SAR Test Report

Product Name : StreamCast HD Transmitter

Model No. : MSP STRC USB XMT WW

FCC ID : RJE-178461

IC : 5153A-178461

Applicant : Monster, LLC

Address : 7251 West Lake Mead Blvd Suite 342 Las Vegas, NV 89128

Date of Receipt : 21/05/2012

Date of Test : 29/05/2012

Issued Date : 08/06/2012

Report No. : 125S060R-HP-US-P03V01

Report Version : V1.0

Test Report Certification

Issued Date: 08/06/2012
Report No: 125S060R-HP-US-P03V01

QuieTek

Product Name	:	StreamCast HD Transmitter
Applicant	:	Monster, LLC
Address	:	7251 West Lake Mead Blvd Suite 342 Las Vegas, NV 89128
Manufacturer	:	Hansong (Nanjing) Technology Ltd.
Address	:	8th Kangping Road, Jiangning Economy and Technology Development Zone, Nanjing, 201106, China
FCC ID	:	RJE-178461
IC	:	5153A-178461
Model No.	:	MSP STRC USB XMT WW
Brand Name	:	Monster Products
EUT Voltage	:	DC 5V
Applicable Standard	:	FCC OET65 Supplement C June 2001 IEEE Std. 1528-2003,47CFR § 2.1093 IEC 62209-2:2010 RSS-102 Issue 4 (March 2010), updated December 2010.
Test Result	:	Max. SAR Measurement (1g) 0.492 W/kg
Performed Location	:	Suzhou EMC Laboratory No.99 Hongye Rd., Suzhou Industrial Park Loufeng Hi-Tech Development Zone., Suzhou, China TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098 FCC Registration Number: 800392
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Approved By	:	Marlin Chen (Engineering Manager: Marlin Chen)

Laboratory Information

We, **QuieTek Corporation**, are an independent EMC and safety consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted(audited or listed) by the following related bodies in compliance with ISO 17025, EN 45001 and specified testing scope:

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Germany	**:**	**TUV Rheinland**
Norway	**:**	**Nemko, DNV**
USA	**:**	**FCC, NVLAP**
Japan	**:**	**VCCI**
China	**:**	**CNAS**

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If you have any comments, Please don't hesitate to contact us. Our contact information is as below:

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1. General Information

1.1. EUT Description

Product Name	StreamCast HD Transmitter
Model No.	MSP STRC USB XMT WW
FCC ID	RJE-178461
IC	5153A-178461
Brand Name	Monster Products
Frequency Range	2.4GHz: 2412 - 2462MHz 5.2GHz: 5180 - 5240 MHz 5.8GHz: 5736 - 5814 MHz
Device Category	USB Dongle
RF Exposure Environment	Uncontrolled
Antenna Type	Internal
Peak Antenna Gain	2.0dBi
Max. Output Power (RMS)	2.4GHz: 10.38dBm 5.2GHz: 11.52dBm 5.8GHz: 5.73dBm

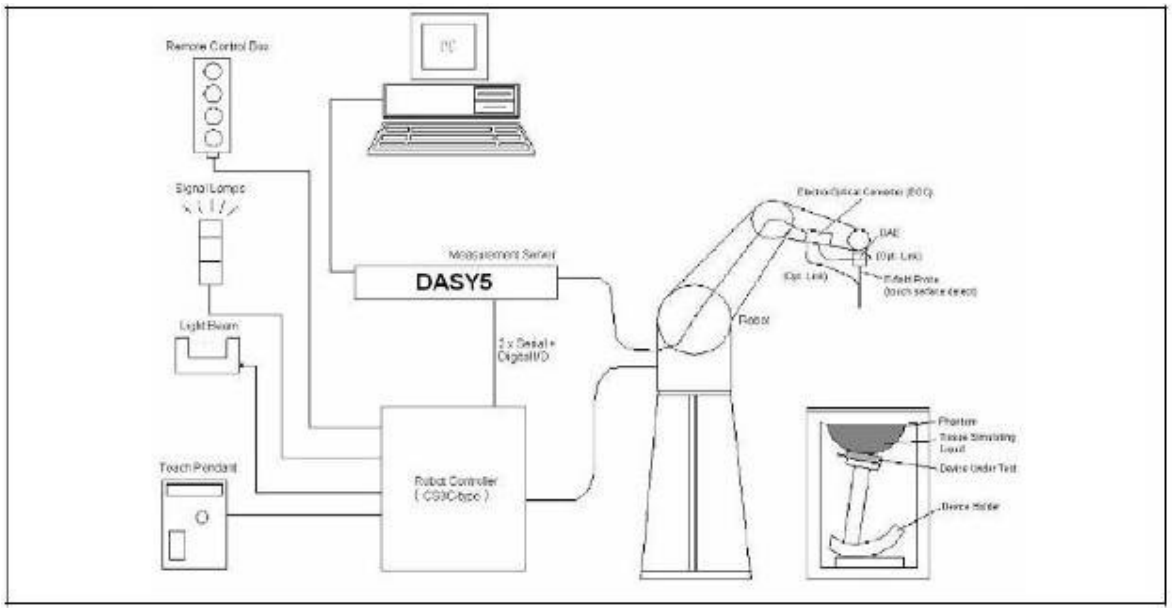
1.2. Test Environment

Ambient conditions in the laboratory:

Items	Required	Actual
Temperature (℃)	18-25	21.5± 2
Humidity (%RH)	30-70	52

2. SAR Measurement System

2.1. DASY5 System Description



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

- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

2.1.1. Applications

Predefined procedures and evaluations for automated compliance testing with all worldwide standards, e.g., IEEE 1528, OET 65, IEC 62209-1, IEC 62209-2, EN 50360, EN 50383 and others.

2.1.2. Area Scans

Area scans are defined prior to the measurement process being executed with a user defined variable spacing between each measurement point (integral) allowing low uncertainty measurements to be conducted. Scans defined for FCC applications utilize a $10mm^2$ step integral, with 1mm interpolation used to locate the peak SAR area used for zoom scan assessments.

When an Area Scan has measured all reachable points, it computes the field maxima found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE 1528-2003 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan).

2.1.3. Zoom Scan (Cube Scan Averaging)

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. A density of 1000 kg/m^3 is used to represent the head and body tissue density and not the phantom liquid density, in order to be consistent with the definition of the liquid dielectric properties, i.e. the side length of the 1 g cube is 10mm, with the side length of the 10 g cube 21,5mm.

The zoom scan integer steps can be user defined so as to reduce uncertainty, but normal practice for typical test applications utilize a physical step of 7x7x7 (5mmx5mmx5mm) providing a volume of 30mm in the X & Y axis, and 30mm in the Z axis.

2.1.4. Uncertainty of Inter-/Extrapolation and Averaging

In order to evaluate the uncertainty of the interpolation, extrapolation and averaged SAR calculation algorithms of the Postprocessor, DASY5 allows the generation of measurement grids which are artificially predefined by analytically based test functions. Therefore, the grids of area scans and zoom scans can be filled with uncertainty test data, according to the SAR benchmark functions of IEEE 1528.The three analytical functions shown in equations as below are used to describe the possible range of the expected SAR distributions for the tested handsets. The field gradients are covered by the spatially flat distribution f1, the spatially steep distribution f3 and f2 accounts for H-field cancellation on the phantom/tissue surface.

$$f_1(x,y,z) = Ae^{-\frac{z}{2a}}\cos^2\left(\frac{\pi}{2}\frac{\sqrt{x'^2+y'^2}}{5a}\right)$$

$$f_2(x,y,z) = Ae^{-\frac{z}{a}}\frac{a^2}{a^2+x'^2}\left(3-e^{-\frac{2z}{a}}\right)\cos^2\left(\frac{\pi}{2}\frac{y'}{3a}\right)$$

$$f_3(x,y,z) = A\frac{a^2}{\frac{a^2}{4}+x'^2+y'^2}\left(e^{-\frac{2z}{a}}+\frac{a^2}{2(a+2z)^2}\right)$$

2.2. DASY5 E-Field Probe

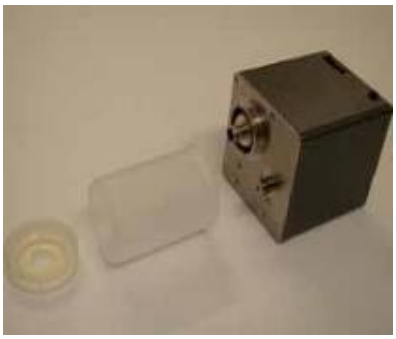
The SAR measurement is conducted with the dosimetric probe manufactured by SPEAG. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. SPEAG conducts the probe calibration in compliance with international and national standards (e.g. IEEE 1528, IEC 62209-1, IEC 62209-2, etc.) under ISO 17025. The calibration data are in Appendix D**.**

2.2.1. Isotropic E-Field Probe Specification

Model	EX3DV4	
Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz to 6 GHz Linearity: ± 0.2 dB (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: ± 0.2 dB (noise: typically < 1 µW/g)	
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.	

2.3. Boundary Detection Unit and Probe Mounting Device

The DASY probes use a precise connector and an additional holder for the probe, consisting of a plastic tube and a flexible silicon ring to center the probe. The connector at the DAE is flexibly mounted and held in the default position with magnets and springs. Two switching systems in the connector mount detect frontal and lateral probe collisions and trigger the necessary software response.



2.4. DATA Acquisition Electronics (DAE) and Measurement Server

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit.
Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.
The input impedance of the DAE4 is 200M Ohm; the inputs are symmetrical and floating. Common mode rejection is above 80dB.

The DASY5 measurement server is based on a PC/104 CPU board with a 400MHz intel ULV Celeron, 128MB chipdisk and 128MB RAM. The necessary circuits for communication with the DAE electronics box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY5 I/O board, which is directly connected to the PC/104 bus of the CPU board.

2.5. Robot

The DASY5 system uses the high precision robots TX90 XL type out of the newer series from Stäubli SA (France). For the 6-axis controller DASY5 system, the CS8C robot controller version from Stäubli is used.

The XL robot series have many features that are important for our application:

- High precision (repeatability 0.02 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)
- 6-axis controller

2.6. Light Beam Unit

The light beam switch allows automatic "tooling" of the probe. During the process, the actual position of the probe tip with respect to the robot arm is measured, as well as the probe length and the horizontal probe offset. The software then corrects all movements, such that the robot coordinates are valid for the probe tip.

The repeatability of this process is better than 0.1 mm. If a position has been taught with an aligned probe, the same position will be reached with another aligned probe within 0.1 mm, even if the other probe has different dimensions. During probe rotations, the probe tip will keep its actual position.

2.7. Device Holder

The DASY5 device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (EPR).
Thus the device needs no repositioning when changing the angles.

The DASY5 device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity εr =3 and loss tangent δ = 0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

2.8. SAM Twin Phantom

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

- Left head
- Right head
- Flat phantom

The bottom plate contains three pair 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 tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

3. Tissue Simulating Liquid

3.1. The composition of the tissue simulating liquid

INGREDIENT (% Weight)	5800MHz Body
Water	75.68
Salt	0.43
Sugar	0.00
HEC	0.00
Preventol	0.00
DGBE	4.42
Triton X-100	19.47

3.2. Tissue Calibration Result

The dielectric parameters of the liquids were verified prior to the SAR evaluation using DASY5 Dielectric Probe Kit and Agilent Vector Network Analyzer E5071C

Body Tissue Simulant Measurement				
Frequency [MHz]	Description	Dielectric Parameters		Tissue Temp. [℃]
		ε_r	σ [s/m]	
5200MHz	Reference result ± 5% window	49.0 46.55 to 51.45	5.30 5.04 to 5.57	N/A
	29-05-2012	48.90	5.26	21.0
5800MHz	Reference result ± 5% window	48.2 45.79 to 50.61	6.00 5.70 to 6.30	N/A
	29-05-2012	47.14	6.08	21.0

Channel/ Frequency (MHz)	**Measured Data**	**Measured Value**		**Target Value**		**Deviation**	
		ε_r	**σ [s/m]**	**ε_r**	**σ [s/m]**	**ε_r (%)**	**σ(%)**
36/5180	29-05-2012	49.07	5.22	49.0	5.30	0.1	1.5
42/5210	29-05-2012	48.84	5.28	49.0	5.30	0.3	0.4
48/5240	29-05-2012	48.59	5.35	49.0	5.30	0.8	0.9
147/5736	29-05-2012	47.31	5.95	48.2	6.00	1.8	0.8
152/5762	29-05-2012	47.25	6.01	48.2	6.00	2.0	0.2
163/5814	29-05-2012	47.10	6.10	48.2	6.00	2.3	1.7

3.3. Tissue Dielectric Parameters for Head and Body Phantoms

The head tissue dielectric parameters recommended by the IEEE 1528, RSS-102 and IEC 62209 have been incorporated in the following table.

