

FCC SAR Test Report (Class II Permissive Change)

Product Name : Wireless Motherboard
Model No. : TH80GA

Applicant : ELITEGROUP COMPUTER SYSTEMS CO., LTD
Address : No.239,Sec.2,Ti Ding Blvd.,Taipei Taiwan

Date of Receipt : 2016/02/05
Issued Date : 2016/04/07
Report No. : 1620222R-SAUSP38V00
Report Version : V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

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Test Report

Issued Date: 2016/04/07

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Product Name : Wireless Motherboard
Applicant : ELITEGROUP COMPUTER SYSTEMS CO., LTD
Address : No.239,Sec.2,Ti Ding Blvd.,Taipei Taiwan
Manufacturer : Elitegroup Computer Systems(SIP) CO., LTD.
Model No. : TH80GA
Trade Name : ECS ELITEGROUP
FCC ID : WL6-TH8AG20GA4
Applicable Standard : 47CFR § 2.1093
KDB 248227 D01 v02r02
Measurement : KDB 447498 D01 v06
procedures : KDB 648474 D04 v01r03
KDB 865664 D01 v01r04
KDB 941225 D01 v03r01
KDB 941225 D06 v02r01
Test Result : Max. SAR Measurement (1g)
0.866 W/kg
Application Type : Certification

The above equipment has been tested by Quietek-a DEKRA, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's SAR characteristics under the conditions specified in this report.

Documented By : Anny Chou
(Senior Adm. Specialist / Anny Chou)

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(Senior Engineer / Wen Lee)

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(Director / Vincent Lin)

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1. General Information

1.1 EUT Description

Product Name	Wireless Motherboard		
Trade Name	ECS ELITEGROUP		
Model No.	TH80GA		
FCC ID	WL6-TH8AG20GA4		
TX Frequency	GSM850: 824.2MHz ~ 848.8MHz GSM1900: 1850.2MHz ~ 1909.8MHz WCDMA Band 2: 1852.4MHz ~ 1907.6MHz WCDMA Band 5: 826.4MHz ~ 846.6MHz 802.11b/g/n-20BW: 2412 ~2462MHz		
RX Frequency	GSM850: 869.2 MHz ~ 893.8 MHz GSM1900: 1930.2 MHz ~ 1989.8 MHz WCDMA Band 2: 1932.4 MHz ~ 1987.6 MHz WCDMA Band 5: 871.4 MHz ~ 891.6 MHz 802.11b/g/n-20BW: 2412 ~2462MHz		
Type of Modulation	2G: GMSK/8PSK; 3G: WCDMA:QPSK 802.11b:DSSS (DBPSK, DQPSK, CCK) 802.11g/n:OFDM (BPSK, QPSK, 16QAM, 64QAM)		
Antenna Type	PIFA Antenna		
Device Category	Portable		
RF Exposure Environment	Uncontrolled		
Summary of test result –Reported 1g SAR (W/Kg)			
Test configuration	WWAN	WLAN	DSS(BT)
Body-Standalone	0.87	0.25	0.10
Body-Simultaneous	1.22		

* Note:

(1) This is to request a Class II permissive change for FCC ID: WL6-TH8AG20GA4, originally granted on 04/07/2016.

The major change filed under this application is:

Change #1: Implementation in new platform

Model number: TH80GAx(x=0~9, A~Z or blank or "-")

Product name: Tablet PC

(2) Per FCC KDB 447498 D01. The output power of BT is less than 10mW, so SAR not required.

1.2 Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	SOUTH STAR	13H130-JJ5451	0.46 dBi for 850MHz 1.32 dBi for 1900MHz
2	SOUTH STAR	13H130-JJ5370	2.71 dBi for 2.4 GHz

1.3 Test Environment

Ambient conditions in the laboratory:

Test Date: Feb. 23, 2016

Items	Required	Actual
Temperature (°C)	18-25	21.9 ± 2
Humidity (%RH)	30-70	54

Test Date: Feb. 26, 2016

Items	Required	Actual
Temperature (°C)	18-25	21.8 ± 2
Humidity (%RH)	30-70	55

Test Date: Mar. 01, 2016

Items	Required	Actual
Temperature (°C)	18-25	21.8 ± 2
Humidity (%RH)	30-70	51

Test Date: Mar. 03, 2016

Items	Required	Actual
Temperature (°C)	18-25	21.8 ± 2
Humidity (%RH)	30-70	55

Test Date: Mar. 22, 2016

Items	Required	Actual
Temperature (°C)	18-25	22.1 ± 2
Humidity (%RH)	30-70	57

Test Date: Mar. 26, 2016

Items	Required	Actual
Temperature (°C)	18-25	21.9 ± 2
Humidity (%RH)	30-70	51

Site Description:

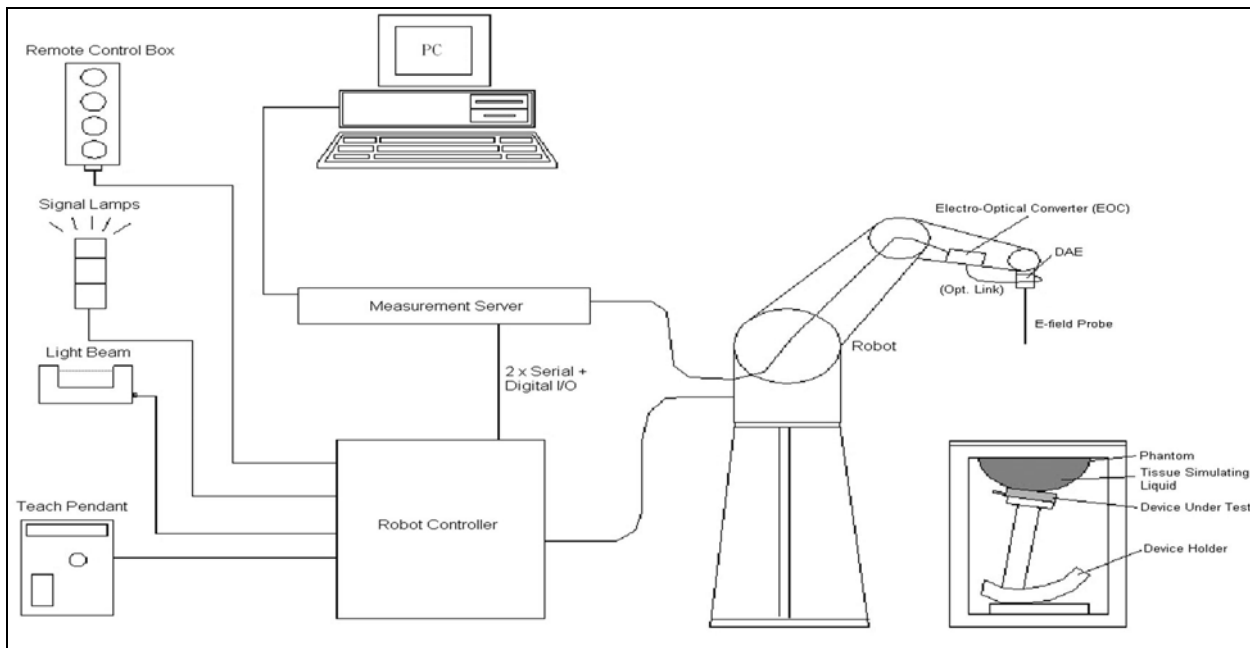
Accredited by TAF
Accredited Number: 3023
Effective through: December 12, 2017

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2. SAR Measurement System

2.1 DASYS System Description



The DASYS 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 DASYS 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 10mm² 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 1528-2013, EN 50361 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/m³ 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 (including FCC) utilize a physical step of 5x5x7 (8mmx8mmx5mm) providing a volume of 32mm 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.

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


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

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

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, EN 62209-1, IEC 62209, 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 $\epsilon_r = 3$ and loss tangent $\delta = 0.02$. 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)	835MHz Head	1900MHz Head	2450MHz Head	835MHz Body	1900MHz Body	2450MHz Body
Water	40.45	54.9	46.7	52.4	40.5	73.2
Salt	1.45	0.18	0.00	1.40	0.50	0.04
Sugar	57.6	0.00	0.00	45	58	0.00
HEC	0.40	0.00	0.00	1.00	0.50	0.00
Preventol	0.10	0.00	0.00	0.20	0.50	0.00
DGBE	0.00	44.92	53.3	0.00	0.00	26.76

3.2 Tissue Calibration Result

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

Head Tissue Simulate Measurement				
Frequency [MHz]	Description	Dielectric Parameters		Tissue Temp. [°C]
		ϵ_r	σ [s/m]	
835 MHz	Reference result ± 5% window	41.5 39.425 to 43.575	0.92 0.874 to 0.966	N/A
	01-Mar-16	42.31	0.94	20.3
824.2 MHz	Low channel	42.47	0.93	20.3
836.4 MHz	Mid channel	42.28	0.94	20.3
848.8 MHz	High channel	42.15	0.95	20.3

Head Tissue Simulate Measurement				
Frequency [MHz]	Description	Dielectric Parameters		Tissue Temp. [°C]
		ϵ_r	σ [s/m]	
1900 MHz	Reference result ± 5% window	40 38 to 42	1.4 1.33 to 1.47	N/A
	03-Mar-16	40.88	1.37	20.9
1850.2 MHz	Low channel	41.22	1.34	20.9
1880 MHz	Mid channel	41.06	1.36	20.9
1909.8 MHz	High channel	40.84	1.38	20.9

Head Tissue Simulate Measurement				
Frequency [MHz]	Description	Dielectric Parameters		Tissue Temp. [°C]
		ϵ_r	σ [s/m]	
2450 MHz	Reference result ± 5% window	39.2 37.24 to 41.16	1.8 1.71 to 1.89	N/A
	22-Mar-16	38.19	1.77	20.8
2412 MHz	Low channel	38.68	1.74	20.8
2437 MHz	Mid channel	38.28	1.76	20.8
2462 MHz	High channel	38.09	1.78	20.8

Body Tissue Simulate Measurement				
Frequency [MHz]	Description	Dielectric Parameters		Tissue Temp. [°C]
		ϵ_r	σ [s/m]	
835 MHz	Reference result ± 5% window	55.2 52.44 to 57.96	0.99 0.9405 to 1.0395	N/A
	23-Feb-16	56.38	1.02	20.8
824.2 MHz	Low channel	56.47	1.01	20.8
836.4 MHz	Mid channel	56.36	1.02	20.8
848.8 MHz	High channel	56.25	1.03	20.8

Body Tissue Simulate Measurement				
Frequency [MHz]	Description	Dielectric Parameters		Tissue Temp. [°C]
		ϵ_r	σ [s/m]	
1900 MHz	Reference result ± 5% window	53.3 50.635 to 55.965	1.52 1.444 to 1.596	N/A
	26-Feb-16	54.47	1.58	20.1
1850.2 MHz	Low channel	54.65	1.53	20.1
1880 MHz	Mid channel	54.53	1.56	20.1
1909.8 MHz	High channel	54.44	1.59	20.1

Body Tissue Simulate Measurement				
Frequency [MHz]	Description	Dielectric Parameters		Tissue Temp. [°C]
		ϵ_r	σ [s/m]	
2450 MHz	Reference result ± 5% window	52.7 50.065 to 55.335	1.95 1.8525 to 2.0475	N/A
	26-Mar-16	52.76	1.98	21.1
2412 MHz	Low channel	52.98	1.95	21.1
2437 MHz	Mid channel	52.83	1.97	21.1
2462 MHz	High channel	52.59	1.99	21.1

3.3 Tissue Dielectric Parameters for Head and Body Phantoms

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in P1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in P1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations described in Reference [12] and extrapolated according to the head parameters specified in P1528.

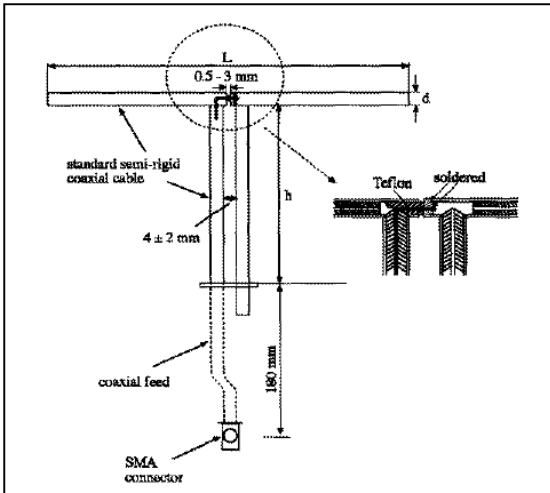
Target Frequency (MHz)	Head		Body	
	ϵ_r	σ (S/m)	ϵ_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80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

(ϵ_r = relative permittivity, σ = conductivity and $\rho = 1000 \text{ kg/m}^3$)

4. SAR Measurement Procedure

4.1 SAR System Check

4.1.1 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)
835MHz	165.0	90.0	3.6
1900MHz	68.0	39.5	3.6
2450MHz	53.5	30.4	3.6

4.1.2 System Check Result

TEST SKU: Head				
System Performance Check at 835MHz, 1900MHz and 2450MHz				
Dipole Kit: ASL-D-835				
Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
835 MHz	Reference result ± 10% window	8.92 8.03 to 9.81	5.78 5.2 to 6.36	N/A
	01-Mar-16	8.44	5.48	20.3
Dipole Kit: ASL-D-1900				
Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
1900 MHz	Reference result ± 10% window	40.20 36.18 to 44.22	21.10 18.99 to 23.21	N/A
	03-Mar-16	37.48	19.6	20.9
Dipole Kit: D2450V2				
Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
2450 MHz	Reference result ± 10% window	51.9 46.71 to 57.09	24.1 21.69 to 26.51	N/A
	22-Mar-16	53.2	24.04	20.8
Note: (1) The power level is used 250mW (2) All SAR values are normalized to 1W forward power. (3) The reference result is from Appendix E.				

TEST SKU: Body				
System Performance Check at 835MHz, 1900MHz and 2450MHz				
Dipole Kit: ASL-D-835				
Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
835 MHz	Reference result ± 10% window	9.49 8.54 to 10.44	6.23 5.61 to 6.85	N/A
	23-Feb-16	8.96	5.84	20.8
Dipole Kit: ASL-D-1900				
Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
1900 MHz	Reference result ± 10% window	41 36.9 to 45.1	21.7 19.53 to 23.87	N/A
	26-Feb-16	44.4	23.64	20.1
Dipole Kit: D2450V2				
Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
2450 MHz	Reference result ± 10% window	51.80 46.62 to 56.98	24.00 21.6 to 26.4	N/A
	26-Mar-16	52	23.44	21.1
<p>Note: (1) The power level is used 250mW (2) All SAR values are normalized to 1W forward power. (3) The reference result is from Appendix E.</p>				

4.2 SAR Measurement Procedure

The Dasy5 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 1mm²) 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 1mm³).

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)	0.08 W/kg
Spatial Peak SAR (10g for hands, feet, ankles and wrist)	4.00 W/kg

6. Test Equipment List

Instrument	Manufacturer	Model No.	Serial No.	Last Calibration	Next Calibration
Stäubli Robot TX60L	Stäubli	TX60L	F09/5BL1A1/A06	2009/05/18	only once
Controller	Speag	CS8c	N/A	2009/05/18	only once
Reference Dipole 835Mhz	Speag	ALS-D-835	QTK-315	2014/05/16	2016/05/15
Reference Dipole 1900MHz	Speag	ALS-D1900	318	2014/05/19	2016/05/18
Reference Dipole 2450MHz	Speag	D2450V2	930	2014/11/19	2016/11/18
SAM Twin Phantom	Speag	QD000 P40 CA	TP 1515	N/A	N/A
Device Holder	Speag	N/A	N/A	N/A	N/A
Data Acquisition Electronic	Speag	DAE4	1425	2014/11/13	2015/11/12
E-Field Probe	Speag	EX3DV4	3979	2014/11/21	2015/11/20
SAR Software	Speag	DASY52	V52.8 (8)	N/A	N/A
Apriel Dipole Spaccer	Apriel	ALS-DS-U	QTK-295	N/A	N/A
Power Amplifier	Mini-Circuit	ZHL-42	D051404-20	N/A	N/A
Directional Coupler	Agilent	778D-012	50550	N/A	N/A
Universal Radio Communication Tester	R&S	CMU200	104846	2014/06/05	2015/06/04
Vector Network	Agilent	E5071C	MY46108013	2015/12/02	2016/11/30
Signal Generator	Anritsu	MG3694A	041902	2014/08/06	2015/08/05
Power Meter	Anritsu	ML2495A	143004	2014/09/05	2015/09/04
Wide Bandwidth Sensor	Anritsu	MA2411B	1339194	2014/09/12	2015/09/11

7. Measurement Uncertainty

DASY5 Uncertainty (According to IEEE 1528-2013)								
Measurement uncertainty for 30 MHz to 3 GHz								
Error Description	Uncert. value	Prob. Dist.	Div.	(ci) 1g	(ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(vi) V _{eff}
Measurement System								
Probe Calibration	±6%	N	1	1	1	±6.0%	±6.0%	∞
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	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%	∞
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%	∞
Modulation Response	±2.4%	R	$\sqrt{3}$	1	1	±1.4%	±1.4%	∞
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	±0.4%	R	$\sqrt{3}$	1	1	±0.2%	±0.2%	∞
Probe Positioning	±2.9%	R	$\sqrt{3}$	1	1	±1.7%	±1.7%	∞
Max. SAR Eval.	±4.0%	R	$\sqrt{3}$	1	1	±1.2%	±1.2%	∞
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%	∞
Power Scaling	±0%	R	$\sqrt{3}$	1	1	±0.0%	±0.0%	
Phantom and Setup								
Phantom Uncertainty	±6.1%	R	$\sqrt{3}$	1	1	±3.5%	±3.5%	∞
SAR correction	±1.9%	R	$\sqrt{3}$	1	0.84	±1.1%	±0.9%	∞
Liquid Conductivity (meas.)	±2.5%	R	$\sqrt{3}$	0.78	0.71	±1.1%	±1.0%	∞
Liquid Permittivity (meas.)	±2.5%	R	$\sqrt{3}$	0.26	0.26	±0.3%	±0.4%	∞
Temp. unc. - Conductivity	±3.4%	R	$\sqrt{3}$	0.78	0.71	±1.5%	±1.4%	∞
Temp. unc. - Permittivity	±0.4%	R	$\sqrt{3}$	0.23	0.26	±0.1%	±0.1%	∞
Combined Std. Uncertainty						±11.2%	±11.1%	361
Expanded STD Uncertainty						±22.3%	±22.2%	

8. Conducted Power Measurement (Including tolerance allowed for production unit)

8.1 Output power Measurement- GSM

Band	Target (+Tolerance)	GSM 850			Target (+Tolerance)	GSM 1900		
CHANNEL		128	189	251		512	661	810
VOICE	32	31.32	31.34	31.34	29.5	28.7	28.78	28.63
GPRS Class 8	32	31.34	31.37	31.36	29.5	28.68	28.78	28.62
GPRS Class 10	29	28.02	28.01	28.01	27	25.92	26.14	26.08
GPRS Class 11	27	25.94	25.93	25.87	25	24.06	24.33	24.29
GPRS Class 12	26	24.52	24.51	24.48	24	22.8	23.07	23.04
EGPRS Class 8	26	25.09	25.1	25.08	25	24.31	24.6	24.58
EGPRS Class 10	26	25.04	25.06	25.08	25	24.27	24.55	24.52
EGPRS Class 11	26	25.03	25.03	25.01	25	23.9	24.16	24.14
EGPRS Class 12	23	21.26	21.26	21.25	23	22.65	22.93	22.9

Unit : dBm

8.2 Output power Measurement – WCDMA

Band	Target (+Tolerance)	WCDMA Band 2			Target (+Tolerance)	WCDMA Band 5		
CHANNEL		9262	9400	9538		4132	4183	4233
VOICE	23	21.39	22.85	22.49	23	22.54	21.96	22.72
RMC	23	21.55	23.00	22.75	23	22.55	21.95	22.73
HSDPA Set 1	23	21.39	22.86	22.54	23	22.57	21.93	22.71
HSDPA Set 2	23	21.1	22.64	22.28	23	22.32	21.65	22.45
HSDPA Set 3	22.5	20.87	22.44	22.04	22.5	22.11	21.44	22.24
HSDPA Set 4	22.5	20.56	22.21	21.77	22.5	21.79	21.19	21.97
HSUPA Set 1	23	20.82	22.51	21.41	23	21.35	20.77	21.52
HSUPA Set 2	21	18.74	20.72	20.37	21	20.2	19.68	20.52
HSUPA Set 3	22	20.23	21.81	21.35	22	21.33	20.8	21.54
HSUPA Set 4	21	19.43	20.96	20.56	21	20.64	20.05	20.93
HSUPA Set 5	23	21.39	22.79	22.45	23	22.37	21.81	22.53

Unit : dBm

8.3 Output power Measurement – WIFI

Test Mode	Channel No.	Frequency (MHz)	Target (+Tolerance)	Average Power (dBm)
802.11b	01	2412	16.5	14.66
	06	2437	17	15.32
	11	2462	17	16.00
802.11g	01	2412	13	12.30
	06	2437	13	12.02
	11	2462	13	11.50
802.11n(20M)	01	2412	13.5	13.36
	06	2437	13	12.95
	11	2462	12.5	10.96

9. Test Results

9.1 SAR Test Results Summary

Test SKU: Head								
SAR Measurement								
Liquid Temperature (°C): 20.3 ±2					Relative Humidity (%): 51			
Ambient Temperature (°C): 21.8 ±2					Depth of Liquid (cm): >15			
Test Mode: GSM 850 Voice								
Test Position Body	Dist (mm)	Frequency		Conducted Power (dBm)		SAR 1g (W/Kg)		Limit (W/kg)
		Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Scaled	
Left-Cheek	0	189	836.4	31.34	32	0.033	0.038	1.6
Left-Tilt	0	189	836.4	31.34	32	0.022	0.026	1.6
Right-Cheek	0	189	836.4	31.34	32	0.043	0.050	1.6
Right-Tilt	0	189	836.4	31.34	32	0.020	0.023	1.6
Note: (1)When the reported SAR of the Mid channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in other channel.								

Test SKU: Head								
SAR Measurement								
Liquid Temperature (°C): 20.1 ±2					Relative Humidity (%): 55			
Ambient Temperature (°C): 21.8 ±2					Depth of Liquid (cm): >15			
Test Mode: PCS 1900 Voice								
Test Position Body	Dist (mm)	Frequency		Conducted Power (dBm)		SAR 1g (W/Kg)		Limit (W/kg)
		Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Scaled	
Left-Cheek	0	661	1880	28.78	29.5	0.027	0.032	1.6
Left-Tilt	0	661	1880	28.78	29.5	0.014	0.017	1.6
Right-Cheek	0	661	1880	28.78	29.5	0.017	0.020	1.6
Right-Tilt	0	661	1880	28.78	29.5	0.017	0.020	1.6
Note: (1)When the reported SAR of the Mid channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in other channel.								

Test SKU: Head								
SAR Measurement								
Liquid Temperature (°C): 20.1 ±2					Relative Humidity (%): 55			
Ambient Temperature (°C): 21.8 ±2					Depth of Liquid (cm): >15			
Test Mode: WCDMA Band 2 Voice								
Test Position Body	Dist (mm)	Frequency		Conducted Power (dBm)		SAR 1g (W/Kg)		Limit (W/kg)
		Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Scaled	
Left-Cheek	0	9400	1880	22.85	23	0.063	0.065	1.6
Left-Tilt	0	9400	1880	22.85	23	0.028	0.029	1.6
Right-Cheek	0	9400	1880	22.85	23	0.026	0.027	1.6
Right-Tilt	0	9400	1880	22.85	23	0.039	0.040	1.6
Note: (1)When the reported SAR of the Mid channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in other channel.								

