77	15.76	15.78	15.77	15.76
	Ant 2	**2422**	10.93	10.93	10.92	10.92	10.91	10.92	10.93	10.9
		2437	15.82	15.79	15.78	15.76	15.77	15.76	15.77	15.74
		2452	15.89	15.86	15.86	15.82	15.83	15.79	15.8	15.81

WiFi 2.4G	**Ant**	**Data Rates / Frequency (MHz)**	**Average Power (dBm)**							
			MCS8	**MCS9**	**MCS10**	**MCS11**	**MCS12**	**MCS13**	**MCS14**	**MCS15**
802.11n HT40	Ant 1	**2422**	10.22	10.19	10.13	10.07	10.04	9.97	9.95	9.83
		2437	15.88	15.87	15.85	15.86	15.84	15.82	15.8	15.78
		2452	15.75	15.72	15.73	15.7	15.68	15.66	15.62	15.59
	Ant 2	**2422**	10.89	10.86	10.85	10.83	10.82	10.8	10.79	10.75
		2437	15.72	15.71	15.69	15.68	15.65	15.62	15.59	15.55
		2452	15.79	15.78	15.76	15.73	15.72	15.71	15.7	15.72
	Sum	**2422**	13.58	13.55	13.52	13.48	13.46	13.42	13.40	13.32
		2437	18.81	18.80	18.78	18.78	18.76	18.73	18.71	18.68
		2452	18.78	18.76	18.76	18.73	18.71	18.70	18.67	18.67

WiFi 5G	Ant	Data Rate (Mbps) / Frequency (MHz)	Test Results (dBm)							
			Conducted AV							
			6	9	12	18	24	36	48	54
802.11a	Ant 1	5180	16.1	16.05	16.01	15.96	15.93	15.9	15.88	15.85
		5200	15.96	15.92	15.86	15.82	15.79	15.73	15.71	15.68
		5240	15.03	14.96	14.97	14.93	14.85	14.82	14.77	14.72
		5745	14.98	14.21	14.17	14.13	14.11	14.08	14.03	13.95
		5785	14.82	14.34	14.31	1427	14.24	14.2	14.15	14.11
		5825	14.7	14.61	14.58	14.54	14.46	14.41	14.38	14.32

WiFi 5G	Ant	Data Rates / Frequency (MHz)	Average Power (dBm)							
			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11n HT20 (SISO)	Ant 1	5180	10.73	10.68	10.64	10.61	10.56	10.52	10.49	10.45
		5200	10.19	10.08	10.07	10.05	10.02	9.98	9.89	9.91
		5240	10.86	10.39	10.38	10.4	10.37	10.35	10.34	10.36
		5745	11.51	11.48	11.44	11.41	11.36	11.32	11.29	11.25
		5785	10.08	10.08	10.07	10.05	10.02	9.98	9.89	9.91
		5825	10.42	10.39	10.38	10.4	10.37	10.35	10.34	10.36
	Ant 2	5180	10.59	10.62	10.63	10.61	10.64	10.63	10.58	10.57
		5200	10.23	10.5	10.52	10.49	10.46	10.44	10.43	10.41
		5240	10.92	10.78	10.72	10.73	10.74	10.71	10.7	10.69
		5745	10.65	10.62	10.63	10.61	10.64	10.63	10.58	10.57
		5785	10.51	10.5	10.52	10.49	10.46	10.44	10.43	10.41
		5825	10.77	10.78	10.72	10.73	10.74	10.71	10.7	10.69

WiFi 5G	Ant	Data Rates / Frequency (MHz)	Average Power (dBm)							
			MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
802.11n HT20 (MIMO)	Ant 1	5180	10.72	10.63	10.64	10.51	10.46	10.42	10.39	10.33
		5200	10.21	10.11	10.09	10.08	10.05	10.02	9.98	9.93
		5240	10.88	10.71	10.65	10.61	10.56	10.55	10.48	10.42
		5745	11.56	11.53	11.54	11.51	11.46	11.42	11.39	11.33
		5785	10.13	10.11	10.09	10.08	10.05	10.02	9.98	9.93
		5825	10.43	10.41	10.35	10.31	10.26	10.25	10.28	10.22

	Ant 2	**5180**	10.53	10.52	10.51	10.51	10.48	10.44	10.41	10.37
		5200	10.26	10.17	10.13	10.08	10.05	10.07	10.01	10
		5240	10.97	10.75	10.73	10.72	10.7	10.68	10.65	10.63
		5745	10.67	10.62	10.56	10.51	10.48	10.44	10.41	10.37
		5785	10.52	10.47	10.43	10.38	10.35	10.37	10.31	10.29
		5825	10.81	10.75	10.76	10.72	10.7	10.68	10.65	10.63
	Sum	**5180**	13.64	13.59	13.59	13.52	13.48	13.44	13.41	13.36
		5200	13.25	13.15	13.12	13.09	13.06	13.06	13.01	12.98
		5240	13.94	13.74	13.70	13.68	13.64	13.63	13.58	13.54
		5745	14.15	14.11	14.09	14.05	14.01	13.97	13.94	13.89
		5785	13.34	13.30	13.27	13.24	13.21	13.21	13.16	13.12
		5825	13.63	13.59	13.57	13.53	13.50	13.48	13.48	13.44

WiFi 5G	**Ant**	**Data Rate (Mbps) / Frequency(MHz)**	**Average Power (dBm)**							
			MCS0	**MCS1**	**MCS2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**	**MCS7**
802.11n HT40 (SISO)	Ant 1	**5190**	10.15	9.88	9.84	9.81	9.76	9.72	9.69	9.65
		5230	10.71	10.69	10.68	10.65	10.63	10.66	10.64	10.61
		5755	11.91	11.88	11.84	11.81	11.76	11.72	11.69	11.65
		5795	11.93	11.89	11.88	11.85	11.83	11.76	11.74	11.71
	Ant 2	**5190**	10.4	10.32	10.33	10.31	10.25	10.23	10.18	10.17
		5230	10.11	10.08	10.08	10.06	10.04	10.01	9.98	9.95
		5755	11.55	11.52	11.53	11.51	11.45	11.43	11.38	11.37
		5795	12.09	12.08	12.08	12.06	12.04	12.01	11.98	11.95

WiFi 5G	**Ant**	**Data Rates / Frequency(MHz)**	**Average Power (dBm)**							
			MCS8	**MCS9**	**MCS10**	**MCS11**	**MCS12**	**MCS13**	**MCS14**	**MCS15**
802.11n HT40 (MIMO)	Ant 1	**5190**	10.12	10.03	10.01	9.98	9.97	9.93	9.88	9.86
		5230	10.73	10.69	10.68	10.66	10.64	10.63	10.68	10.65
		5755	11.94	11.83	11.81	11.78	11.77	11.73	11.68	11.66
		5795	11.92	11.91	11.88	11.86	11.84	11.83	11.78	11.75
	Ant 2	**5190**	10.42	10.34	10.31	10.29	10.27	10.23	10.22	10.2
		5230	10.12	10.06	10.05	10.01	9.97	9.95	9.93	9.91
		5755	11.56	11.54	11.51	11.49	11.47	11.43	11.42	11.4
		5795	12.13	12.06	12.05	12.01	11.97	11.95	11.93	11.91
	Sum	**5190**	13.28	13.20	13.17	13.15	13.13	13.09	13.06	13.04
		5230	13.45	13.40	13.39	13.36	13.33	13.31	13.33	13.31
		5755	14.76	14.70	14.67	14.65	14.63	14.59	14.56	14.54
		5795	15.04	15.00	14.98	14.95	14.92	14.90	14.87	14.84

WiFi 5G	Ant	Data Rates / Frequency (MHz)	Average Power (dBm)								
			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
802.11ac HT20	Ant 1	5180	13.95	13.92	13.91	13.87	13.85	13.82	13.78	13.75	13.76
		5200	13.87	13.78	13.77	13.71	13.67	13.66	13.61	13.59	13.98
		5240	14.22	14.18	14.19	14.08	14.09	13.98	13.89	13.88	14.04
		5745	12.1	12.05	12.91	12.87	12.85	12.82	12.78	12.75	11.97
		5785	12.42	12.38	12.37	12.31	12.27	12.26	12.21	12.19	12.08
		5825	12.32	12.28	12.29	12.28	12.29	12.28	12.29	12.28	12.33
	Ant 2	5180	14.55	14.52	14.51	14.49	14.47	14.42	14.39	14.35	14.74
		5200	14.42	14.38	14.35	14.31	14.28	14.24	14.09	13.95	14.56
		5240	14.73	14.63	14.65	14.65	14.56	14.51	14.48	14.15	14.67
		5745	11.64	11.62	11.63	11.63	11.63	11.62	11.63	11.62	11.72
		5785	12.44	12.38	12.35	12.31	12.28	12.24	12.09	11.95	11.67
		5825	12.89	12.83	12.75	12.65	12.56	12.51	15.48	15.15	12.02
	Sum	5180	17.27	17.24	17.23	17.20	17.18	17.14	17.11	17.07	17.29
		5200	17.16	17.10	17.08	17.03	17.00	16.97	16.87	16.78	17.29
		5240	17.49	17.42	17.44	17.38	17.34	17.26	17.21	17.03	17.38
		5745	14.89	14.85	15.33	15.30	15.29	15.27	15.25	15.23	14.86
		5785	15.44	15.39	15.37	15.32	15.29	15.26	15.16	15.08	14.89
		5825	15.62	15.57	15.54	15.48	15.44	15.41	17.18	16.96	15.19

WiFi 5G	Ant	Data Rates / Frequency (MHz)	Average Power (dBm)								
			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
802.11 ac 40	Ant 1	5190	12.03	11.97	11.92	11.9	11.85	11.83	11.81	11.79	12.05
		5230	14.67	14.62	14.57	14.55	14.53	14.5	14.49	14.44	14.93
		5755	13.32	13.27	13.28	13.26	13.27	13.29	13.28	12.29	13.36
		5795	13.88	13.87	13.85	13.79	13.76	16.69	13.62	13.59	13.45
	Ant 2	5190	12.55	12.51	12.47	12.43	12.41	12.39	12.36	12.31	12.17
		5230	14.79	14.72	14.66	14.61	14.59	14.52	14.53	14.49	14.87
		5755	13.84	13.78	13.71	13.65	13.62	13.59	13.57	13.52	13.42
		5795	13.95	13.92	13.9	13.86	13.82	13.81	13.8	13.81	13.78
	Sum	5190	15.31	15.26	15.21	15.18	15.15	15.13	15.10	15.07	15.12
		5230	17.74	17.68	17.63	17.59	17.57	17.52	17.52	17.48	17.91
		5755	16.60	16.54	16.51	16.47	16.46	16.45	16.44	15.96	16.40
		5795	16.93	16.91	16.89	16.84	16.80	18.49	16.72	16.71	16.63

WiFi 5G	Ant	Data Rates / Frequency(MHz)	Average Power (dBm)								
			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
802.11 ac 80	Ant 1	**5210**	13.21	13.18	13.15	13.11	13.09	13.07	13.05	13.02	13.21
		5775	12.62	12.62	12.59	12.57	12.55	12.52	12.48	12.45	12.62
	Ant 2	**5210**	13.26	13.22	13.18	13.11	13.08	13.03	12.97	12.95	13.26
		5775	12.54	12.52	12.47	12.41	12.37	12.35	12.32	12.29	12.54
	Sum	**5210**	16.25	16.21	16.18	16.12	16.10	16.06	16.02	16.00	16.25
		5775	15.59	15.58	15.54	15.50	15.47	15.45	15.41	15.38	15.59

8.2 SAR TEST RESULTS

8.2.1 WIFI 2.4G

Test Position	Channel Frequency (MHz)	Duty Cycle	Maximum Allowed Power (dBm)	Conducted power (dBm)	Drift ±0.21dB	Limit of SAR 1.6 W/kg			
					Drift (dB)	Measured SAR (W/kg)	Scaling factor	Reported SAR (W/kg)	Graph Results
Test Position of Body, 802.11b (Distance=5mm)									
1	2437(ant1)	1:1	16.5	15.93	-0.04	0.149	1.140	**0.170**	1
2	2437(ant1)	1:1	16.5	15.93	-0.06	0.0379	1.140	0.043	2
3	2437(ant1)	1:1	16.5	15.93	-0.05	0.121	1.140	0.138	3
4	2437(ant1)	1:1	16.5	15.93	-0.03	0.0152	1.140	0.017	4
Worse Position of Body, 802.11n - 20 MHz (Distance=5mm)									
1	2437(ant1)	1:1	16.5	15.88	-0.05	0.112	1.153	0.129	5
1	2437(ant2)	1:1	16.5	14.89	-0.03	0.128	1.449	**0.185**	6
Worse Position of Body, 802.11n - 40 MHz (Distance=5mm)									
1	2437(ant1)	1:1	16.5	15.88	-0.03	0.109	1.153	0.126	7
1	2437(ant2)	1:1	16.5	15.79	-0.02	0.127	1.178	0.150	8

8.2.2 WIFI 5G BAND1

Test Position	Channel Frequency (MHz)	Duty Cycle	Maximum Allowed Power (dBm)	Conducted power (dBm)	Drift ±0.21dB	Limit of SAR 1.6 W/kg			
					Drift (dB)	Measured SAR (W/kg)	Scaling factor	Reported SAR (W/kg)	Graph Results
Test Position of Body, 802.11a 5G Band1 (Distance=5mm)									
1	5180(ant1)	1:1	16.5	16.1	0.06	1.36	1.096	1.491	1
1	5200(ant1)	1:1	16.5	15.96	-0.01	1.36	1.132	**1.540**	2
1	5240(ant1)	1:1	16.5	15.03	0.07	0.717	1.403	1.006	3
2	5180(ant1)	1:1	16.5	16.1	0.06	0.482	1.096	0.529	4
3	5180(ant1)	1:1	16.5	16.1	0	0.896	1.096	0.982	5
3	5200(ant1)	1:1	16.5	15.96	0.04	0.918	1.132	1.040	6
3	5240(ant1)	1:1	16.5	15.03	0.05	0.841	1.403	1.180	7
4	5180(ant1)	1:1	16.5	16.1	0.08	0.179	1.096	0.196	8
Worse Position of Body, 802.11n - 20MHz 5G Band1 (Distance=5mm)									
1	5240(ant1)	1:1	11	10.88	0.04	0.678	1.028	0.697	9
1	5240(ant2)	1:1	11	10.97	0.05	0.615	1.007	**0.619**	10
Worse Position of Body, 802.11ac - 40MHz 5G Band1 (Distance=5mm)									
1	5230(ant1)	1:1	15.5	14.93	0.04	0.38	1.140	0.433	11

1	5230(ant2)	1:1	15.5	14.87	0.01	0.33	1.156	0.382	12

8.2.1 WIFI 5G BAND4

Test Position	Channel Frequency (MHz)	Duty Cycle	Maximum Allowed Power (dBm)	Conducted power (dBm)	Drift ±0.21dB	Limit of SAR 1.6 W/kg			
					Drift (dB)	Measured SAR (W/kg)	Scaling factor	Reported SAR (W/kg)	Graph Results
Test Position of Body, 802.11a 5G Band4 (Distance=5mm)									
1	5745(ant1)	1:1	15.5	14.98	0.02	1.36	1.127	**1.533**	1
1	5785(ant1)	1:1	15.5	14.82	-0.01	1.3	1.169	1.520	2
1	5825(ant1)	1:1	15.5	14.7	-0.09	1.26	1.202	1.515	3
2	5745(ant1)	1:1	15.5	14.98	0.06	0.766	1.127	0.863	4
2	5785(ant1)	1:1	15.5	14.82	0.05	0.605	1.169	0.708	5
2	5825(ant1)	1:1	15.5	14.7	0.09	0.592	1.202	0.712	6
3	5745(ant1)	1:1	15.5	14.98	0.03	0.782	1.127	0.881	7
3	5785(ant1)	1:1	15.5	14.82	0.09	0.775	1.169	0.906	8
3	5825(ant1)	1:1	15.5	14.7	0.03	0.742	1.202	0.892	9
4	5745(ant1)	1:1	15.5	14.98	0.05	0.279	1.127	0.314	10
Worse Position of Body, 802.11n - 20 MHz 5G Band4 (Distance=5mm)									
1	5795(ant1)	1:1	12.5	11.92	0.04	0.678	1.028	0.697	11
1	5795(ant2)	1:1	12.5	12.13	0.05	0.615	1.007	0.619	12
Worse Position of Body, 802.11ac - 40MHz 5G Band4 (Distance=5mm)									
1	5795(ant1)	1:1	14	13.88	0.04	0.38	1.140	0.433	13
1	5795(ant2)	1:1	14	13.95	0.01	0.33	1.156	0.382	14

Note:

1. The value with boldface is the maximum SAR Value of each test band.
2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is 0.8 W/kg then testing at the other channels is not required for such test configuration(s).
3. KDB 248227-SAR is not required for 802.11g/n channels when the maximum average output power is less than 1/4dB higher than measured on the corresponding 802.11b channels.