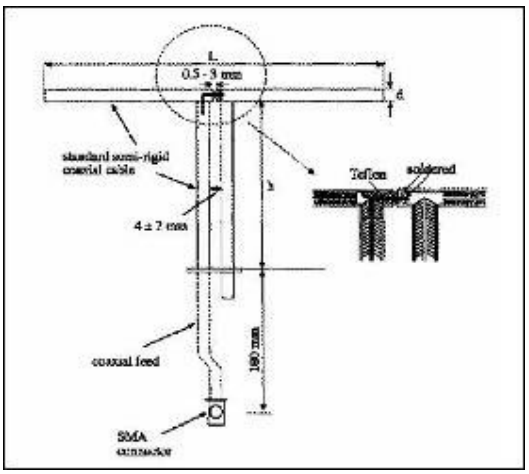
Target Frequency	Head		Body	
(MHz)	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5200	36.0	4.66	**49.0**	**5.30**
5800	35.3	5.27	**48.2**	**6.00**

(ε_r = relative permittivity, σ = conductivity and ρ = 1000 kg/m^3)

4. SAR Measurement Procedure

4.1. SAR System Validation

4.1.1. Validation Dipoles



The dipoles used is based on the IEEE-1528 standard, and is complied with mechanical and electrical specifications in line with the requirements of both IEEE and FCC Supplement C. the table below provides details for the mechanical and electrical specifications for the dipoles.

Frequency	L (mm)	h (mm)	d (mm)
5800MHz	20.6	14.2	3.6

4.1.2. Validation Result

System Performance Check at 5200MHz

Validation Dipole: D5GHzV2, SN: 1078

Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [℃]
5200 MHz	Reference result ± 10% window	73.1 65.79 to 80.41	20.5 18.45 to 22.55	N/A
	29-05-2012	78.3	22.0	21.0

Note: All SAR values are normalized to 1W forward power.

System Performance Check at 5800MHz

Validation Kit: D5GHzV2, SN: 1078

Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [℃]
5800 MHz	Reference result ± 10% window	73.5 66.15 to 80.85	20.3 18.27 to 22.33	N/A
	29-05-2012	75.6	20.9	21.0

Note: All SAR values are normalized to 1W forward power.

4.2. SAR Measurement Procedure

The DASY 5 calculates SAR using the following equation,

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

σ: represents the simulated tissue

conductivity ρ: represents the tissue density

The EUT is set to transmit at the required power in line with product specification, at each frequency relating to the LOW, MID, and HIGH channel settings.

Pre-scans are made on the device to establish the location for the transmitting antenna, using a large area scan in either air or tissue simulation fluid.

The EUT is placed against the Universal Phantom where the maximum area scan dimensions are larger than the physical size of the resonating antenna. When the scan size is not large enough to cover the peak SAR distribution, it is modified by either extending the area scan size in both the X and Y directions, or the device is shifted within the predefined area.

The area scan is then run to establish the peak SAR location (interpolated resolution set at $1mm^2$) which is then used to orient the center of the zoom scan. The zoom scan is then executed and the 1g and 10g averages are derived from the zoom scan volume (interpolated resolution set at $1mm^3$).

5. SAR Exposure Limits

SAR assessments have been made in line with the requirements of IEEE-1528, FCC Supplement C, and comply with ANSI/IEEE C95.1-1992 “Uncontrolled Environments” limits. These limits apply to a location which is deemed as “Uncontrolled Environment” which can be described as a situation where the general public may be exposed to an RF source with no prior knowledge or control over their exposure.

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

Type Exposure	Uncontrolled Environment Limit
Spatial Peak SAR (1g cube tissue for brain or body)	1.60 W/kg
Spatial Average SAR (whole body)	0.8 W/kg
Spatial Peak SAR (10g for hands, feet, ankles and wrist)	4.0 W/kg

6. Test Equipment List

Instrument	Manufacturer	Model No.	Serial No.	Cali. Due Date
Stäubli Robot TX60L	Stäubli	TX60L	F10/5C90A1/A/01	only once
Controller	Stäubli	SP1	S-0034	only once
Dipole Validation Kits	Speag	D5GHzV2	1078	2013.03.11
SAM Twin Phantom	Speag	SAM	TP-1561/1562	N/A
Device Holder	Speag	SD 000 H01 HA	N/A	N/A
Data Acquisition Electronic	Speag	DAE4	1220	2013.01.23
E-Field Probe	Speag	EX3DV4	3710	2013.03.12
SAR Software	Speag	DASY5	V5.2 Build 162	N/A
Power Amplifier	Mini-Circuit	ZHL-42	D051404-28	N/A
Directional Coupler	Agilent	778D	20160	N/A
Vector Network	Agilent	E5071C	MY48367267	2013.04.10
Signal Generator	Agilent	E4438C	MY49070163	2013.04.18
Power Meter	Anritsu	ML2495A	0905006	2013.01.12
Wide Bandwidth Sensor	Anritsu	MA2411B	0846014	2013.01.12

7. Measurement Uncertainty

DASY5 Uncertainty Measurement uncertainty for 3 GHz to 6 GHz averaged over 1 gram / 10 gram.								
Error Description	Uncert. value	Prob. Dist.	Div.	(c_i) 1g	(c_i) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(v_i) v_{eff}
Measurement System								
Probe Calibration	±6.55%	N	1	1	1	±6.55%	±6.55%	∞
Axial Isotropy	±4.7%	R	$\sqrt{3}$	0.7	0.7	±1.9%	±1.9%	∞
Hemispherical Isotropy	±9.6%	R	$\sqrt{3}$	0.7	0.7	±3.9%	±3.9%	∞
Boundary Effects	±2.0%	R	$\sqrt{3}$	1	1	±1.2%	±1.2%	∞
Linearity	±4.7%	R	$\sqrt{3}$	1	1	±2.7%	±2.7%	∞
System Detection Limits	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%	∞
Readout Electronics	±0.3%	N	1	1	1	±0.3%	±0.3%	∞
Response Time	±0.8%	R	$\sqrt{3}$	1	1	±0.5%	±0.5%	∞
Integration Time	±2.6%	R	$\sqrt{3}$	1	1	±1.5%	±1.5%	∞
RF Ambient Noise	±3.0%	R	$\sqrt{3}$	1	1	±1.7%	±1.7%	∞
RF Ambient Reflections	±3.0%	R	$\sqrt{3}$	1	1	±1.7%	±1.7%	∞
Probe Positioner	±0.8%	R	$\sqrt{3}$	1	1	±0.5%	±0.5%	∞
Probe Positioning	±9.9%	R	$\sqrt{3}$	1	1	±5.7%	±5.7%	∞
Max. SAR Eval.	±4.0%	R	$\sqrt{3}$	1	1	±2.3%	±2.3%	∞
Test Sample Related								
Device Positioning	±2.9%	N	1	1	1	±2.9%	±2.9%	145
Device Holder	±3.6%	N	1	1	1	±3.6%	±3.6%	5
Power Drift	±5.0%	R	$\sqrt{3}$	1	1	±2.9%	±2.9%	∞
Phantom and Setup								
Phantom Uncertainty	±4.0%	R	$\sqrt{3}$	1	1	±2.3%	±2.3%	∞
Liquid Conductivity (target)	±5.0%	R	$\sqrt{3}$	0.64	0.43	±1.8%	±1.2%	∞
Liquid Conductivity (meas.)	±2.5%	N	1	0.64	0.43	±1.6%	±1.1%	∞
Liquid Permittivity (target)	±5.0%	R	$\sqrt{3}$	0.6	0.49	±1.7%	±1.4%	∞
Liquid Permittivity (meas.)	±2.5%	N	1	0.6	0.49	±1.5%	±1.2%	∞
Combined Std. Uncertainty						±12.8%	±12.6%	330
Expanded STD Uncertainty						±25.6%	±25.2%	

8. Conducted Power Measurement

Test Band	Channel	Frequency (MHz)	RMS Power (dBm)
2.4GHz	Low	2412	10.38
	Mid	2438	9.97
	High	2464	9.70
5.2GHz	Low	5180	11.34
	Mid	5210	11.40
	High	5240	**11.52**
5.8GHz	Low	5736	5.07
	Mid	5762	5.73
	High	5814	4.78

Note: the SAR test for 2.4GHz band please reference report SHEM120200011217

9. Test Procedures

9.1. Test position and configuration

SAR was performed with the device configured in the positions according to IEEE1528, IEC 62209-2 and KDB 447498 D02 SAR Procedures for Dongle Xmtr v01 1, body SAR was performed with the device to phantom separation distance of 5mm. Two USB orientations (A: Horizontal-Up, D: Vertical-Back) were evaluated using an appropriate laptop computer. The other USB orientations (B: Horizontal-Down, C: Vertical-Front, and E: Tip) were evaluated with 15cm USB cable for extension. Please check the SAR test photos.

Other KDB files were referred for this device SAR evaluation: KDB 447498, KDB 248227.

9.2. SAR Test Results Summary

SAR MEASUREMENT							
Ambient Temperature (℃) : 21.5 ±2				Relative Humidity (%): 55			
Liquid Temperature (℃) : 21.0 ±2				Depth of Liquid (cm):>15			
Product: StreamCast HD Transmitter							
Test Position Body	Antenna Position	Frequency		Separation Distance (cm)	Power Drift (<±0.2)	SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz				
Tip (USB Cable)	Fixed	36	5180	0.5	-0.14	0.313	1.6
Tip (USB Cable)	Fixed	42	5210	0.5	0.11	0.354	1.6
Horizontal Up (Laptop)	Fixed	48	5240	0.5	0.14	0.419	1.6
Horizontal Down (USB Cable)	Fixed	48	5240	0.5	-0.12	0.236	1.6
Vertical Front (USB Cable)	Fixed	48	5240	0.5	0.11	0.084	1.6
Vertical Back (Laptop)	Fixed	48	5240	0.5	-0.08	0.144	1.6
Tip (USB Cable)	Fixed	48	5240	0.5	0.10	**0.492**	1.6
Tip (USB Cable)	Fixed	147	5736	0.5	-0.12	0.081	1.6
Tip (USB Cable)	Fixed	152	5762	0.5	0.17	0.083	1.6
Tip (USB Cable)	Fixed	163	5814	0.5	-0.09	0.069	1.6