Test SKU: Head								
SAR Measurement								
Liquid Temperature (°C): 20.3 ±2					Relative Humidity (%): 51			
Ambient Temperature (°C): 21.8 ±2					Depth of Liquid (cm): >15			
Test Mode: WCDMA Band 5 Voice								
Test Position Body	Dist (mm)	Frequency		Conducted Power (dBm)		SAR 1g (W/Kg)		Limit (W/kg)
		Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Scaled	
Left-Cheek	0	4183	826.4	21.96	23	0.033	0.042	1.6
Left-Tilt	0	4183	826.4	21.96	23	0.022	0.028	1.6
Right-Cheek	0	4183	826.4	21.96	23	0.051	0.065	1.6
Right-Tilt	0	4183	826.4	21.96	23	0.022	0.028	1.6
Note: (1)When the reported SAR of the Mid channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in other channel.								

Test SKU: Head								
SAR Measurement								
Liquid Temperature (°C): 20.8 ±2					Relative Humidity (%): 57			
Ambient Temperature (°C): 22.1 ±2					Depth of Liquid (cm): >15			
Test Mode: 802.11b								
Test Position Body	Dist (mm)	Frequency		Conducted Power (dBm)		SAR 1g (W/Kg)		Limit (W/kg)
		Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Scaled	
Left-Cheek	0	11	2462	16	17	0.082	0.103	1.6
Left-Tilt	0	11	2462	16	17	0.051	0.064	1.6
Right-Cheek	0	11	2462	16	17	0.169	0.213	1.6
Right-Tilt	0	11	2462	16	17	0.141	0.178	1.6
Note: (1)When the reported SAR of the Mid channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in other channel.								

Test SKU: Body								
SAR Measurement								
Liquid Temperature (°C): 20.8 ±2					Relative Humidity (%): 54			
Ambient Temperature (°C): 21.9 ±2					Depth of Liquid (cm): >15			
Test Mode: GSM 850 (GPRS 1Slot)								
Test Position Body	Dist (mm)	Frequency		Conducted Power (dBm)		SAR 1g (W/Kg)		Limit (W/kg)
		Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Scaled	
Front	10	189	836.4	31.37	32	0.249	0.288	1.6
Back	10	128	824.2	31.34	32	0.414	0.482	1.6
Back	10	189	836.4	31.37	32	0.623	0.720	1.6
Back	10	251	848.8	31.36	32	0.747	0.866	1.6
Left-Side	10	189	836.4	31.37	32	0.028	0.032	1.6
Right-Side	10	189	836.4	31.37	32	0.115	0.133	1.6
Bottom	10	189	836.4	31.37	32	0.207	0.239	1.6
Note: (1)When the reported SAR of the Mid channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in other channel.								

Test SKU: Body								
SAR Measurement								
Liquid Temperature (°C): 20.1 ±2					Relative Humidity (%): 55			
Ambient Temperature (°C): 21.8 ±2					Depth of Liquid (cm): >15			
Test Mode: PCS 1900 (GPRS 2Slot)								
Test Position Body	Dist (mm)	Frequency		Conducted Power (dBm)		SAR 1g (W/Kg)		Limit (W/kg)
		Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Scaled	
Front	10	661	1880	26.14	27	0.151	0.184	1.6
Back	10	661	1880	26.14	27	0.128	0.156	1.6
Left-Side	10	661	1880	26.14	27	0.028	0.034	1.6
Right-Side	10	661	1880	26.14	27	0.036	0.044	1.6
Bottom	10	661	1880	26.14	27	0.179	0.218	1.6
Note: (1)When the reported SAR of the Mid channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in other channel.								

Test SKU: Body								
SAR Measurement								
Liquid Temperature (°C): 20.1 ±2					Relative Humidity (%): 55			
Ambient Temperature (°C): 21.8 ±2					Depth of Liquid (cm): >15			
Test Mode: WCDMA RMC Band 2								
Test Position Body	Dist (mm)	Frequency		Conducted Power (dBm)		SAR 1g (W/Kg)		Limit (W/kg)
		Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Scaled	
Front	10	9400	1880	23	23	0.327	0.327	1.6
Back	10	9400	1880	23	23	0.292	0.292	1.6
Left-Side	10	9400	1880	23	23	0.127	0.127	1.6
Right-Side	10	9400	1880	23	23	0.073	0.073	1.6
Bottom	10	9400	1880	23	23	0.392	0.392	1.6
Note: (1)When the reported SAR of the Mid channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in other channel.								

Test SKU: Body								
SAR Measurement								
Liquid Temperature (°C): 20.8 ±2					Relative Humidity (%): 54			
Ambient Temperature (°C): 21.9 ±2					Depth of Liquid (cm): >15			
Test Mode: WCDMA RMC Band 5								
Test Position Body	Dist (mm)	Frequency		Conducted Power (dBm)		SAR 1g (W/Kg)		Limit (W/kg)
		Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Scaled	
Front	10	4183	826.4	21.96	23	0.196	0.249	1.6
Back	10	4132	836.6	22.54	23	0.472	0.525	1.6
Back	10	4183	846.6	21.96	23	0.602	0.765	1.6
Back	10	4233	836.6	22.72	23	0.670	0.715	1.6
Left-Side	10	4183	836.6	21.96	23	0.025	0.032	1.6
Right-Side	10	4183	836.6	21.96	23	0.074	0.094	1.6
Bottom	10	4183	836.6	21.96	23	0.155	0.197	1.6
Note: (1)When the reported SAR of the Mid channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in other channel.								

Test SKU: Body								
SAR Measurement								
Liquid Temperature (°C): 21.1 ±2					Relative Humidity (%): 51			
Ambient Temperature (°C): 21.9 ±2					Depth of Liquid (cm): >15			
Test Mode: 802.11b								
Test Position Body	Dist (mm)	Frequency		Conducted Power (dBm)		SAR 1g (W/Kg)		Limit (W/kg)
		Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Scaled	
Front	10	11	2462	16	17	0.197	0.248	1.6
Back	10	11	2462	16	17	0.116	0.146	1.6
Right-Side	10	11	2462	16	17	0.143	0.180	1.6
Bottom	10	11	2462	16	17	0.008	0.010	1.6
Note: (1)When the reported SAR of the Mid channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in other channel.								

9.2 Simultaneous Transmission

According the KDB 447498 D01 Section 4.3.2, the standalone SAR must be estimated according to the following to determine simultaneous transmission SAR test exclusion

$$(max. power of channel, mW)/(min. test separation distance, mm) \cdot [\sqrt{f(GHz)}/7.5]$$

Mode	Frequency	Max. power (mW)	Test separation distance, (mm)	Estimated SAR (W/Kg)
BT(Head)	2441	5	5	0.21
BT(Body)	2441	5	10	0.10

When the sum of SAR is larger than the limit, The ratio is determined by $(SAR1 + SAR2)^{1.5/Ri}$, rounded to two decimal digits, and must be ≤ 0.04 for all antenna pairs in the configuration to qualify for 1-g SAR test exclusion. The estimation result as below:

9.2.1 Simultaneous Transmission Configurations

Item	Capable Transmit Configurations
1	GSM/PCS + DTS + BT
2	WCDMA + DTS + BT

9.2.2 Simultaneous Transmission Summation for Head:

Exposure condition	Band	(1)	(2)	(3)	(1)+(2)	(1)+(3)	(1)+(2)+(3)
		WWAN (W/Kg)	DTS (W/Kg)	BT (W/Kg)	Σ 1-g SAR	Σ 1-g SAR	Σ 1-g SAR
Head	GSM 850	0.05	0.213	0.21	0.263	0.26	0.473
	PCS 1900	0.032	0.213	0.21	0.245	0.242	0.455
	UMTS 850	0.065	0.213	0.21	0.278	0.275	0.488
	UMTS 1900	0.065	0.213	0.21	0.278	0.275	0.488

The sum of value is less than 1.6W/Kg, thus simultaneous SAR testing is no need.

9.2.3 Simultaneous Transmission Summation for Body

Exposure condition	Band	(1)	(2)	(3)	(1)+(2)	(1)+(3)	(1)+(2)+(3)
		WWAN (W/Kg)	DTS (W/Kg)	BT (W/Kg)	Σ 1-g SAR	Σ 1-g SAR	Σ 1-g SAR
Body	GSM 850	0.866	0.248	0.1	1.114	0.966	1.214
	PCS 1900	0.218	0.248	0.1	0.466	0.318	0.566
	UMTS 850	0.392	0.248	0.1	0.64	0.492	0.74
	UMTS 1900	0.715	0.248	0.1	0.963	0.815	1.063

The sum of value is less than 1.6W/Kg, thus simultaneous SAR testing is no need.

10. SAR measurement variability

- 1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
- 3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .

Frequency		SAR 1g (W/kg)						
Channel	MHz	Original	First Repeated		Second Repeated		Third Repeated	
			Value	Ratio	Value	Ratio	Value	Ratio
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix

Appendix A. SAR System Check Data

Appendix B. SAR measurement Data

Appendix C. Test Setup Photographs & EUT Photographs

Appendix D. Probe Calibration Data

Appendix E. Dipole Calibration Data

Appendix A. SAR System Check Data

Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/03/01

System Performance Check_835MHz-Head

DUT: Dipole 835 MHz; Type: ALS-D-835

Communication System: UID 0, CW; Frequency: 835 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 835$ MHz; $\sigma = 0.94$ S/m; $\epsilon_r = 42.31$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.3

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(8.76, 8.76, 8.76); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASYS2, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/835MHz Head/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 2.15 W/kg

Configuration/835MHz Head/Zoom Scan (5x5x7) (5x5x7)/Cube 0:

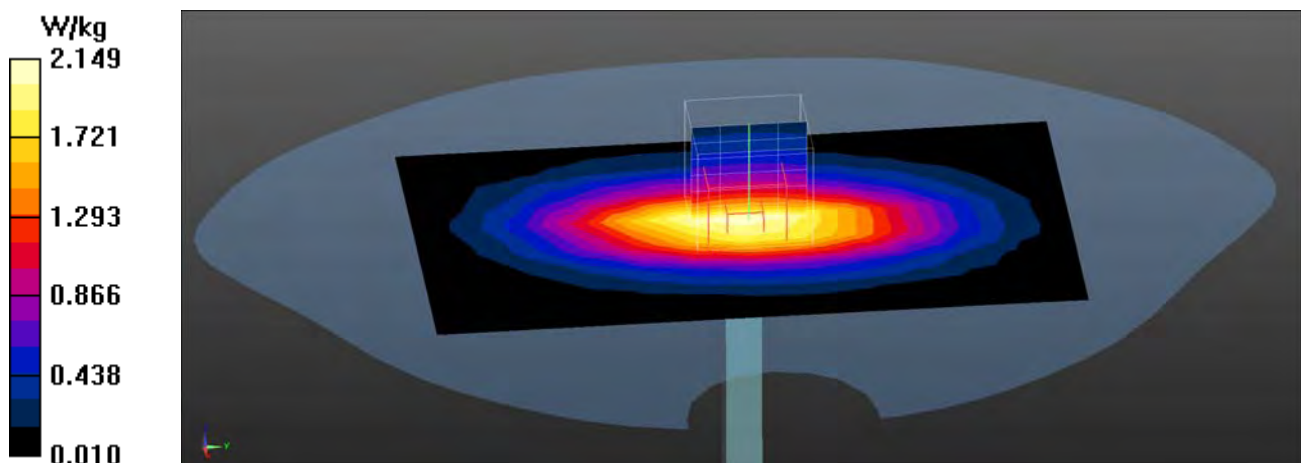
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 50.86 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.24 W/kg

SAR(1 g) = 2.11 W/kg; SAR(10 g) = 1.37 W/kg

Maximum value of SAR (measured) = 2.26 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/03/03

System Performance Check_1900MHz-Head

DUT: Dipole 1900 MHz; Type: ALS-D1900

Communication System: UID 0, CW; Frequency: 1900 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.37$ S/m; $\epsilon_r = 40.88$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.1

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.41, 7.41, 7.41); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/1900MHz_Body/Area Scan (8x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 8.13 W/kg

Configuration/1900MHz_Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0:

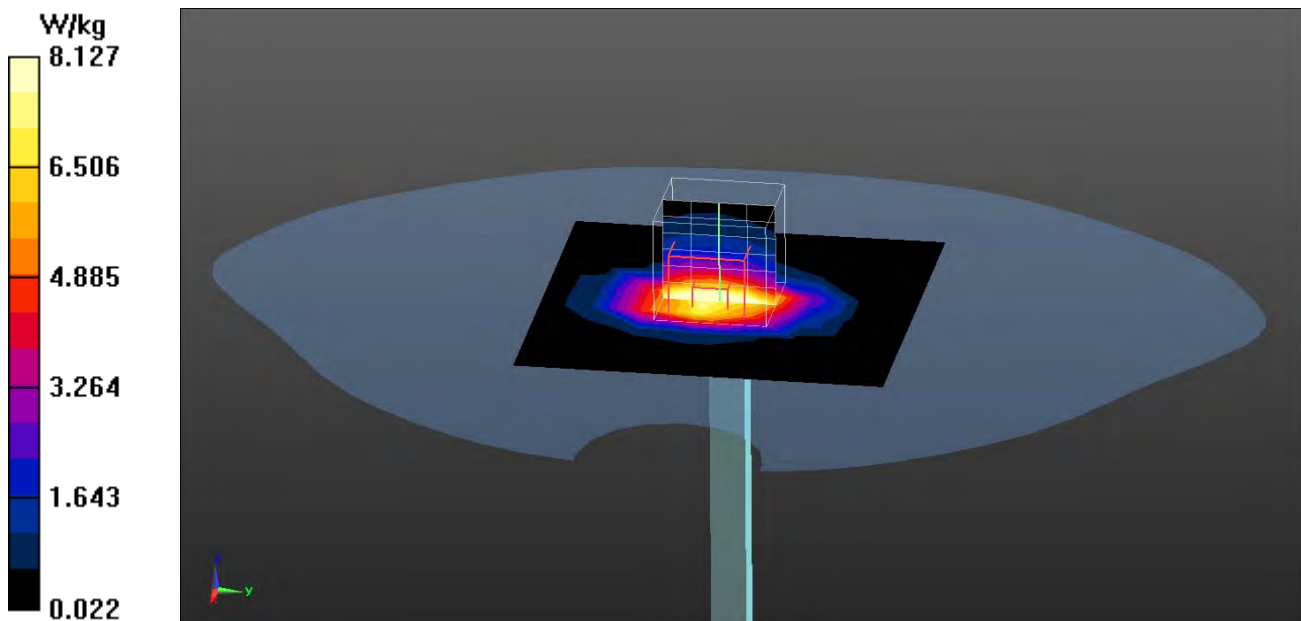
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 85.20 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 17.4 W/kg

SAR(1 g) = 9.37 W/kg; SAR(10 g) = 4.9 W/kg

Maximum value of SAR (measured) = 10.5 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/03/22

System Performance Check_2450MHz-Head

DUT: Dipole 2450 MHz; Type: D2450V2

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

Communication System PAR: 0 dB

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.77$ S/m; $\epsilon_r = 38.19$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 22.1, Liquid Temperature (°C) : 20.8

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(6.77, 6.77, 6.77); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left tablet; Type: SAM
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/2450MHz Head/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 11.6 W/kg

Configuration/2450MHz Head/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

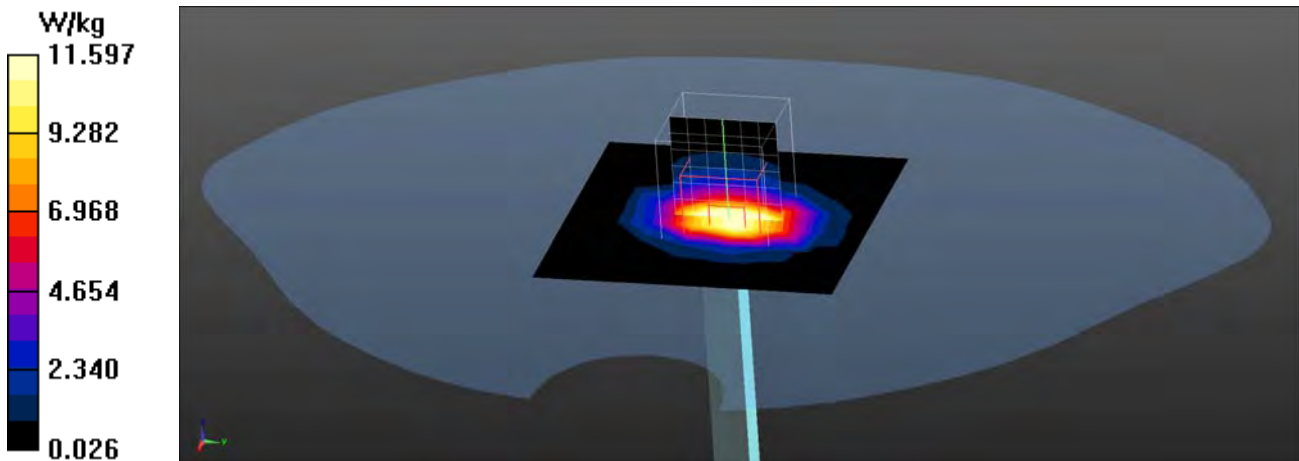
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 91.00 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 28.3 W/kg

SAR(1 g) = 13.3 W/kg; SAR(10 g) = 6.01 W/kg

Maximum value of SAR (measured) = 15.1 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/23

System Performance Check_835MHz-Body

DUT: Dipole 835 MHz; Type: ALS-D-835

Communication System: UID 0, CW; Frequency: 835 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 1.02 \text{ S/m}$; $\epsilon_r = 56.38$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Ambient Temperature ($^{\circ}\text{C}$) : 21.9, Liquid Temperature ($^{\circ}\text{C}$) : 20.8

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(8.96, 8.96, 8.96); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right tablet; Type: SAM
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/835MHz Body/Area Scan (8x9x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 2.20 W/kg

Configuration/835MHz Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0:

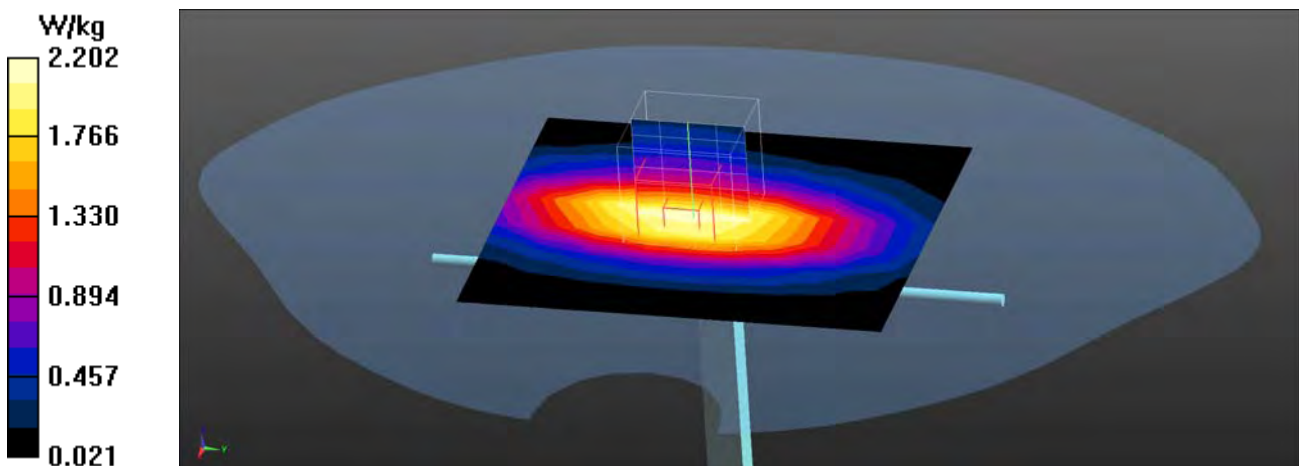
Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 48.64 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 3.37 W/kg

SAR(1 g) = 2.24 W/kg; SAR(10 g) = 1.46 W/kg

Maximum value of SAR (measured) = 2.41 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/26

System Performance Check_1900MHz-Body

DUT: Dipole 1900 MHz; Type: ALS-D1900

Communication System: UID 0, CW; Frequency: 1900 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.58$ S/m; $\epsilon_r = 54.47$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.1

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.08, 7.08, 7.08); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left tablet; Type: SAM
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/1900MHz Body/Area Scan (8x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 9.75 W/kg

Configuration/1900MHz Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0:

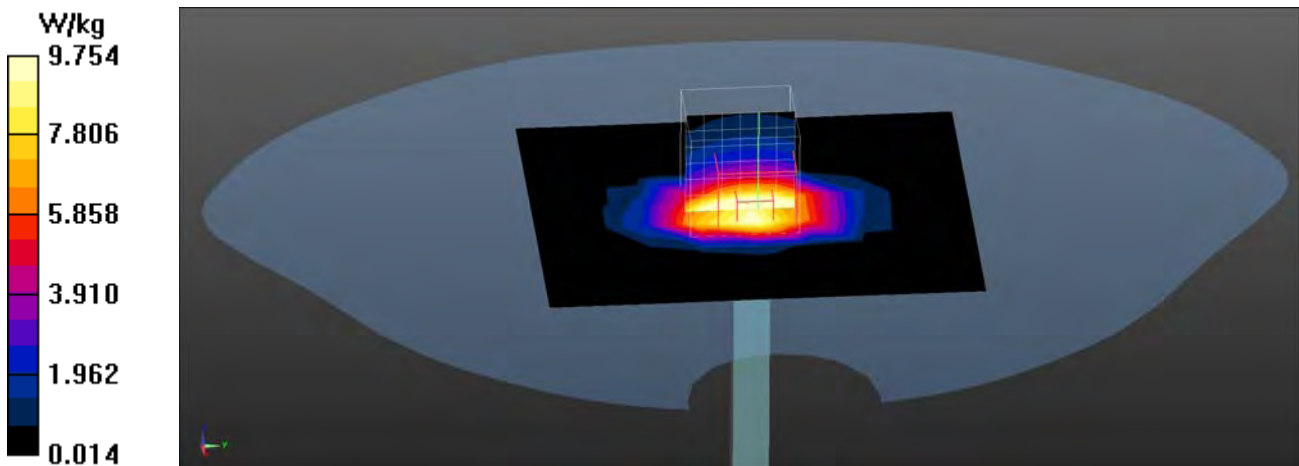
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 93.56 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 20.2 W/kg

SAR(1 g) = 11.1 W/kg; SAR(10 g) = 5.91 W/kg

Maximum value of SAR (measured) = 13.6 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/03/26

System Performance Check_2450MHz-Body

DUT: Dipole 2450 MHz; Type: D2450V2

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

Communication System PAR: 0 dB

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.98$ S/m; $\epsilon_r = 52.76$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 21.1

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(6.75, 6.75, 6.75); Calibrated: 2015/11/24;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/2450MHz_Body/Area Scan (9x9x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 14.5 W/kg