8.3 SIMULTANEOUS TRANSMISSION CONDITIONS

Antenna		Simultaneous transmission
Ant 1	Ant 2	802.11n/ac

Reported $SAR_{1g(W/Kg)}$ / Mode	Ant 1	Ant 2	MAX. $\sum SAR_{1g}$
802.11n -20MHz(2.4G)	0.129	0.185	0.314
802.11n -40MHz (2.4G)	0.126	0.150	0.276
802.11n -20MHz (5.2G)	0.697	0.619	**1.316**
802.11ac -40MHz (5.2G)	0.433	0.382	0.815
802.11n -20 MHz (5.8G)	0.399	0.633	1.032
802.11ac -40 MHz (5.8G)	0.557	0.620	1.177
Note:1. The value with boldface is the maximum $\sum SAR_{1g}$ Value. 2. MAX. $\sum SAR_{1g}$=Report $SAR_{Max.Ant0}$+ Report $SAR_{Max.Ant1}$			

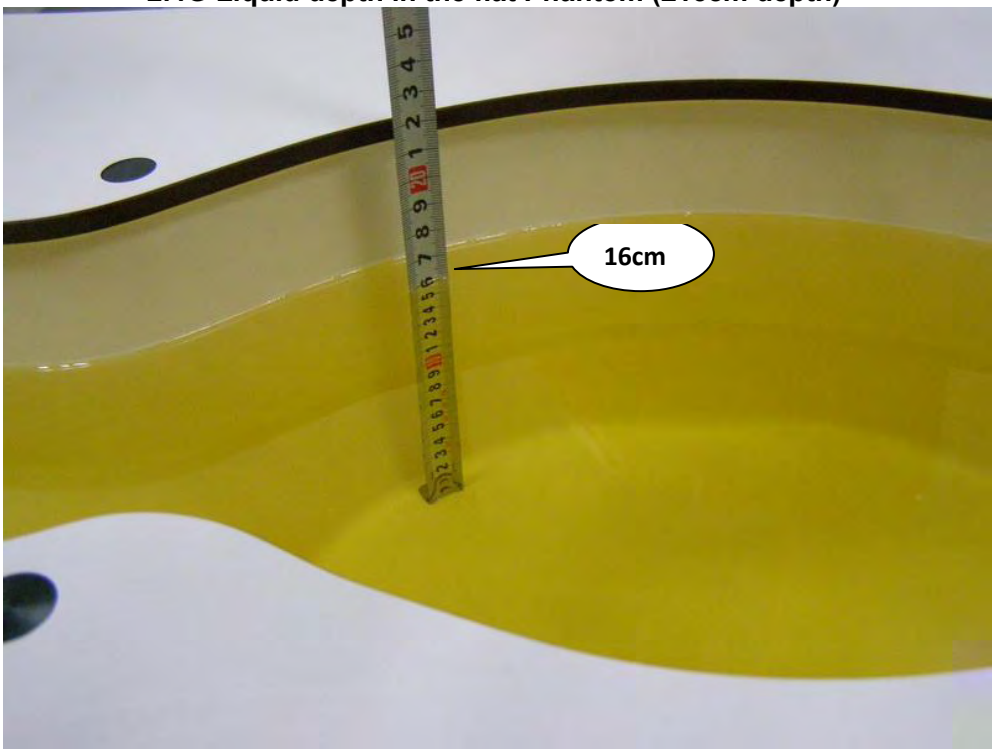
MAX. $\sum SAR_{1g}$ =1.316 W/Kg<1.6W/kg, so the simultaneous transmission SAR are not required for Ant 1 and Ant 2.

APPENDIX

1. Test Layout

Specific Absorption Rate Test Layout

2.4G Liquid depth in the flat Phantom (≥15cm depth)



2. System Check Results

Date/Time: 02/08/2015 08:31:30

Test Laboratory: BTL Inc.

SystemPerformanceCheck-2450 Body

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:919

Communication System: UID 0, CW (0); Frequency: 2450 MHz

Medium parameters used: f = 2450 MHz; σ = 2.01 S/m; εr = 51.41; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(7.60, 7.60, 7.60); Calibrated: 01/30/2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at 2450MHz/d=10mm, Pin=250 mW, dist=2.0mm (EX-Probe)/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 16.6 W/kg

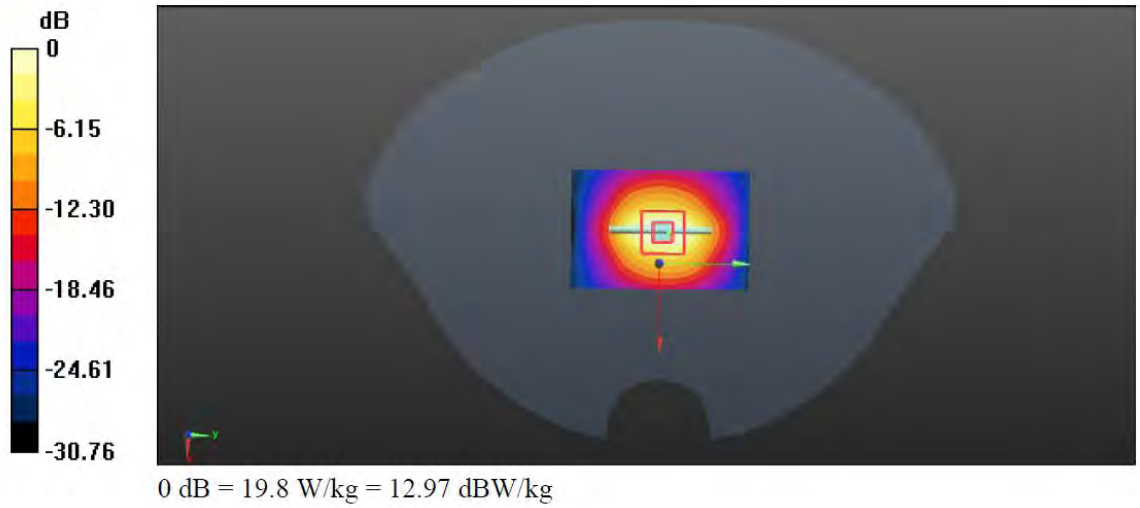
System Performance Check at 2450MHz/d=10mm, Pin=250 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 91.668 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 26.1 W/kg

SAR(1 g) = 12.7 W/kg; SAR(10 g) = 5.92 W/kg

Maximum value of SAR (measured) = 19.5 W/kg



0 dB = 19.8 W/kg = 12.97 dBW/kg

Date/Time: 02/12/2015 08:07:05

Test Laboratory: BTL Inc.

SystemPerformanceCheck-5200 Body

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1160

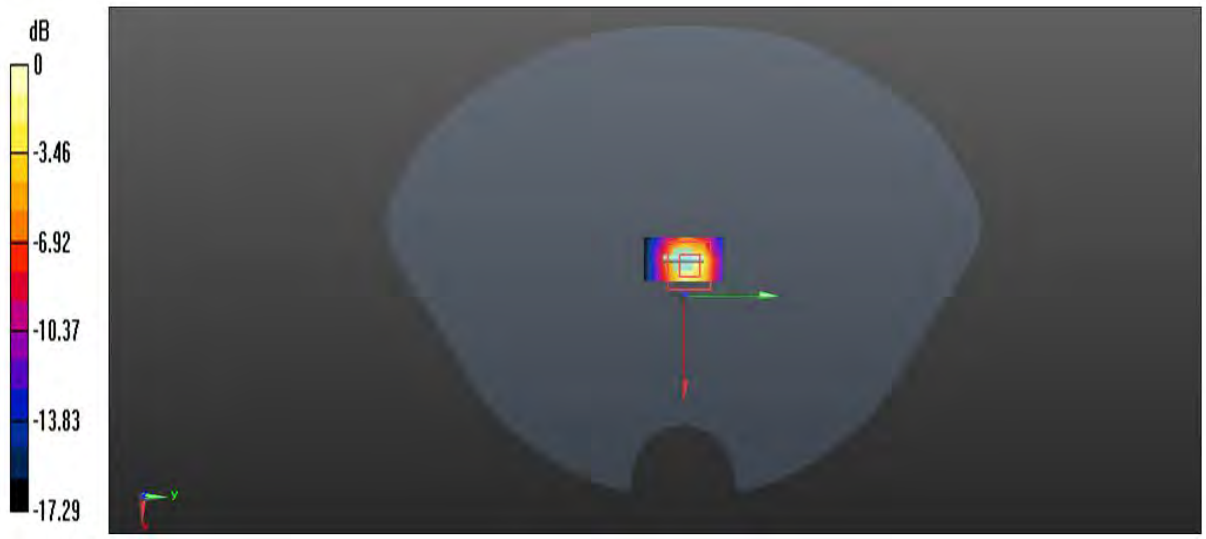
Communication System: UID 0, CW (0); Frequency: 5200 MHz
Medium parameters used: f = 5200 MHz; σ = 5.36 S/m; ε_r = 49.52; ρ = 996 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(5.17, 5.17, 5.17); Calibrated: 01/30/2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration 2/System Check MSL 5000/Area Scan (3x5x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 17.8 W/kg

Configuration 2/System Check MSL 5000/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 36.513 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 28.2 W/kg
SAR(1 g) = 18.06 W/kg; SAR(10 g) = 2 W/kg
Maximum value of SAR (measured) = 14.8 W/kg



Date/Time: 02/13/2015 08:12:55

Test Laboratory: BTL Inc.

SystemPerformanceCheck-5800 Body

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1160

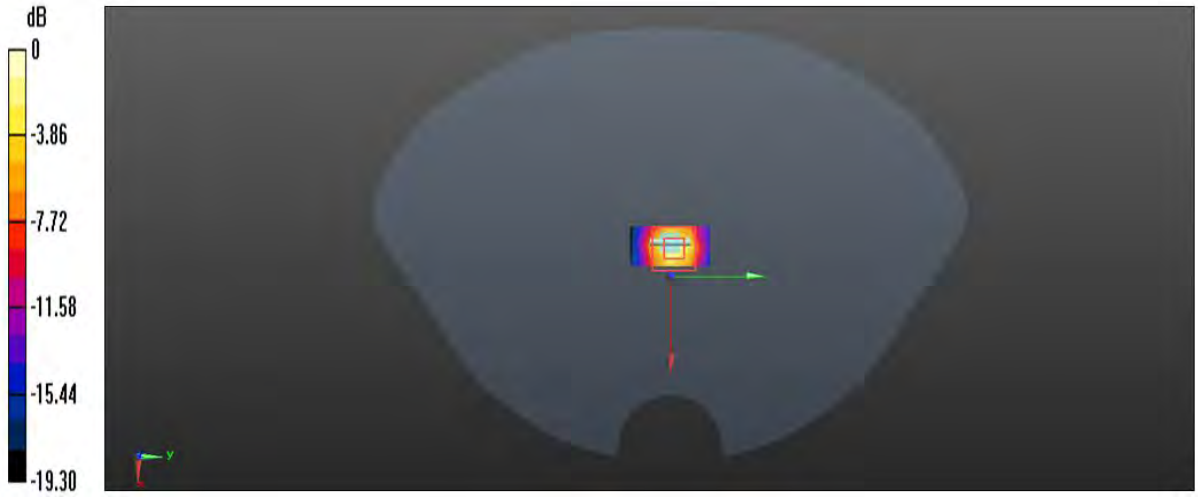
Communication System: UID 0, CW (0); Frequency: 5800 MHz
Medium parameters used: f = 5800 MHz; σ = 5.92 S/m; ε_r = 47.96; ρ = 996 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(4.50, 4.50, 4.50); Calibrated: 01/30/2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration 2/System Check MSL 5800GHz/Area Scan (3x5x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 20.7 W/kg

Configuration 2/System Check MSL 5800GHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 32.635 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 29.1 W/kg
SAR(1 g) = 19.32 W/kg; SAR(10 g) = 1.76 W/kg
Maximum value of SAR (measured) = 13.4 W/kg



3. Graph Results

Date/Time: 02/08/2015 09:54:27

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11b CH6 Test Position 1 5mm

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11b WiFi 2.4GHz (DSSS,1Mbps) (0); Frequency: 2437 MHz
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.883 S/m; εr = 38.021 ; ρ = 1000 kg/m^3
Phantom section: Flat Section

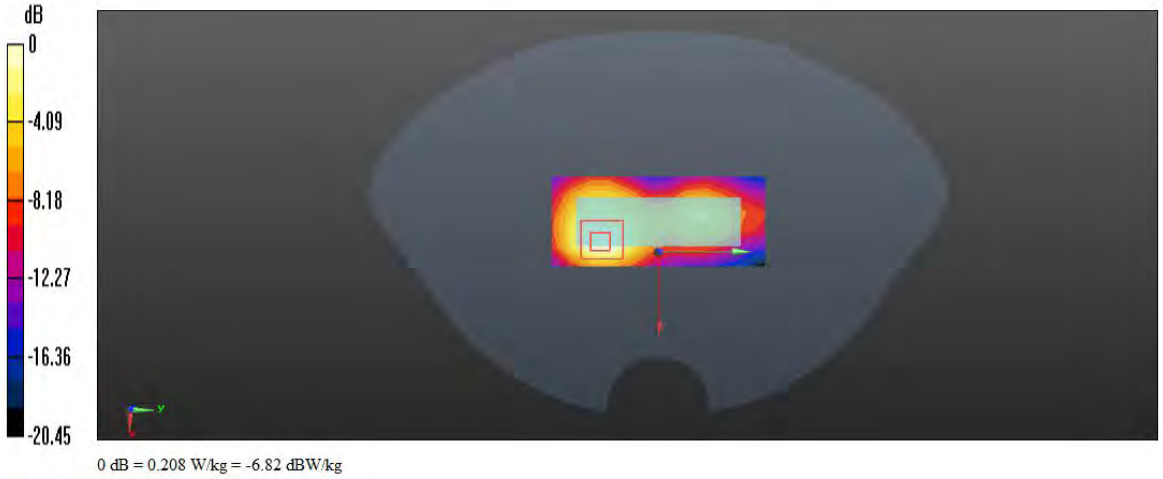
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(7.60, 7.60, 7.60); Calibrated: 01/30/2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 1/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.208 W/kg

Test Position 1/EW-7722UAC/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.768 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.326 W/kg
SAR(1 g) = 0.149 W/kg; SAR(10 g) = 0.064 W/kg
Maximum value of SAR (measured) = 0.238 W/kg



Date/Time: 02/08/2015 10:21:17

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11b CH6 Test Position 2 5mm

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11b WiFi 2.4GHz (DSSS,1Mbps) (0); Frequency: 2437 MHz
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.883 S/m; εr = 38.021 ; ρ = 1000 kg/m^3
Phantom section: Flat Section