Appendix A. SAR System Validation Data

Date/Time: 29-05-2012

Test Laboratory: QuieTek Lab

System Check Body 5200MHz

DUT: Dipole D5GHzV2; Type: D5GHzV2

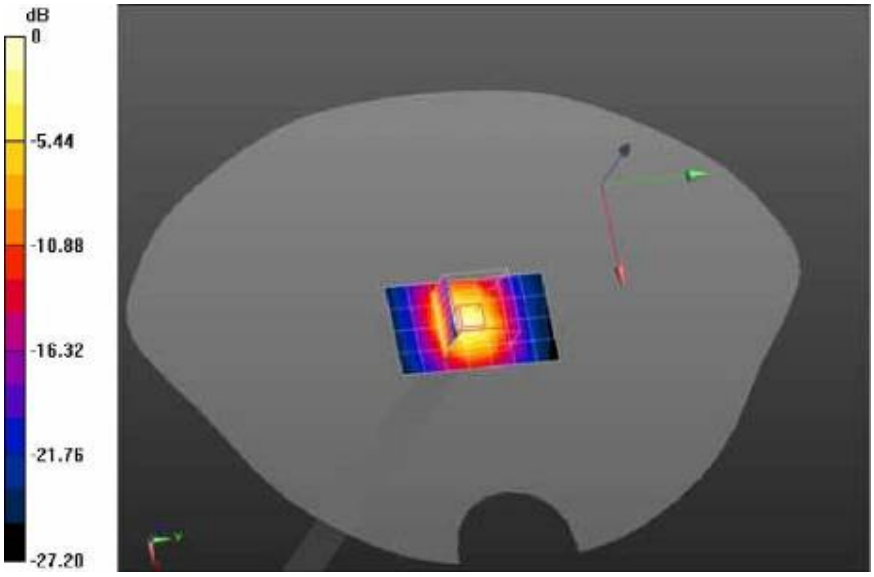
Communication System: CW; Communication System Band: ITD5500 (5000.0 - 5900.0 MHz); Duty Cycle: 1:1; Frequency: 5200 MHz; Medium parameters used: f = 5200 MHz; σ = 5.26 mho/m; ε_r = 48.9; ρ = 1000 kg/m^3 ; Phantom section: Flat Section ; Input Power=100mW

Ambient temperature (℃): 21.5, Liquid temperature (℃):
21.0 DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(4.2, 4.2, 4.2); Calibrated: 12/03/2012;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/System Check Body 5200MHz/Area Scan (5x8x1): Measurement grid:
dx=10mm, dy=10mm, Maximum value of SAR (measured) = 14.3 mW/g

Configuration/System Check Body 5200MHz/Zoom Scan (8x8x10)/Cube 0: Measurement grid:
dx=4mm, dy=4mm, dz=2.5mm, Reference Value = 41.966 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 29.529 mW/g
SAR(1 g) = 7.83 mW/g; SAR(10 g) = 2.2 mW/g Maximum value of SAR (measured) = 15.5 mW/g



0 dB = 14.3 mW/g = 23.09 dB mW/g

Date/Time: 29-05-2012

Test Laboratory: QuieTek Lab

System Check Body 5800MHz

DUT: Dipole D5GHzV2; Type: D5GHzV2

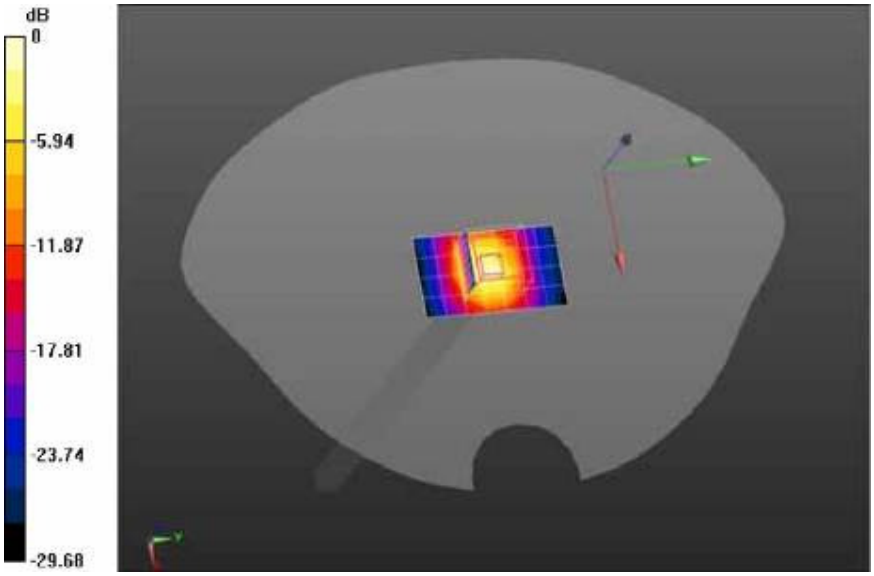
Communication System: CW; Communication System Band: ITD5500 (5000.0 - 5900.0 MHz); Duty Cycle: 1:1; Frequency: 5800 MHz; Medium parameters used: f = 5800 MHz; σ = 6.08 mho/m; ε_r = 47.14; ρ = 1000 kg/m^3 ; Phantom section: Flat Section ; Input Power=100mW

Ambient temperature (℃): 21.5, Liquid temperature (℃):
21.0 DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(3.89, 3.89, 3.89); Calibrated: 12/03/2012;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/System Check Body 5800MHz/Area Scan (5x8x1): Measurement grid:
dx=10mm, dy=10mm, Maximum value of SAR (measured) = 13.3 mW/g

Configuration/System Check Body 5800MHz/Zoom Scan (8x8x10)/Cube 0: Measurement grid:
dx=4mm, dy=4mm, dz=2.5mm, Reference Value = 38.530 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 31.261 mW/g
SAR(1 g) = 7.56 mW/g; SAR(10 g) = 2.09 mW/g Maximum value of SAR (measured) = 15.2 mW/g



0 dB = 13.3 mW/g = 22.50 dB mW/g

Appendix B. SAR measurement Data

Date/Time: 29-05-2012

Test Laboratory: QuieTek

Lab 5180MHz-Tip

DUT: StreamCast HD Transmitter; Type: MSP STRC USB XMT WW

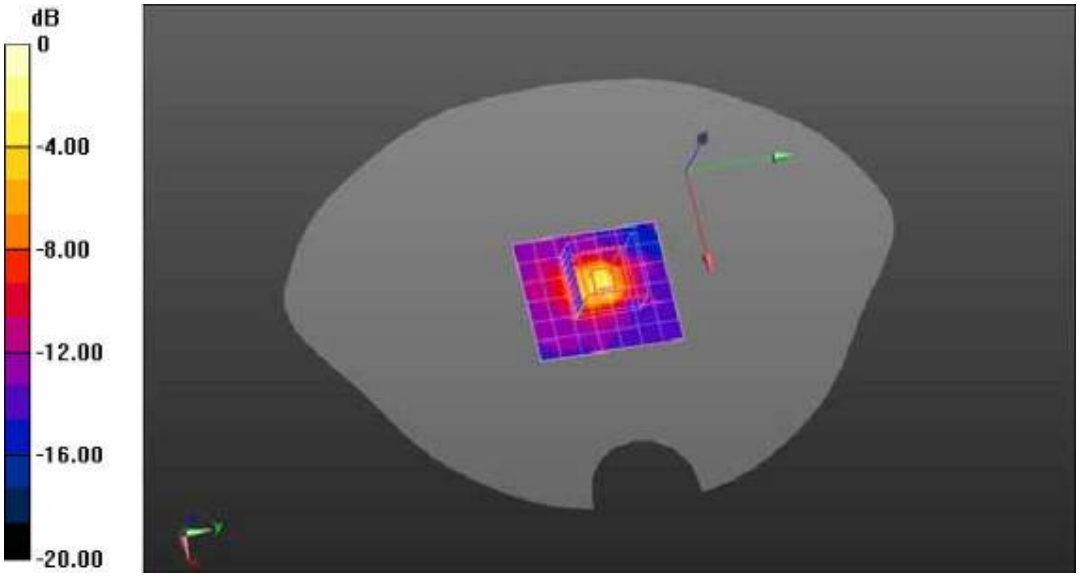
Communication System: CW; Communication System Band: 5GHz(5000.0-6000.0MHz); Duty Cycle: 1:1; Frequency: 5180 MHz; Medium parameters used: f = 5180 MHz; σ = 5.22 mho/m; ε_r = 49.07; ρ = 1000 kg/m^3 ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃):
21.0 DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(4.13, 4.13, 4.13); Calibrated: 05/03/2010;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/5180MHz Channel36-Tip/Area Scan (7x8x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.480 mW/g

Configuration/5180MHz Channel36-Tip/Zoom Scan (9x9x5)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm, Reference Value = 8.246 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 1.162 mW/g
SAR(1 g) = 0.313 mW/g; SAR(10 g) = 0.085 mW/g Maximum value of SAR (measured) = 0.688 mW/g



0 dB = 0.688 mW/g = -3.25 dB mW/g

Date/Time: 29-05-2012

Test Laboratory: QuieTek

Lab 5210MHz-Tip

DUT: StreamCast HD Transmitter; Type: MSP STRC USB XMT WW

Communication System: CW; Communication System Band: 5GHz(5000.0-6000.0MHz); Duty Cycle: 1:1; Frequency: 5210 MHz; Medium parameters used: f = 5210 MHz; σ = 5.28 mho/m; ε_r = 48.84; ρ = 1000 kg/m^3 ; Phantom section: Flat Section

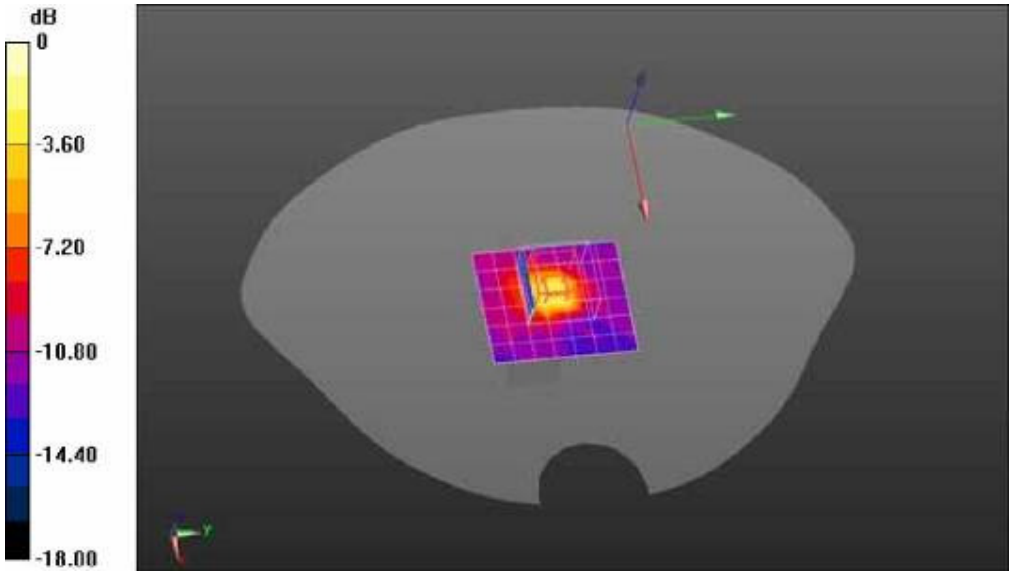
Ambient temperature (℃): 21.5, Liquid temperature (℃):
21.0 DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(4.13, 4.13, 4.13); Calibrated: 05/03/2010;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/5210MHz Channel42-Tip/Area Scan (7x8x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.411 mW/g

Configuration/5210MHz Channel42-Tip/Zoom Scan (9x9x5)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm, Reference Value = 7.808 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 1.434 mW/g

SAR(1 g) = 0.354 mW/g; SAR(10 g) = 0.113 mW/g Maximum value of SAR (measured) = 0.730 mW/g



0 dB = 0.730 mW/g = -2.73 dB mW/g

Date/Time: 29-05-2012

Test Laboratory: QuieTek Lab

5240MHz-Horizontal Up

DUT: StreamCast HD Transmitter; Type: MSP STRC USB XMT WW

Communication System: CW; Communication System Band: 5GHz(5000.0-6000.0MHz); Duty Cycle: 1:1; Frequency: 5240 MHz; Medium parameters used: f = 5240 MHz; σ = 5.35 mho/m; ε_r = 48.59; ρ = 1000 kg/m^3 ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 21.0 DASY5 Configuration:

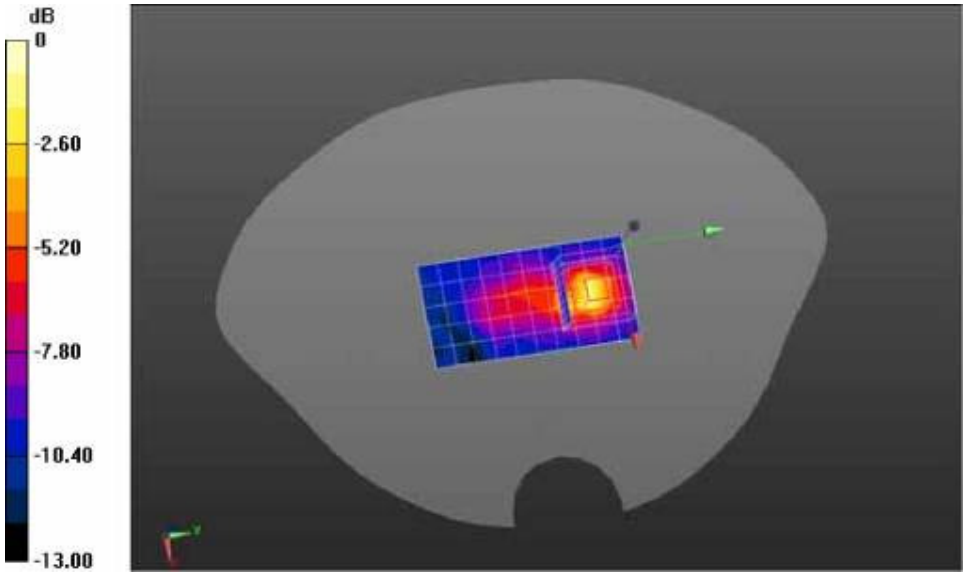
- Probe: EX3DV4 - SN3710; ConvF(4.13, 4.13, 4.13); Calibrated: 05/03/2010;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/5240MHz Channel48-Horizontal Up/Area Scan (6x11x1): Measurement grid: dx=10mm, dy=10mm, Maximum value of SAR (measured) = 0.617 mW/g

Configuration/5240MHz Channel48-Horizontal Up/Zoom Scan (9x9x5)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm, Reference Value = 5.550 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 1.579 mW/g

SAR(1 g) = 0.419 mW/g; SAR(10 g) = 0.172 mW/g Maximum value of SAR (measured) = 0.795 mW/g



0 dB = 0.795 mW/g = -1.99 dB mW/g

Date/Time: 29-05-2012

Test Laboratory: QuieTek Lab

5240MHz-Horizontal Down

DUT: StreamCast HD Transmitter; Type: MSP STRC USB XMT WW

Communication System: CW; Communication System Band: 5GHz(5000.0-6000.0MHz); Duty Cycle: 1:1; Frequency: 5240 MHz; Medium parameters used: f = 5240 MHz; σ = 5.35 mho/m; ε_r = 48.59; ρ = 1000 kg/m^3 ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 21.0 DASY5 Configuration:

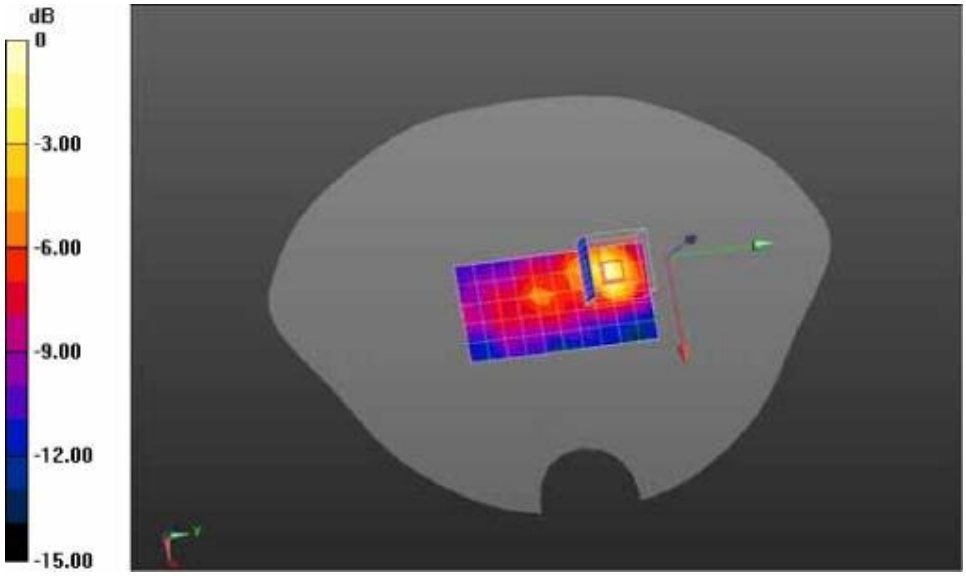
- Probe: EX3DV4 - SN3710; ConvF(4.13, 4.13, 4.13); Calibrated: 05/03/2010;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/5240MHz Channel48-Horizontal Down/Area Scan (6x11x1): Measurement grid: dx=10mm, dy=10mm, Maximum value of SAR (measured) = 0.407 mW/g

Configuration/5240MHz Channel48-Horizontal Down/Zoom Scan (9x9x5)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm, Reference Value = 4.175 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 0.959 mW/g

SAR(1 g) = 0.236 mW/g; SAR(10 g) = 0.093 mW/g Maximum value of SAR (measured) = 0.433 mW/g



0 dB = 0.433 mW/g = -7.27 dB mW/g

Date/Time: 29-05-2012

Test Laboratory: QuieTek Lab

5240MHz-Vertical Front

DUT: StreamCast HD Transmitter; Type: MSP STRC USB XMT WW

Communication System: CW; Communication System Band: 5GHz(5000.0-6000.0MHz); Duty Cycle: 1:1; Frequency: 5240 MHz; Medium parameters used: f = 5240 MHz; σ = 5.35 mho/m; ε_r = 48.59; ρ = 1000 kg/m^3 ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 21.0 DASY5 Configuration:

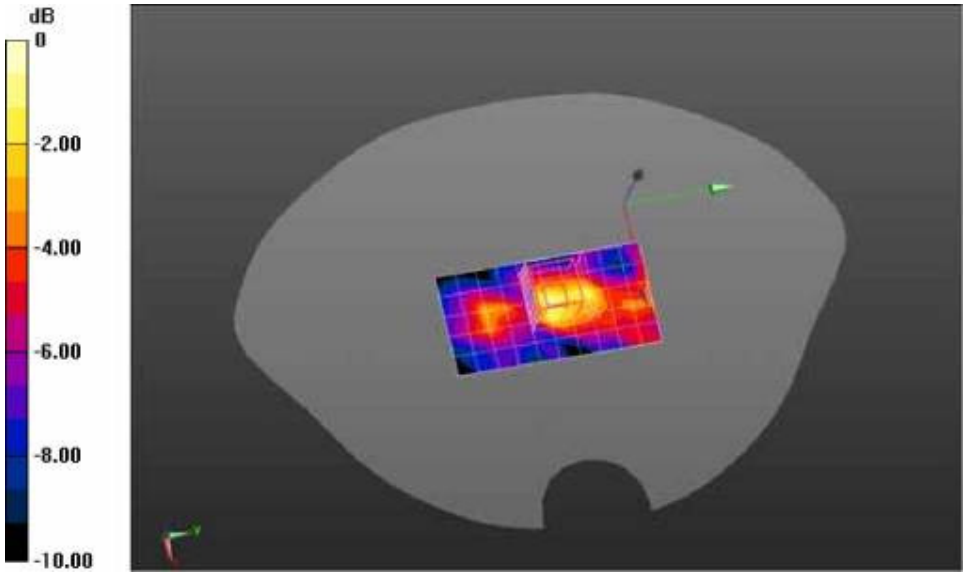
- Probe: EX3DV4 - SN3710; ConvF(4.13, 4.13, 4.13); Calibrated: 05/03/2010;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/5240MHz Channel48-Vertical Front/Area Scan (6x11x1): Measurement grid: dx=10mm, dy=10mm, Maximum value of SAR (measured) = 0.130 mW/g

Configuration/5240MHz Channel48-Vertical Front/Zoom Scan (8x8x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm, Reference Value = 4.041 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 0.291 mW/g

SAR(1 g) = 0.084 mW/g; SAR(10 g) = 0.052 mW/g Maximum value of SAR (measured) = 0.137 mW/g



0 dB = 0.137 mW/g = -17.27 dB mW/g

Date/Time: 29-05-2012

Test Laboratory: QuieTek Lab

5240MHz-Vertical Back

DUT: StreamCast HD Transmitter; Type: MSP STRC USB XMT WW

Communication System: CW; Communication System Band: 5GHz(5000.0-6000.0MHz); Duty Cycle: 1:1; Frequency: 5240 MHz; Medium parameters used: f = 5240 MHz; σ = 5.35 mho/m; ε_r = 48.59; ρ = 1000 kg/m^3 ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃): 21.0 DASY5 Configuration:

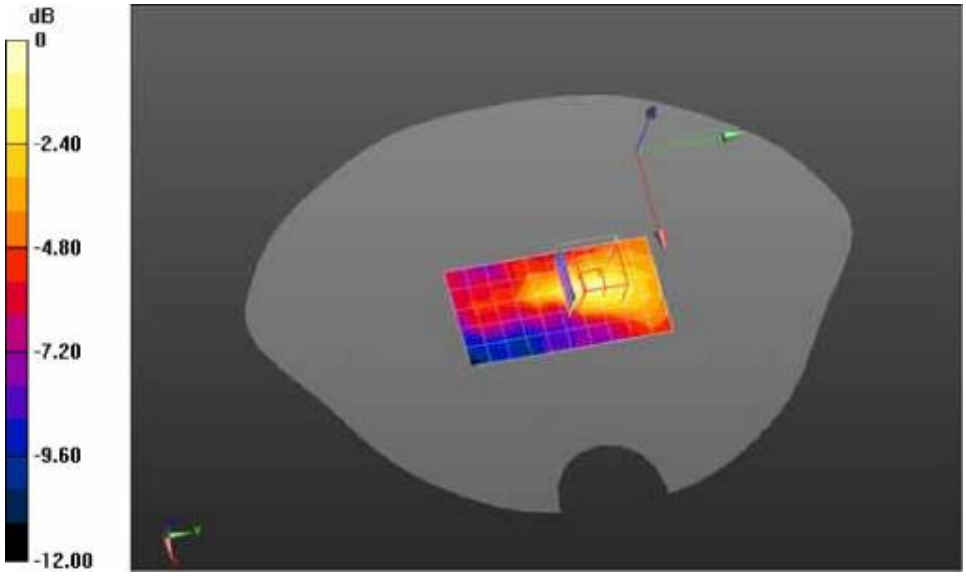
- Probe: EX3DV4 - SN3710; ConvF(4.13, 4.13, 4.13); Calibrated: 05/03/2010;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/5240 Channel48-Vertical Back/Area Scan (6x11x1): Measurement grid: dx=10mm, dy=10mm, Maximum value of SAR (measured) = 0.213 mW/g

Configuration/5240 Channel48-Vertical Back/Zoom Scan (8x8x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm, Reference Value = 4.049 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 0.571 mW/g

SAR(1 g) = 0.144 mW/g; SAR(10 g) = 0.072 mW/g Maximum value of SAR (measured) = 0.244 mW/g



0 dB = 0.244 mW/g = -12.25 dB mW/g

Date/Time: 29-05-2012

Test Laboratory: QuieTek

Lab 5240MHz-Tip

DUT: StreamCast HD Transmitter; Type: MSP STRC USB XMT WW

Communication System: CW; Communication System Band: 5GHz(5000.0-6000.0MHz); Duty Cycle: 1:1; Frequency: 5240 MHz; Medium parameters used: f = 5240 MHz; σ = 5.35 mho/m; ε_r = 48.59; ρ = 1000 kg/m^3 ; Phantom section: Flat Section