Configuration/2450MHz_Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

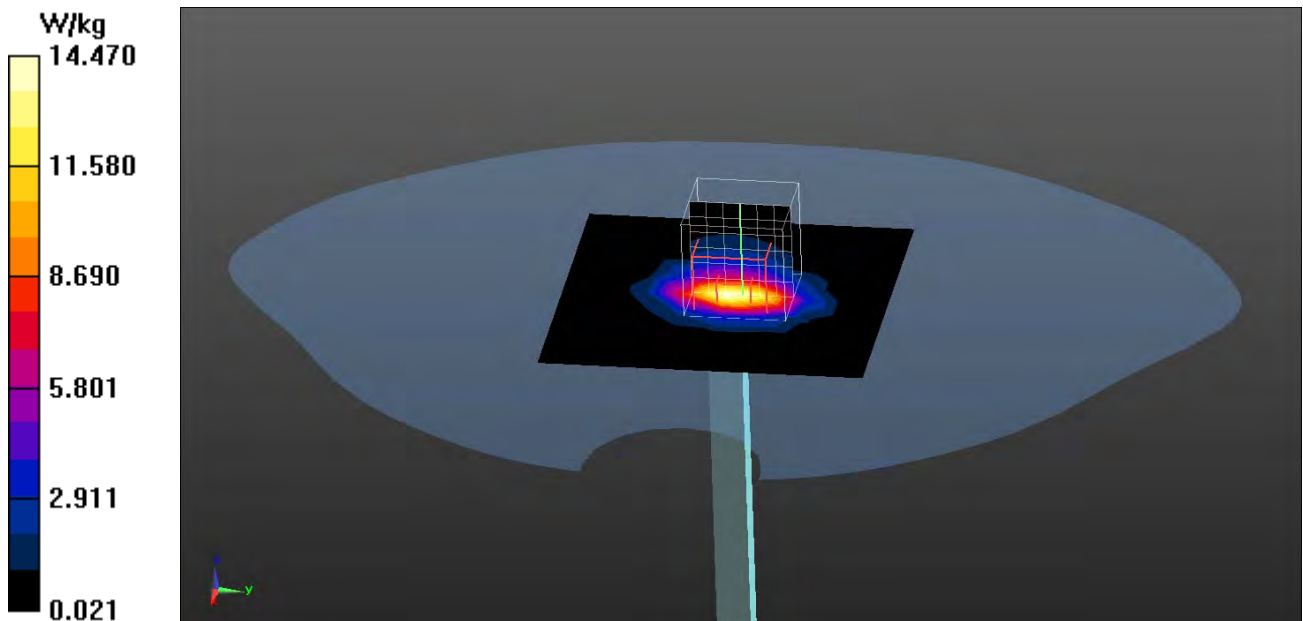
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 85.63 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 27.7 W/kg

SAR(1 g) = 13 W/kg; SAR(10 g) = 5.86 W/kg

Maximum value of SAR (measured) = 14.8 W/kg



Appendix B. SAR measurement Data

Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/03/01

GSM_850_Voice_189-Left-Cheek

DUT: Tablet PC; Type: TH80GAX(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC GSM_850MHz; Frequency: 836.4 MHz;

Communication System PAR: 9.191 dB

Medium parameters used: $f = 836.4$ MHz; $\sigma = 0.94$ S/m; $\epsilon_r = 42.28$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.3

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(8.76, 8.76, 8.76); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.0400 W/kg

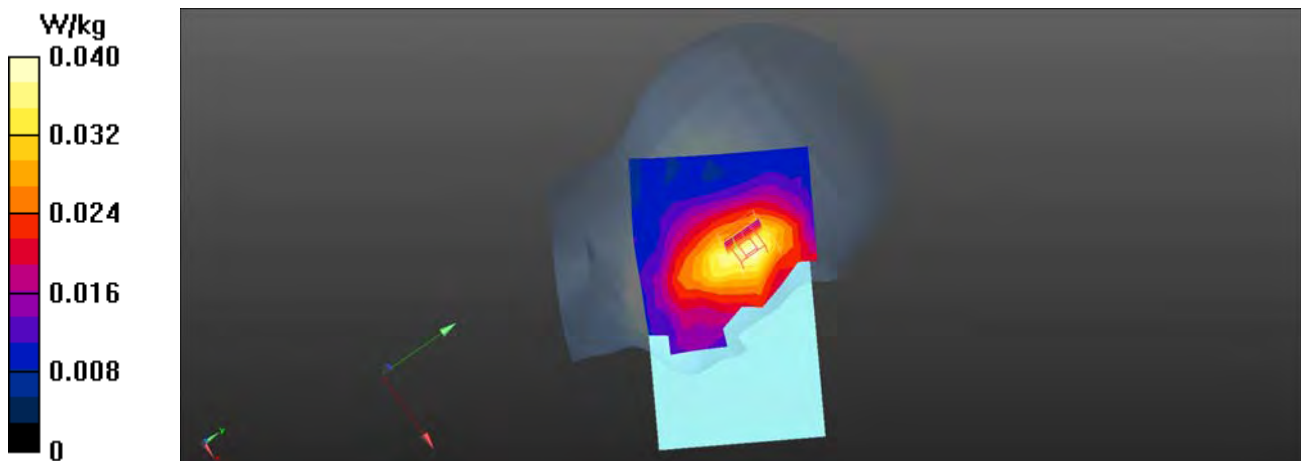
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.947 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 0.0390 W/kg

SAR(1 g) = 0.033 W/kg; SAR(10 g) = 0.028 W/kg

Maximum value of SAR (measured) = 0.0353 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/03/01

GSM_850_Voice_189-Left-Tilt

DUT: Tablet PC; Type: TH80GAX(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC GSM_850MHz; Frequency: 836.4 MHz;

Communication System PAR: 9.191 dB

Medium parameters used: $f = 836.4$ MHz; $\sigma = 0.94$ S/m; $\epsilon_r = 42.28$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.3

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(8.76, 8.76, 8.76); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.0271 W/kg

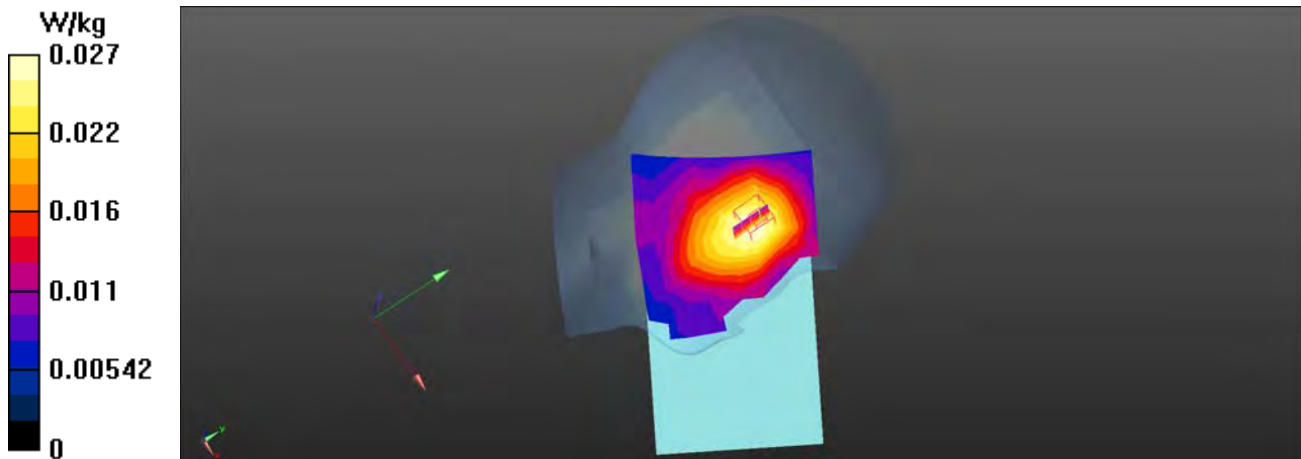
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.957 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 0.0270 W/kg

SAR(1 g) = 0.022 W/kg; SAR(10 g) = 0.019 W/kg

Maximum value of SAR (measured) = 0.0240 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/03/01

GSM_850_Voice_189-Right-Cheek

DUT: Tablet PC; Type: TH80GAx(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC GSM_850MHz; Frequency: 836.4 MHz;

Communication System PAR: 9.191 dB

Medium parameters used: $f = 836.4$ MHz; $\sigma = 0.94$ S/m; $\epsilon_r = 42.28$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.3

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(8.76, 8.76, 8.76); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.0458 W/kg

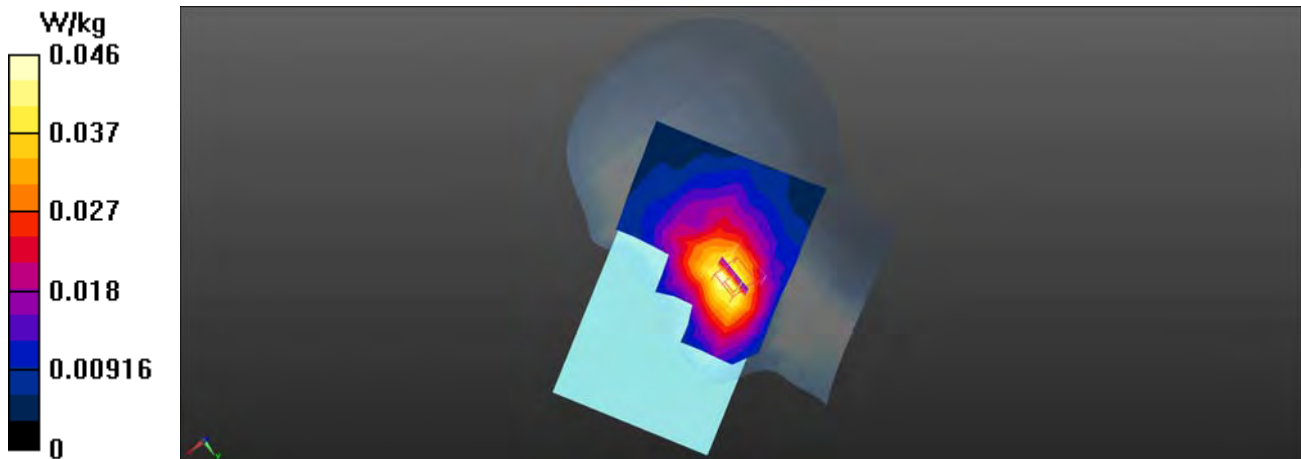
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.291 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.0510 W/kg

SAR(1 g) = 0.043 W/kg; SAR(10 g) = 0.033 W/kg

Maximum value of SAR (measured) = 0.0462 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/03/01

GSM_850_Voice_189-Right-Tilt

DUT: Tablet PC; Type: TH80GAx(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC GSM_850MHz; Frequency: 836.4 MHz;

Communication System PAR: 9.191 dB

Medium parameters used: $f = 836.4$ MHz; $\sigma = 0.94$ S/m; $\epsilon_r = 42.28$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.3

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(8.76, 8.76, 8.76); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASYS2, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.0215 W/kg

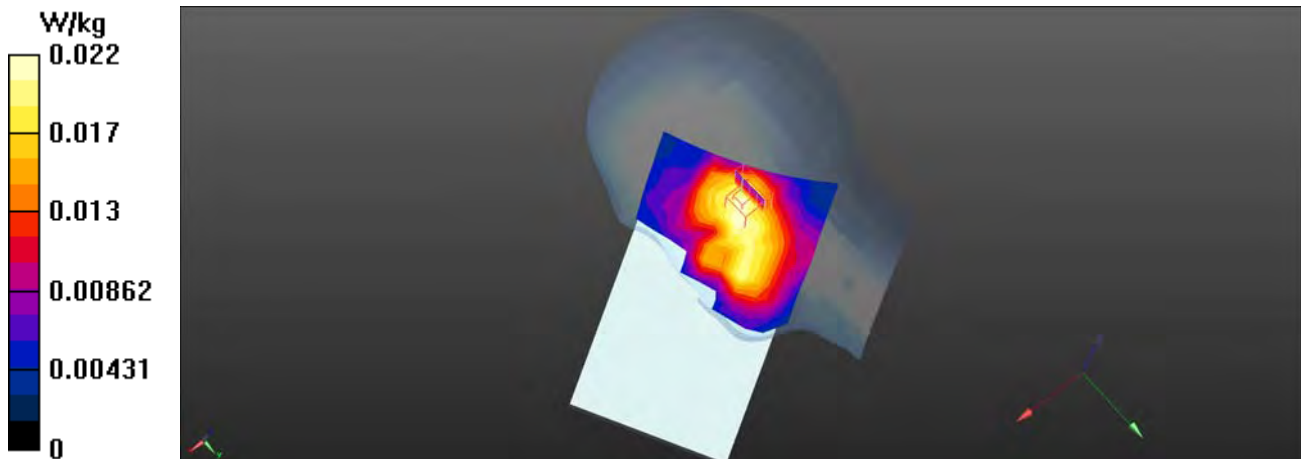
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.249 V/m; Power Drift = 0.13 dB

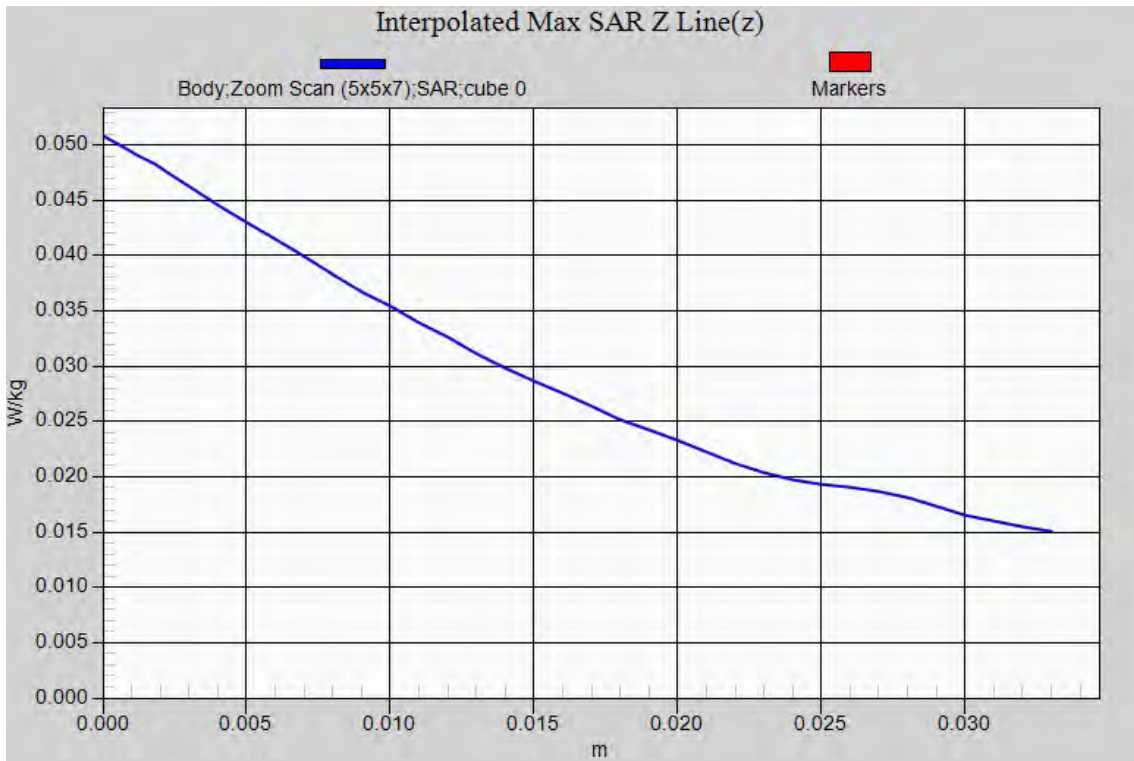
Peak SAR (extrapolated) = 0.0260 W/kg

SAR(1 g) = 0.020 W/kg; SAR(10 g) = 0.018 W/kg

Maximum value of SAR (measured) = 0.0222 W/kg



GSM 850 EUT Right-Cheek Z-Axis plot
Channel: 189



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/03/03

PCS_1900_Voice_661-Left-Cheek

DUT: Tablet PC; Type: TH80GAX(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC PCS_1900MHz; Frequency: 1880 MHz;

Communication System PAR: 9.191 dB

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.36$ S/m; $\epsilon_r = 41.06$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.1

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.41, 7.41, 7.41); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.0332 W/kg

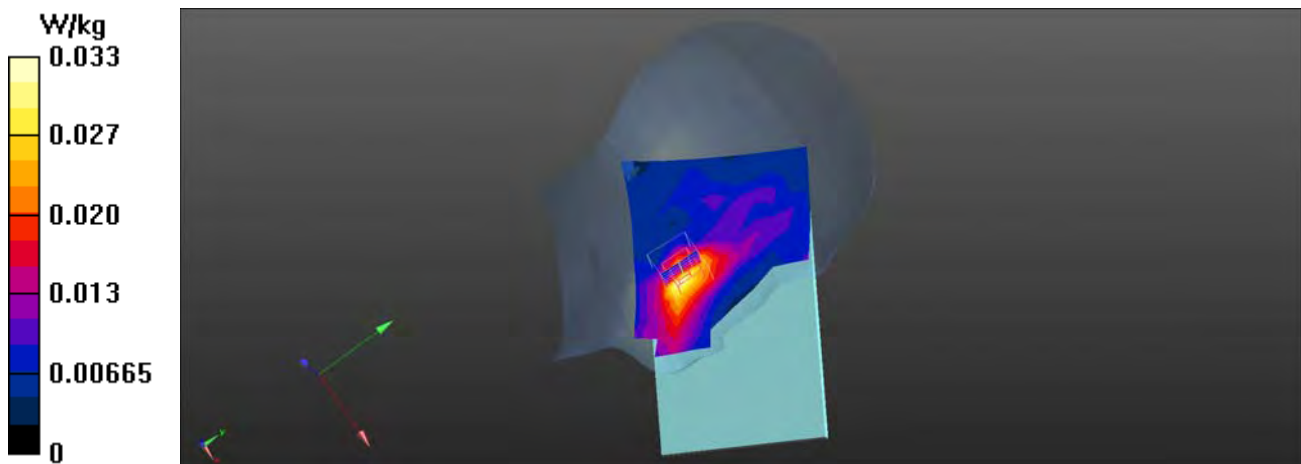
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.345 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.0360 W/kg

SAR(1 g) = 0.027 W/kg; SAR(10 g) = 0.019 W/kg

Maximum value of SAR (measured) = 0.0294 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/03/03

PCS_1900_Voice_661-Left-Tilt

DUT: Tablet PC; Type: TH80GAx(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC PCS_1900MHz; Frequency: 1880 MHz;

Communication System PAR: 9.191 dB

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.36$ S/m; $\epsilon_r = 41.06$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.1

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.41, 7.41, 7.41); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.0158 W/kg

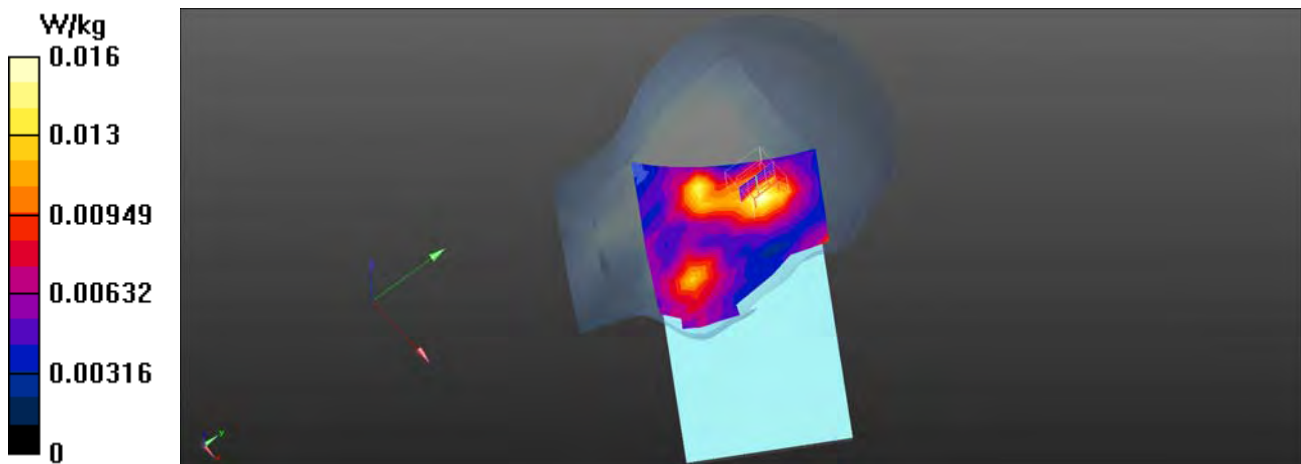
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.715 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.0190 W/kg

SAR(1 g) = 0.014 W/kg; SAR(10 g) = 0.0099 W/kg

Maximum value of SAR (measured) = 0.0152 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/03/03

PCS_1900_Voice_661-Right-Cheek

DUT: Tablet PC; Type: TH80GAx(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC PCS_1900MHz; Frequency: 1880 MHz;

Communication System PAR: 9.191 dB

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.36$ S/m; $\epsilon_r = 41.06$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.1

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.41, 7.41, 7.41); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.0182 W/kg

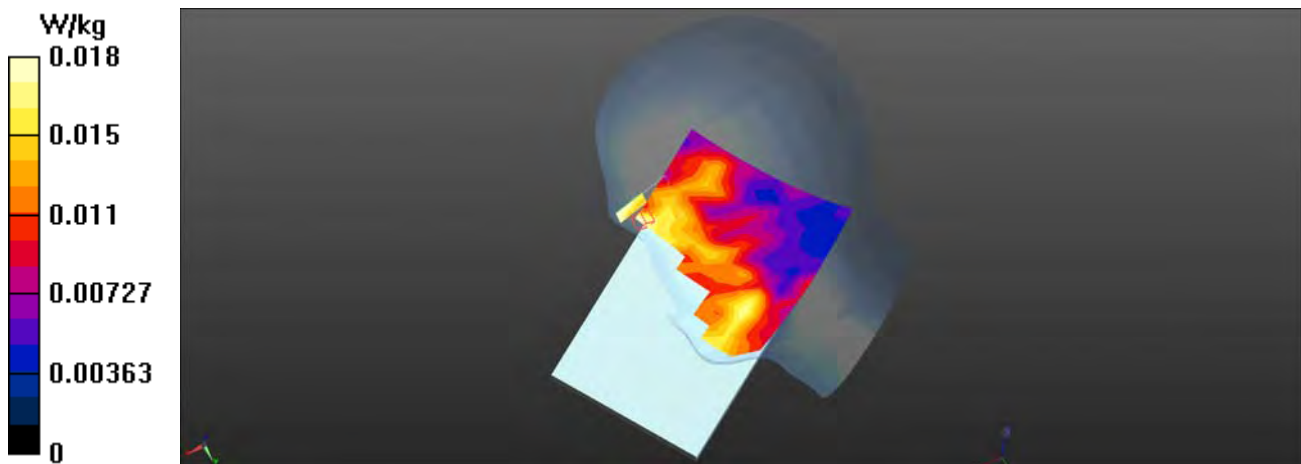
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.133 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 0.0400 W/kg

SAR(1 g) = 0.017 W/kg; SAR(10 g) = 0.011 W/kg

Maximum value of SAR (measured) = 0.0261 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/03/03

PCS_1900_Voice_661-Right-Tilt

DUT: Tablet PC; Type: TH80GAx(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC PCS_1900MHz; Frequency: 1880 MHz;

Communication System PAR: 9.191 dB

Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.36 \text{ S/m}$; $\epsilon_r = 41.06$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.1

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.41, 7.41, 7.41); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.0184 W/kg

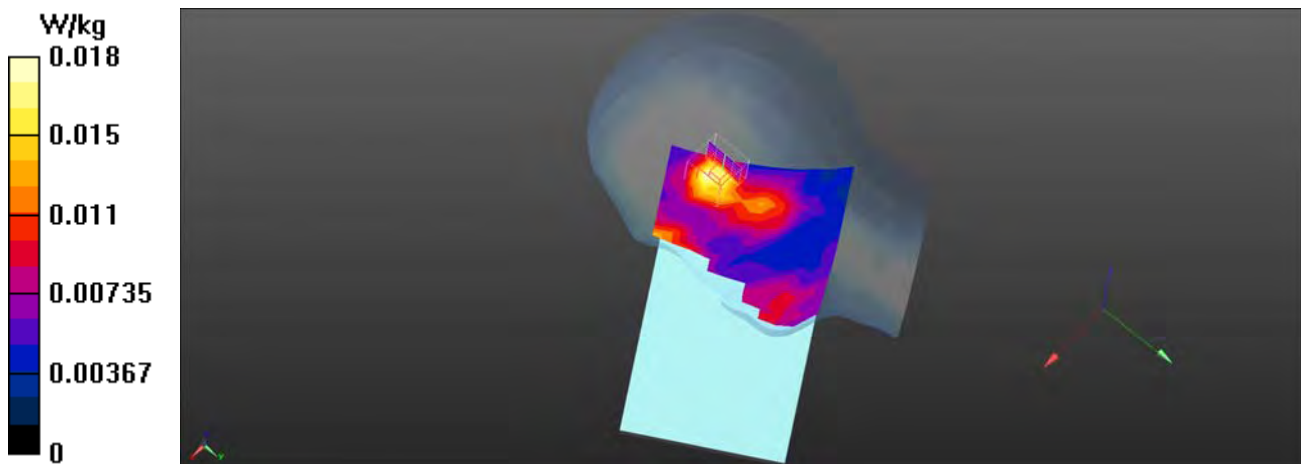
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 2.611 V/m; Power Drift = 0.17 dB