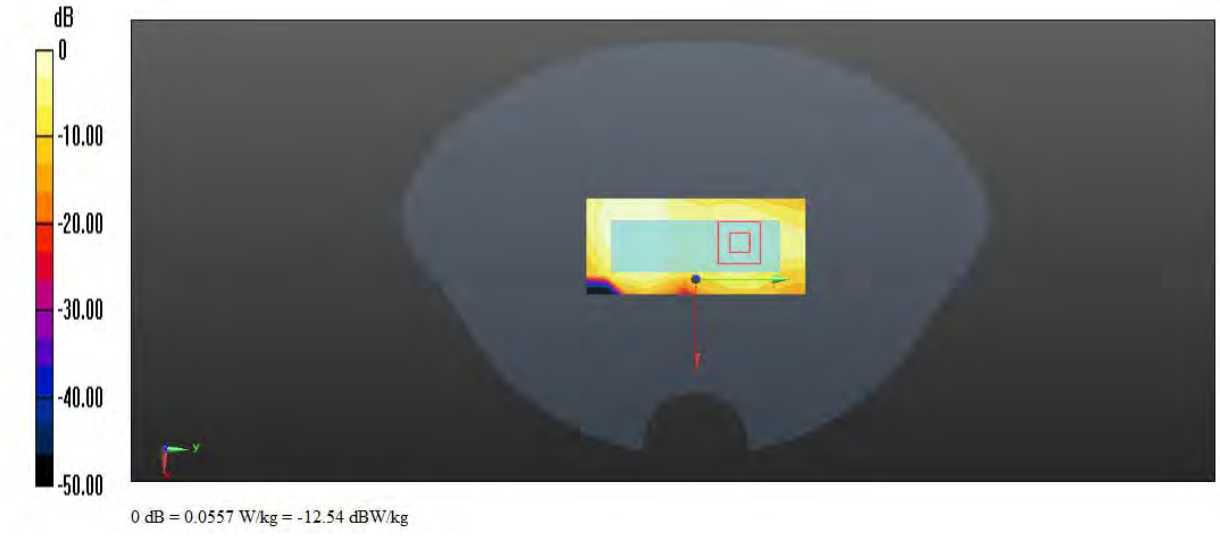
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(7.60, 7.60, 7.60); Calibrated: 01/30/2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 2/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.0557 W/kg

Test Position 2/EW-7722UAC/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.911 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.0790 W/kg
SAR(1 g) = 0.038 W/kg; SAR(10 g) = 0.017 W/kg
Maximum value of SAR (measured) = 0.0566 W/kg



Date/Time: 02/08/2015 10:51:35

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11b CH6 Test Position 3 5mm

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11b WiFi 2.4GHz (DSSS,1Mbps) (0); Frequency: 2437 MHz
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.883 S/m; εr = 38.021 ; ρ = 1000 kg/m^3
Phantom section: Flat Section

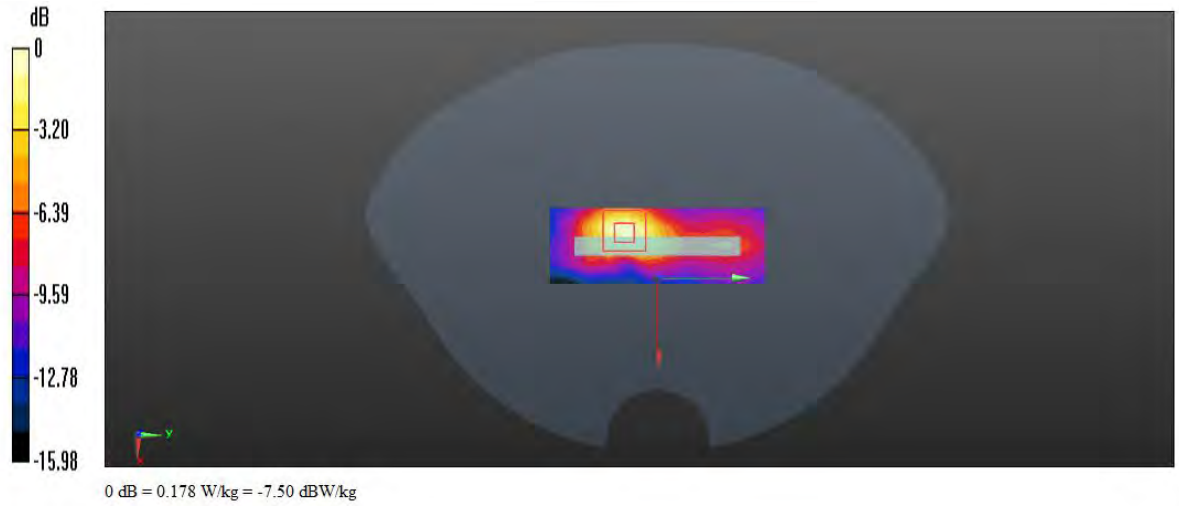
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(7.60, 7.60, 7.60); Calibrated: 01/30/2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 3/EW-7722UAC/Area Scan (5x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.178 W/kg

Test Position 3/EW-7722UAC/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.144 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.265 W/kg
SAR(1 g) = 0.121 W/kg; SAR(10 g) = 0.051 W/kg
Maximum value of SAR (measured) = 0.193 W/kg



Date/Time: 02/08/2015 11:22:02

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11b CH6 Test Position 4 5mm

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11b WiFi 2.4GHz (DSSS,1Mbps) (0); Frequency: 2437 MHz
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.883 S/m; εr = 38.021 ; ρ = 1000 kg/m^3
Phantom section: Flat Section

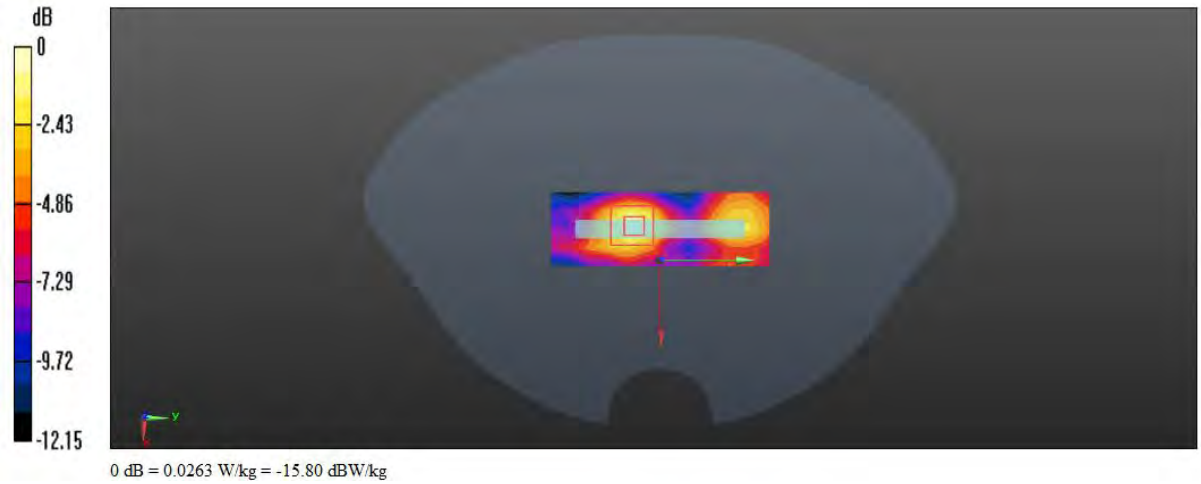
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(7.60, 7.60, 7.60); Calibrated: 01/30/2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 4/EW-7722UAC/Area Scan (5x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.0263 W/kg

Test Position 4/EW-7722UAC/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.623 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.0940 W/kg
SAR(1 g) = 0.015 W/kg; SAR(10 g) = 0.00618 W/kg
Maximum value of SAR (measured) = 0.0236 W/kg



Date/Time: 02/08/2015 12:39:12

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11N20a CH6 Test Position 1 5mm

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11n (HT20,6.5Mbps,BPSK) (0); Frequency: 2437 MHz
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.883 S/m; εr = 38.021 ; ρ = 1000 kg/m^3
Phantom section: Flat Section

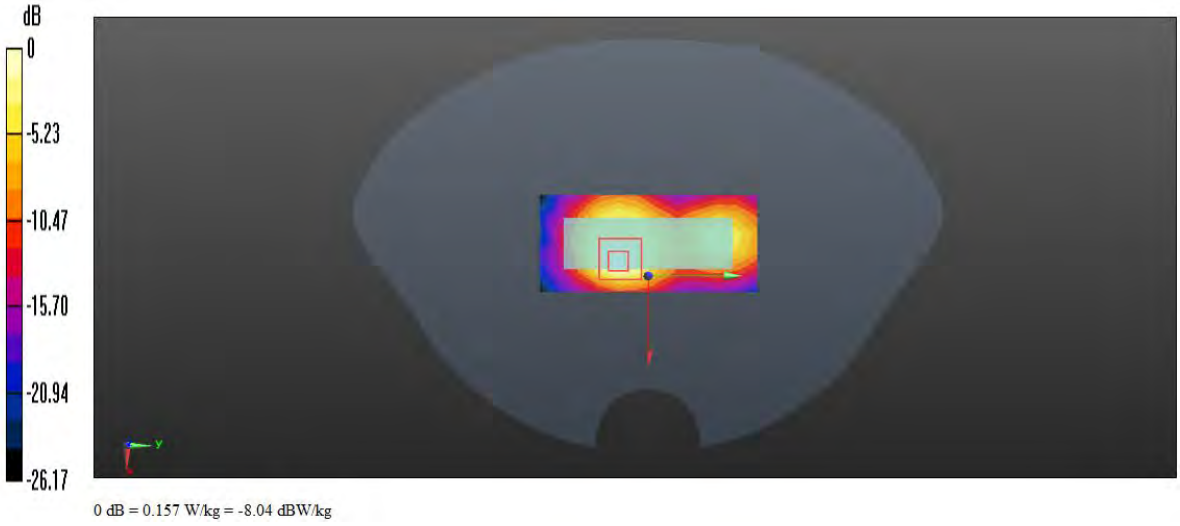
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(7.60, 7.60, 7.60); Calibrated: 01/30/2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 1/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.157 W/kg

Test Position 1/EW-7722UAC/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.740 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.264 W/kg
SAR(1 g) = 0.112 W/kg; SAR(10 g) = 0.044 W/kg
Maximum value of SAR (measured) = 0.185 W/kg



Date/Time: 02/08/2015 13:25:26

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11N20b CH6 Test Position 1 5mm

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11n (HT20,6.5Mbps,BPSK) (0); Frequency: 2437 MHz
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.883 S/m; εr = 38.021 ; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(7.60, 7.60, 7.60); Calibrated: 01/30/2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 1/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.211 W/kg

Test Position 1/EW-7722UAC/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.690 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.296 W/kg
SAR(1 g) = 0.128 W/kg; SAR(10 g) = 0.052 W/kg
Maximum value of SAR (measured) = 0.214 W/kg

Date/Time: 02/08/2015 14:04:08

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11N40a CH6 Test Position 1 5mm

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11n(HT40,13.5Mbps,BPSK) (0); Frequency: 2437 MHz
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.883 S/m; εr = 38.021 ; ρ = 1000 kg/m^3
Phantom section: Flat Section

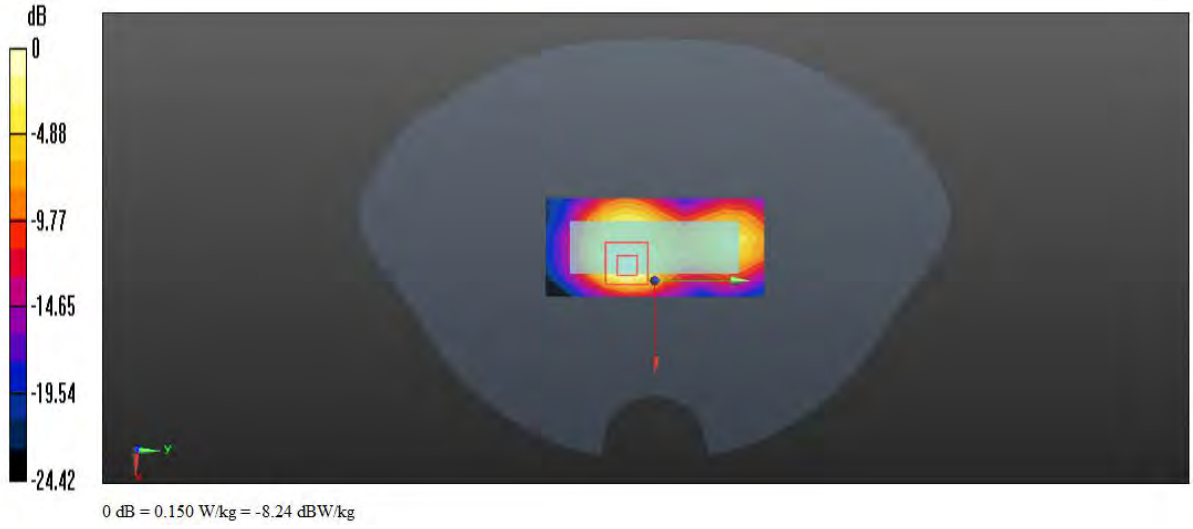
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(7.60, 7.60, 7.60); Calibrated: 01/30/2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 1/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.150 W/kg

Test Position 1/EW-7722UAC/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.341 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.259 W/kg
SAR(1 g) = 0.109 W/kg; SAR(10 g) = 0.043 W/kg
Maximum value of SAR (measured) = 0.180 W/kg



Date/Time: 02/08/2015 14:49:48

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11N40b CH6 Test Position 1 5mm

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11n(HT40,13.5Mbps,BPSK) (0); Frequency: 2437 MHz
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.883 S/m; εr = 38.021 ; ρ = 1000 kg/m^3
Phantom section: Flat Section

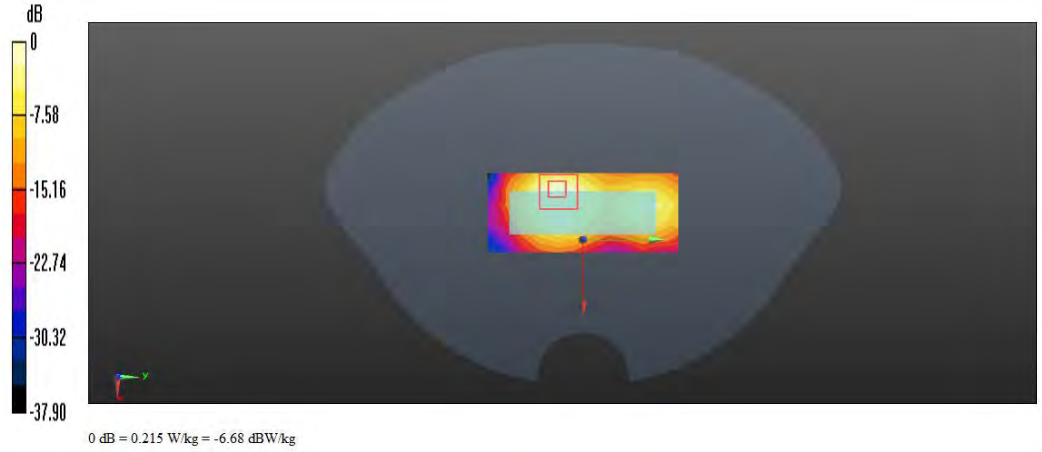
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(7.60, 7.60, 7.60); Calibrated: 01/30/2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 1/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.215 W/kg

Test Position 1/EW-7722UAC/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.707 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.292 W/kg
SAR(1 g) = 0.127 W/kg; SAR(10 g) = 0.052 W/kg
Maximum value of SAR (measured) = 0.211 W/kg



Date/Time: 02/12/2015 08:42:53

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11A band1 CH36 Test Position 1 5mm