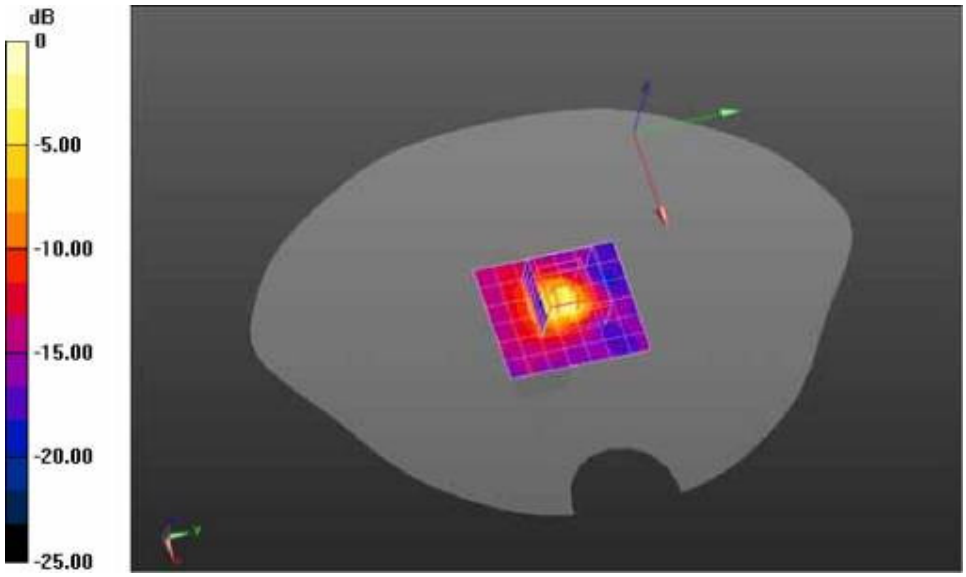
Ambient temperature (℃): 21.5, Liquid temperature (℃):
21.0 DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(4.13, 4.13, 4.13); Calibrated: 05/03/2010;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/5240MHz Channel48-Tip/Area Scan (7x8x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.659 mW/g

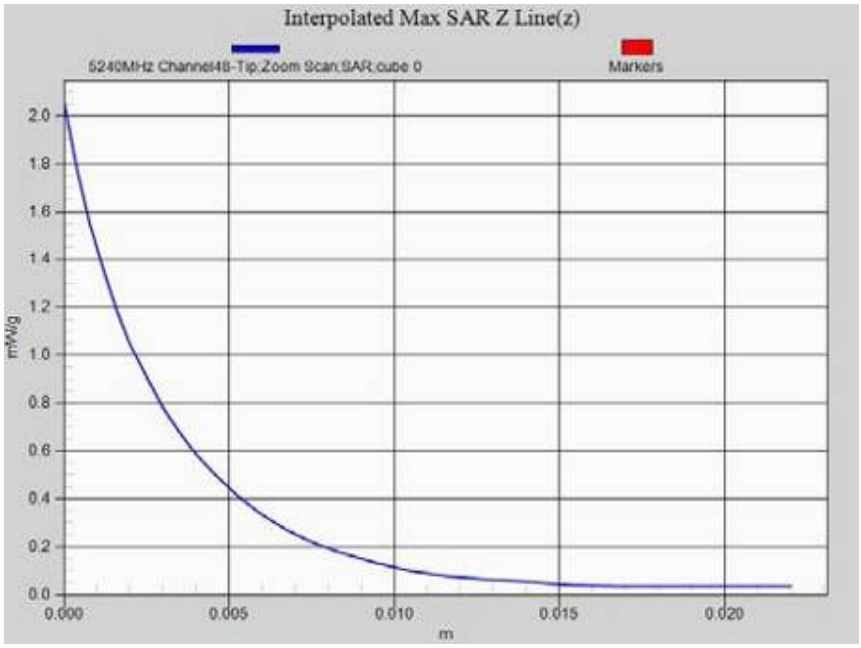
Configuration/5240MHz Channel48-Tip/Zoom Scan (9x9x5)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm, Reference Value = 9.351 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 2.046 mW/g

SAR(1 g) = 0.492 mW/g; SAR(10 g) = 0.142 mW/g Maximum value of SAR (measured) = 1.05 mW/g



0 dB = 1.05 mW/g = 0.42 dB mW/g

Z-Axis Plot


Interpolated Max SAR Z Line(z)
5240MHz Channel48-Tip;Zoom Scan;SAR;cube 0
Markers
mW/g
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.000
0.005
0.010
0.015
0.020
m

Date/Time: 29-05-2012

Test Laboratory: QuieTek

Lab 5736MHz-Tip

DUT: StreamCast HD Transmitter; Type: MSP STRC USB XMT WW

Communication System: CW; Communication System Band: 5GHz(5000.0-6000.0MHz); Duty Cycle: 1:1; Frequency: 5736 MHz; Medium parameters used: f = 5736 MHz; σ = 5.95 mho/m; ε_r = 47.31; ρ = 1000 kg/m^3 ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃):
21.0 DASY5 Configuration:

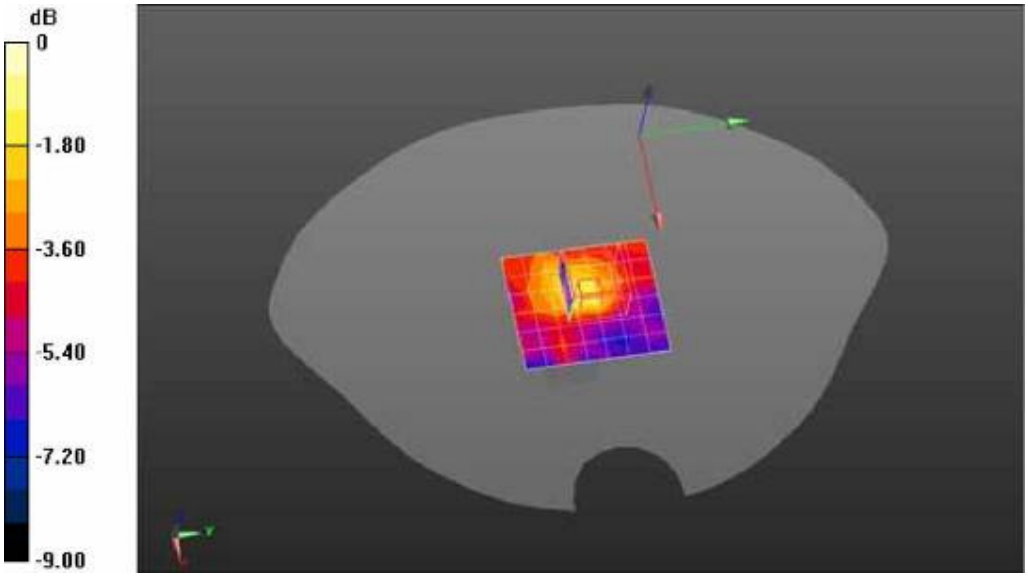
- Probe: EX3DV4 - SN3710; ConvF(3.97, 3.97, 3.97); Calibrated: 05/03/2010;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/5736MHz Channel147-Tip/Area Scan (7x8x1): Measurement grid: dx=10mm, dy=10mm Maximum value of SAR (measured) = 0.0959 mW/g

Configuration/5736MHz Channel147-Tip/Zoom Scan (8x8x5)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm, Reference Value = 3.223 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 0.334 mW/g

SAR(1 g) = 0.081 mW/g; SAR(10 g) = 0.050 mW/g Maximum value of SAR (measured) = 0.130 mW/g



0 dB = 0.130 mW/g = -17.72 dB mW/g

Date/Time: 29-05-2012

Test Laboratory: QuieTek

Lab 5762MHz-Tip

DUT: StreamCast HD Transmitter; Type: MSP STRC USB XMT WW

Communication System: CW; Communication System Band: 5GHz(5000.0-6000.0MHz); Duty Cycle: 1:1; Frequency: 5762 MHz; Medium parameters used: f = 5762 MHz; σ = 6.01 mho/m; ε_r = 47.25; ρ = 1000 kg/m^3 ; Phantom section: Flat Section

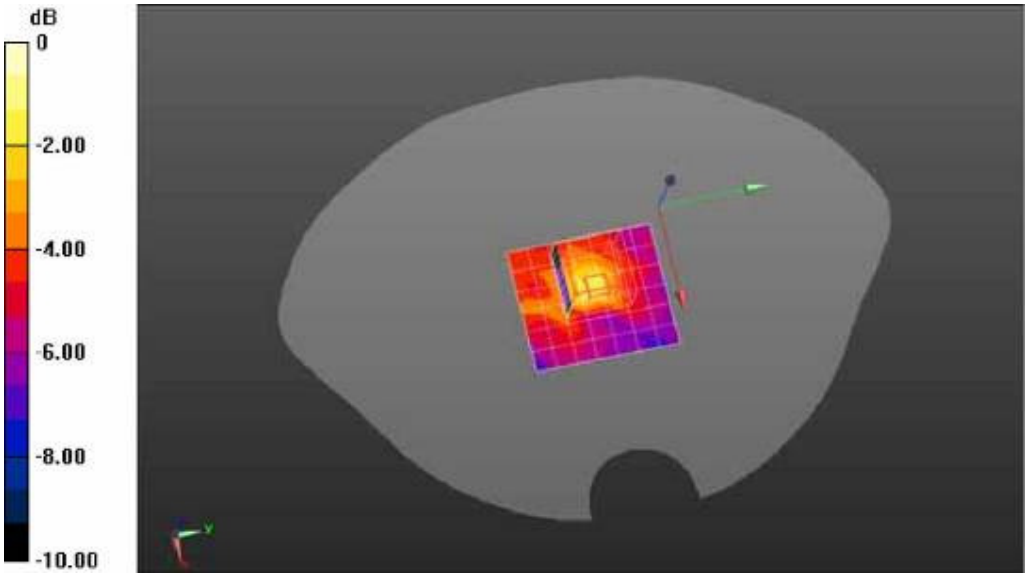
Ambient temperature (℃): 21.5, Liquid temperature (℃):
21.0 DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(3.97, 3.97, 3.97); Calibrated: 05/03/2010;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/5762MHz Channel00-Tip/Area Scan (7x8x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.112 mW/g

Configuration/5762MHz Channel00-Tip/Zoom Scan (9x9x5)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm, Reference Value = 3.759 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 0.293 mW/g

SAR(1 g) = 0.083 mW/g; SAR(10 g) = 0.042 mW/g Maximum value of SAR (measured) = 0.158 mW/g



0 dB = 0.158 mW/g = -16.03 dB mW/g

Date/Time: 29-05-2012

Test Laboratory: QuieTek

Lab 5814MHz-Tip

DUT: StreamCast HD Transmitter; Type: MSP STRC USB XMT WW

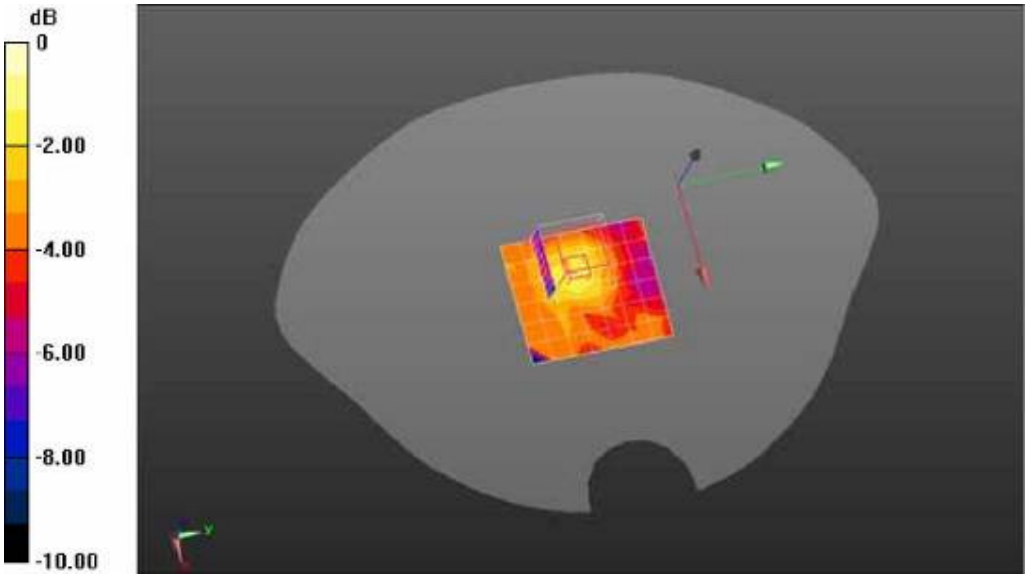
Communication System: CW; Communication System Band: 5GHz(5000.0-6000.0MHz); Duty Cycle: 1:1;