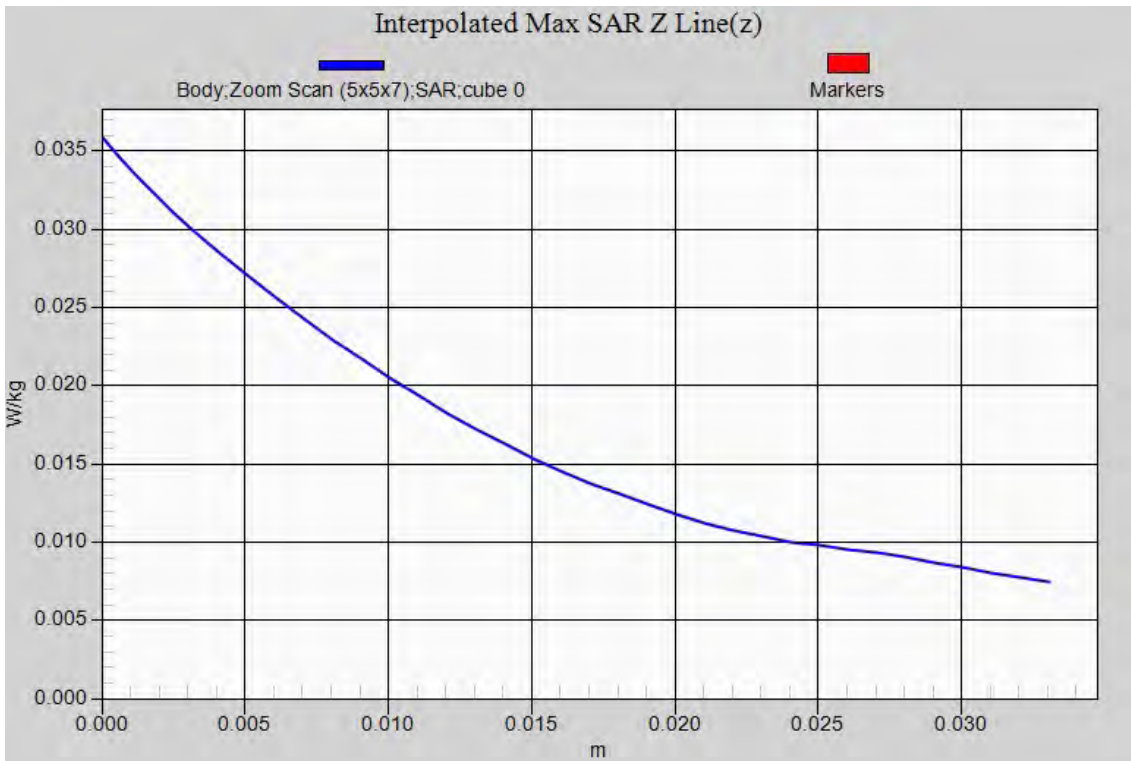
Peak SAR (extrapolated) = 0.0280 W/kg

SAR(1 g) = 0.017 W/kg; SAR(10 g) = 0.012 W/kg

Maximum value of SAR (measured) = 0.0197 W/kg



PCS 1900 EUT Left-Cheek Z-Axis plot
Channel: 661



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/03/03

WCDMA_Band 2_Voice_9400-Left-Cheek

DUT: Tablet PC; Type: TH80GAX(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC WCDMA_Band-2; Frequency: 1880 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.36$ S/m; $\epsilon_r = 41.06$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.1

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.41, 7.41, 7.41); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.0736 W/kg

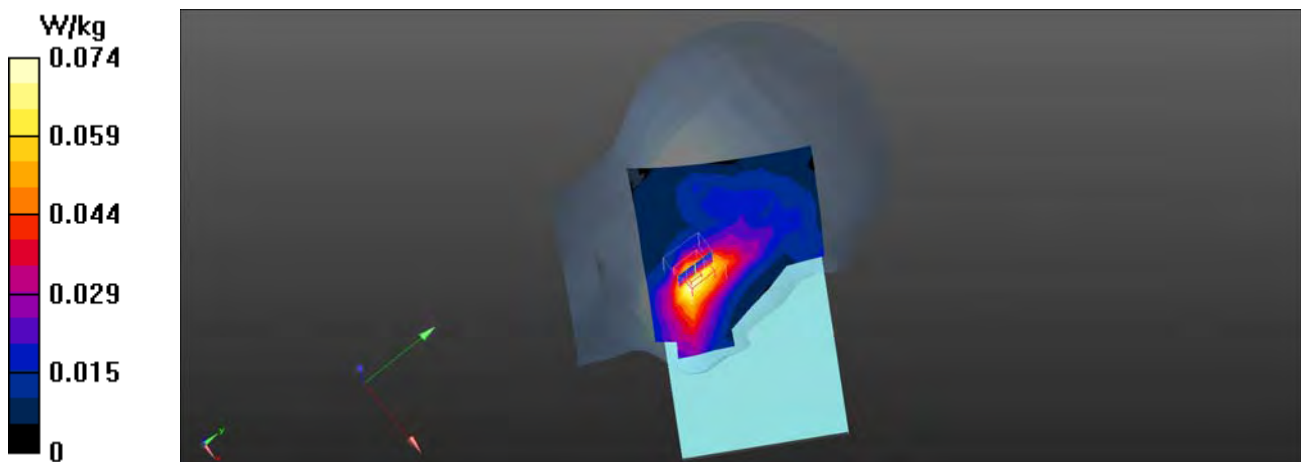
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.243 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.0870 W/kg

SAR(1 g) = 0.063 W/kg; SAR(10 g) = 0.042 W/kg

Maximum value of SAR (measured) = 0.0698 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/03/03

WCDMA_Band 2_Voice_9400-Left-Tilt

DUT: Tablet PC; Type: TH80GAX(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC WCDMA_Band-2; Frequency: 1880 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.36$ S/m; $\epsilon_r = 41.06$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.1

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.41, 7.41, 7.41); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.0301 W/kg

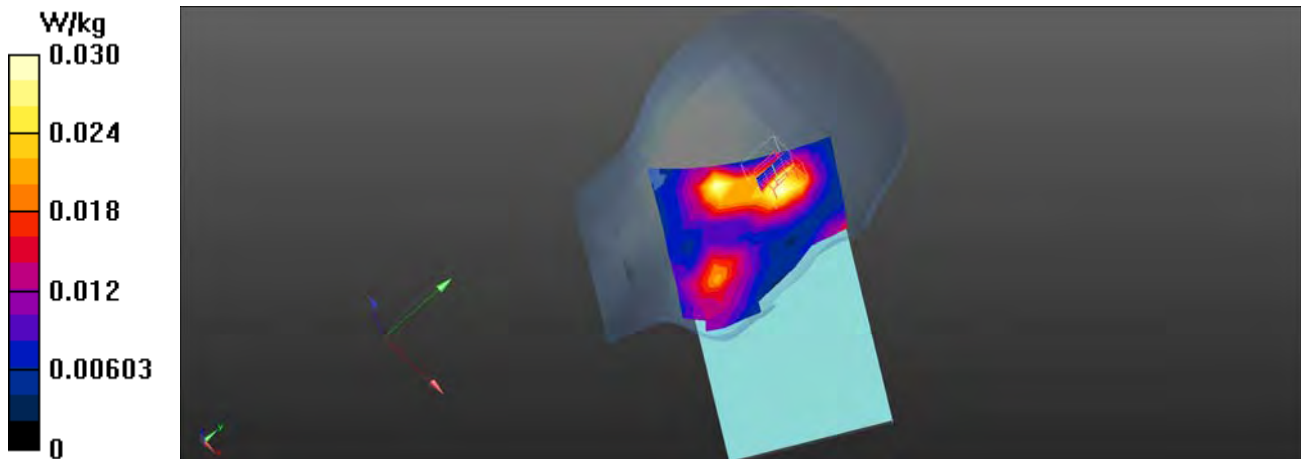
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.963 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 0.0410 W/kg

SAR(1 g) = 0.028 W/kg; SAR(10 g) = 0.019 W/kg

Maximum value of SAR (measured) = 0.0320 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/03/03

WCDMA_Band 2_Voice_9400-Right-Cheek

DUT: Tablet PC; Type: TH80GAX(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC WCDMA_Band-2; Frequency: 1880 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.36$ S/m; $\epsilon_r = 41.06$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.1

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.41, 7.41, 7.41); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.0302 W/kg

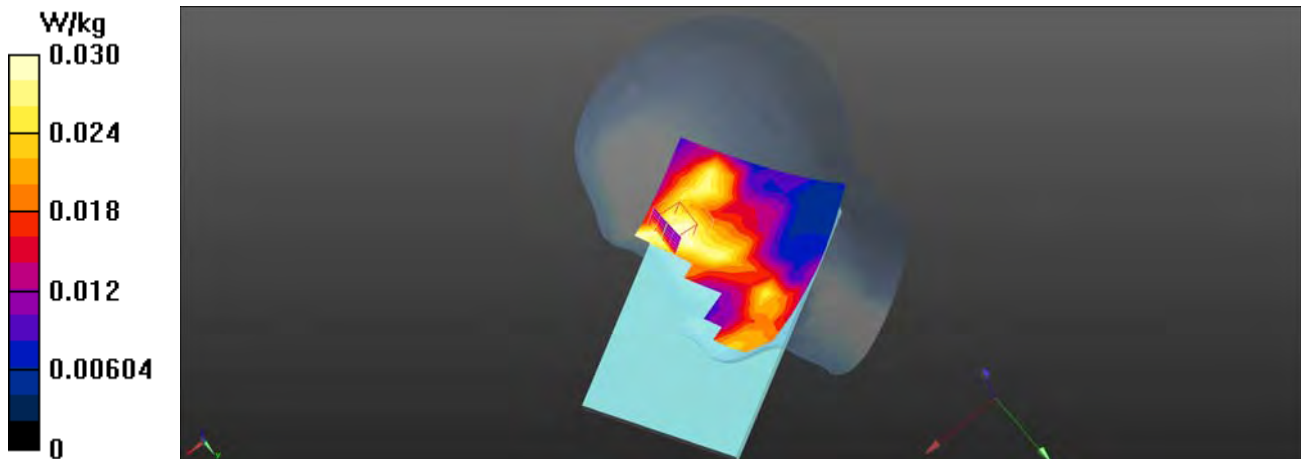
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.779 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.0370 W/kg

SAR(1 g) = 0.026 W/kg; SAR(10 g) = 0.020 W/kg

Maximum value of SAR (measured) = 0.0285 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/03/03

WCDMA_Band 2_Voice_9400-Right-Tilt

DUT: Tablet PC; Type: TH80GAX(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC WCDMA_Band-2; Frequency: 1880 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.36$ S/m; $\epsilon_r = 41.06$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.1

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.41, 7.41, 7.41); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.0417 W/kg

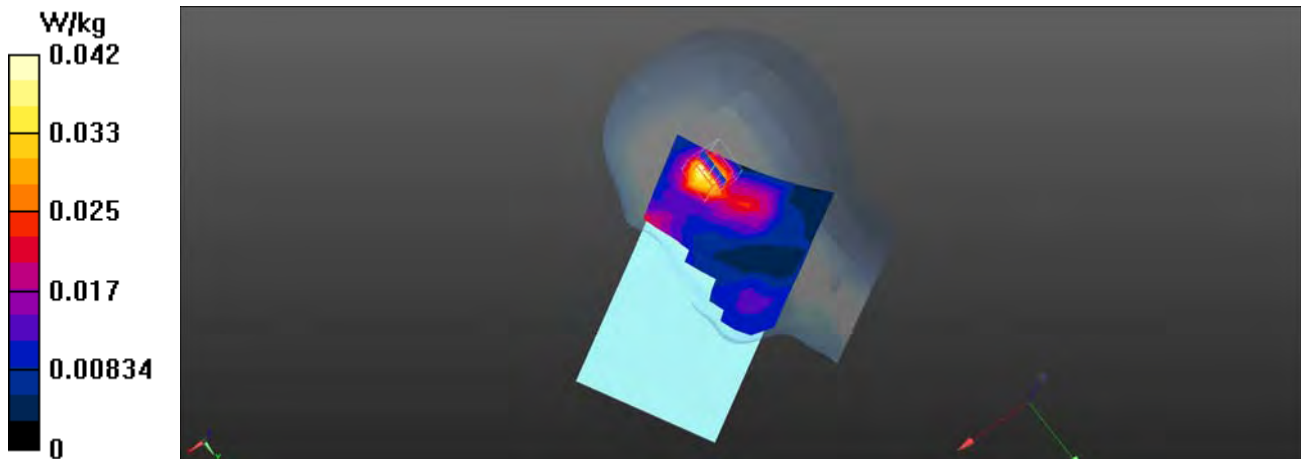
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.522 V/m; Power Drift = 0.16 dB

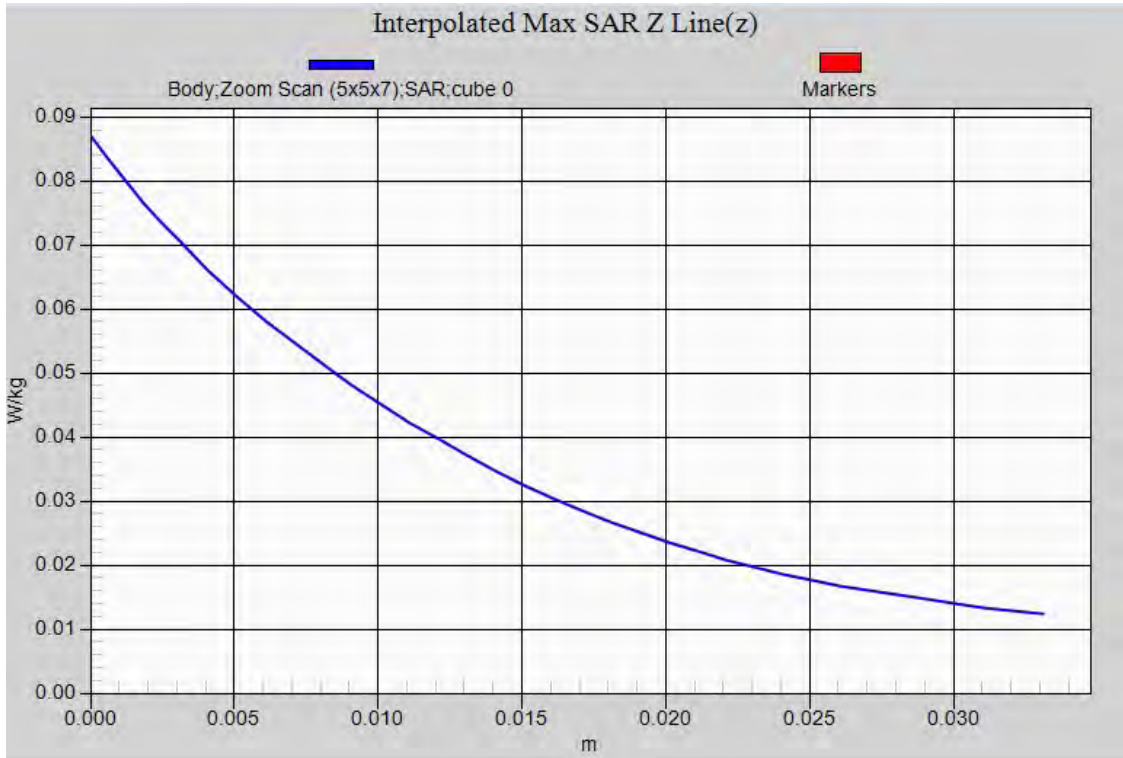
Peak SAR (extrapolated) = 0.0650 W/kg

SAR(1 g) = 0.039 W/kg; SAR(10 g) = 0.024 W/kg

Maximum value of SAR (measured) = 0.0447 W/kg



WCDMA Band 2 EUT Left-Cheek Z-Axis plot
Channel: 9400



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/03/01

WCDMA_Band 5_Voice_4183-Left-Cheek

DUT: Tablet PC; Type: TH80GAX(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC WCDMA_Band-5; Frequency: 836.6 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 836.6$ MHz; $\sigma = 0.94$ S/m; $\epsilon_r = 42.26$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.3

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(8.76, 8.76, 8.76); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.0398 W/kg

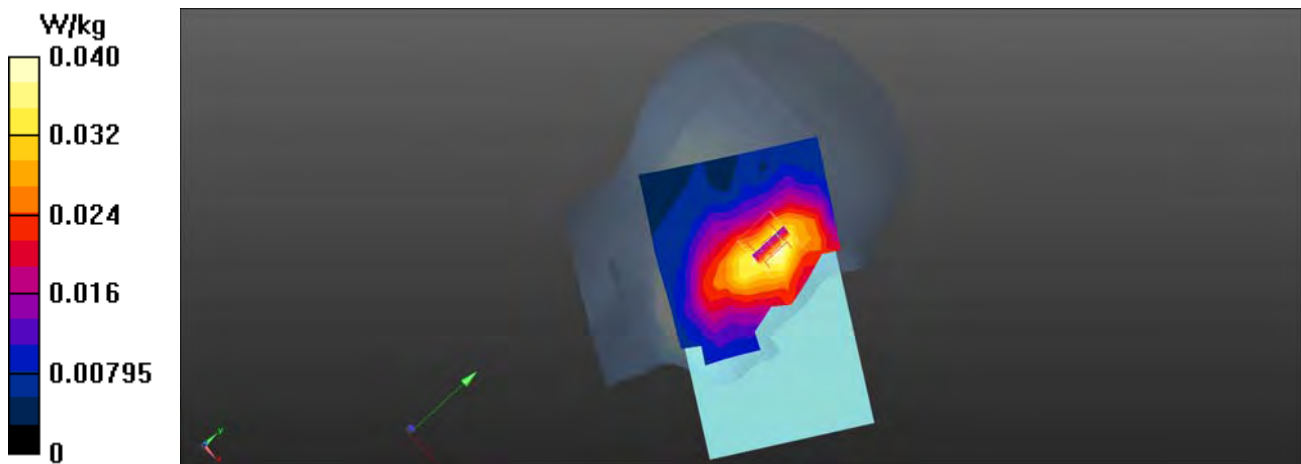
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.356 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 0.0400 W/kg

SAR(1 g) = 0.033 W/kg; SAR(10 g) = 0.027 W/kg

Maximum value of SAR (measured) = 0.0350 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/03/01

WCDMA_Band 5_Voice_4183-Left-Tilt

DUT: Tablet PC; Type: TH80GAX(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC WCDMA_Band-5; Frequency: 836.6 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 836.6$ MHz; $\sigma = 0.94$ S/m; $\epsilon_r = 42.26$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.3

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(8.76, 8.76, 8.76); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.0238 W/kg

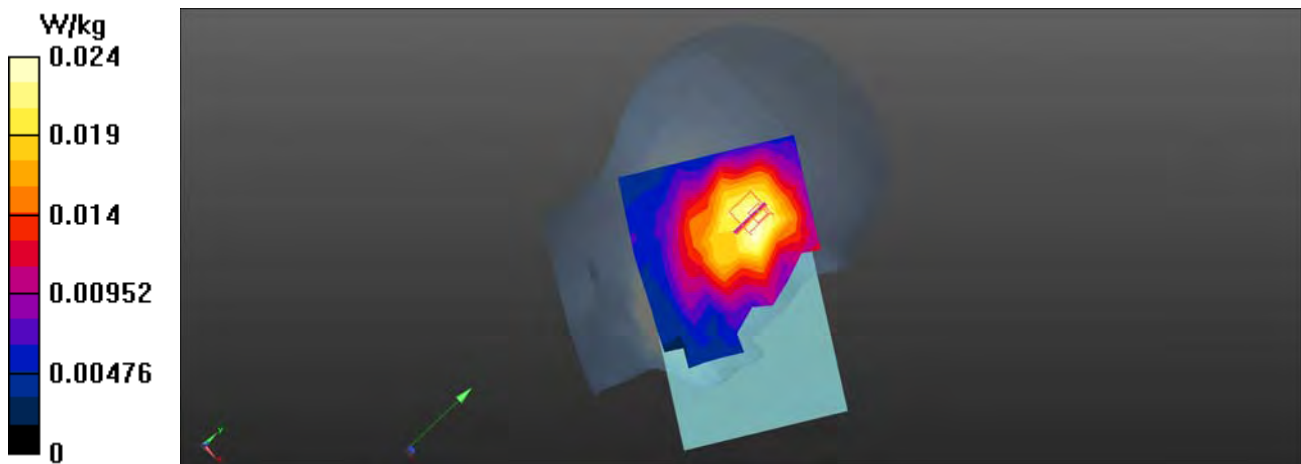
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.197 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 0.0270 W/kg

SAR(1 g) = 0.022 W/kg; SAR(10 g) = 0.017 W/kg

Maximum value of SAR (measured) = 0.0239 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/03/01

WCDMA_Band 5_Voice_4183-Right-Cheek

DUT: Tablet PC; Type: TH80Gax(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC WCDMA_Band-5; Frequency: 836.6 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 836.6$ MHz; $\sigma = 0.94$ S/m; $\epsilon_r = 42.26$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.3

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(8.76, 8.76, 8.76); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.0538 W/kg

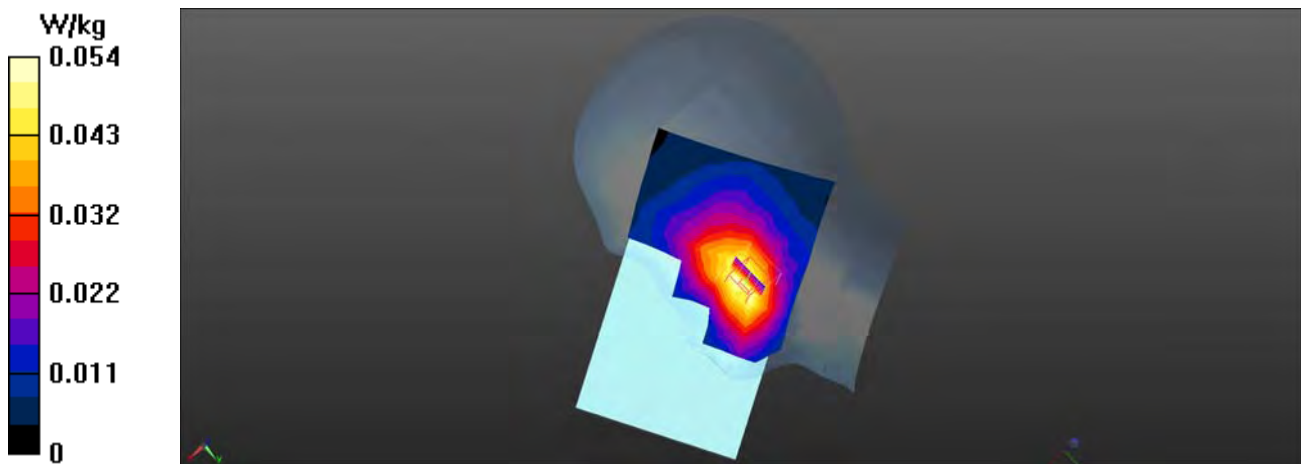
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.508 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 0.0610 W/kg

SAR(1 g) = 0.051 W/kg; SAR(10 g) = 0.040 W/kg

Maximum value of SAR (measured) = 0.0550 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/03/01