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

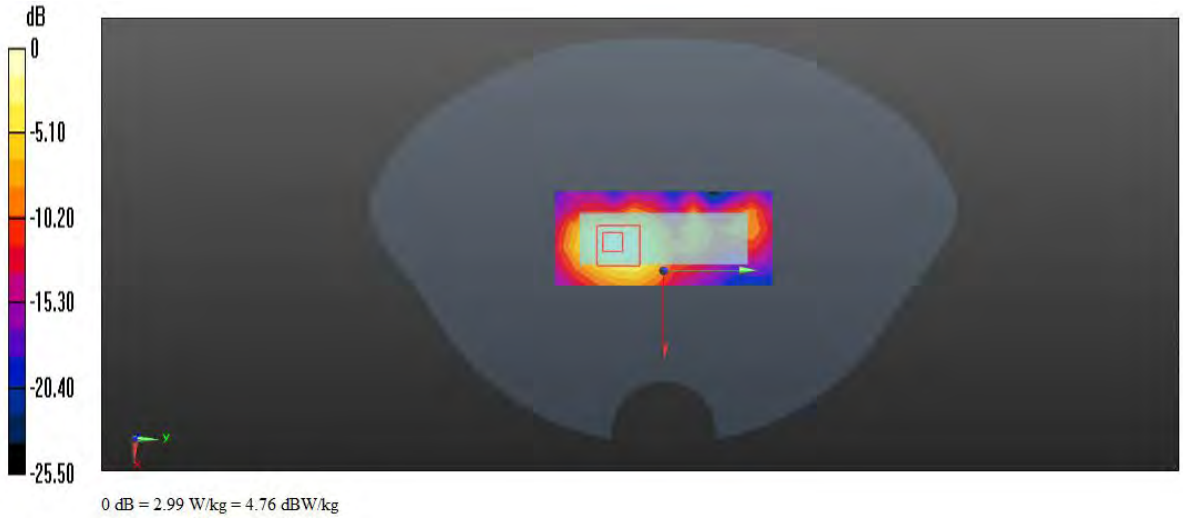
Communication System: UID 0, IEEE 802.11a WiFi 5G(OFDM, 6 Mbps,) (0); Frequency: 5180 MHz
Medium parameters used (interpolated): f = 5180 MHz; σ = 5.352 S/m; ε_r = 49.44; ρ = 996 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(5.17, 5.17, 5.17); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 1/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 2.99 W/kg

Test Position 1/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.659 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 5.12 W/kg
SAR(1 g) = 1.36 W/kg; SAR(10 g) = 0.486 W/kg
Maximum value of SAR (measured) = 3.10 W/kg



Date/Time: 02/12/2015 09:09:52

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11A band1 CH40 Test Position 1 5mm Mid

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

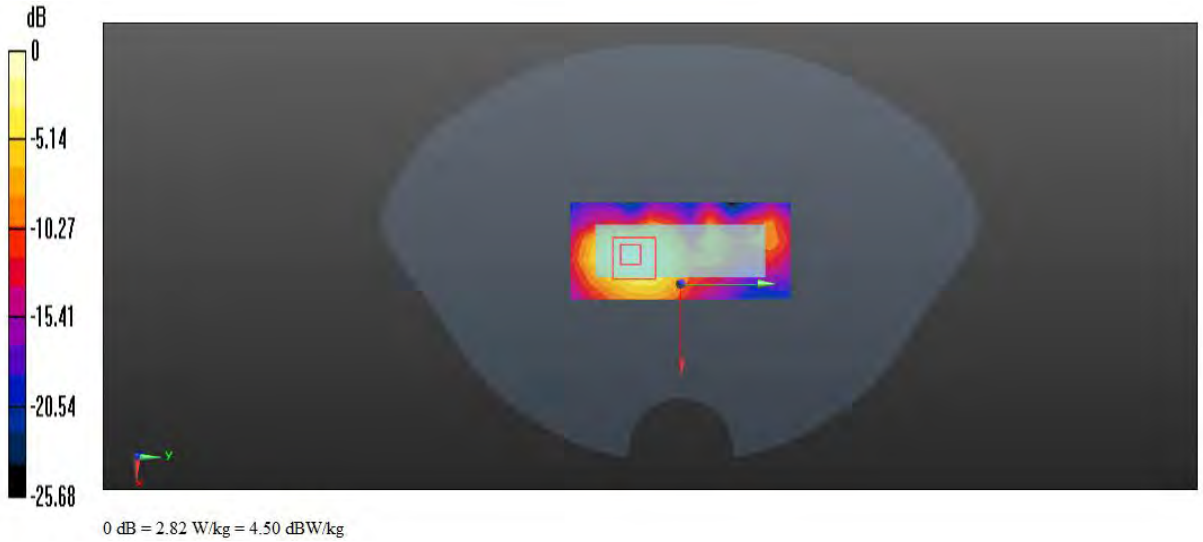
Communication System: UID 0, IEEE 802.11a WiFi 5G(OFDM, 6 Mbps,) (0); Frequency: 5200 MHz
Medium parameters used: f = 5200 MHz; σ = 5.29 S/m; ε_r = 49.02; ρ = 996 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(5.17, 5.17, 5.17); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 1/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 2.82 W/kg

Test Position 1/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.874 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 5.09 W/kg
SAR(1 g) = 1.36 W/kg; SAR(10 g) = 0.483 W/kg
Maximum value of SAR (measured) = 3.15 W/kg



Date/Time: 02/12/2015 09:35:33

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11A band1 CH48 Test Position 1 5mm High

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11a WiFi 5G(OFDM, 6 Mbps,) (0); Frequency: 5240 MHz
Medium parameters used (interpolated): f = 5240 MHz; σ = 5.436 S/m; ε_r = 49.32; ρ = 996 kg/m^3
Phantom section: Flat Section

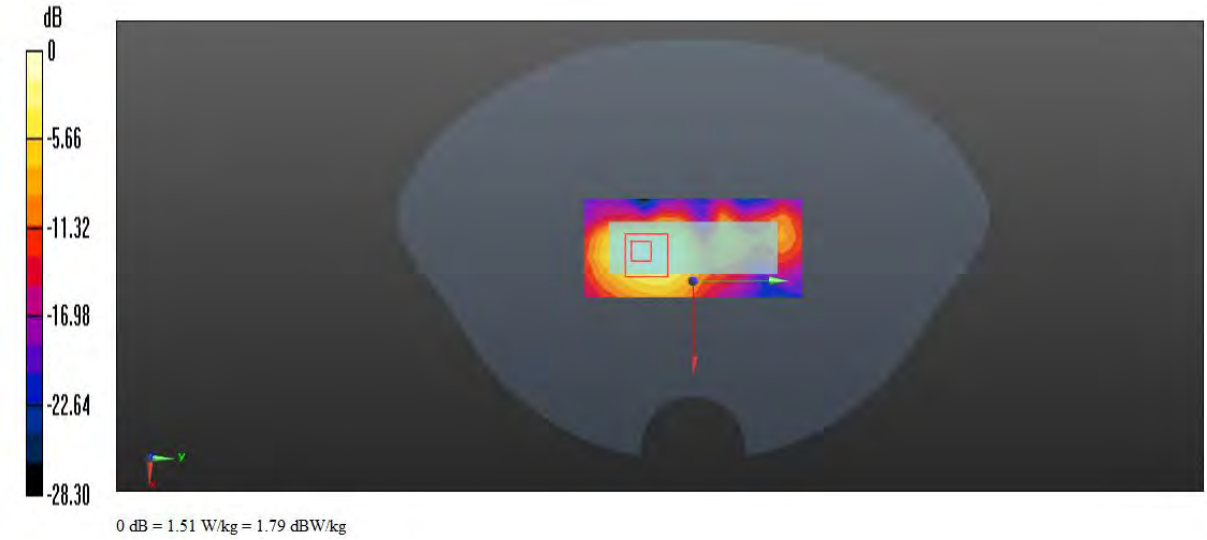
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(5.17, 5.17, 5.17); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 1/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm

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

Test Position 1/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.159 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 2.75 W/kg
SAR(1 g) = 0.717 W/kg; SAR(10 g) = 0.254 W/kg
Maximum value of SAR (measured) = 1.65 W/kg



Date/Time: 02/12/2015 15:02:12

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11A band1 CH36 Test Position 2 5mm

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11a WiFi 5G(OFDM, 6 Mbps,) (0); Frequency: 5180 MHz
Medium parameters used (interpolated): f = 5180 MHz; σ = 5.352 S/m; ε_r = 49.44; ρ = 996 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(5.17, 5.17, 5.17); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 2/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.977 W/kg

Test Position 2/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.334 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.79 W/kg
SAR(1 g) = 0.482 W/kg; SAR(10 g) = 0.185 W/kg
Maximum value of SAR (measured) = 1.07 W/kg

Date/Time: 02/12/2015 11:24:53

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11A band1 CH36 Test Position 3 5mm

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11a WiFi 5G(OFDM, 6 Mbps,) (0); Frequency: 5180 MHz
Medium parameters used (interpolated): f = 5180 MHz; σ = 5.352 S/m; ε_r = 49.44; ρ = 996 kg/m^3
Phantom section: Flat Section

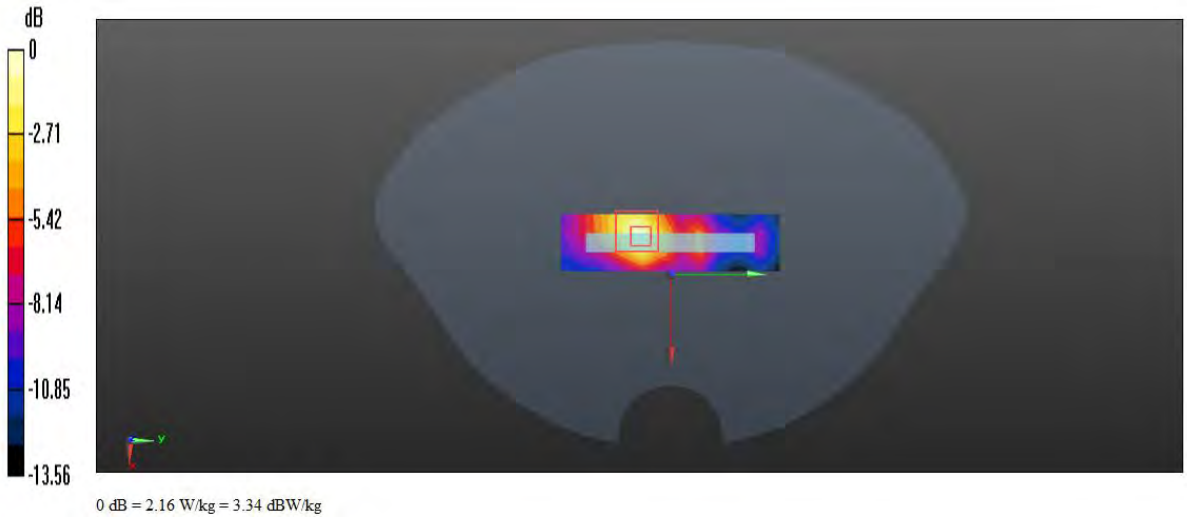
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(5.17, 5.17, 5.17); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 3/EW-7722UAC/Area Scan (4x12x1): Measurement grid: dx=10mm, dy=10mm

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

Test Position 3/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.082 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 3.37 W/kg
SAR(1 g) = 0.896 W/kg; SAR(10 g) = 0.328 W/kg
Maximum value of SAR (measured) = 2.09 W/kg



Date/Time: 02/12/2015 11:49:19

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11A band1 CH40 Test Position 3 5mm Mid

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

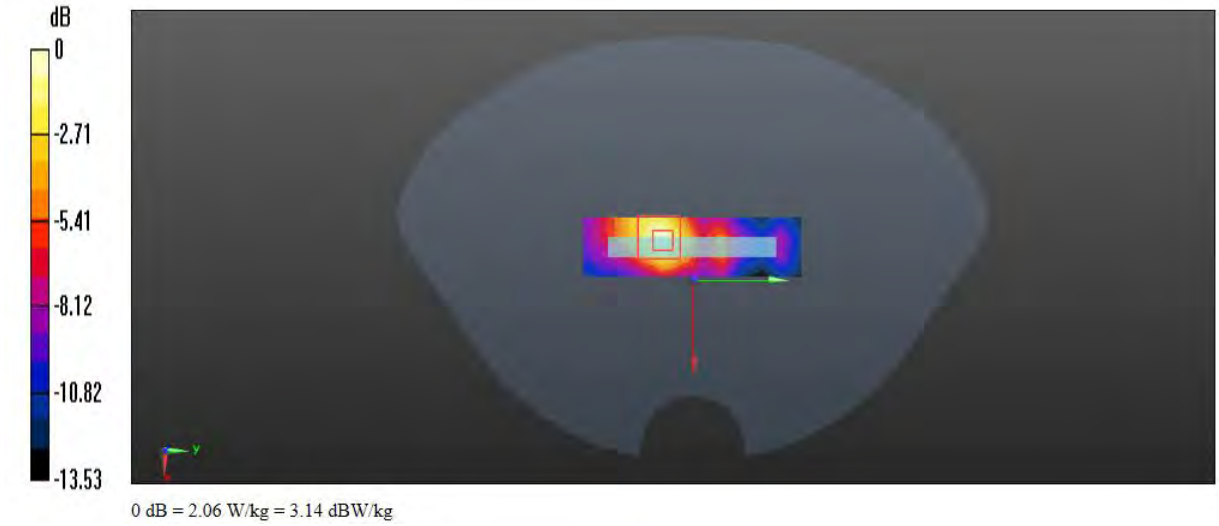
Communication System: UID 0, IEEE 802.11a WiFi 5G(OFDM, 6 Mbps,) (0); Frequency: 5200 MHz
Medium parameters used: f = 5200 MHz; σ = 5.29 S/m; ε_r = 49.02; ρ = 996 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(5.17, 5.17, 5.17); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 3/EW-7722UAC/Area Scan (4x12x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 2.06 W/kg

Test Position 3/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.932 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 3.40 W/kg
SAR(1 g) = 0.918 W/kg; SAR(10 g) = 0.336 W/kg
Maximum value of SAR (measured) = 2.08 W/kg



Date/Time: 02/12/2015 13:36:19

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11A band1 CH48 Test Position 3 5mm High

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11a WiFi 5G(OFDM, 6 Mbps,) (0); Frequency: 5240 MHz
Medium parameters used (interpolated): f = 5240 MHz; σ = 5.436 S/m; ε_r = 49.32; ρ = 996 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(5.17, 5.17, 5.17); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 3/EW-7722UAC/Area Scan (4x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.93 W/kg

Test Position 3/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.838 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 3.15 W/kg
SAR(1 g) = 0.841 W/kg; SAR(10 g) = 0.313 W/kg
Maximum value of SAR (measured) = 1.86 W/kg

Date/Time: 02/12/2015 14:02:28

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11A band1 CH36 Test Position 4 5mm

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11a WiFi 5G(OFDM, 6 Mbps,) (0); Frequency: 5180 MHz
Medium parameters used (interpolated): f = 5180 MHz; σ = 5.352 S/m; ε_r = 49.44; ρ = 996 kg/m^3
Phantom section: Flat Section

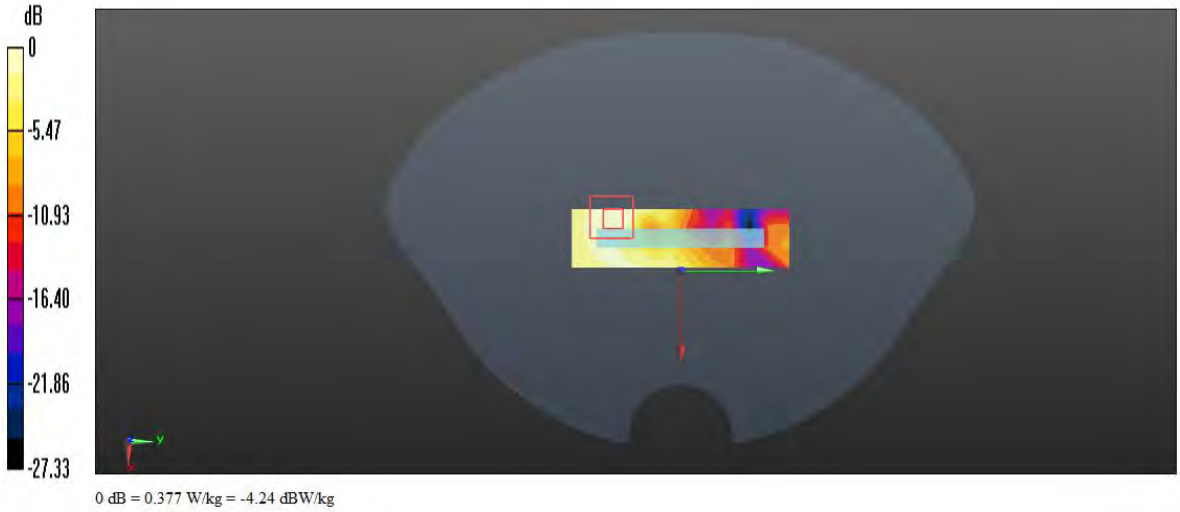
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(5.17, 5.17, 5.17); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 4/EW-7722UAC/Area Scan (4x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.377 W/kg