Frequency: 5814 MHz; Medium parameters used: f = 5814 MHz; σ = 6.1 mho/m; ε_r = 47.1; ρ = 1000 kg/m^3 ; Phantom section: Flat Section

Ambient temperature (℃): 21.5, Liquid temperature (℃):
21.0 DASY5 Configuration:

- Probe: EX3DV4 - SN3710; ConvF(3.97, 3.97, 3.97); Calibrated: 05/03/2010;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1220; Calibrated: 23/01/2012
- Phantom: SAM1; Type: SAM; Serial: TP1561
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

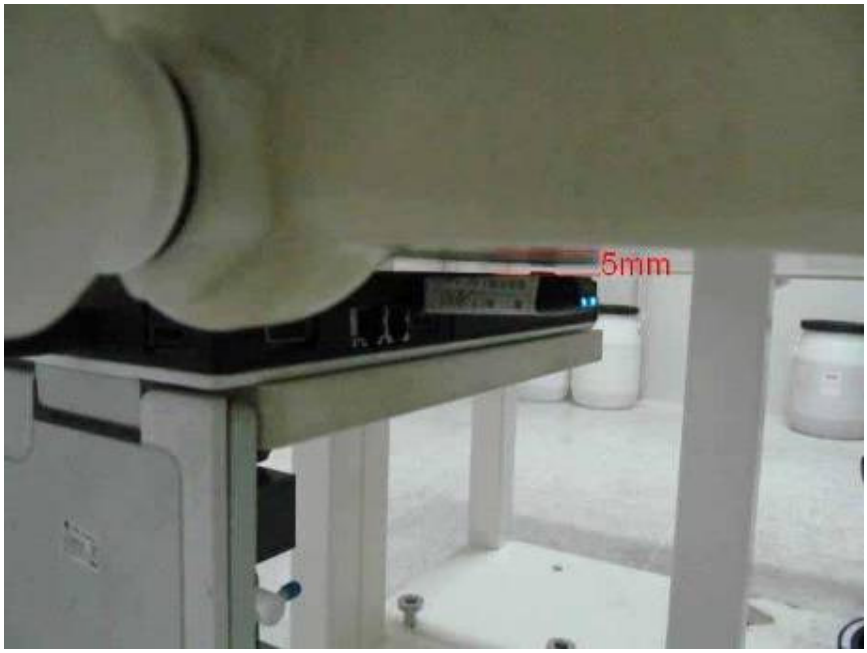
Configuration/5814MHz Channel00-Tip/Area Scan (7x8x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.0920 mW/g
Configuration/5814MHz Channel00-Tip/Zoom Scan (9x9x5)/Cube 0: Measurement grid:
dx=4mm, dy=4mm, dz=2.5mm, Reference Value = 2.986 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.221 mW/g
SAR(1 g) = 0.069 mW/g; SAR(10 g) = 0.045 mW/g Maximum value of SAR (measured) = 0.120 mW/g



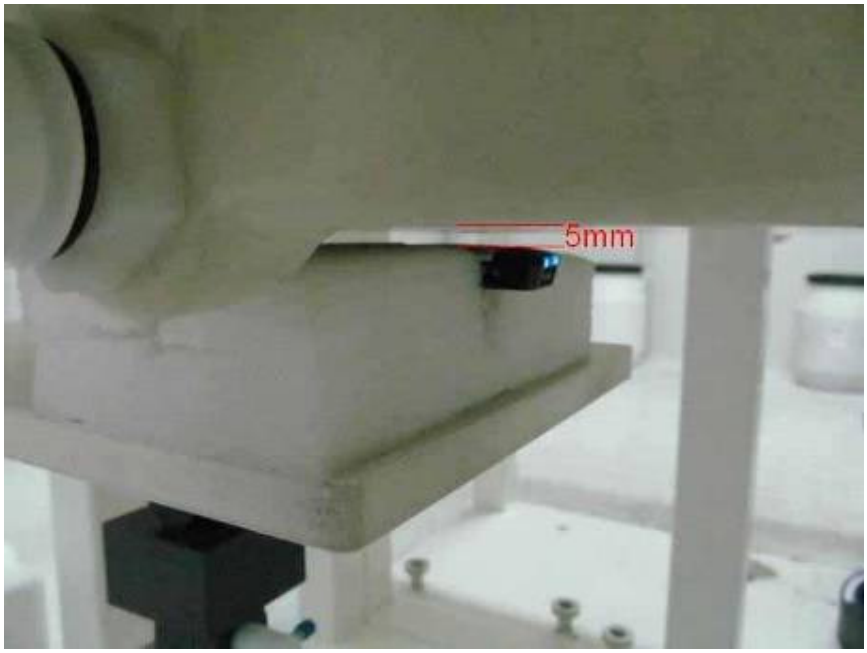
0 dB = 0.120 mW/g = -18.42 dB mW/g

Appendix C. Test Setup Photographs & EUT Photographs

Test Setup Photographs



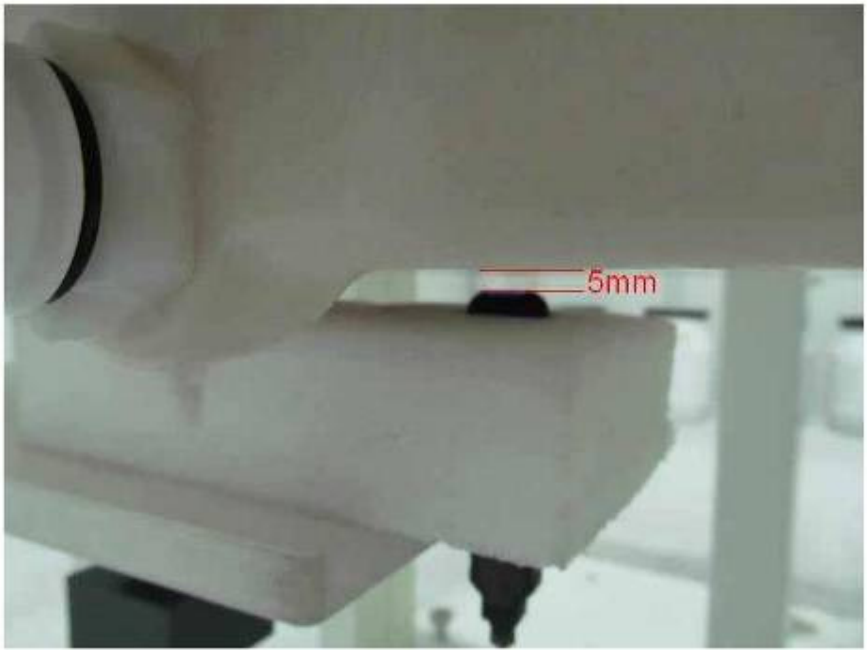
(Horizontal Up)



(Horizontal Down)

(Vertical Front)

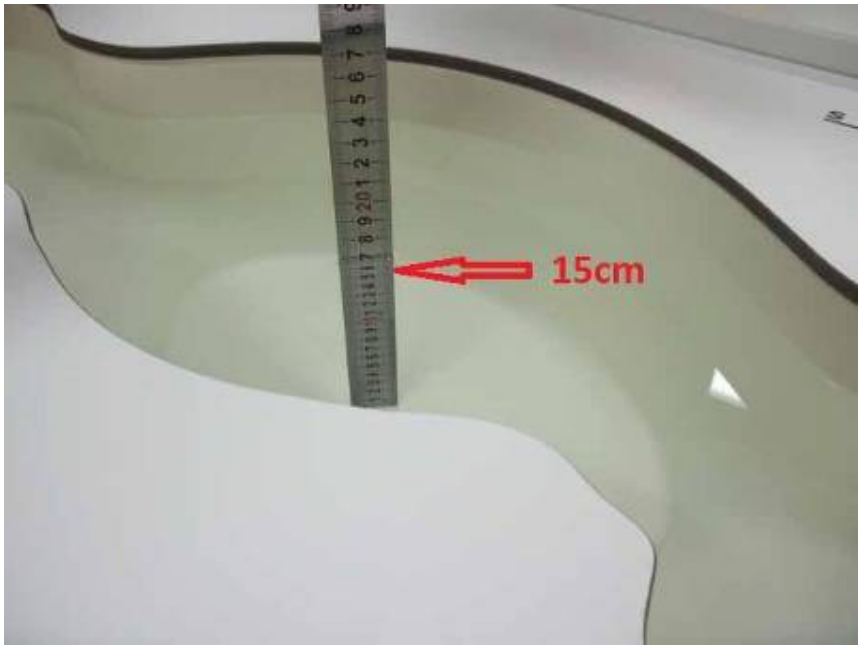
(Vertical Back)



(Tip)

Depth of the liquid in the phantom – Zoom in

Note: The position used in the measurements were according to IEEE 1528 - 2003

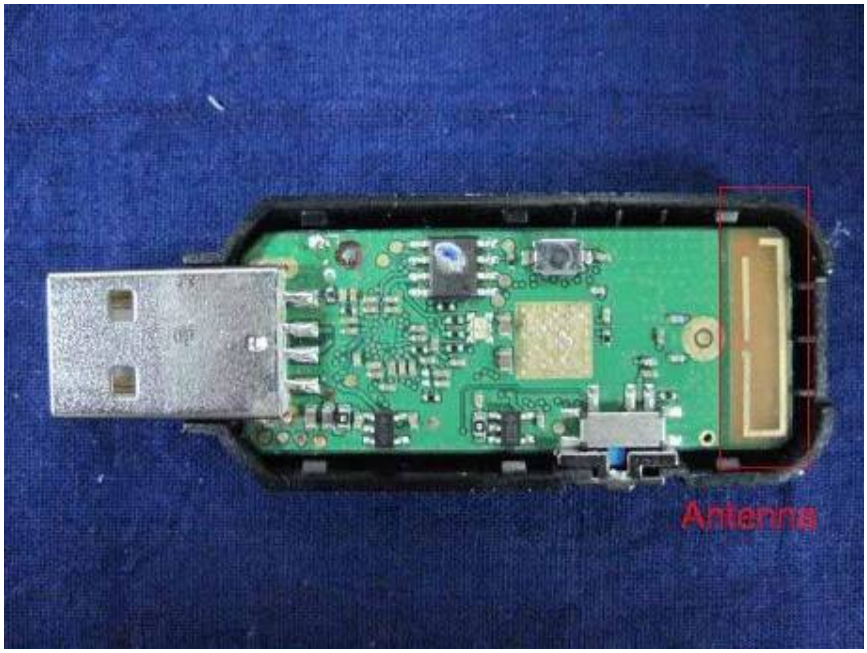


EUT Photographs

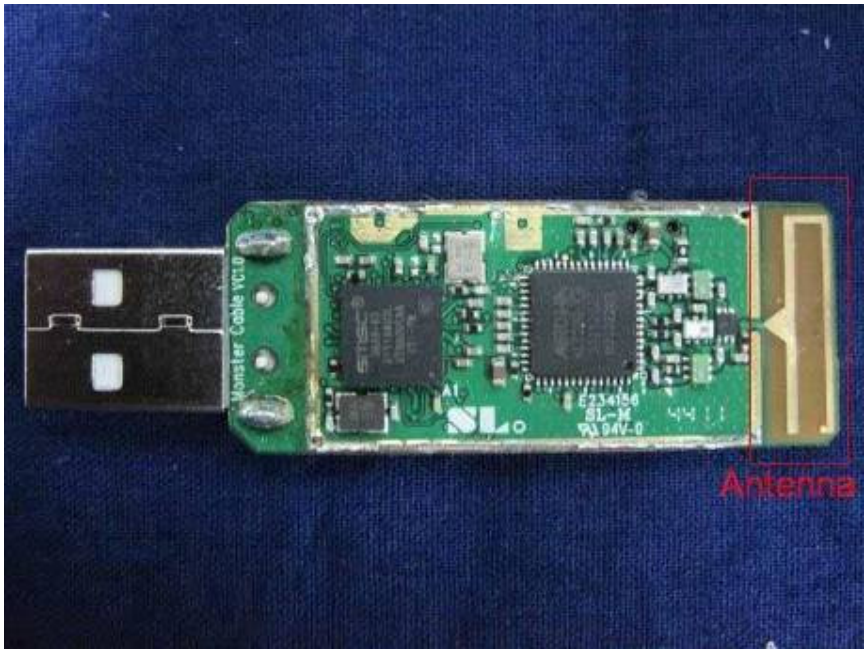
(1) EUT Photo

(2) EUT Photo

(3) EUT Photo



(4) EUT Photo



(5) EUT Photo


SMSC
DARR-83
A1119AU2L
1FS000619A
CT1-TV
AIROHA
AL7230
20112105
M3132281
A1
E234156
SL-M
94V-0

Appendix D. Probe Calibration Data

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

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

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

Accreditation No.: SCS 108

Client: Quietek-CN (Auden)