WCDMA_Band 5_Voice_4183-Right-Tilt

DUT: Tablet PC; Type: TH80Gax(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC WCDMA_Band-5; Frequency: 836.6 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 836.6$ MHz; $\sigma = 0.94$ S/m; $\epsilon_r = 42.26$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.3

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(8.76, 8.76, 8.76); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.0256 W/kg

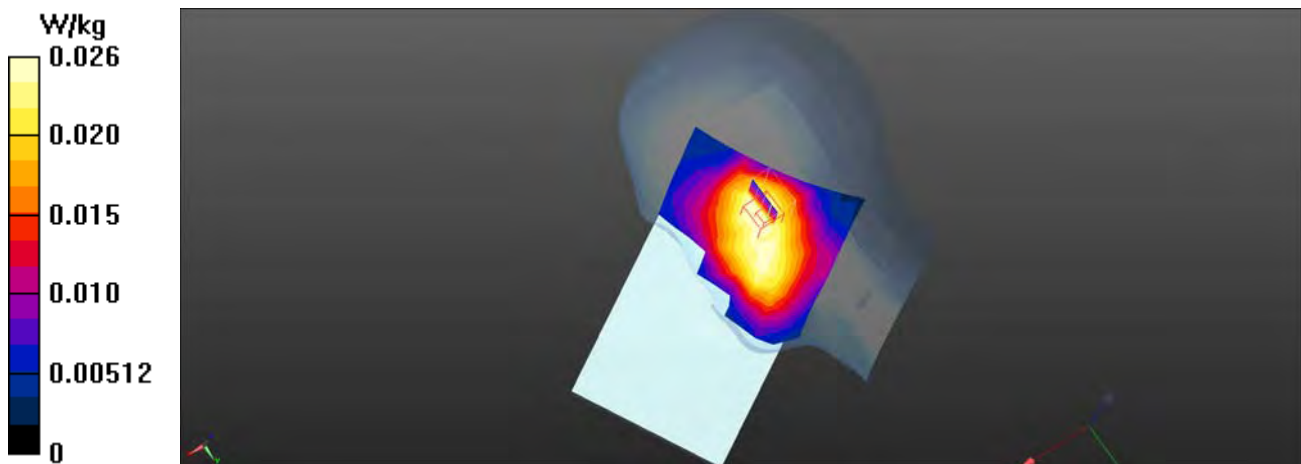
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.731 V/m; Power Drift = -0.06 dB

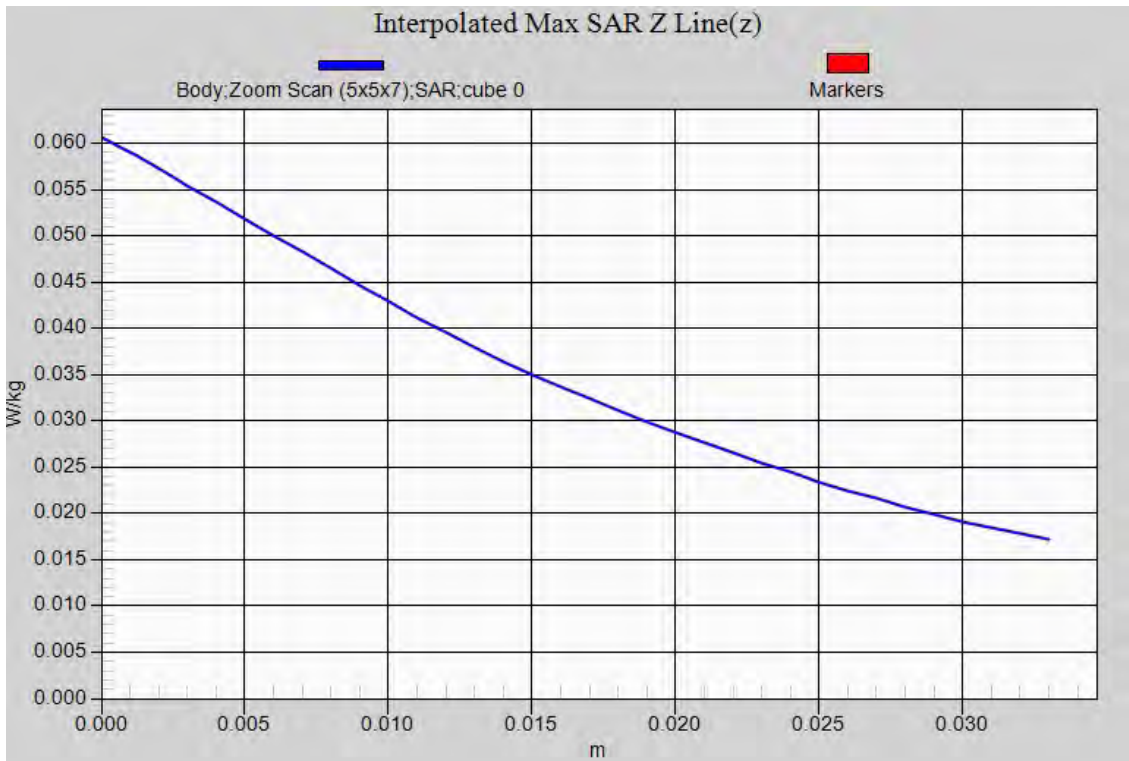
Peak SAR (extrapolated) = 0.0290 W/kg

SAR(1 g) = 0.022 W/kg; SAR(10 g) = 0.017 W/kg

Maximum value of SAR (measured) = 0.0246 W/kg



WCDMA Band 5 EUT Right-Cheek Z-Axis plot
Channel: 4183



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/3/22

802.11b_11-Left-Cheek

DUT: Tablet PC; Type: TH80GAx(x=0~9, A~Z or blank or "-")

Communication System: UID 0, WLAN 2.4G; Frequency: 2462 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 2462$ MHz; $\sigma = 1.78$ S/m; $\epsilon_r = 38.09$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Ambient Temperature (°C) : 22.1, Liquid Temperature (°C) : 20.8

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(6.77, 6.77, 6.77); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASYS2, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (12x21x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.100 W/kg

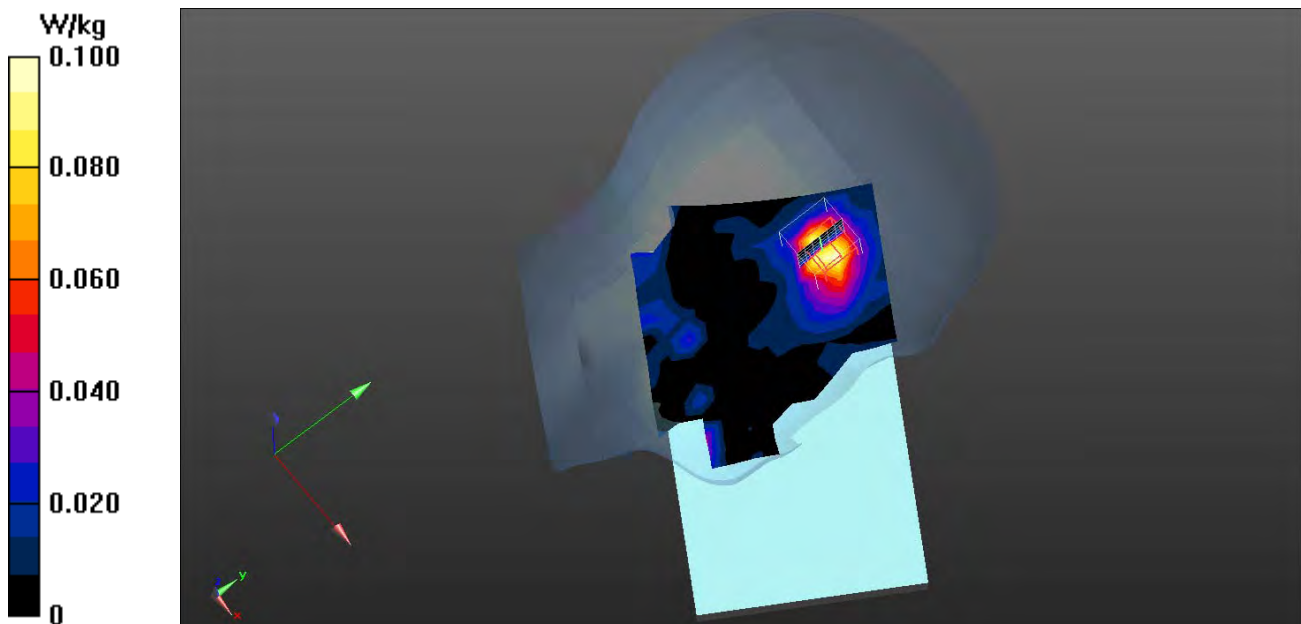
Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.540 V/m; Power Drift = -0.18 dB

Peak SAR (extrapolated) = 0.205 W/kg

SAR(1 g) = 0.082 W/kg; SAR(10 g) = 0.041 W/kg

Maximum value of SAR (measured) = 0.110 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/3/22

802.11b_11-Left-Tilt

DUT: Tablet PC; Type: TH80GAx(x=0~9, A~Z or blank or "-")

Communication System: UID 0, WLAN 2.4G; Frequency: 2462 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 2462$ MHz; $\sigma = 1.78$ S/m; $\epsilon_r = 38.09$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Ambient Temperature (°C) : 22.1, Liquid Temperature (°C) : 20.8

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(6.77, 6.77, 6.77); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASYS2, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (12x21x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.0676 W/kg

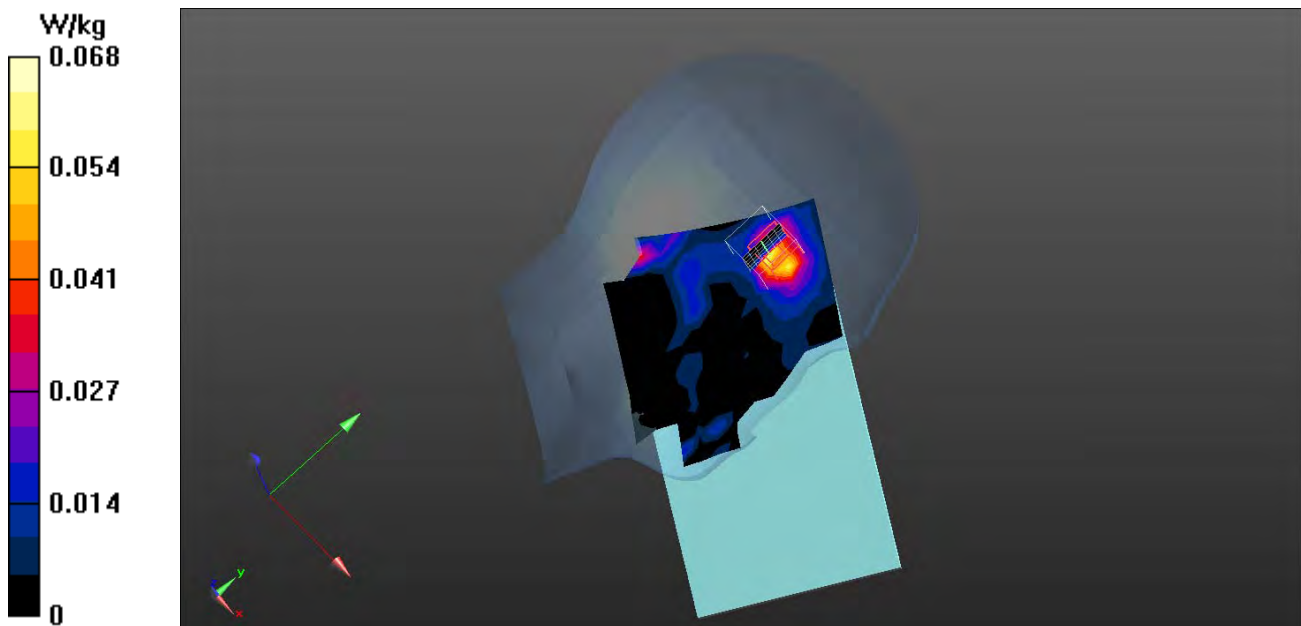
Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.432 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 0.109 W/kg

SAR(1 g) = 0.051 W/kg; SAR(10 g) = 0.024 W/kg

Maximum value of SAR (measured) = 0.0688 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/3/22

802.11b_11-Right-Cheek

DUT: Tablet PC; Type: TH80GAx(x=0~9, A~Z or blank or "-")

Communication System: UID 0, WLAN 2.4G; Frequency: 2462 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 2462 \text{ MHz}$; $\sigma = 1.78 \text{ S/m}$; $\epsilon_r = 38.09$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Ambient Temperature (°C) : 22.1, Liquid Temperature (°C) : 20.8

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(6.77, 6.77, 6.77); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (12x21x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Maximum value of SAR (measured) = 0.254 W/kg

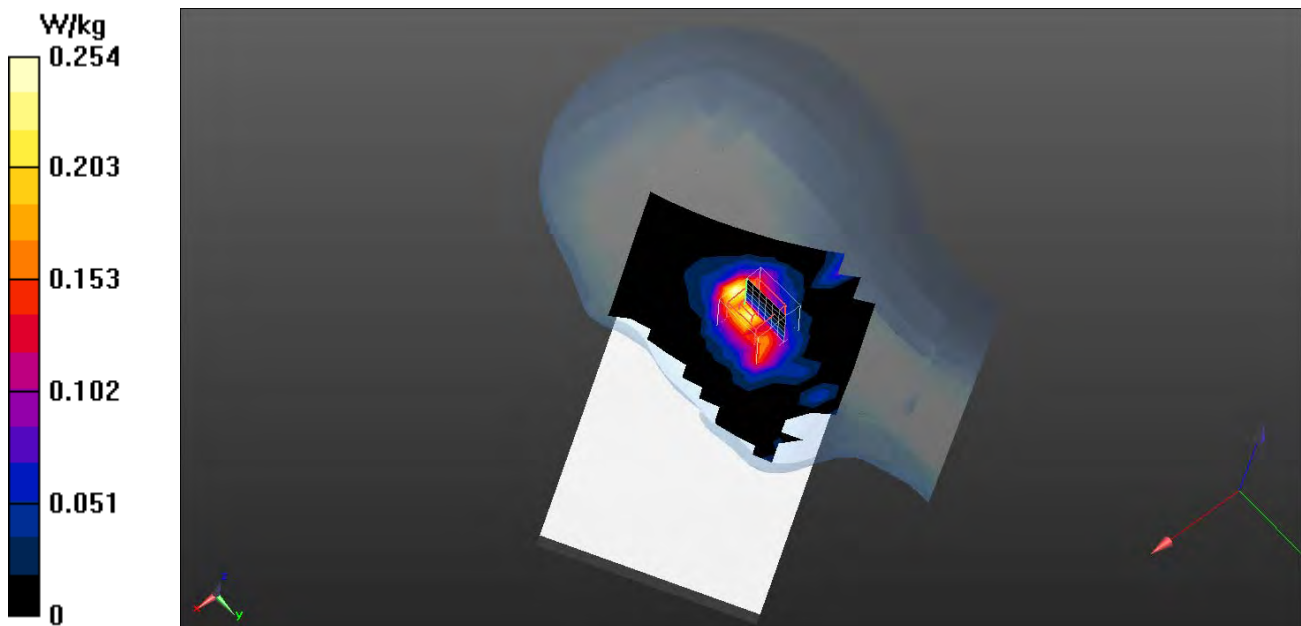
Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 7.659 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.433 W/kg

SAR(1 g) = 0.169 W/kg; SAR(10 g) = 0.079 W/kg

Maximum value of SAR (measured) = 0.262 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/3/22

802.11b_11-Right-Tilt

DUT: Tablet PC; Type: TH80GAx(x=0~9, A~Z or blank or "-")

Communication System: UID 0, WLAN 2.4G; Frequency: 2462 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 2462$ MHz; $\sigma = 1.78$ S/m; $\epsilon_r = 38.09$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Ambient Temperature (°C) : 22.1, Liquid Temperature (°C) : 20.8

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(6.77, 6.77, 6.77); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASYS2, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (12x21x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.194 W/kg

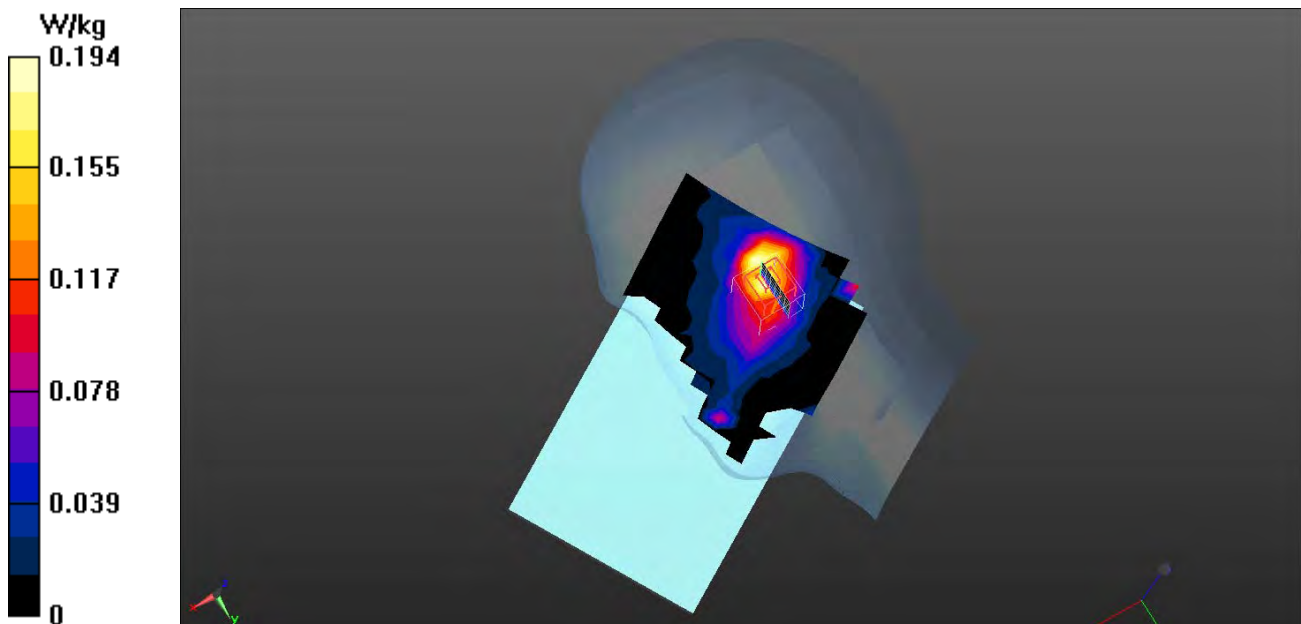
Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.167 V/m; Power Drift = 0.15 dB

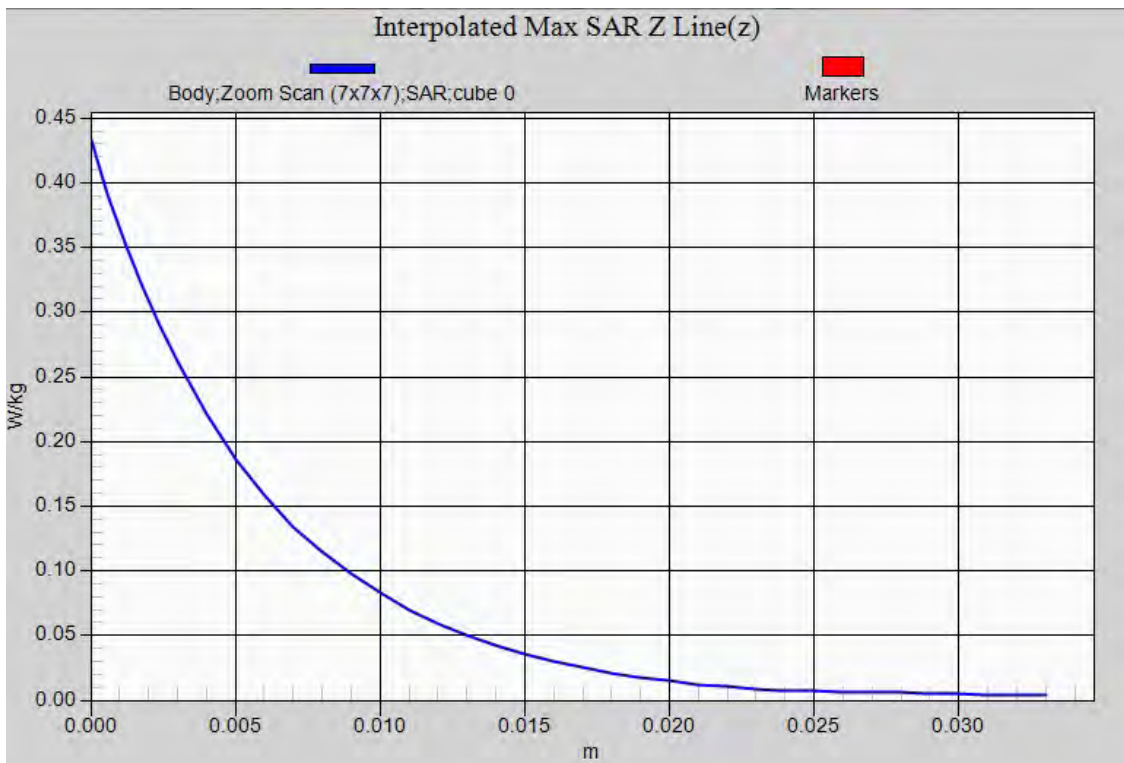
Peak SAR (extrapolated) = 0.325 W/kg

SAR(1 g) = 0.141 W/kg; SAR(10 g) = 0.063 W/kg

Maximum value of SAR (measured) = 0.199 W/kg



802.11b EUT Right-Cheek Z-Axis plot
Channel: 11



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/23

GSM_GPRS_850_1UP_189-Front 10mm

DUT: Tablet PC; Type: TH80Gax(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC GSM_850MHz; Frequency: 836.4 MHz;

Communication System PAR: 9.191 dB

Medium parameters used: $f = 836.4$ MHz; $\sigma = 1.02$ S/m; $\epsilon_r = 56.36$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.8

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(8.96, 8.96, 8.96); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right tablet; Type: SAM
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.278 W/kg

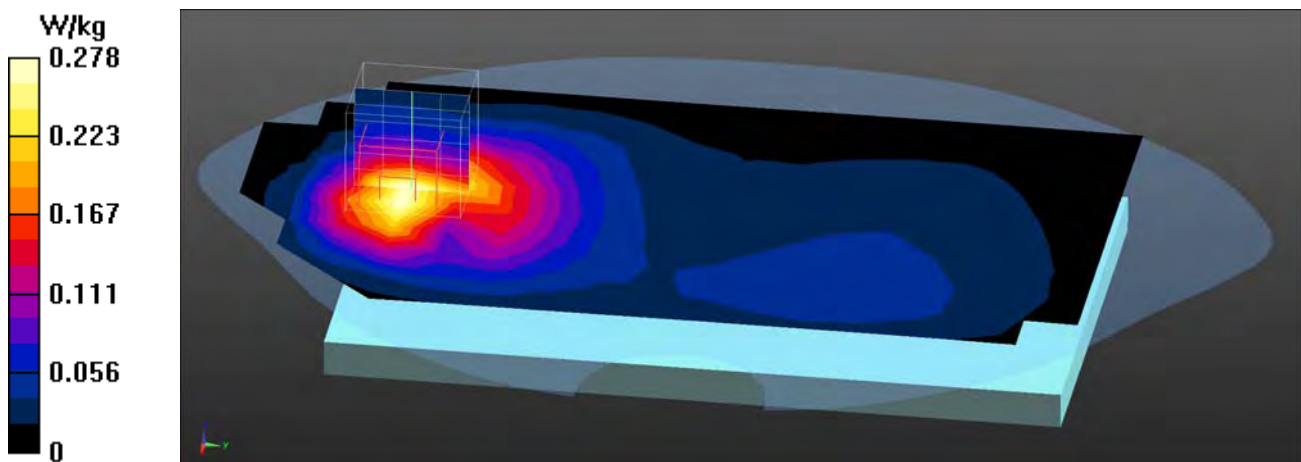
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.261 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.406 W/kg