Test Position 4/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.688 V/m; Power Drift = 0.08dB
Peak SAR (extrapolated) = 0.641 W/kg
SAR(1 g) = 0.179 W/kg; SAR(10 g) = 0.073 W/kg
Maximum value of SAR (measured) = 0.390 W/kg



Date/Time: 02/12/2015 15:31:05

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11n20a band1 CH48 Test Position 1 5mm

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11n (HT20,6.5Mbps,BPSK) (0); Frequency: 5240 MHz
Medium parameters used (interpolated): f = 5240 MHz; σ = 5.436 S/m; ε_r = 49.32; ρ = 996 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(5.17, 5.17, 5.17); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 1/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm

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

Test Position 1/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.997 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 2.59 W/kg
SAR(1 g) = 0.678 W/kg; SAR(10 g) = 0.283 W/kg
Maximum value of SAR (measured) = 1.54 W/kg

Date/Time: 02/12/2015 16:03:31

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11n20b band1 CH48 Test Position 1 5mm

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11n (HT20,6.5Mbps,BPSK) (0); Frequency: 5240 MHz
Medium parameters used (interpolated): f = 5240 MHz; σ = 5.436 S/m; ε_r = 49.32; ρ = 996 kg/m^3
Phantom section: Flat Section

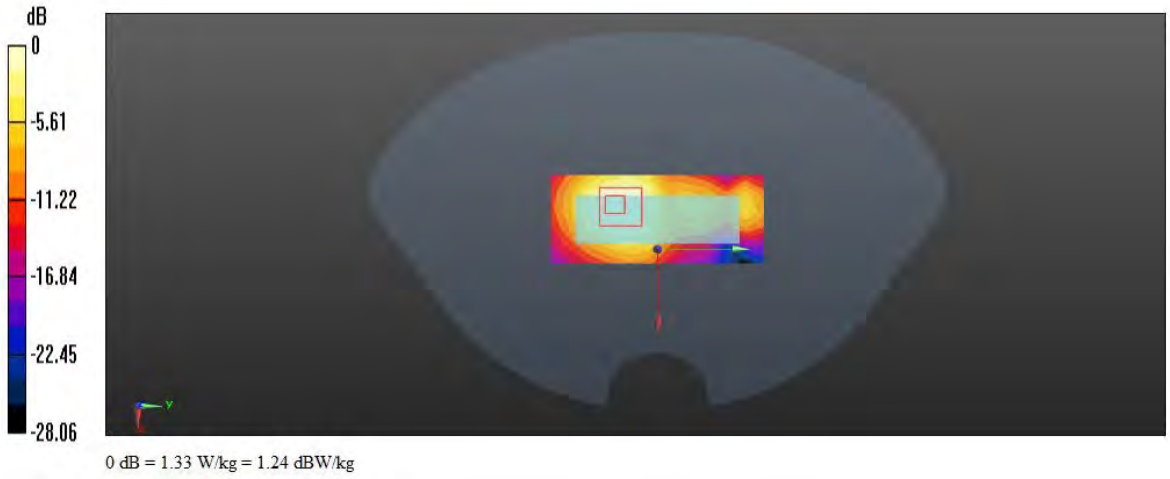
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(5.17, 5.17, 5.17); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 1/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.33 W/kg

Test Position 1/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.277 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 2.34 W/kg
SAR(1 g) = 0.615 W/kg; SAR(10 g) = 0.257 W/kg
Maximum value of SAR (measured) = 1.38 W/kg



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Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11ac40a band1 CH46 Test Position 1 5mm

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11n (HT20,6.5Mbps,BPSK) (0); Frequency: 5230 MHz
Medium parameters used (interpolated): f = 5230 MHz; σ = 5.422 S/m; ε_r = 49.34; ρ = 996 kg/m^3
Phantom section: Flat Section

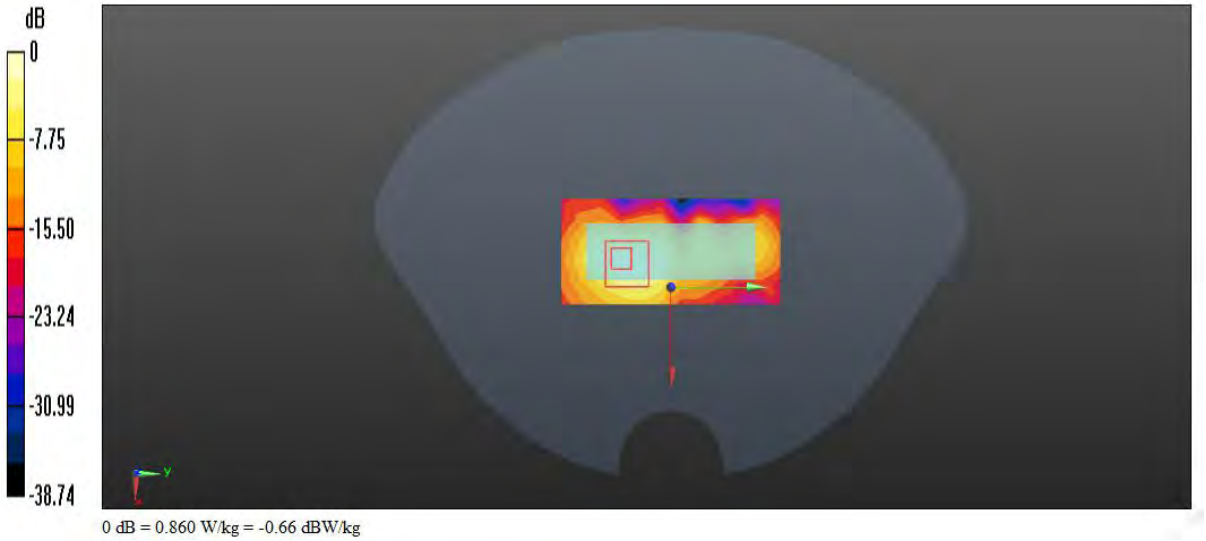
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(5.17, 5.17, 5.17); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 1/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.860 W/kg

Test Position 1/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.882 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.60 W/kg
SAR(1 g) = 0.380 W/kg; SAR(10 g) = 0.130 W/kg
Maximum value of SAR (measured) = 0.871 W/kg



Date/Time: 02/12/2015 17:16:44

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11ac40b band1 CH46 Test Position 1

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11n (HT20,6.5Mbps,BPSK) (0); Frequency: 5230 MHz
Medium parameters used (interpolated): f = 5230 MHz; σ = 5.422 S/m; ε_r = 49.34; ρ = 996 kg/m^3
Phantom section: Flat Section

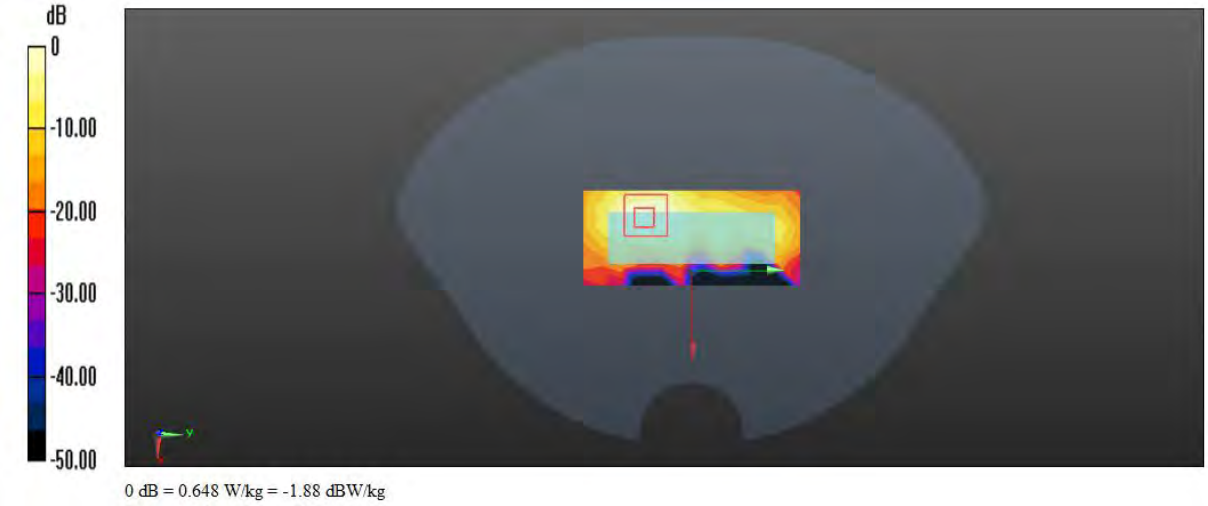
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(5.17, 5.17, 5.17); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 1/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.648 W/kg

Test Position 1/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.274 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.43 W/kg
SAR(1 g) = 0.330 W/kg; SAR(10 g) = 0.109 W/kg
Maximum value of SAR (measured) = 0.811 W/kg



Date/Time: 02/13/2015 16:17:00

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11A band 4 CH149 Test Position 1

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11a WiFi 5G(OFDM, 6 Mbps,) (0); Frequency: 5745 MHz
Medium parameters used (interpolated): f = 5745 MHz; σ = 6.143 S/m; ε_r = 48.41; ρ = 996 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(4.50, 4.50, 4.50); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 1/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 2.29 W/kg

Test Position 1/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.581 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 6.86 W/kg
SAR(1 g) = 1.36 W/kg; SAR(10 g) = 0.445 W/kg
Maximum value of SAR (measured) = 3.73 W/kg

Date/Time: 02/13/2015 16:44:13

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11A band 4 CH157 Test Position 1 Mid

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11a WiFi 5G(OFDM, 6 Mbps,) (0); Frequency: 5785 MHz
Medium parameters used (interpolated): f = 5785 MHz; σ = 6.199 S/m; ε_r = 48.33; ρ = 996 kg/m^3
Phantom section: Flat Section

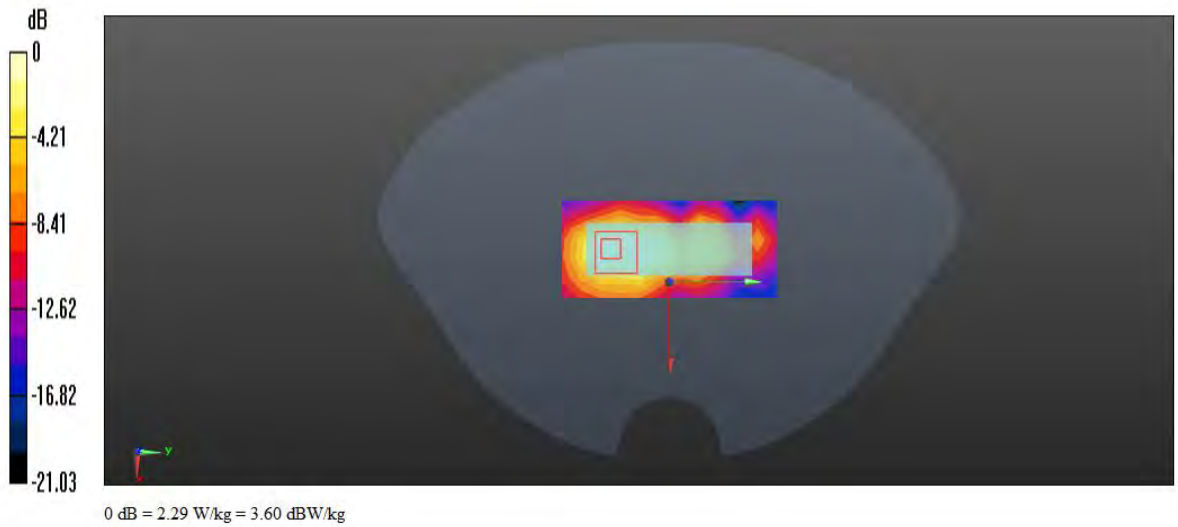
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(4.50, 4.50, 4.50); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 1/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 2.29 W/kg

Test Position 1/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.449 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 6.63 W/kg
SAR(1 g) = 1.3 W/kg; SAR(10 g) = 0.423 W/kg
Maximum value of SAR (measured) = 3.57 W/kg



Date/Time: 02/13/2015 17:10:16

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11A band 4 CH165 Test Position 1 High

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11a WiFi 5G(OFDM, 6 Mbps,) (0); Frequency: 5825 MHz
Medium parameters used (interpolated): f = 5825 MHz; σ = 6.22 S/m; ε_r = 48.3; ρ = 996 kg/m^3
Phantom section: Flat Section

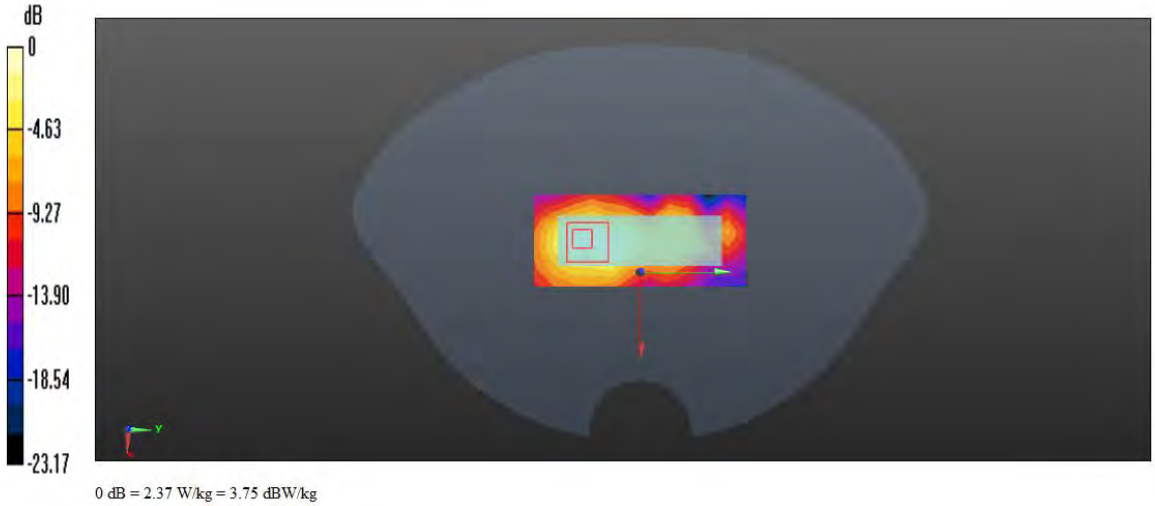
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(4.50, 4.50, 4.50); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 1/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 2.37 W/kg

Test Position 1/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.346 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 6.45 W/kg
SAR(1 g) = 1.26 W/kg; SAR(10 g) = 0.413 W/kg
Maximum value of SAR (measured) = 3.41 W/kg



Date/Time: 02/13/2015 17:45:09

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11A band 4 CH149 Test Position 2

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11a WiFi 5G(OFDM, 6 Mbps,) (0); Frequency: 5745 MHz
Medium parameters used (interpolated): f = 5745 MHz; σ = 6.143 S/m; ε_r = 48.41; ρ = 996 kg/m^3
Phantom section: Flat Section