Certificate No: EX3-3710_Mar12

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3710

Calibration procedure(s): QA CAL-01.v8, QA CAL-12.v7, QA CAL-14.v3, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes

Calibration date: March 12, 2012

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

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

Issued: March 13, 2012

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

Certificate No: EX3-3710_Mar12 Page 1 of 11

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

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Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS) Accreditation No.: **SCS 108**
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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	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z. 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 ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe EX3DV4

SN:3710

Manufactured: July 21, 2009
Repaired: February 21, 2012
Calibrated: March 12, 2012

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3710

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.51	0.56	0.44	± 10.1 %
DCP (mV)[B]	101.3	98.9	100.9	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	114.4	±2.2 %
			Y	0.00	0.00	1.00	94.4	
			Z	0.00	0.00	1.00	114.2	

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 NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3710

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	Depth (mm)	Unct. (k=2)
450	43.5	0.87	9.61	9.61	9.61	0.12	1.00	± 13.4 %
750	41.9	0.89	9.51	9.51	9.51	0.24	1.16	± 12.0 %
835	41.5	0.90	9.18	9.18	9.18	0.22	1.15	± 12.0 %
900	41.5	0.97	8.97	8.97	8.97	0.19	1.35	± 12.0 %
1810	40.0	1.40	8.32	8.32	8.32	0.79	0.60	± 12.0 %
1900	40.0	1.40	8.16	8.16	8.16	0.72	0.66	± 12.0 %
2450	39.2	1.80	7.25	7.25	7.25	0.36	0.91	± 12.0 %
2600	39.0	1.96	6.96	6.96	6.96	0.39	0.95	± 12.0 %
3500	37.9	2.91	6.80	6.80	6.80	0.33	1.09	± 13.1 %
5200	36.0	4.66	5.21	5.21	5.21	0.35	1.80	± 13.1 %
5500	35.6	4.96	4.95	4.95	4.95	0.35	1.80	± 13.1 %
5800	35.3	5.27	4.56	4.56	4.56	0.45	1.80	± 13.1 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3710

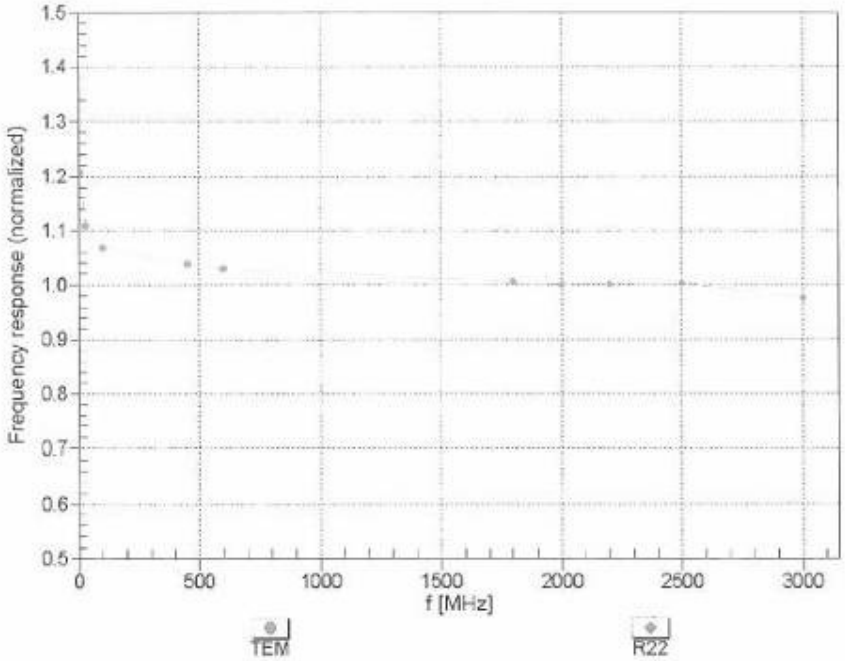
Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	56.7	0.94	10.69	10.69	10.69	0.06	1.00	± 13.4 %
750	55.5	0.96	9.33	9.33	9.33	0.43	0.86	± 12.0 %
835	55.2	0.97	9.13	9.13	9.13	0.63	0.70	± 12.0 %
900	55.0	1.05	9.04	9.04	9.04	0.39	0.88	± 12.0 %
1810	53.3	1.52	7.73	7.73	7.73	0.33	1.10	± 12.0 %
1900	53.3	1.52	7.43	7.43	7.43	0.42	0.90	± 12.0 %
2450	52.7	1.95	6.98	6.98	6.98	0.79	0.59	± 12.0 %
2600	52.5	2.16	6.68	6.68	6.68	0.79	0.52	± 12.0 %
3500	51.3	3.31	6.23	6.23	6.23	0.36	1.13	± 13.1 %
5200	49.0	5.30	4.20	4.20	4.20	0.50	1.90	± 13.1 %
5500	48.6	5.65	3.82	3.82	3.82	0.50	1.90	± 13.1 %
5800	48.2	6.00	3.89	3.89	3.89	0.60	1.90	± 13.1 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

EX3DV4– SN:3710 March 12, 2012

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

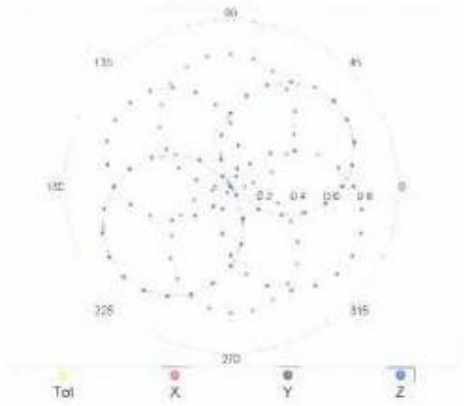


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

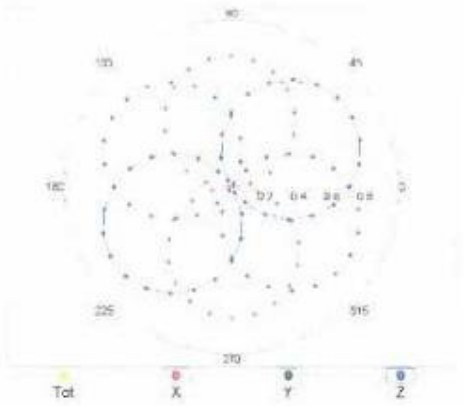
EX3DV4– SN:3710 March 12, 2012

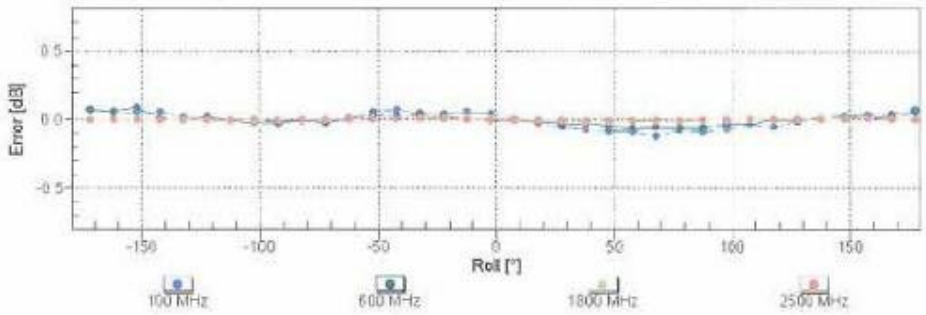
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



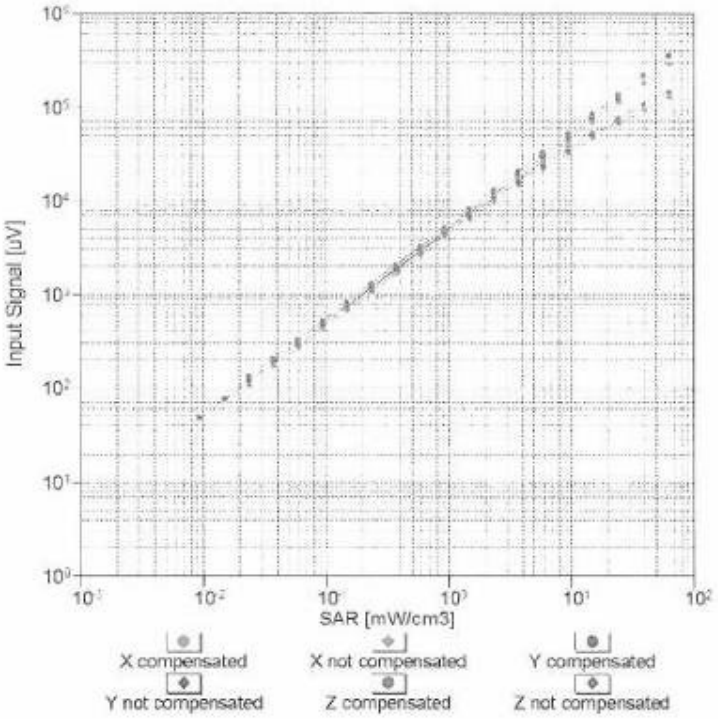
f=1800 MHz,R22

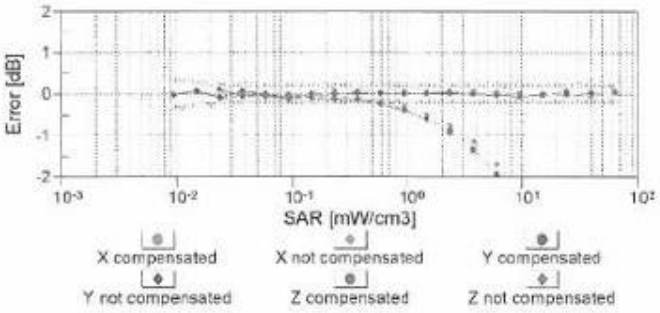




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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



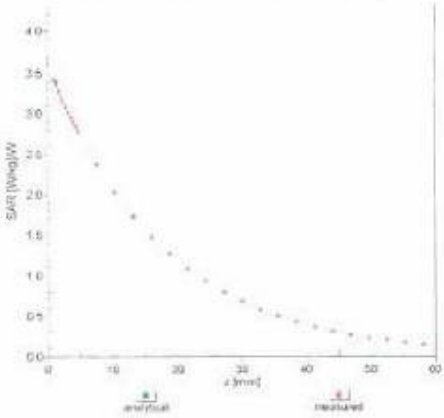


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

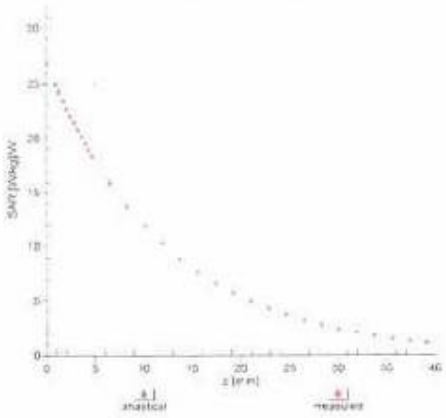
EX3DV4– SN:3710 March 12, 2012

Conversion Factor Assessment

f = 900 MHz,WGLS R9 (H_convF)

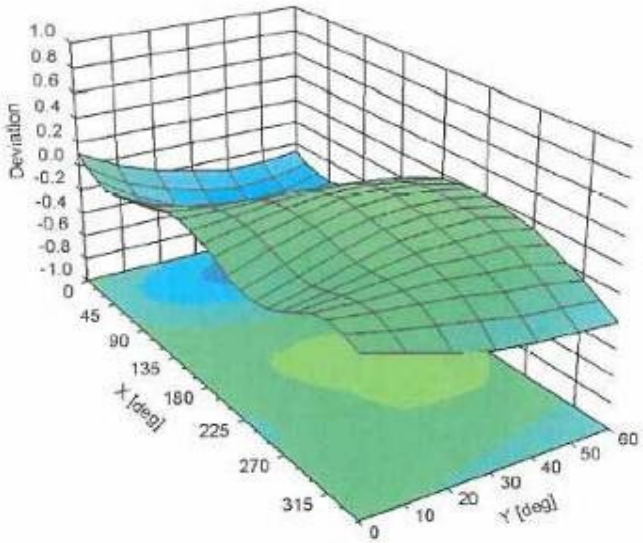


f = 1810 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3710

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm

Appendix E. Dipole Calibration Data

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

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Accreditation No.: SCS 108

Client: Quietek-CN (Auden)

Certificate No: D5GHzV2-1078_Feb12

CALIBRATION CERTIFICATE

Object: D5GHzV2 - SN: 1078

Calibration procedure(s): QA CAL-22.v1
Calibration procedure for dipole validation kits between 3-6 GHz

Calibration date: February 21, 2012

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29 Mar 11 (No. 217 01371)	Apr-12
Reference Probe EX3DV4	SN: 3503	30-Dec-11 (No. EX3-3503_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

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

Issued: February 22, 2012

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

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

Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

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.