SAR(1 g) = 0.249 W/kg; SAR(10 g) = 0.153 W/kg

Maximum value of SAR (measured) = 0.296 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/23

GSM_GPRS_850_1UP_128-Back 10mm

DUT: Tablet PC; Type: TH80GAx(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC GSM_850MHz; Frequency: 824.2 MHz;

Communication System PAR: 9.191 dB

Medium parameters used: $f = 824.2$ MHz; $\sigma = 1.01$ S/m; $\epsilon_r = 56.47$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.8

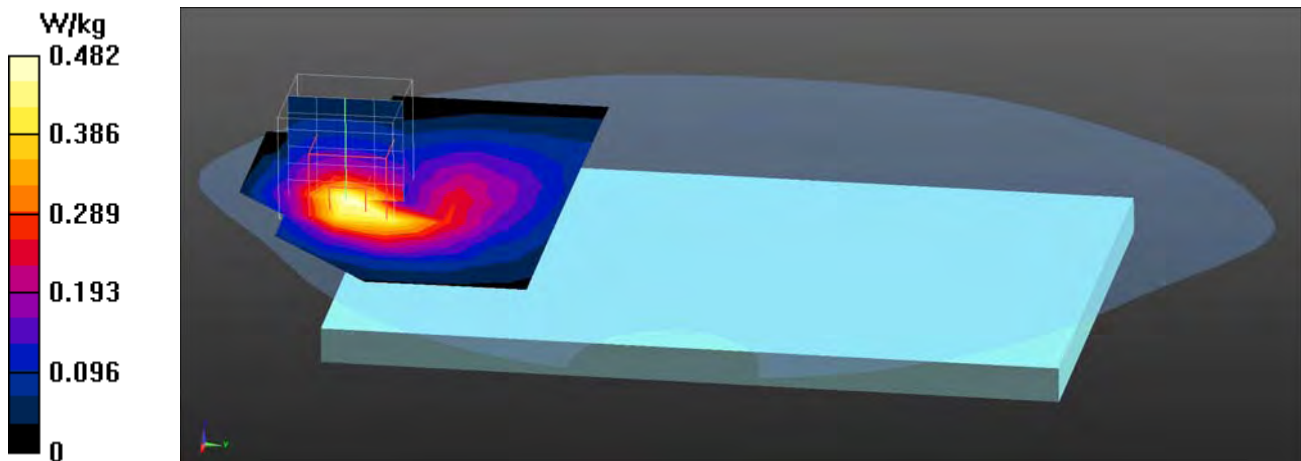
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(8.96, 8.96, 8.96); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right tablet; Type: SAM
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.482 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid:
dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.242 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.706 W/kg
SAR(1 g) = 0.414 W/kg; SAR(10 g) = 0.243 W/kg
Maximum value of SAR (measured) = 0.489 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/23

GSM_GPRS_850_1UP_189-Back 10mm

DUT: Tablet PC; Type: TH80GAx(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC GSM_850MHz; Frequency: 836.4 MHz;

Communication System PAR: 9.191 dB

Medium parameters used: $f = 836.4$ MHz; $\sigma = 1.02$ S/m; $\epsilon_r = 56.36$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.8

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(8.96, 8.96, 8.96); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right tablet; Type: SAM
- Measurement SW: DASYS2, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.742 W/kg

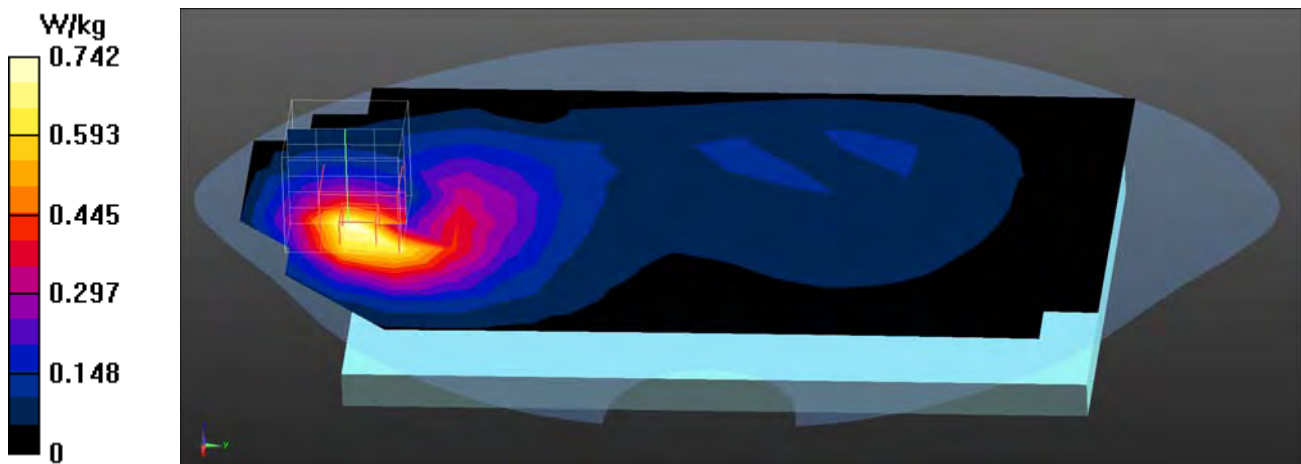
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.427 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 1.00 W/kg

SAR(1 g) = 0.623 W/kg; SAR(10 g) = 0.370 W/kg

Maximum value of SAR (measured) = 0.745 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/23

GSM_GPRS_850_1UP_251-Back 10mm

DUT: Tablet PC; Type: TH80GAX(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC GSM_850MHz; Frequency: 848.8 MHz;

Communication System PAR: 9.191 dB

Medium parameters used: $f = 848.8$ MHz; $\sigma = 1.03$ S/m; $\epsilon_r = 56.25$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.8

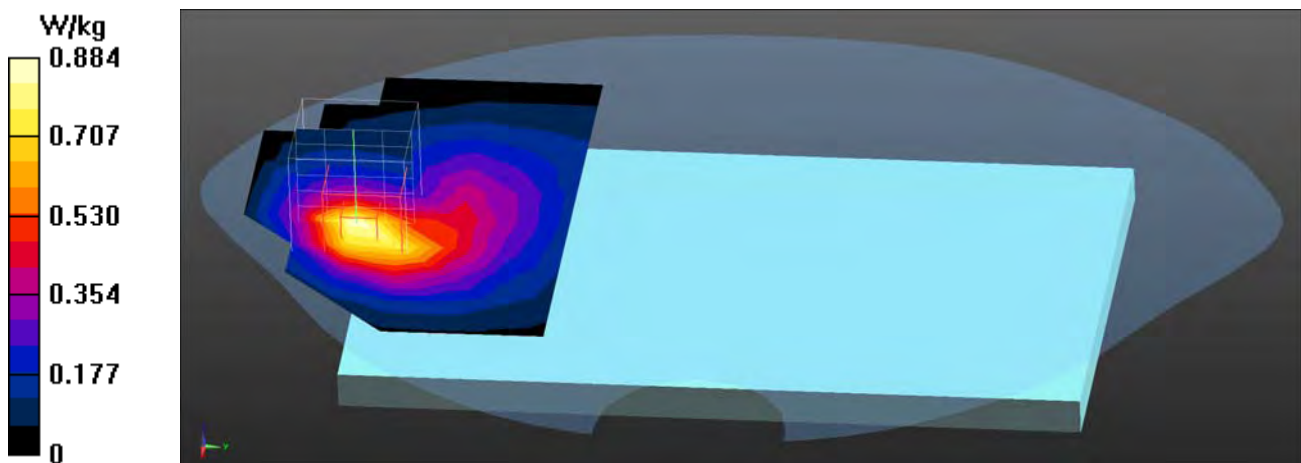
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(8.96, 8.96, 8.96); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right tablet; Type: SAM
- Measurement SW: DASYS2, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.884 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid:
dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.682 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 1.26 W/kg
SAR(1 g) = 0.747 W/kg; SAR(10 g) = 0.447 W/kg
Maximum value of SAR (measured) = 0.903 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/23

GSM_GPRS_850_1UP_189-Left-Side 10mm

DUT: Tablet PC; Type: TH80GAX(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC GSM_850MHz; Frequency: 836.4 MHz;

Communication System PAR: 9.191 dB

Medium parameters used: $f = 836.4$ MHz; $\sigma = 1.02$ S/m; $\epsilon_r = 56.36$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.8

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(8.96, 8.96, 8.96); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right tablet; Type: SAM
- Measurement SW: DASYS2, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.0320 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid:

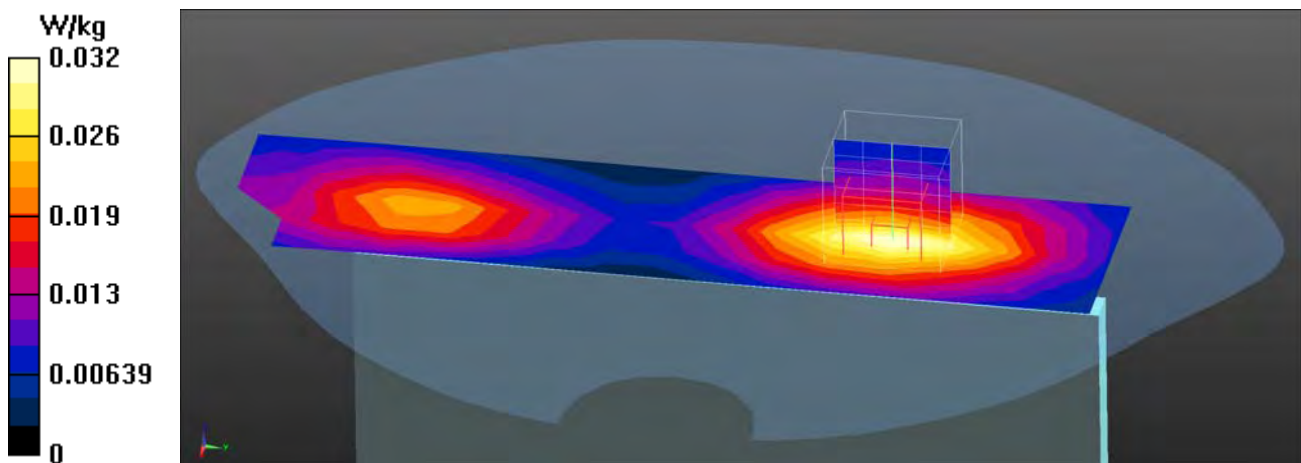
dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.748 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.0400 W/kg

SAR(1 g) = 0.028 W/kg; SAR(10 g) = 0.020 W/kg

Maximum value of SAR (measured) = 0.0322 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/23

GSM_GPRS_850_1UP_189-Right-Side 10mm

DUT: Tablet PC; Type: TH80GAx(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC GSM_850MHz; Frequency: 836.4 MHz;

Communication System PAR: 9.191 dB

Medium parameters used: $f = 836.4$ MHz; $\sigma = 1.02$ S/m; $\epsilon_r = 56.36$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.8

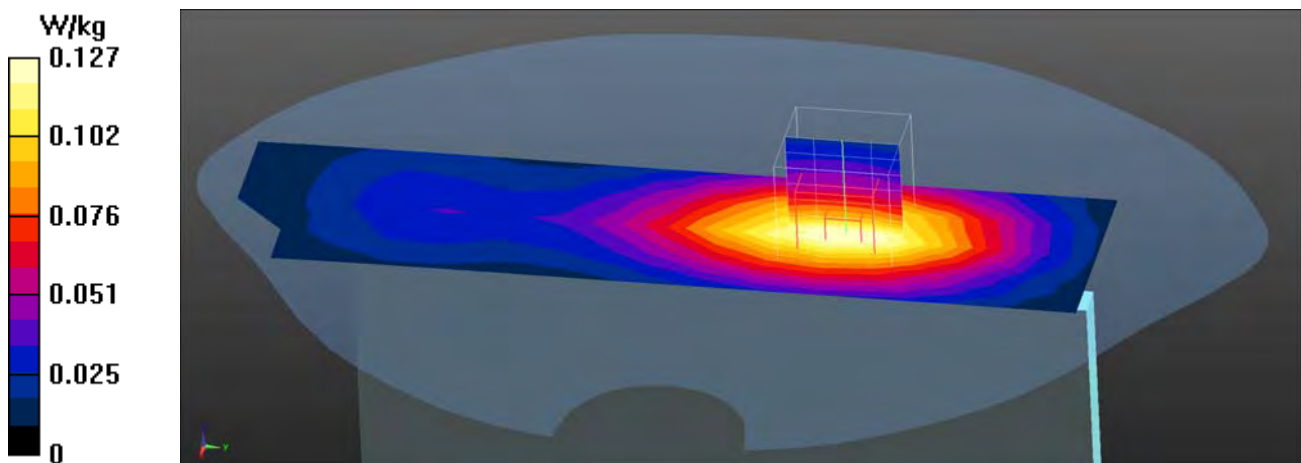
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(8.96, 8.96, 8.96); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right tablet; Type: SAM
- Measurement SW: DASYS2, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.127 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid:
dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.501 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.160 W/kg
SAR(1 g) = 0.115 W/kg; SAR(10 g) = 0.082 W/kg
Maximum value of SAR (measured) = 0.130 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/23

GSM_GPRS_850_1UP_189-Bottom 10mm

DUT: Tablet PC; Type: TH80GAX(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC GSM_850MHz; Frequency: 836.4 MHz;

Communication System PAR: 9.191 dB

Medium parameters used: $f = 836.4$ MHz; $\sigma = 1.02$ S/m; $\epsilon_r = 56.36$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.8

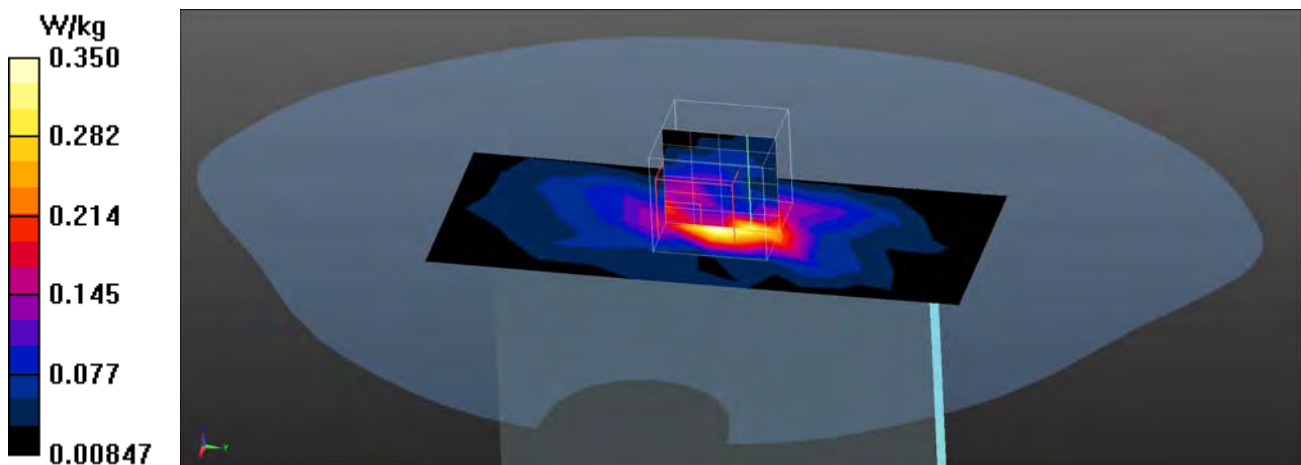
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

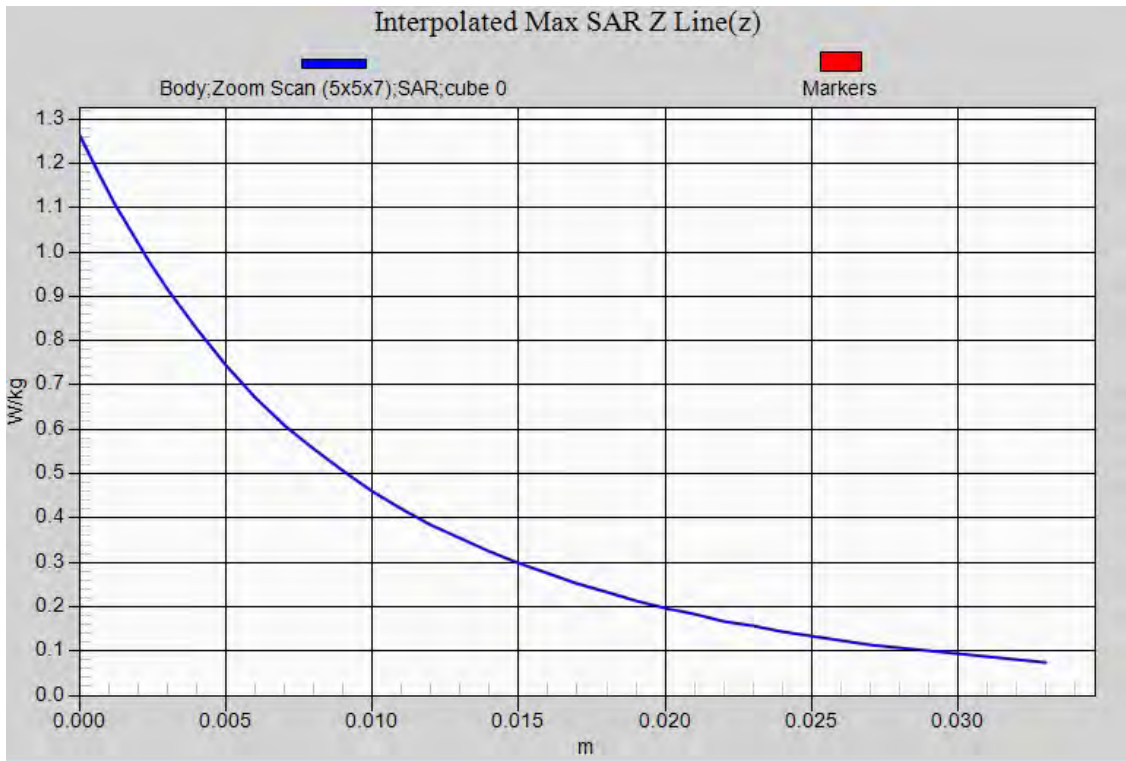
- Probe: EX3DV4 - SN3698; ConvF(8.96, 8.96, 8.96); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right tablet; Type: SAM
- Measurement SW: DASYS2, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.350 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid:
dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.70 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 0.533 W/kg
SAR(1 g) = 0.207 W/kg; SAR(10 g) = 0.118 W/kg
Maximum value of SAR (measured) = 0.324 W/kg



GSM 850 EUT Back (GPRS 1UP 10mm) Z-Axis plot
Channel: 251



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/26

PCS_GPRS_1900_2UP_661-Front 10mm

DUT: Tablet PC; Type: TH80Gax(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC PCS_1900MHz_GPRS&EGPRS-2 Slot; Frequency: 1880 MHz;

Communication System PAR: 6.128 dB

Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.56 \text{ S/m}$; $\epsilon_r = 54.53$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Ambient Temperature ($^{\circ}\text{C}$) : 21.8, Liquid Temperature ($^{\circ}\text{C}$) : 20.1

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.08, 7.08, 7.08); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left tablet; Type: SAM
- Measurement SW: DASYS2, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x17x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.181 W/kg

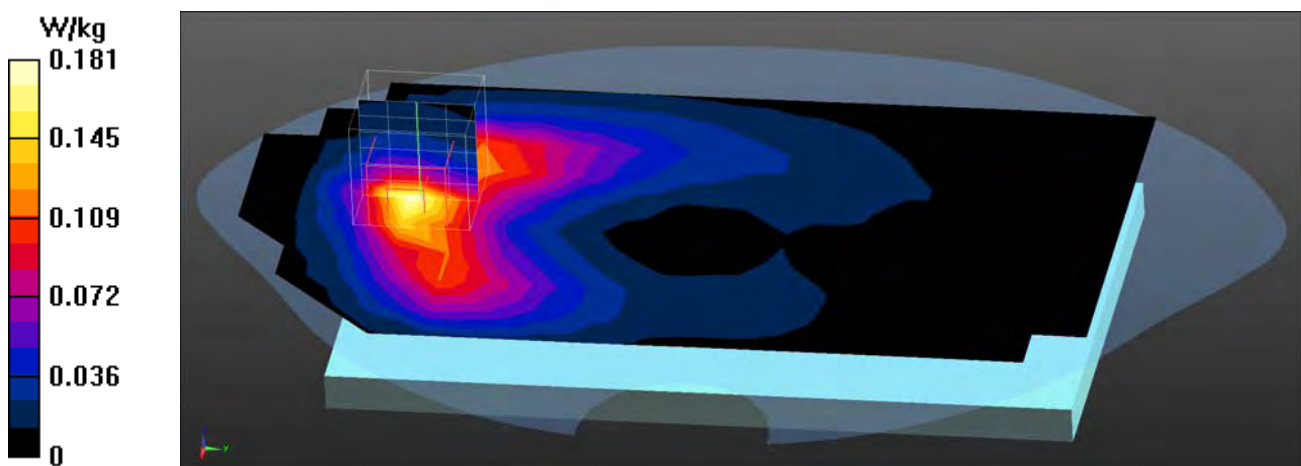
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 2.142 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.271 W/kg

SAR(1 g) = 0.151 W/kg; SAR(10 g) = 0.084 W/kg

Maximum value of SAR (measured) = 0.177 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/26

PCS_GPRS_1900_2UP_661-Back 10mm

DUT: Tablet PC; Type: TH80GAx(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC PCS_1900MHz_GPRS&EGPRS-2 Slot;

Frequency: 1880 MHz; Communication System PAR: 6.128 dB

Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.56 \text{ S/m}$; $\epsilon_r = 54.53$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Ambient Temperature ($^{\circ}\text{C}$) : 21.8, Liquid Temperature ($^{\circ}\text{C}$) : 20.1

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.08, 7.08, 7.08); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left tablet; Type: SAM
- Measurement SW: DASYS2, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x17x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.136 W/kg

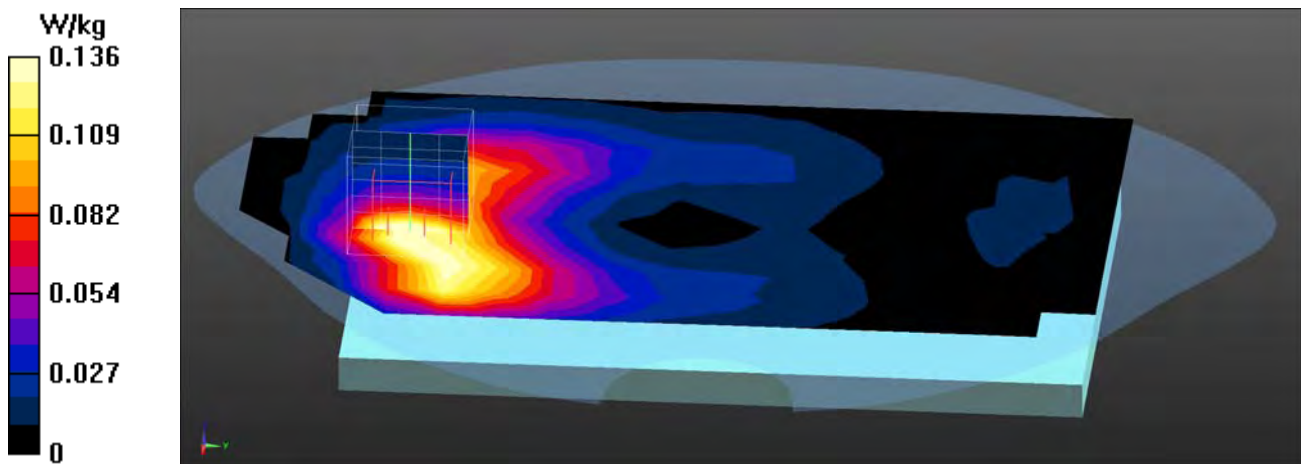
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 2.417 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 0.226 W/kg