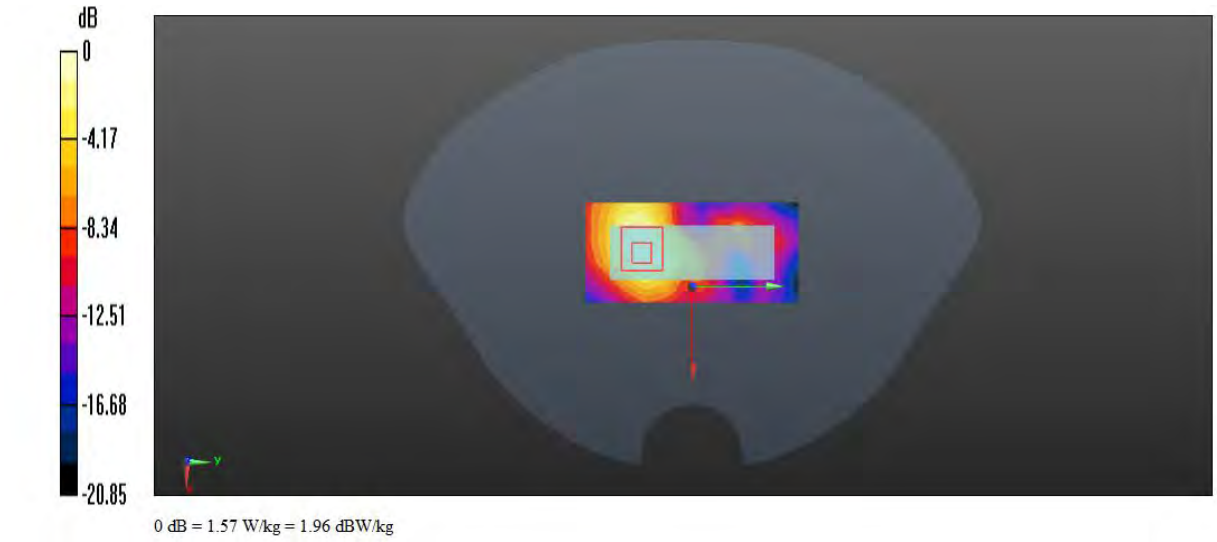
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(4.50, 4.50, 4.50); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 2/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm

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

Test Position 2/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.887 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 3.14 W/kg
SAR(1 g) = 0.766 W/kg; SAR(10 g) = 0.284 W/kg
Maximum value of SAR (measured) = 1.82 W/kg



Date/Time: 02/13/2015 18:29:05

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11A band 4 CH157 Test Position 2 Mid

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11a WiFi 5G(OFDM, 6 Mbps,) (0); Frequency: 5785 MHz
Medium parameters used (interpolated): f = 5785 MHz; σ = 6.199 S/m; ε_r = 48.33; ρ = 996 kg/m^3
Phantom section: Flat Section

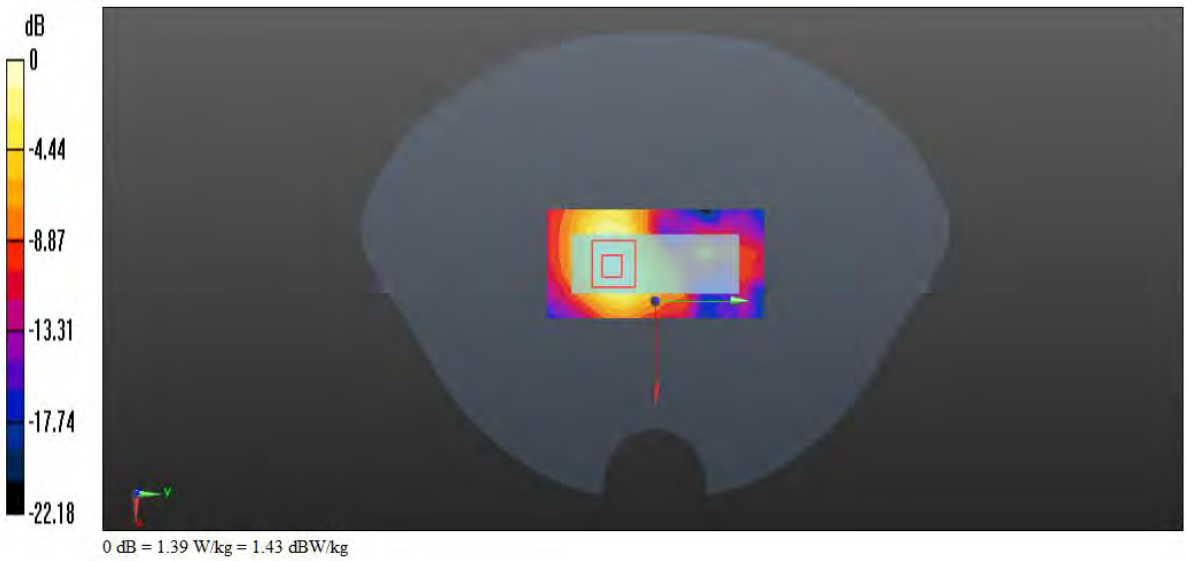
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(4.50, 4.50, 4.50); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 2/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.39 W/kg

Test Position 2/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.312 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 2.52 W/kg
SAR(1 g) = 0.605 W/kg; SAR(10 g) = 0.231 W/kg
Maximum value of SAR (measured) = 1.43 W/kg



Date/Time: 02/13/2015 19:19:11

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11A band 4 CH157 Test Position 2 High

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11a WiFi 5G(OFDM, 6 Mbps,) (0); Frequency: 5825 MHz
Medium parameters used (interpolated): f = 5825 MHz; σ = 6.22 S/m; ε_r = 48.3; ρ = 996 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(4.50, 4.50, 4.50); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 2/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.34 W/kg

Test Position 2/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.982 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 2.59 W/kg
SAR(1 g) = 0.592 W/kg; SAR(10 g) = 0.224 W/kg
Maximum value of SAR (measured) = 1.44 W/kg

Date/Time: 02/13/2015 20:12:12

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11A band 4 CH149 Test Position 3

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11a WiFi 5G(OFDM, 6 Mbps,) (0); Frequency: 5745 MHz
Medium parameters used (interpolated): f = 5745 MHz; σ = 6.143 S/m; ε_r = 48.41; ρ = 996 kg/m^3
Phantom section: Flat Section

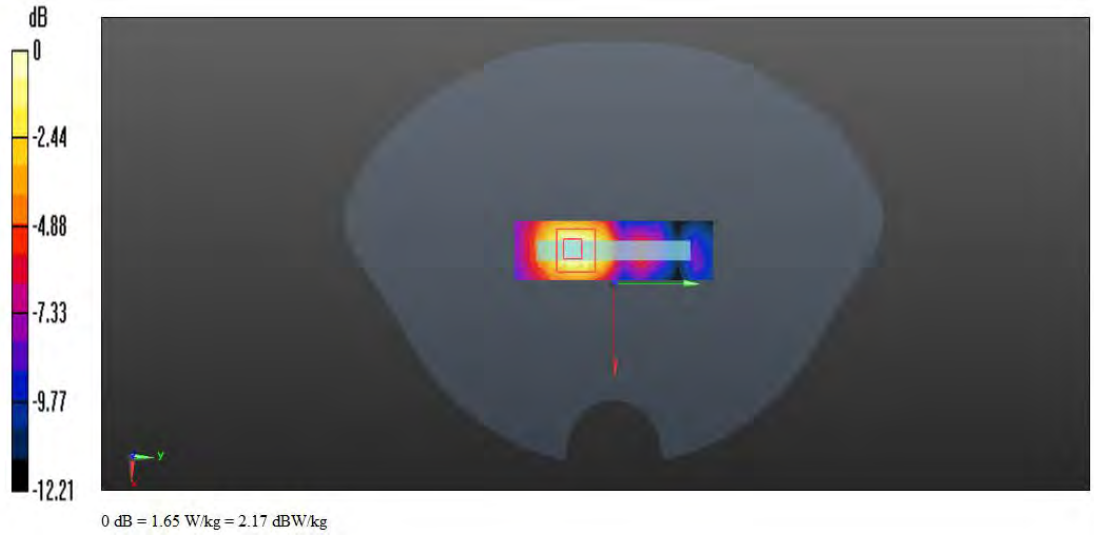
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(4.50, 4.50, 4.50); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 3/EW-7722UAC/Area Scan (4x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.65 W/kg

Test Position 3/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.624 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.43 W/kg
SAR(1 g) = 0.782 W/kg; SAR(10 g) = 0.291 W/kg
Maximum value of SAR (measured) = 1.94 W/kg



Date/Time: 02/13/2015 20:50:18

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11A band 4 CH157 Test Position 3 Mid

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11a WiFi 5G(OFDM, 6 Mbps,) (0); Frequency: 5785 MHz
Medium parameters used (interpolated): f = 5785 MHz; σ = 6.199 S/m; ε_r = 48.33; ρ = 996 kg/m^3
Phantom section: Flat Section

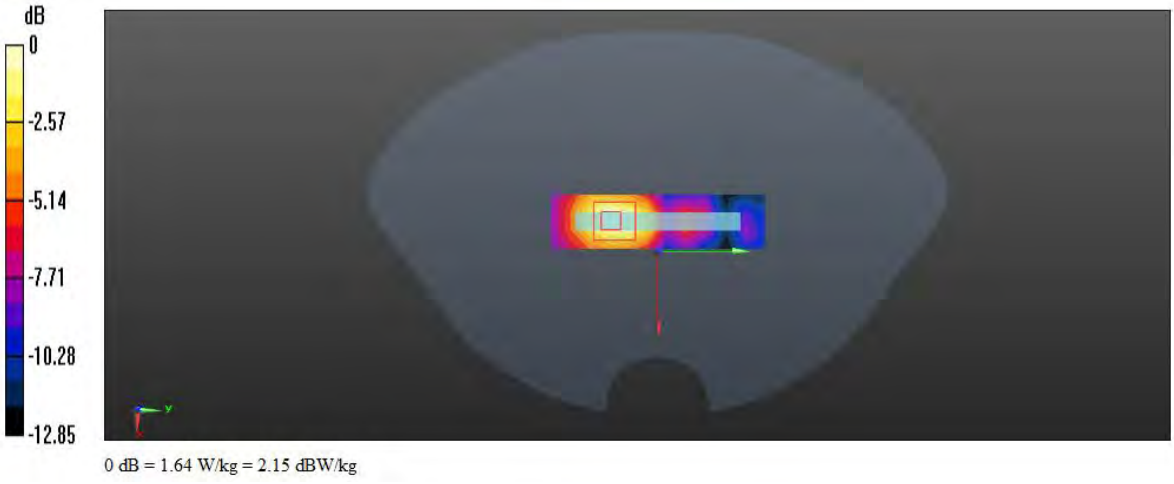
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(4.50, 4.50, 4.50); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 3/EW-7722UAC/Area Scan (4x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.64 W/kg

Test Position 3/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.339 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 3.47 W/kg
SAR(1 g) = 0.775 W/kg; SAR(10 g) = 0.281 W/kg
Maximum value of SAR (measured) = 1.89 W/kg



Date/Time: 02/13/2015 21:23:43

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11A band 4 CH165 Test Position 3 High

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11a WiFi 5G(OFDM, 6 Mbps,) (0); Frequency: 5825 MHz
Medium parameters used (interpolated): f = 5825 MHz; σ = 6.22 S/m; ε_r = 48.3; ρ = 996 kg/m^3
Phantom section: Flat Section

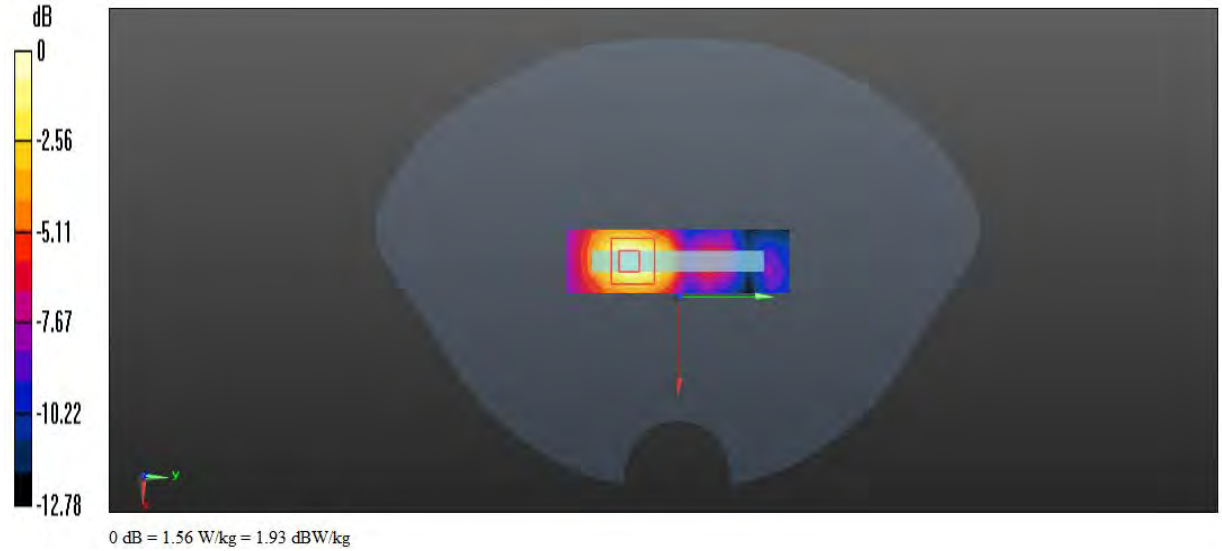
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(4.50, 4.50, 4.50); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 3/EW-7722UAC/Area Scan (4x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.56 W/kg

Test Position 3/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.220 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.41 W/kg
SAR(1 g) = 0.742 W/kg; SAR(10 g) = 0.264 W/kg
Maximum value of SAR (measured) = 1.84 W/kg



Date/Time: 02/13/2015 21:52:35

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11A band 4 CH149 Test Position 4

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11a WiFi 5G(OFDM, 6 Mbps,) (0); Frequency: 5745 MHz
Medium parameters used (interpolated): f = 5745 MHz; σ = 6.143 S/m; ε_r = 48.41; ρ = 996 kg/m^3
Phantom section: Flat Section

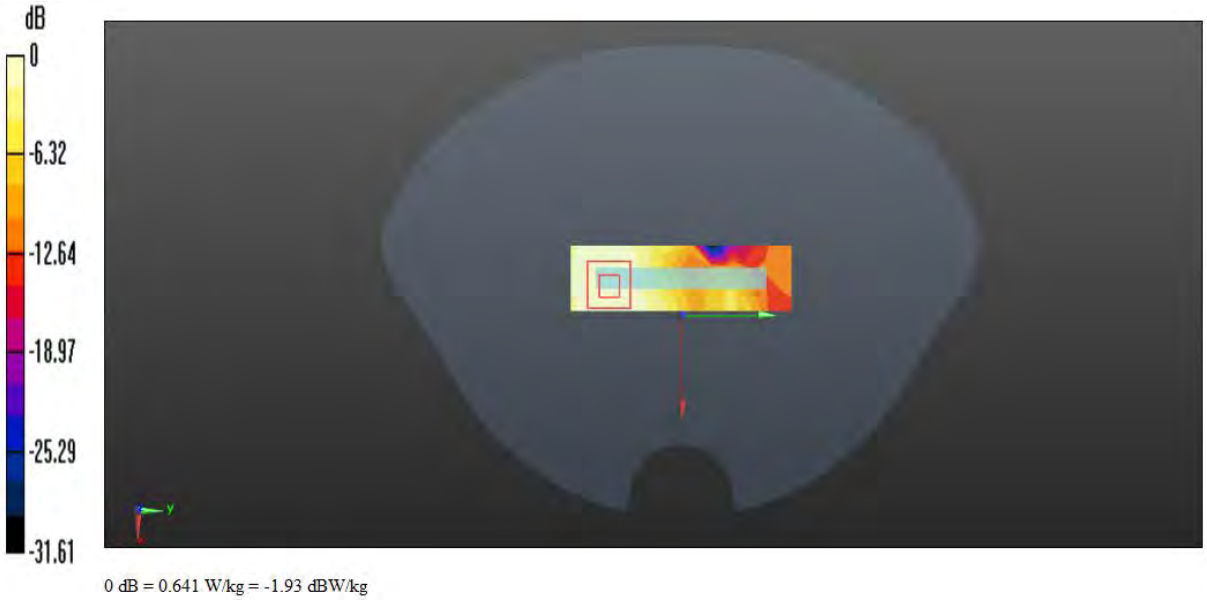
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(4.50, 4.50, 4.50); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 4/EW-7722UAC/Area Scan (4x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.641 W/kg