Measurement Conditions

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

DASY Version	DASY5	V52.8.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHz ± 1 MHz 5500 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.3 ± 6 %	4.60 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.09 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**80.6 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.32 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**23.1 mW /g ± 16.5 % (k=2)**

Head TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.6	4.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.9 ± 6 %	4.89 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5500 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.54 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**85.0 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.44 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**24.3 mW / g ± 16.5 % (k=2)**

Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.4 ± 6 %	5.19 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.94 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**78.9 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.27 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**22.5 mW / g ± 16.5 % (k=2)**

Body TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	49.0	5.30 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.6 ± 6 %	5.48 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5200 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.32 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**73.1 mW / g ± 18.1 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.05 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**20.5 mW / g ± 17.6 % (k=2)**

Body TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.6	5.65 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.1 ± 6 %	5.87 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5500 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.79 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**77.9 mW / g ± 18.1 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.16 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**21.6 mW / g ± 17.6 % (k=2)**

Body TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.2	6.00 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.2 ± 6 %	6.28 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.34 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**73.5 mW / g ± 18.1 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.03 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**20.3 mW / g ± 17.6 % (k=2)**

Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	51.5 Ω - 8.0 jΩ
Return Loss	- 22.0 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	52.7 Ω - 4.0 jΩ
Return Loss	- 26.6 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	57.7 Ω - 0.5 jΩ
Return Loss	- 22.9 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	52.0 Ω - 8.4 jΩ
Return Loss	- 21.5 dB

Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	51.7 Ω - 4.9 jΩ
Return Loss	- 25.9 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	55.1 Ω - 2.0 jΩ
Return Loss	- 25.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.199 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	September 26, 2008

DASY5 Validation Report for Head TSL

Date: 21.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1078

Communication System: CW; Frequency: 5200 MHz, Frequency: 5500 MHz, Frequency: 5800 MHz Medium parameters used: f = 5200 MHz; σ = 4.6 mho/m; ε_r = 35.3; ρ = 1000 kg/m^3 , Medium parameters used: f = 5500 MHz; σ = 4.89 mho/m; ε_r = 34.9; ρ = 1000 kg/m^3 , Medium parameters used: f = 5800 MHz; σ = 5.19 mho/m; ε_r = 34.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

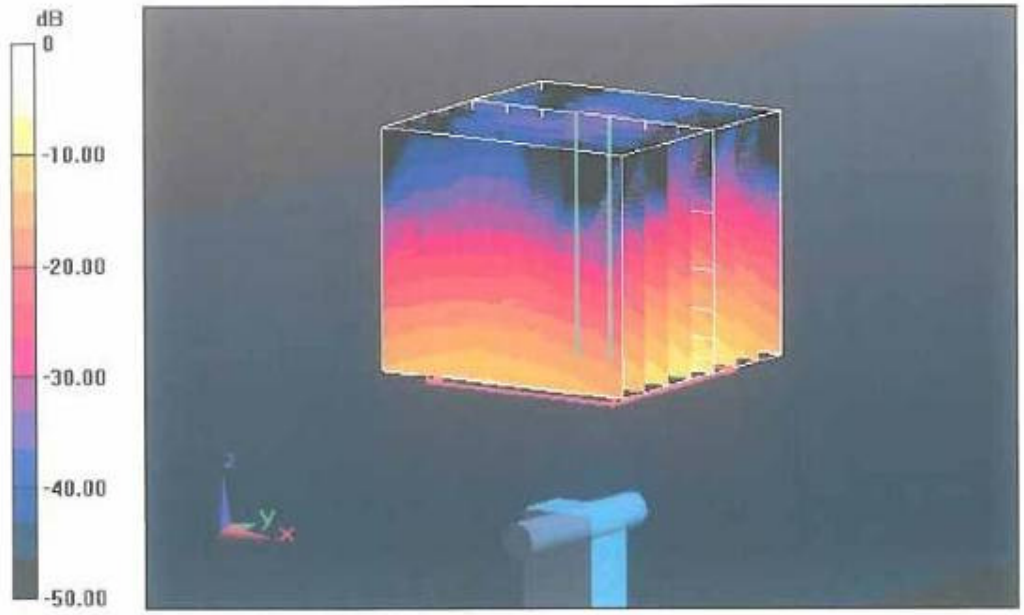
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.41, 5.41, 5.41), ConvF(4.91, 4.91, 4.91), ConvF(4.81, 4.81, 4.81); Calibrated: 30.12.2011
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 64.753 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 30.0660
SAR(1 g) = 8.09 mW/g; SAR(10 g) = 2.32 mW/g
Maximum value of SAR (measured) = 18.532 mW/g

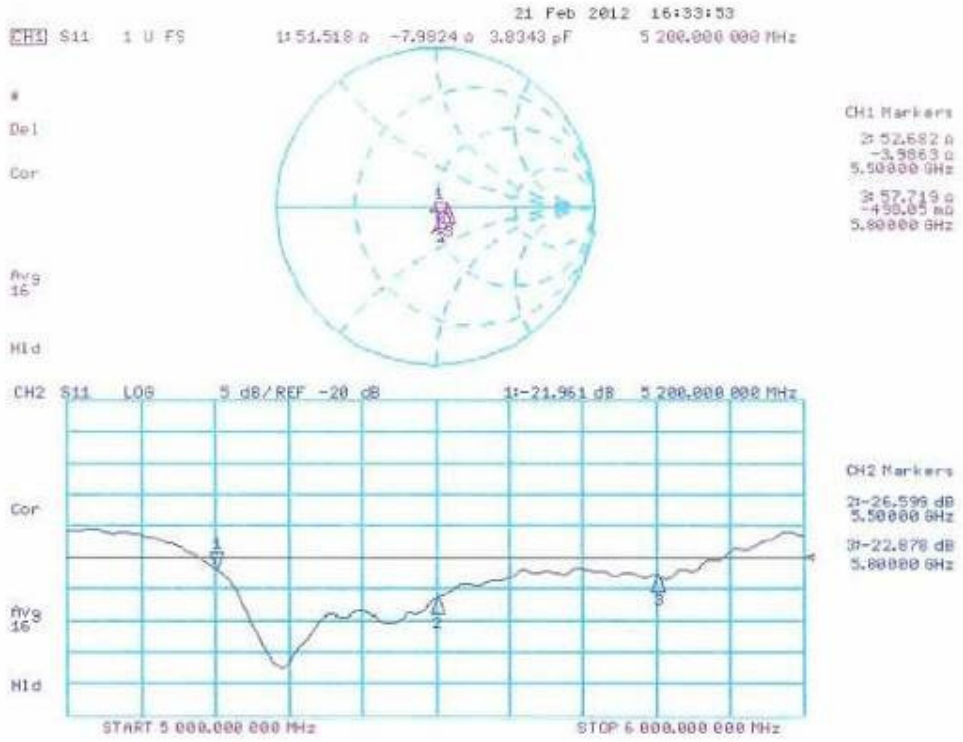
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 65.079 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 33.9620
SAR(1 g) = 8.54 mW/g; SAR(10 g) = 2.44 mW/g
Maximum value of SAR (measured) = 19.991 mW/g

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 61.472 V/m; Power Drift = 0.0053 dB
Peak SAR (extrapolated) = 33.1950
SAR(1 g) = 7.94 mW/g; SAR(10 g) = 2.27 mW/g
Maximum value of SAR (measured) = 19.013 mW/g



0 dB = 19.010mW/g = 25.58 dB mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 20.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1078

Communication System: CW; Frequency: 5200 MHz, Frequency: 5500 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; σ = 5.48 mho/m; ε_r = 48.6; ρ = 1000 kg/m^3 , Medium parameters used: f = 5500 MHz; σ = 5.87 mho/m; ε_r = 48.1; ρ = 1000 kg/m^3 , Medium parameters used: f = 5800 MHz; σ = 6.28 mho/m; ε_r = 48.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

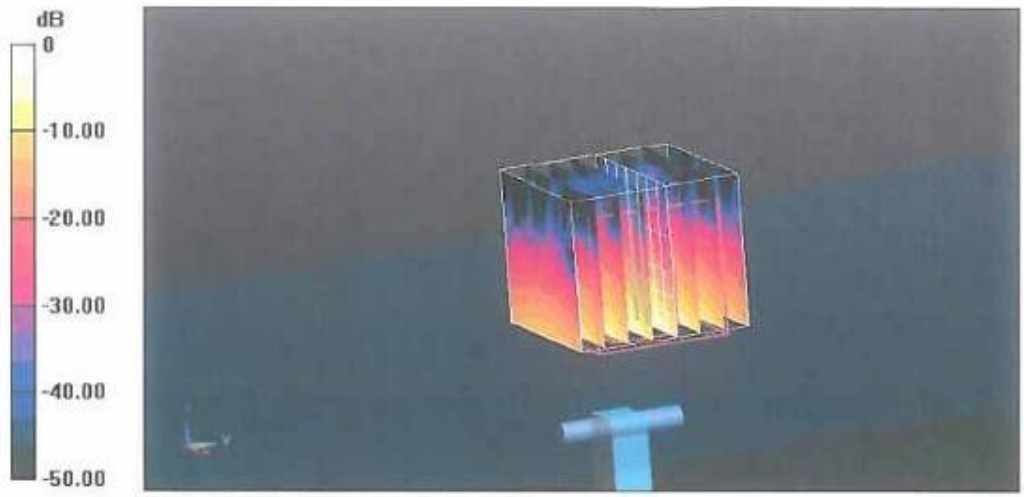
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(4.91, 4.91, 4.91), ConvF(4.43, 4.43, 4.43), ConvF(4.38, 4.38, 4.38); Calibrated: 30.12.2011
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 57.301 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 28.7930
SAR(1 g) = 7.32 mW/g; SAR(10 g) = 2.05 mW/g
Maximum value of SAR (measured) = 17.024 mW/g

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 57.671 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 33.4840
SAR(1 g) = 7.79 mW/g; SAR(10 g) = 2.16 mW/g
Maximum value of SAR (measured) = 18.648 mW/g

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 54.184 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 34.4800
SAR(1 g) = 7.34 mW/g; SAR(10 g) = 2.03 mW/g
Maximum value of SAR (measured) = 18.069 mW/g



0 dB = 18.070mW/g = 25.14 dB mW/g

Impedance Measurement Plot for Body TSL