SAR(1 g) = 0.128 W/kg; SAR(10 g) = 0.075 W/kg

Maximum value of SAR (measured) = 0.158 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/26

PCS_GPRS_1900_2UP_661-Left-Side 10mm

DUT: Tablet PC; Type: TH80GAX(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC PCS_1900MHz_GPRS&EGPRS-2 Slot;

Frequency: 1880 MHz; Communication System PAR: 6.128 dB

Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.56 \text{ S/m}$; $\epsilon_r = 54.53$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Ambient Temperature ($^{\circ}\text{C}$) : 21.8, Liquid Temperature ($^{\circ}\text{C}$) : 20.1

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.08, 7.08, 7.08); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left tablet; Type: SAM
- Measurement SW: DASYS2, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x17x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.0310 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid:

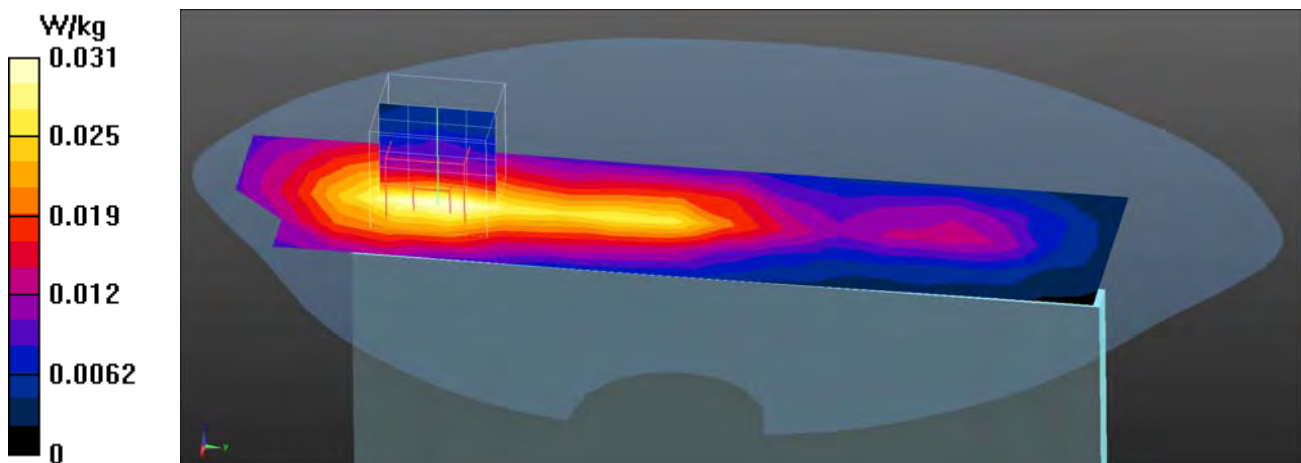
$dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 3.623 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 0.0430 W/kg

SAR(1 g) = 0.028 W/kg; SAR(10 g) = 0.018 W/kg

Maximum value of SAR (measured) = 0.0325 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/26

PCS_GPRS_1900_2UP_661-Right-Side 10mm

DUT: Tablet PC; Type: TH80GAx(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC PCS_1900MHz_GPRS&EGPRS-2 Slot;

Frequency: 1880 MHz; Communication System PAR: 6.128 dB

Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.56 \text{ S/m}$; $\epsilon_r = 54.53$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Ambient Temperature ($^{\circ}\text{C}$) : 21.8, Liquid Temperature ($^{\circ}\text{C}$) : 20.1

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.08, 7.08, 7.08); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left tablet; Type: SAM
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x17x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.0406 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid:

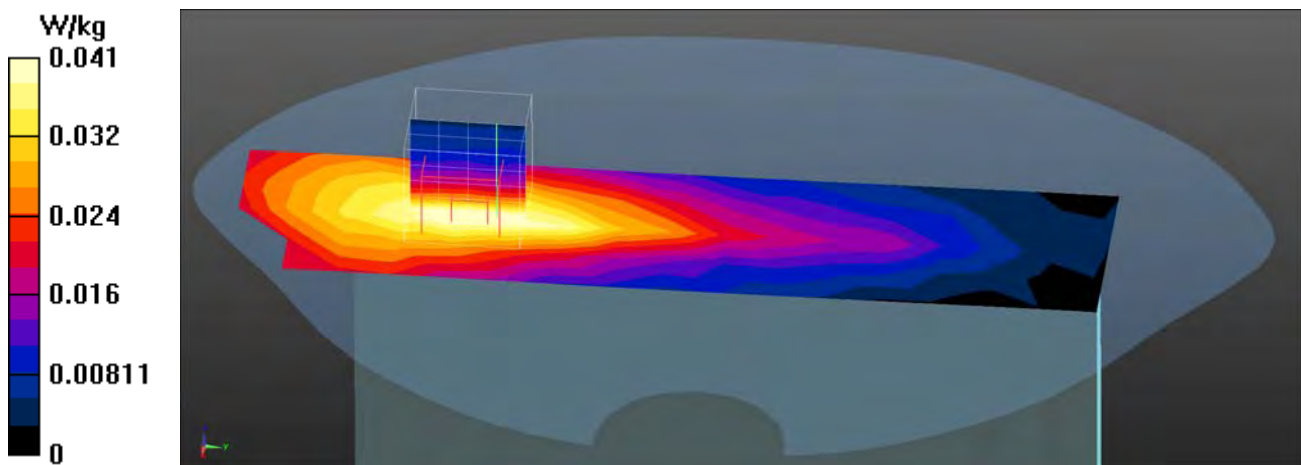
$dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 3.676 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 0.0560 W/kg

SAR(1 g) = 0.036 W/kg; SAR(10 g) = 0.024 W/kg

Maximum value of SAR (measured) = 0.0427 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/26

PCS_GPRS_1900_2UP_661-Bottom 10mm

DUT: Tablet PC; Type: TH80GAX(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC PCS_1900MHz_GPRS&EGPRS-2 Slot;

Frequency: 1880 MHz; Communication System PAR: 6.128 dB

Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.56 \text{ S/m}$; $\epsilon_r = 54.53$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Ambient Temperature ($^{\circ}\text{C}$) : 21.8, Liquid Temperature ($^{\circ}\text{C}$) : 20.1

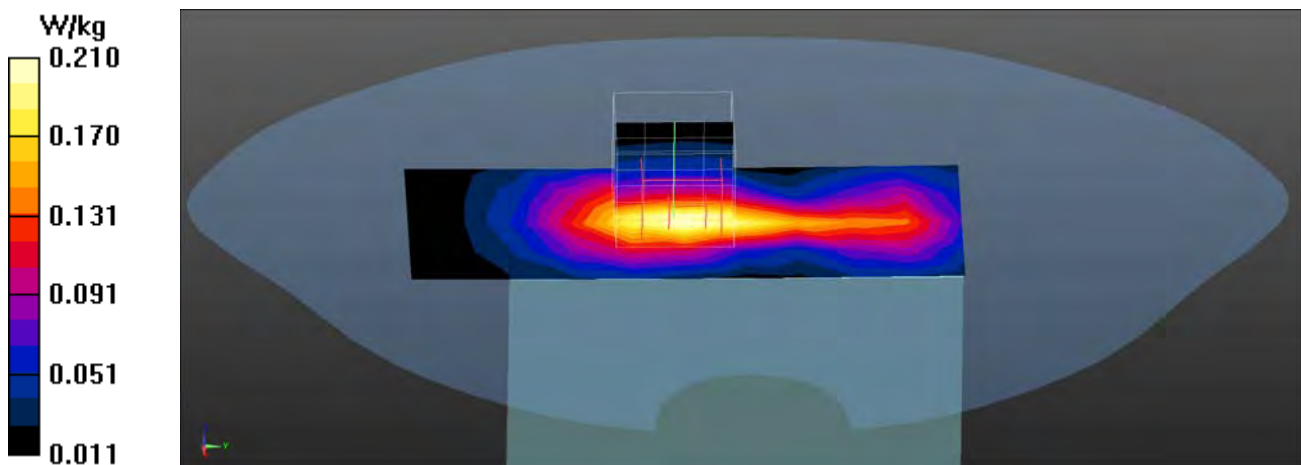
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

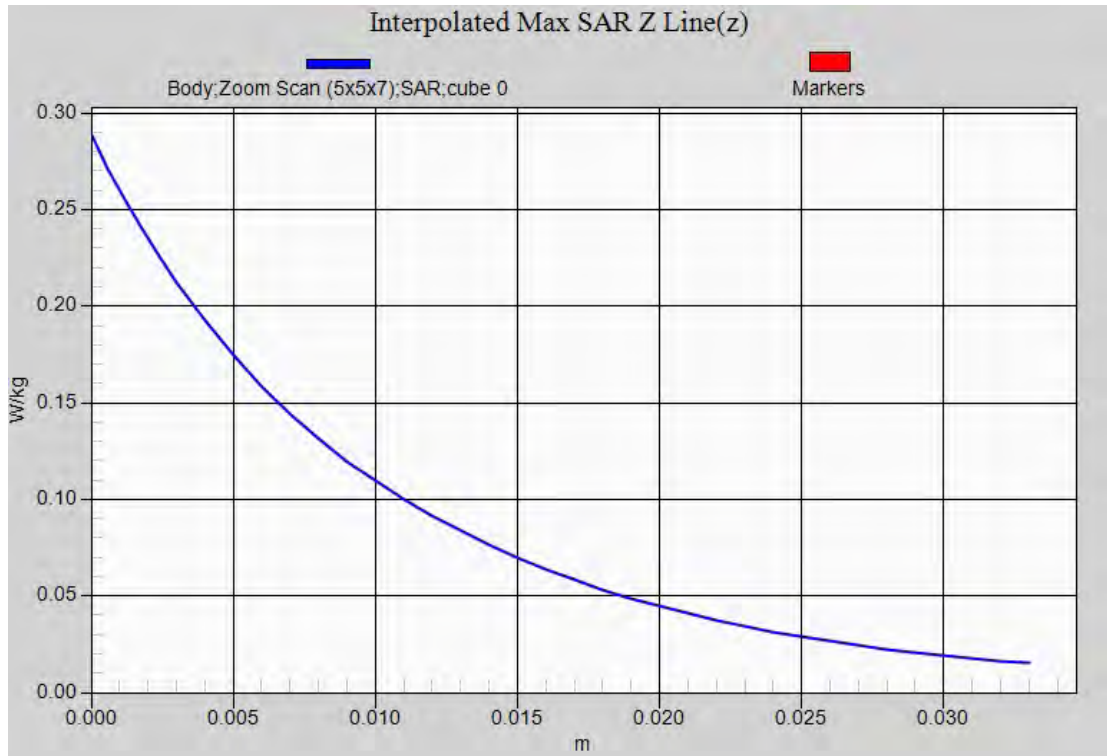
- Probe: EX3DV4 - SN3698; ConvF(7.08, 7.08, 7.08); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left tablet; Type: SAM
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (measured) = 0.210 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid:
 $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 11.10 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.289 W/kg
SAR(1 g) = 0.179 W/kg; SAR(10 g) = 0.110 W/kg
Maximum value of SAR (measured) = 0.211 W/kg



PCS 1900 EUT Bottom (GPRS 2UP 10mm) Z-Axis plot
Channel: 661



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/26

WCDMA_Band 2_RMC_9400-Front 10mm

DUT: Tablet PC; Type: TH80Gax(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC WCDMA_Band-2; Frequency: 1880 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.56$ S/m; $\epsilon_r = 54.53$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.1

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.08, 7.08, 7.08); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left tablet; Type: SAM
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.387 W/kg

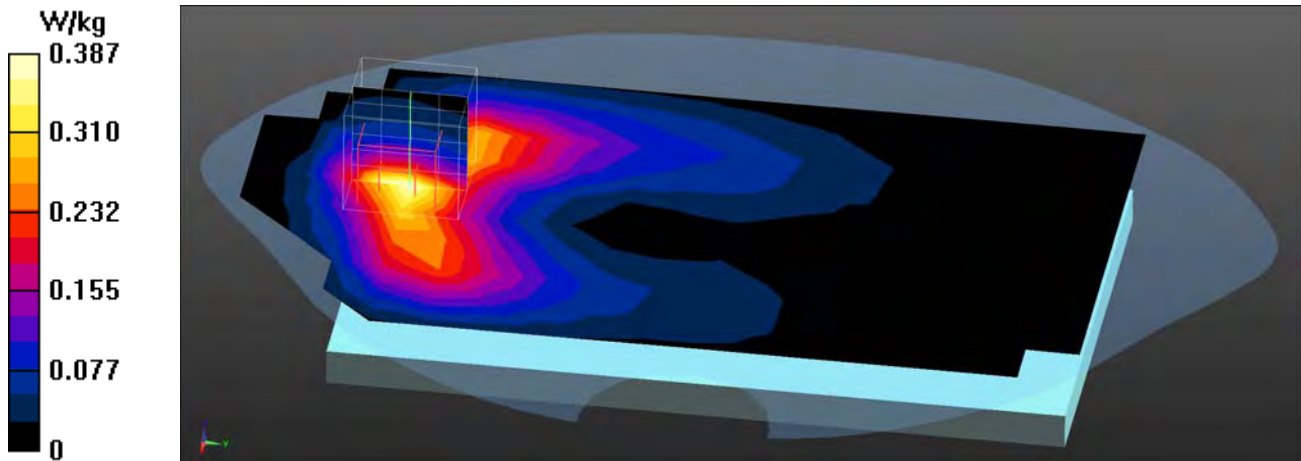
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.764 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 0.575 W/kg

SAR(1 g) = 0.327 W/kg; SAR(10 g) = 0.183 W/kg

Maximum value of SAR (measured) = 0.394 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/26

WCDMA_Band 2_RMC_9400-Back 10mm

DUT: Tablet PC; Type: TH80GAX(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC WCDMA_Band-2; Frequency: 1880 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.56$ S/m; $\epsilon_r = 54.53$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.1

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.08, 7.08, 7.08); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left tablet; Type: SAM
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.330 W/kg

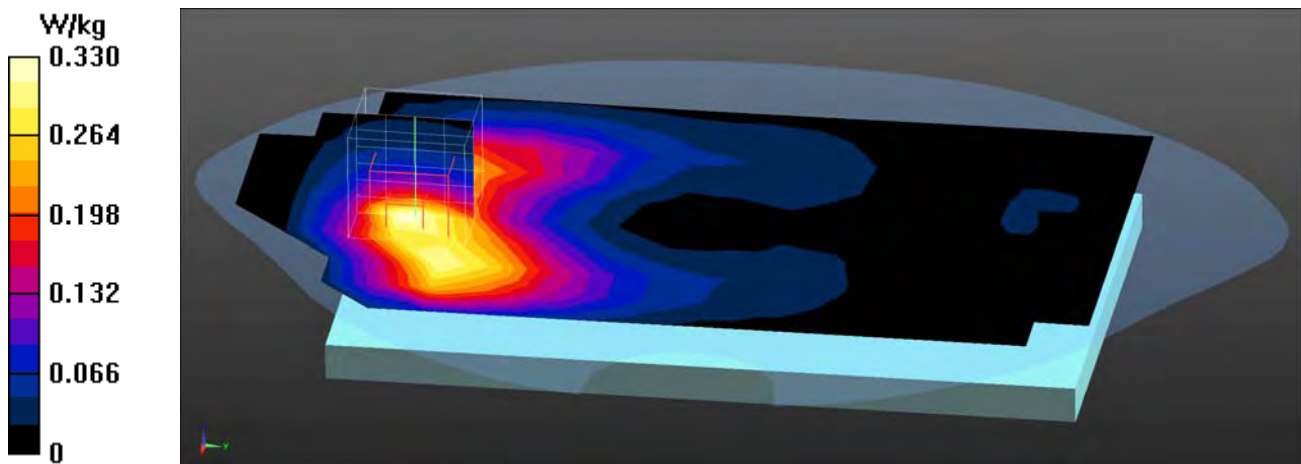
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.664 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.511 W/kg

SAR(1 g) = 0.292 W/kg; SAR(10 g) = 0.169 W/kg

Maximum value of SAR (measured) = 0.351 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/26

WCDMA_Band 2_RMC_9400-Left-Side 10mm

DUT: Tablet PC; Type: TH80GAX(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC WCDMA_Band-2; Frequency: 1880 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.56$ S/m; $\epsilon_r = 54.53$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.1

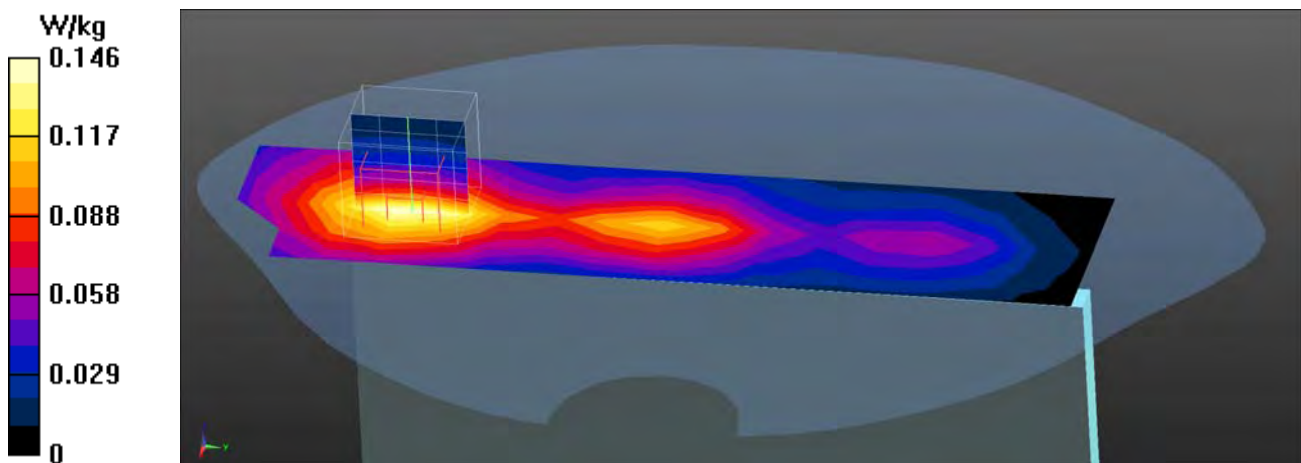
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.08, 7.08, 7.08); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left tablet; Type: SAM
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.146 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid:
dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.865 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.201 W/kg
SAR(1 g) = 0.127 W/kg; SAR(10 g) = 0.079 W/kg
Maximum value of SAR (measured) = 0.150 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/26

WCDMA_Band 2_RMC_9400-Right-Side 10mm

DUT: Tablet PC; Type: TH80GAX(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC WCDMA_Band-2; Frequency: 1880 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.56$ S/m; $\epsilon_r = 54.53$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.1

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.08, 7.08, 7.08); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left tablet; Type: SAM
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.0845 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid:

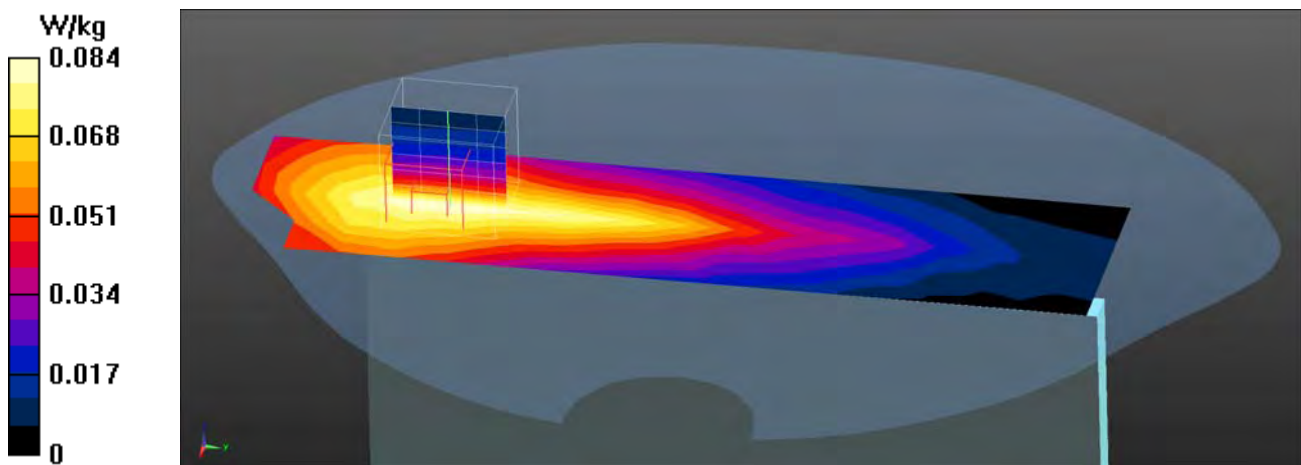
dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.726 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.115 W/kg

SAR(1 g) = 0.073 W/kg; SAR(10 g) = 0.048 W/kg

Maximum value of SAR (measured) = 0.0860 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/26

WCDMA_Band 2_RMC_9400-Bottom 10mm

DUT: Tablet PC; Type: TH80GAX(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC WCDMA_Band-2; Frequency: 1880 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.56$ S/m; $\epsilon_r = 54.53$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.8, Liquid Temperature (°C) : 20.1

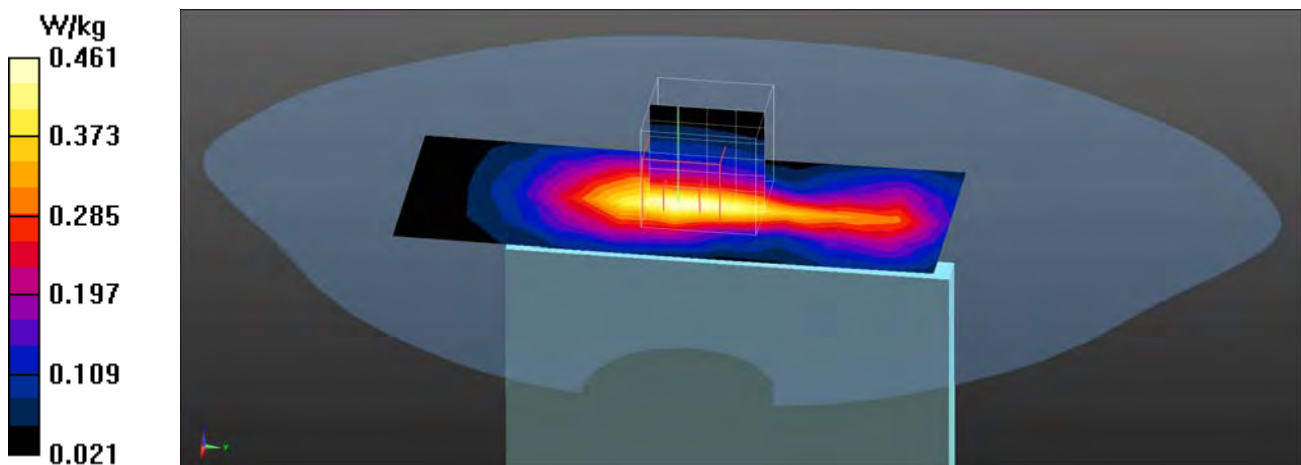
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