Test Position 4/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.945 V/m; Power Drift = 0.05dB
Peak SAR (extrapolated) = 0.851 W/kg
SAR(1 g) = 0.279 W/kg; SAR(10 g) = 0.122 W/kg
Maximum value of SAR (measured) = 0.635 W/kg



Date/Time: 02/13/2015 23:57:24

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11N40A band 4 5795MHz CH159 Test Position 1

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11a WiFi 5G(OFDM, 6 Mbps,) (0); Frequency: 5795 MHz
Medium parameters used (interpolated): f = 5795 MHz; σ = 6.213 S/m; ε_r = 48.31; ρ = 996 kg/m^3
Phantom section: Flat Section

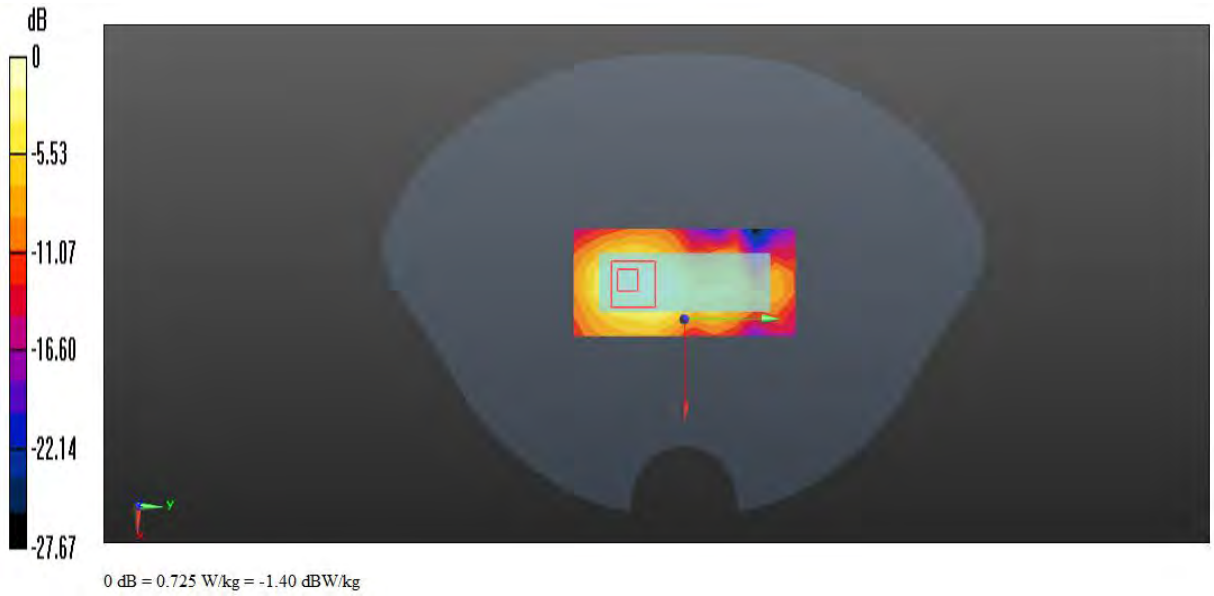
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(4.50, 4.50, 4.50); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 1/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.725 W/kg

Test Position 1/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.285 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.15 W/kg
SAR(1 g) = 0.349 W/kg; SAR(10 g) = 0.113 W/kg
Maximum value of SAR (measured) = 0.942 W/kg



Date/Time: 02/14/2015 00:28:27

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11N40B band 4 5795MHz CH159 Test Position 1

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11a WiFi 5G(OFDM, 6 Mbps,) (0); Frequency: 5795 MHz
Medium parameters used (interpolated): f = 5795 MHz; σ = 6.213 S/m; ε_r = 48.31; ρ = 996 kg/m^3
Phantom section: Flat Section

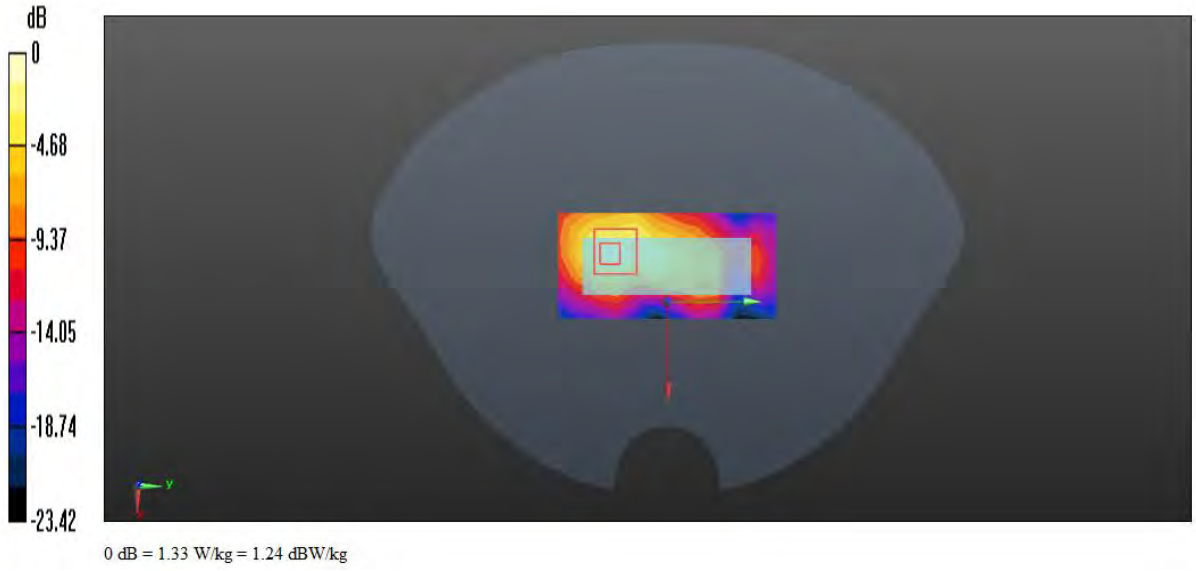
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(4.50, 4.50, 4.50); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 1/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.33 W/kg

Test Position 1/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.693 V/m; Power Drift = 0.02dB
Peak SAR (extrapolated) = 2.51 W/kg
SAR(1 g) = 0.581 W/kg; SAR(10 g) = 0.192 W/kg
Maximum value of SAR (measured) = 1.36 W/kg



Date/Time: 02/14/2015 00:58:52

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11ac40A band 4 CH159 Test Position 1

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11a WiFi 5G(OFDM, 6 Mbps,) (0); Frequency: 5795 MHz
Medium parameters used (interpolated): f = 5795 MHz; σ = 6.213 S/m; ε_r = 48.31; ρ = 996 kg/m^3
Phantom section: Flat Section

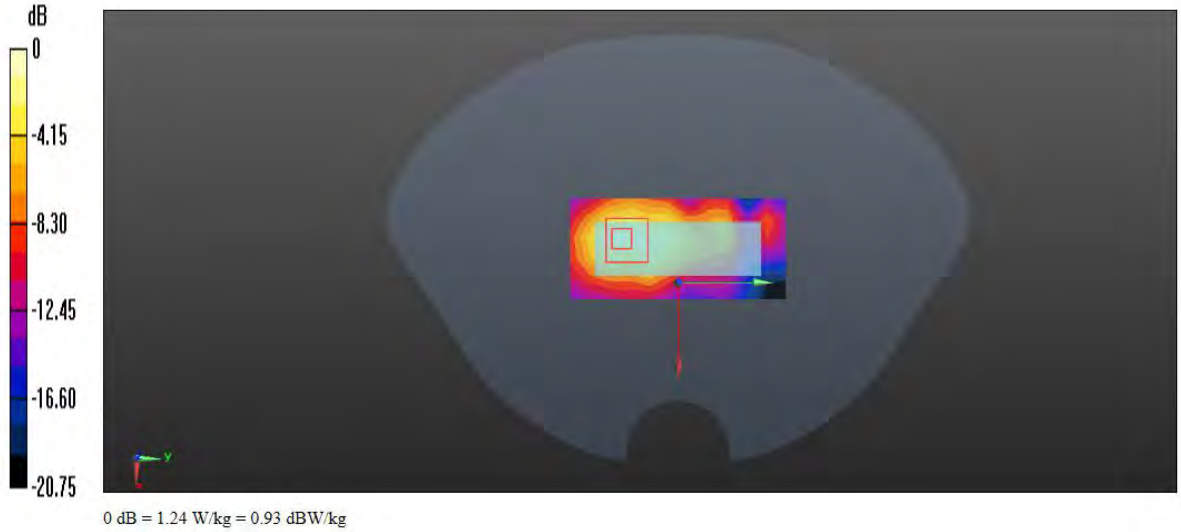
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(4.50, 4.50, 4.50); Calibrated: 01/30/2013;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 1/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.24 W/kg

Test Position 1/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.697 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.67 W/kg
SAR(1 g) = 0.542 W/kg; SAR(10 g) = 0.182 W/kg
Maximum value of SAR (measured) = 1.39 W/kg



Date/Time: 02/14/2015 01:27:45

Test Laboratory: BTL Inc.

AC1200 11ac Wireless Dual Band USB Adapter EW-7722UAC 802.11ac40B band 4 CH159 Test Position 1

DUT: AC1200 11ac Wireless Dual Band USB Adapter; Type: EW-7722UAC; Serial: NA

Communication System: UID 0, IEEE 802.11a WiFi 5G(OFDM, 6 Mbps,) (0); Frequency: 5795 MHz
Medium parameters used (interpolated): f = 5795 MHz; σ = 6.213 S/m; ε_r = 48.31; ρ = 996 kg/m^3
Phantom section: Flat Section

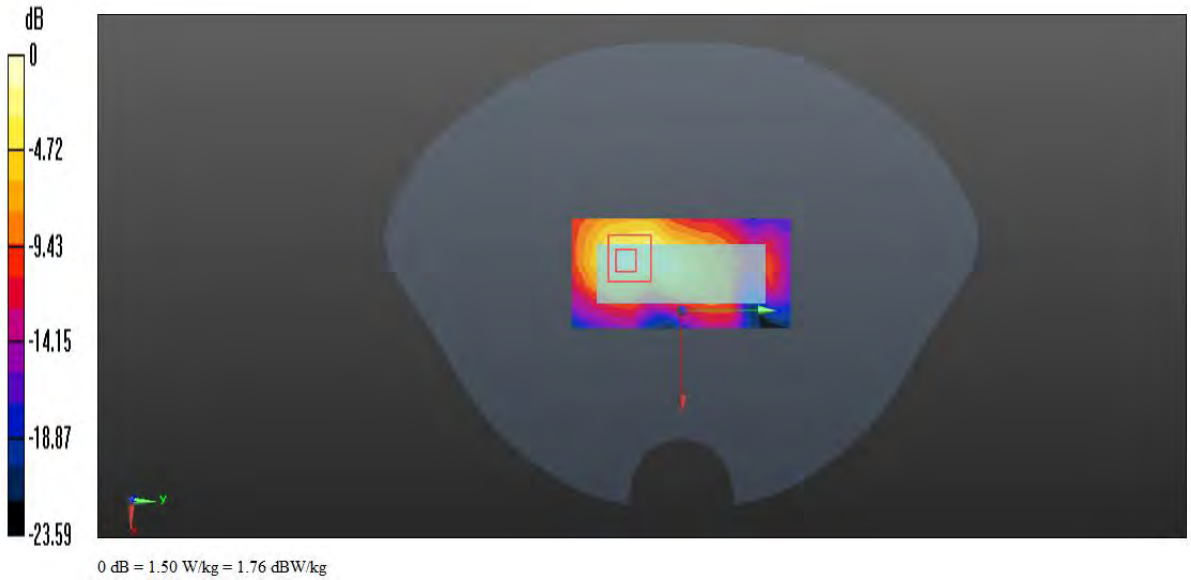
DASY Configuration:

- Probe: EX3DV4 - SN3932; ConvF(4.50, 4.50, 4.50); Calibrated: 01/30/2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1390; Calibrated: 09/15/2014
- Phantom: SAM 1; Type: SAM; Serial: 1784
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Test Position 1/EW-7722UAC/Area Scan (6x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.50 W/kg

Test Position 1/EW-7722UAC/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.099 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 2.95 W/kg
SAR(1 g) = 0.613 W/kg; SAR(10 g) = 0.203 W/kg
Maximum value of SAR (measured) = 1.55 W/kg



4. Probe Calibration Certificate

EX3DV4 – 3932

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com Http://www.chinattl.cn

CALIBRATION No. L0570

Client NIM Certificate No: Z15-97006

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3932
Calibration Procedure(s)	FD-Z11-2-004-01 Calibration Procedures for Dosimetric E-field Probes
Calibration date:	January 30, 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)℃ 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-14 (CTTL, No.J14X02146)	Jun-15
Power sensor NRP-Z91	101547	01-Jul-14 (CTTL, No.J14X02146)	Jun-15
Power sensor NRP-Z91	101548	01-Jul-14 (CTTL, No.J14X02146)	Jun-15
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 3617	28-Aug-14(SPEAG,No.EX3-3617_Aug14)	Aug-15
DAE4	SN 777	17-Sep-14 (SPEAG, DAE4-777_Sep14)	Sep -15
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
SignalGeneratorMG3700A	6201052605	01-Jul-14 (CTTL, No.J14X02145)	Jun-15
Network Analyzer E5071C	MY46110673	15-Feb-14 (TMC, No.JZ14-781)	Feb-15

	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: January 31, 2015

In Collaboration with
s p e a g
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E-mail: cttl@chinattl.com Http://www.chinattl.cn

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: 3932

Calibrated: January 30, 2015

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3932

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm(μV/(V/m)^2)^A	0.52	0.55	0.46	±10.8%
DCP(mV)^B	105.1	102.5	106.9	

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	201.4	±2.3%
		Y	0.0	0.0	1.0		208.3	
		Z	0.0	0.0	1.0		188.1	

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: 3932

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	10.38	10.38	10.38	0.13	1.31	±12%
835	41.5	0.90	9.75	9.75	9.75	0.14	1.36	±12%
900	41.5	0.97	9.61	9.61	9.61	0.15	1.27	±12%
1750	40.1	1.37	8.42	8.42	8.42	0.23	1.04	±12%
1900	40.0	1.40	8.23	8.23	8.23	0.24	1.05	±12%
2100	39.8	1.49	7.81	7.81	7.81	0.18	1.28	±12%
2300	39.5	1.67	7.84	7.84	7.84	0.31	0.92	±12%
2450	39.2	1.80	7.38	7.38	7.38	0.51	0.77	±12%
2600	39.0	1.96	7.20	7.20	7.20	0.59	0.70	±12%
5200	36.0	4.66	5.62	5.62	5.62	0.40	1.06	±13%
5300	35.9	4.76	5.37	5.37	5.37	0.38	1.05	±13%
5500	35.6	4.96	5.10	5.10	5.10	0.49	1.03	±13%
5600	35.5	5.07	5.03	5.03	5.03	0.46	1.05	±13%
5800	35.3	5.27	4.89	4.89	4.89	0.43	1.31	±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: 3932

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	10.25	10.25	10.25	0.14	1.55	±12%
835	55.2	0.97	10.19	10.19	10.19	0.16	1.52	±12%
900	55.0	1.05	9.82	9.82	9.82	0.26	1.11	±12%
1750	53.4	1.49	8.08	8.08	8.08	0.15	1.65	±12%
1900	53.3	1.52	7.86	7.86	7.86	0.19	1.33	±12%
2100	53.2	1.62	8.05	8.05	8.05	0.20	1.80	±12%
2300	52.9	1.81	7.92	7.92	7.92	0.34	1.15	±12%
2450	52.7	1.95	7.60	7.60	7.60	0.33	1.16	±12%
2600	52.5	2.16	7.48	7.48	7.48	0.45	0.89	±12%
5200	49.0	5.30	5.17	5.17	5.17	0.45	1.15	±13%
5300	48.9	5.42	4.97	4.97	4.97	0.48	1.20	±13%
5500	48.6	5.65	4.54	4.54	4.54	0.51	1.37	±13%
5600	48.5	5.77	4.47	4.47	4.47	0.51	1.50	±13%
5800	48.2	6.00	4.50	4.50	4.50	0.55	0.90	±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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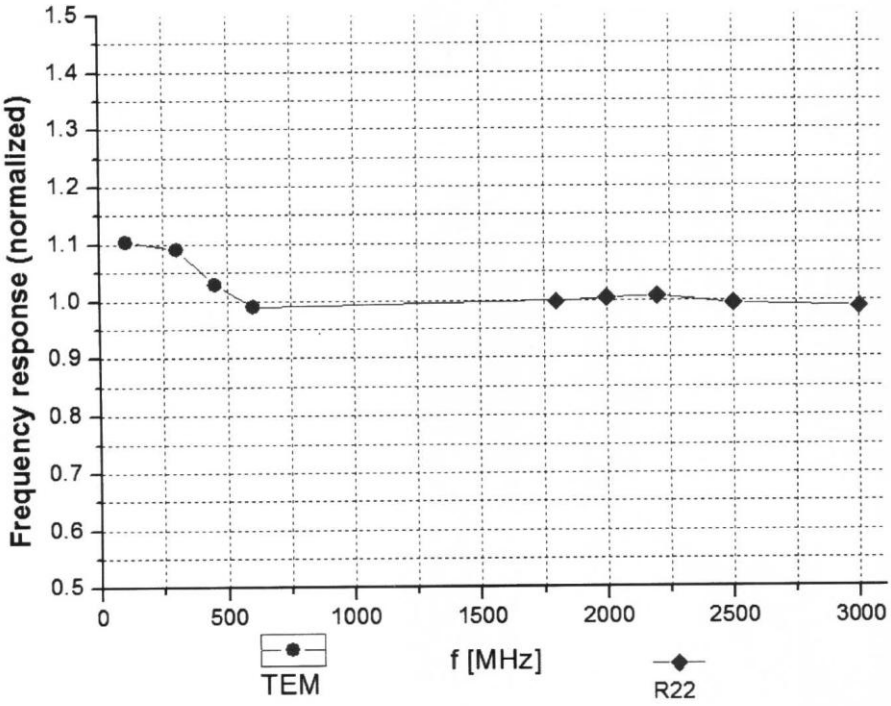
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



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

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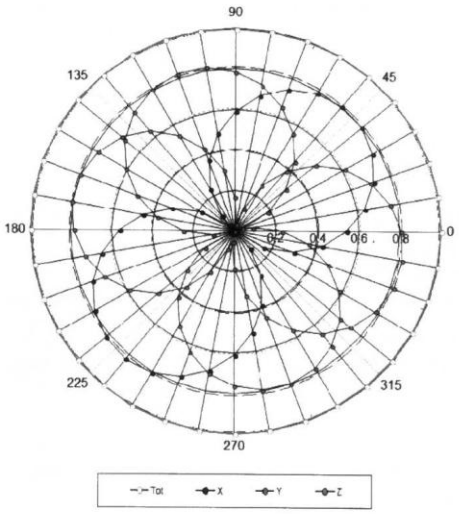
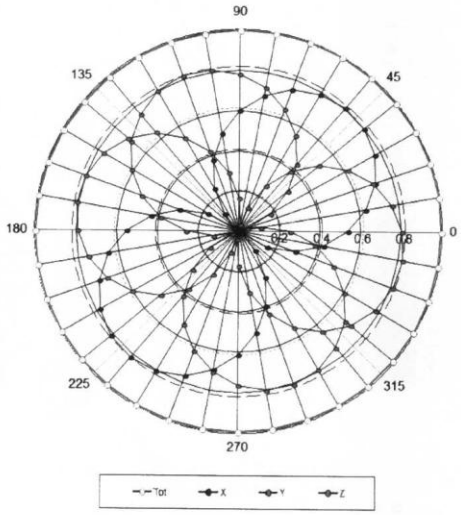
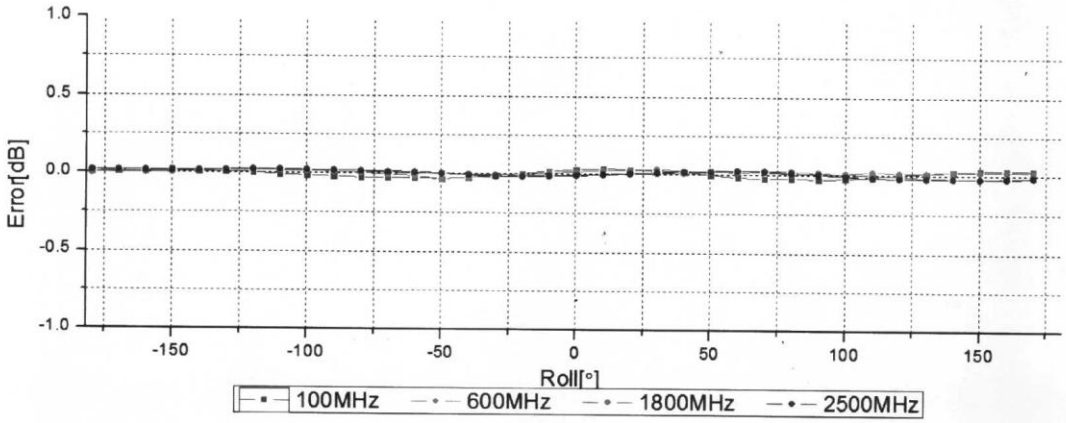
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM



f=1800 MHz, R22





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

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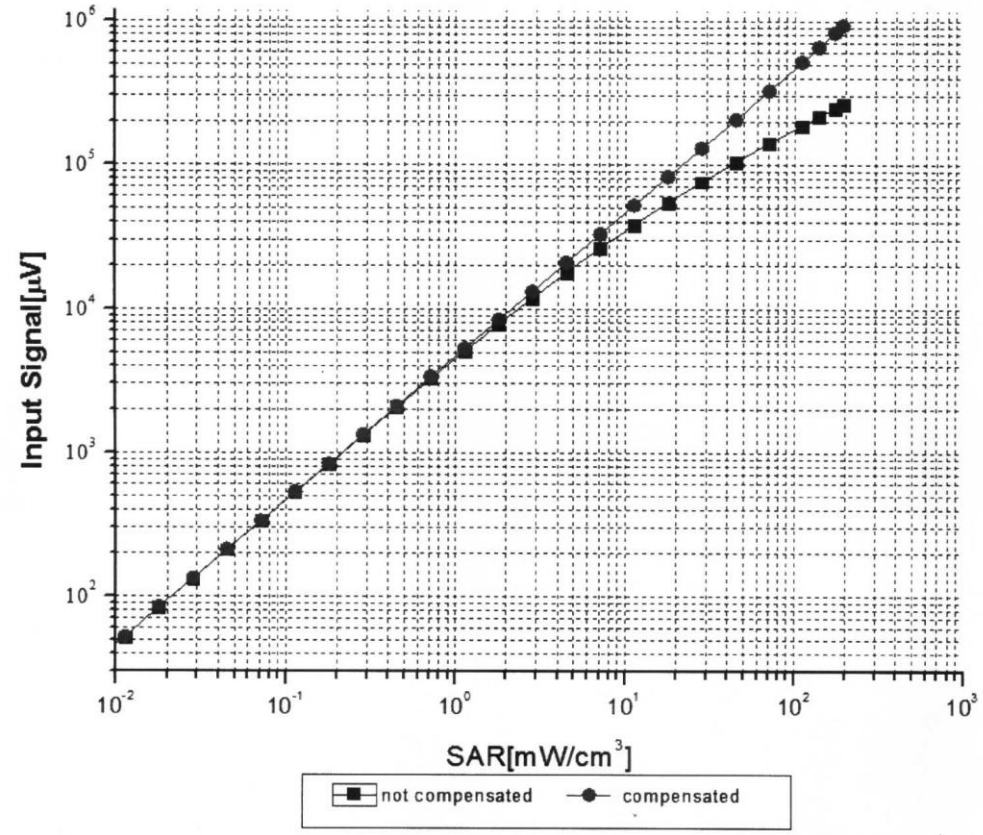
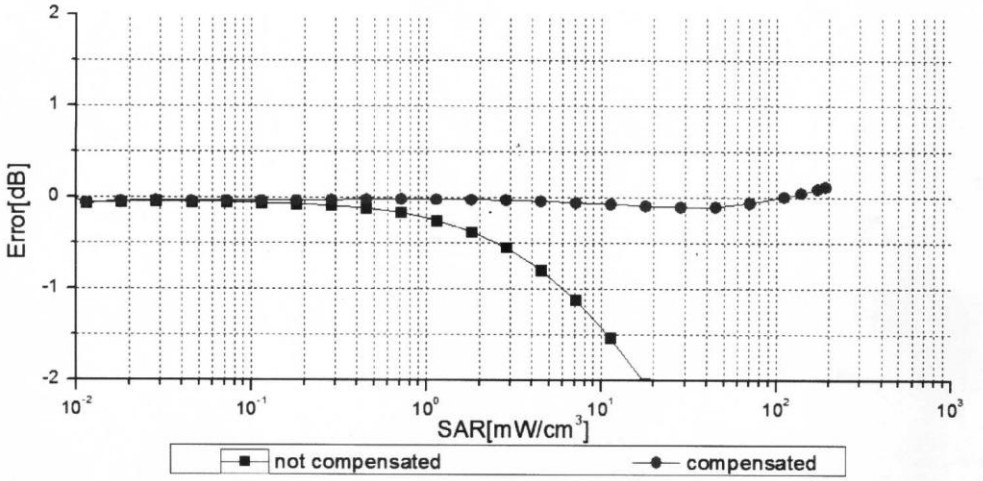
Dynamic Range f(SAR_{head})
(TEM cell, f = 900 MHz)





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

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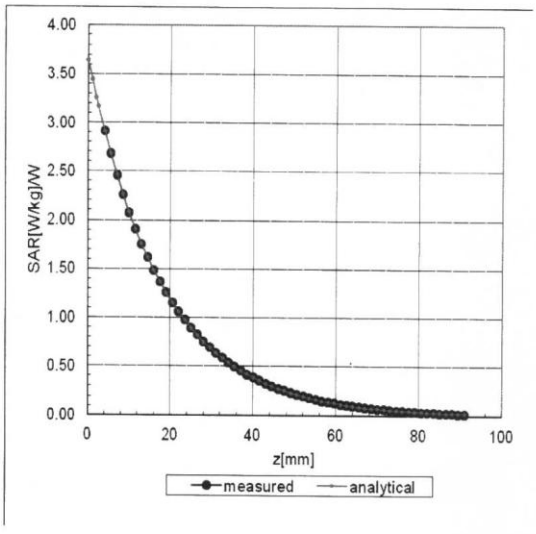
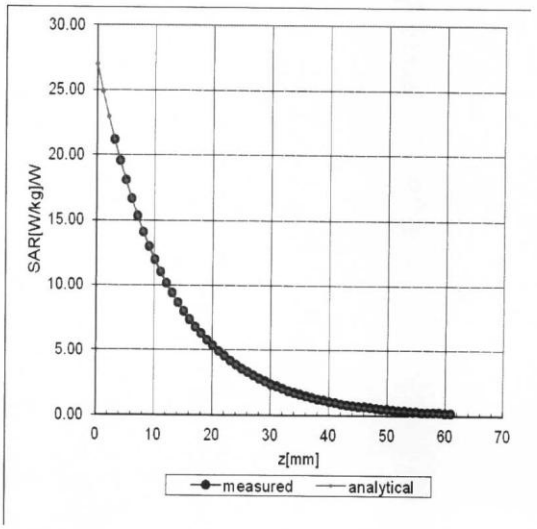
Conversion Factor Assessment

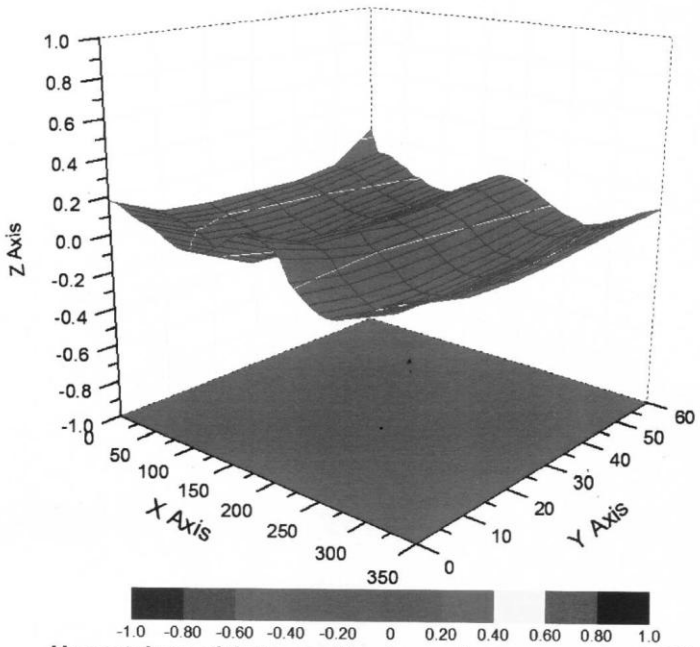
f=900 MHz, WGLS R9(H_convF)



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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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3932

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	69.9
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	9mm
Tip Diameter	2.5mm
Probe Tip to Sensor X Calibration Point	1mm
Probe Tip to Sensor Y Calibration Point	1mm
Probe Tip to Sensor Z Calibration Point	1mm
Recommended Measurement Distance from Surface	1.4mm

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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).

5. (1) D2450V2 Dipole Calibration Certificate

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CNAS CALIBRATION No. L0570

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Client NIM Certificate No: Z14-97101

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 919
Calibration Procedure(s)	TMC-OS-E-02-194 Calibration procedure for dipole validation kits
Calibration date:	September 17, 2014

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRVD	102196	14-Mar-14 (CTTL, No.JZ14-896)	Mar-15
Power sensor NRV-Z5	100596	14-Mar-14 (CTTL, No. JZ14-896)	Mar -15
Reference Probe ES3DV3	SN 3142	1- Sep-14 (CTTL-SPEAG, No.JZ14-97079)	Aug-15
DAE3	SN 536	23-Jan-14 (SPEAG, DAE3-536_Jan14)	Jan -15
Signal Generator E4438C	MY49070393	13-Nov-13 (TMC, No.JZ13-394)	Nov-14
Network Analyzer E8362B	MY43021135	19-Oct-13 (TMC, No.JZ13-278)	Oct-14

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

Issued: September 30, 2014

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: Z14-97101 Page 1 of 8

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Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx,y,z
N/A	not applicable or not measured

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

c) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

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%.

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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	52.8.8.1222
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.8 ± 6 %	1.85 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	—	—

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.0 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**51.5 mW /g ± 20.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	6.03 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**24.0 mW /g ± 20.4 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.2 ± 6 %	1.97 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	—

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.8 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**50.7 mW /g ± 20.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	6.02 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**23.9 mW /g ± 20.4 % (k=2)**