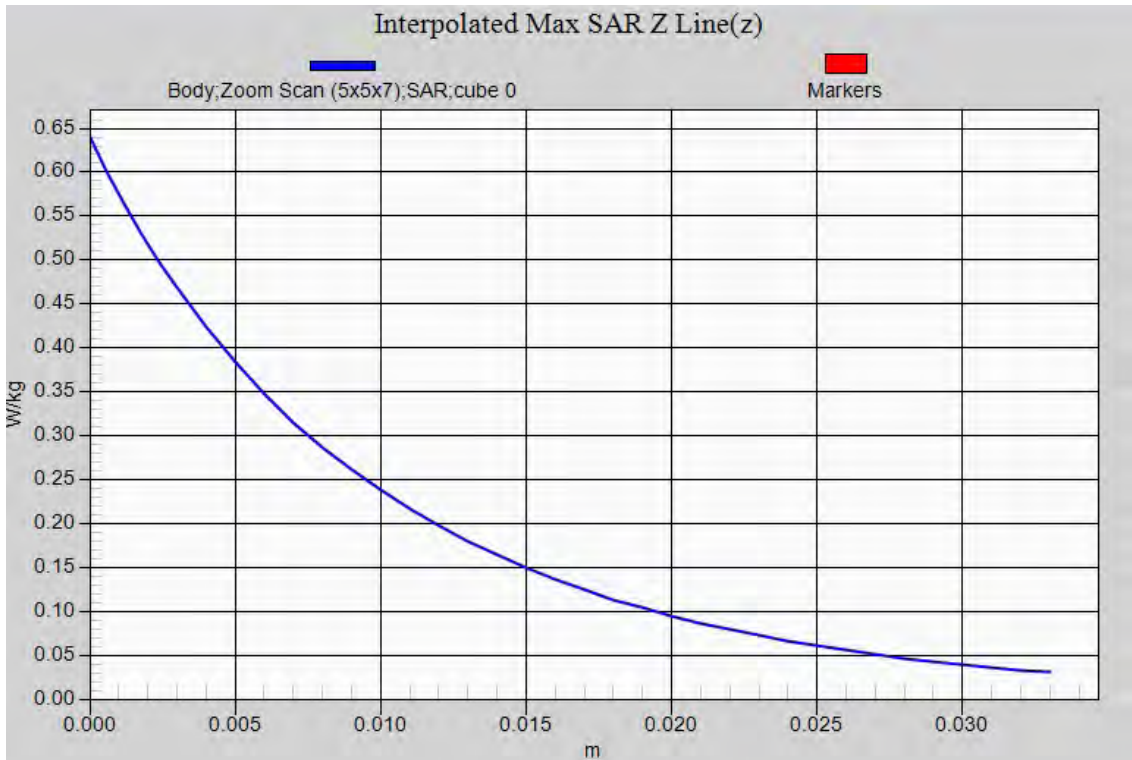
- Probe: EX3DV4 - SN3698; ConvF(7.08, 7.08, 7.08); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left tablet; Type: SAM
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.461 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid:
dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.58 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.640 W/kg
SAR(1 g) = 0.392 W/kg; SAR(10 g) = 0.237 W/kg
Maximum value of SAR (measured) = 0.468 W/kg



WCDMA Band 2 EUT Bottom (10mm) Z-Axis plot
Channel: 9400



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/23

WCDMA_Band 5_RMC_4183-Front 10mm

DUT: Tablet PC; Type: TH80GAX(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC WCDMA_Band-5; Frequency: 836.6 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 836.6$ MHz; $\sigma = 1.02$ S/m; $\epsilon_r = 56.36$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.8

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(8.96, 8.96, 8.96); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right tablet; Type: SAM
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.229 W/kg

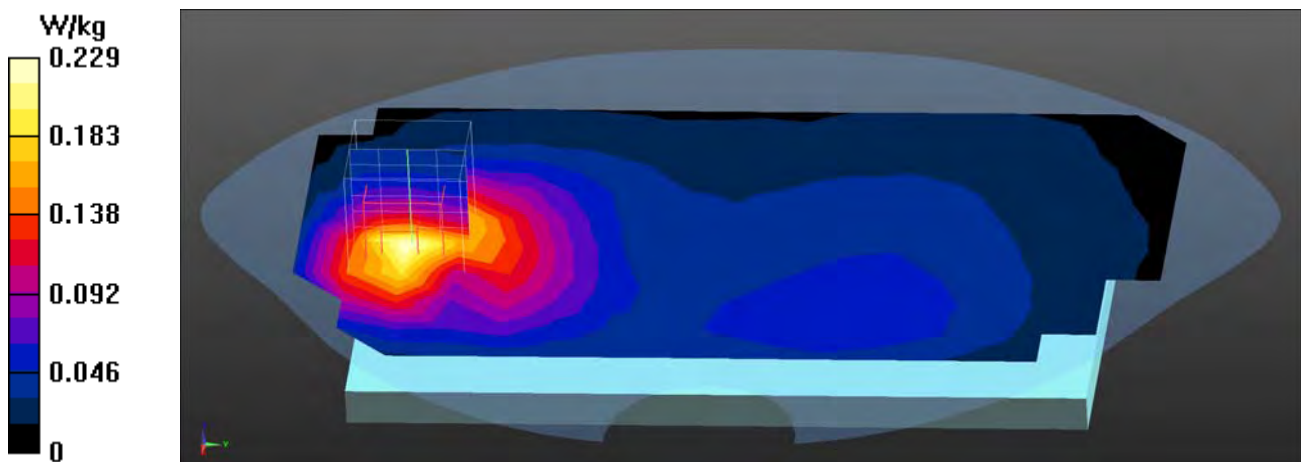
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.898 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 0.306 W/kg

SAR(1 g) = 0.196 W/kg; SAR(10 g) = 0.127 W/kg

Maximum value of SAR (measured) = 0.228 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/23

WCDMA_Band 5_RMC_4132-Back 10mm

DUT: Tablet PC; Type: TH80GAx(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC WCDMA_Band-5; Frequency: 826.4 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 826.4$ MHz; $\sigma = 1.01$ S/m; $\epsilon_r = 56.45$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.8

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(8.96, 8.96, 8.96); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right tablet; Type: SAM
- Measurement SW: DASYS2, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.355 W/kg

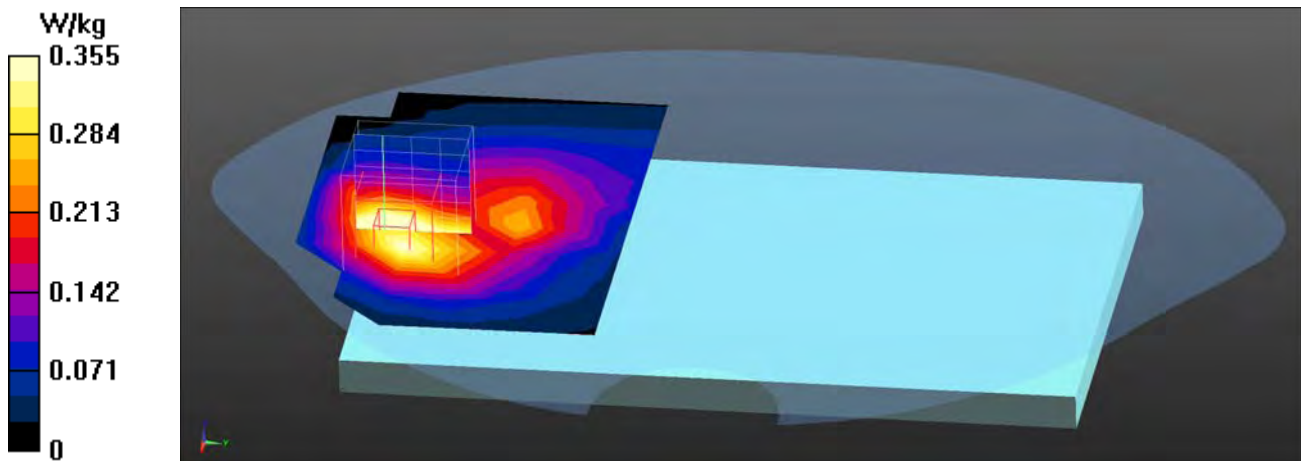
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid:
dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.772 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 0.786 W/kg

SAR(1 g) = 0.472 W/kg; SAR(10 g) = 0.287 W/kg

Maximum value of SAR (measured) = 0.555 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/23

WCDMA_Band 5_RMC_4183-Back 10mm

DUT: Tablet PC; Type: TH80GAX(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC WCDMA_Band-5; Frequency: 836.6 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 836.6$ MHz; $\sigma = 1.02$ S/m; $\epsilon_r = 56.36$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.8

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(8.96, 8.96, 8.96); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right tablet; Type: SAM
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.705 W/kg

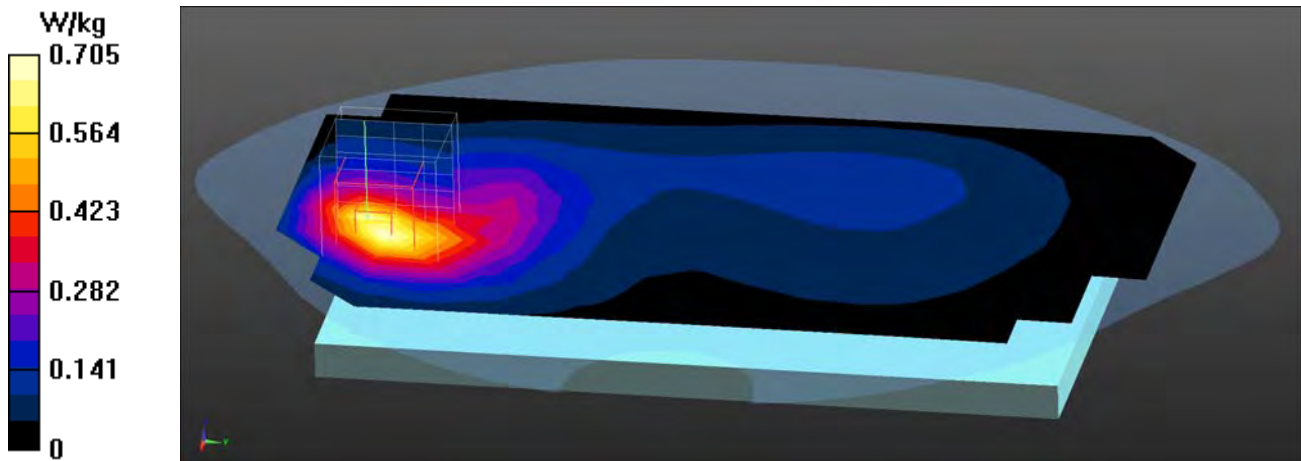
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.792 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 1.00 W/kg

SAR(1 g) = 0.602 W/kg; SAR(10 g) = 0.364 W/kg

Maximum value of SAR (measured) = 0.712 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/23

WCDMA_Band 5_RMC_4233-Back 10mm

DUT: Tablet PC; Type: TH80Gax(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC WCDMA_Band-5; Frequency: 846.6 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 846.6$ MHz; $\sigma = 1.03$ S/m; $\epsilon_r = 56.27$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.8

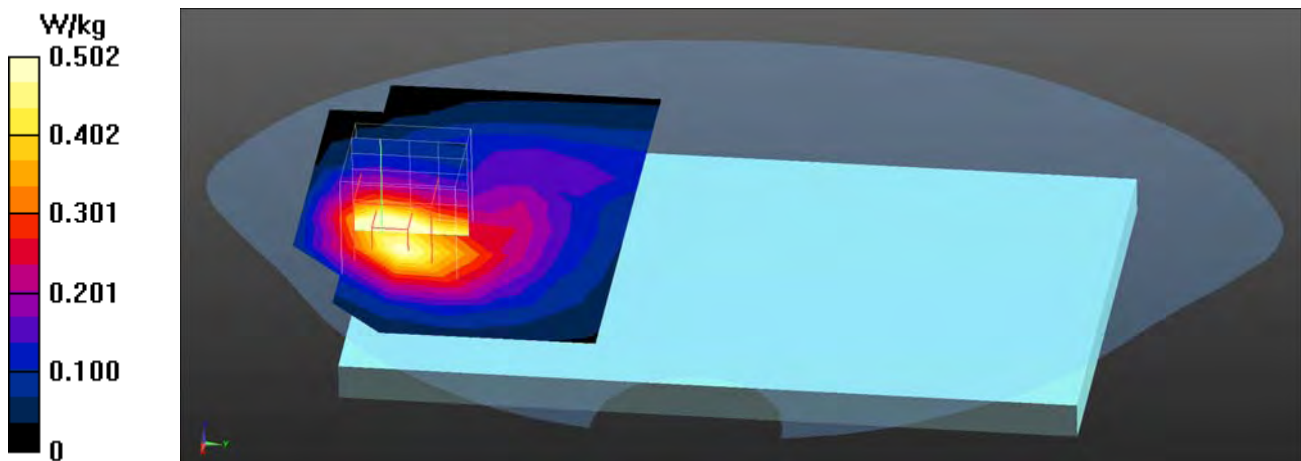
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(8.96, 8.96, 8.96); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right tablet; Type: SAM
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (10x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.502 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid:
dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.293 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 1.13 W/kg
SAR(1 g) = 0.670 W/kg; SAR(10 g) = 0.404 W/kg
Maximum value of SAR (measured) = 0.794 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/23

WCDMA_Band 5_RMC_4183-Left-Side 10mm

DUT: Tablet PC; Type: TH80Gax(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC WCDMA_Band-5; Frequency: 836.6 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 836.6$ MHz; $\sigma = 1.02$ S/m; $\epsilon_r = 56.36$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.8

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(8.96, 8.96, 8.96); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right tablet; Type: SAM
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.0270 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid:

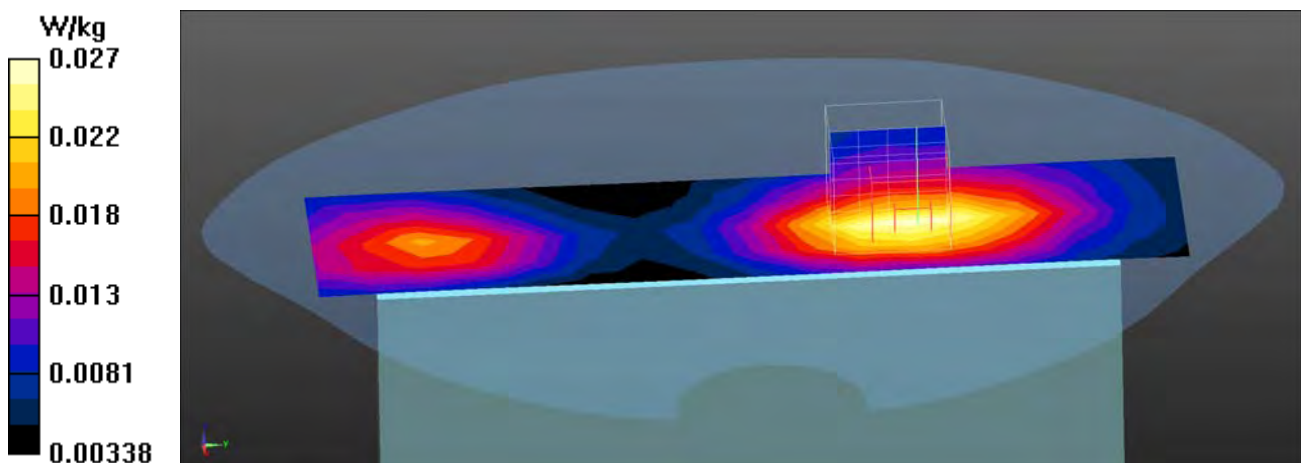
dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.670 V/m; Power Drift = -0.19 dB

Peak SAR (extrapolated) = 0.0330 W/kg

SAR(1 g) = 0.025 W/kg; SAR(10 g) = 0.019 W/kg

Maximum value of SAR (measured) = 0.0277 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/23

WCDMA_Band 5_RMC_4183-Right-Side 10mm

DUT: Tablet PC; Type: TH80GAX(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC WCDMA_Band-5; Frequency: 836.6 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 836.6$ MHz; $\sigma = 1.02$ S/m; $\epsilon_r = 56.36$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.8

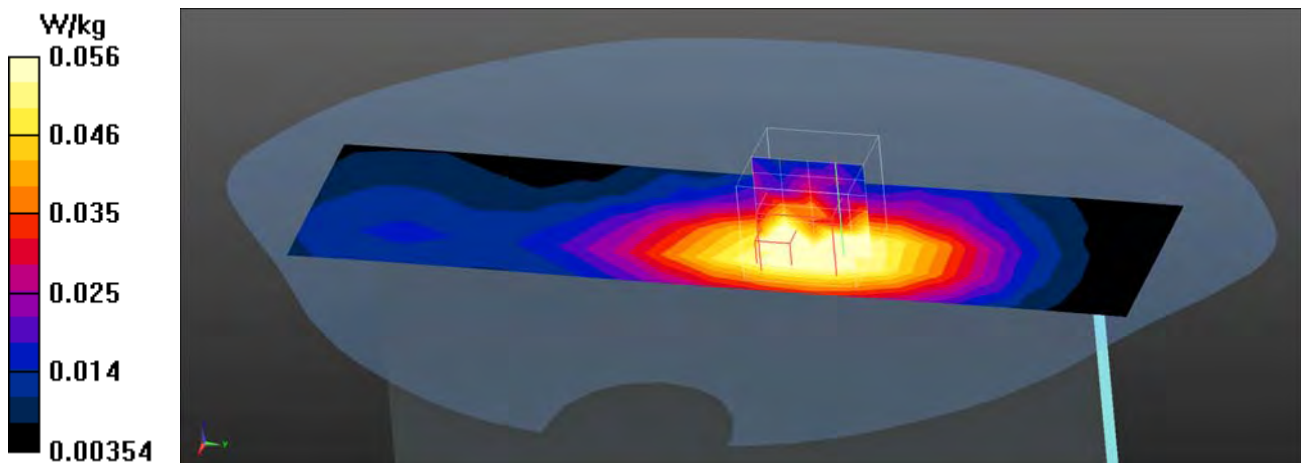
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(8.96, 8.96, 8.96); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right tablet; Type: SAM
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0560 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid:
dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.449 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 0.164 W/kg
SAR(1 g) = 0.074 W/kg; SAR(10 g) = 0.048 W/kg
Maximum value of SAR (measured) = 0.0918 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/02/23

WCDMA_Band 5_RMC_4183-Bottom 10mm

DUT: Tablet PC; Type: TH80GAX(x=0~9, A~Z or blank or "-")

Communication System: UID 0, FCC WCDMA_Band-5; Frequency: 836.6 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 836.6$ MHz; $\sigma = 1.02$ S/m; $\epsilon_r = 56.36$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.8

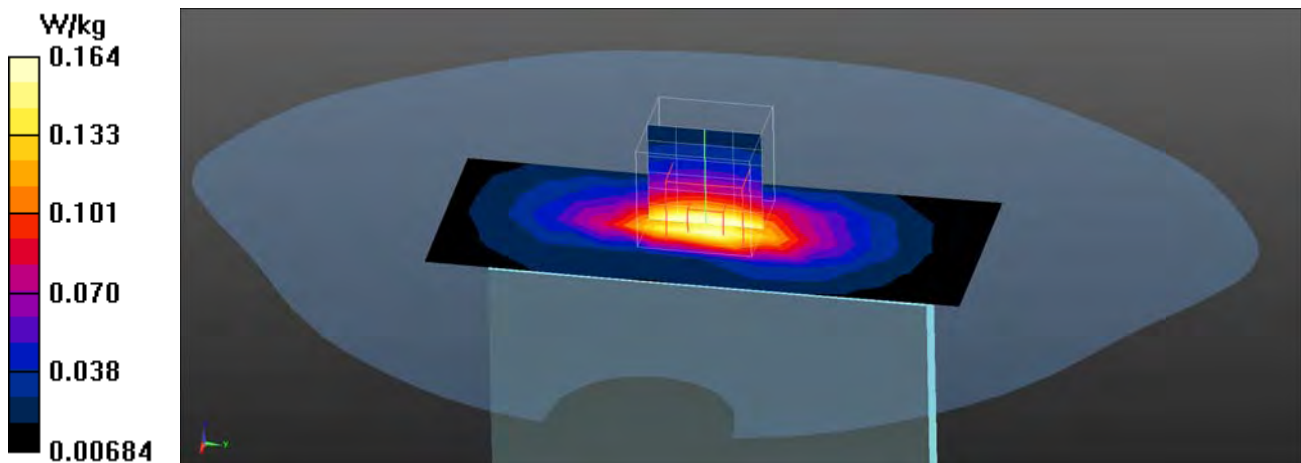
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

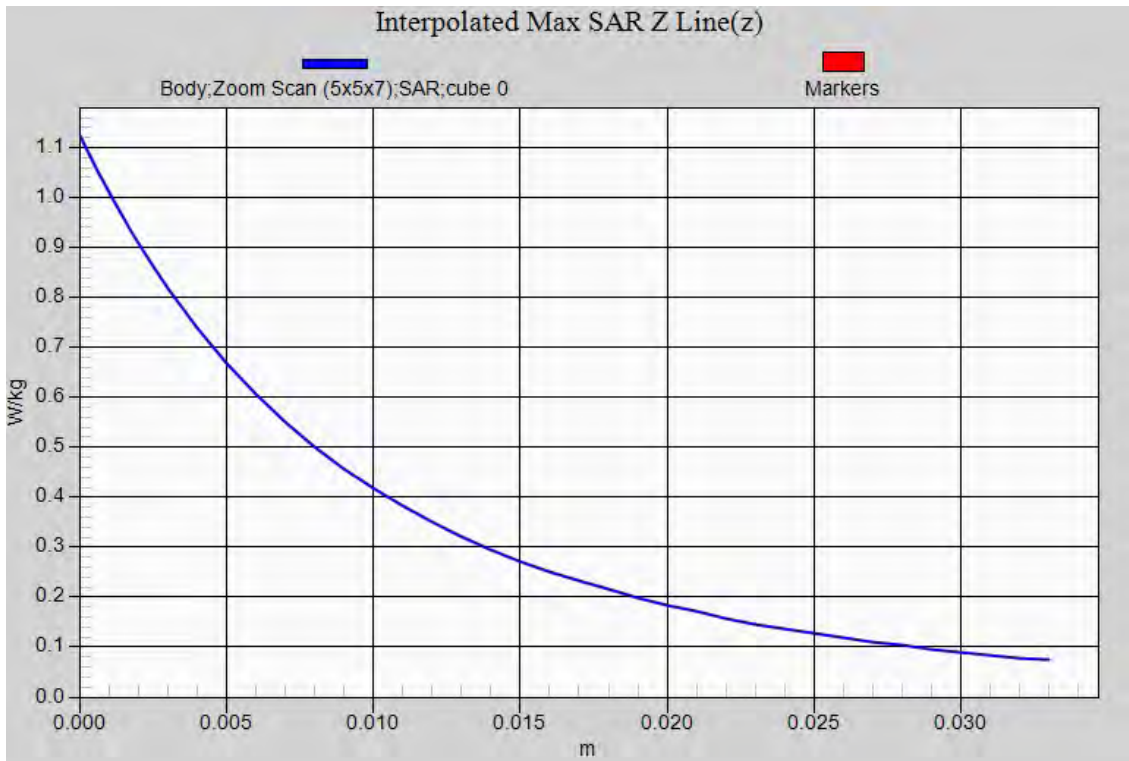
- Probe: EX3DV4 - SN3698; ConvF(8.96, 8.96, 8.96); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right tablet; Type: SAM
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.164 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid:
dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.71 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.254 W/kg
SAR(1 g) = 0.155 W/kg; SAR(10 g) = 0.091 W/kg
Maximum value of SAR (measured) = 0.187 W/kg



WCDMA Band 5 EUT Back (10mm) Z-Axis plot
Channel: 4233



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/3/26

802.11b_11-Front 10mm

DUT: Tablet PC; Type: TH80GAx(x=0~9, A~Z or blank or "-")

Communication System: UID 0, WLAN 2.4G; Frequency: 2462 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 2462$ MHz; $\sigma = 1.99$ S/m; $\epsilon_r = 52.59$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 21.1

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(6.75, 6.75, 6.75); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (12x19x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.230 W/kg

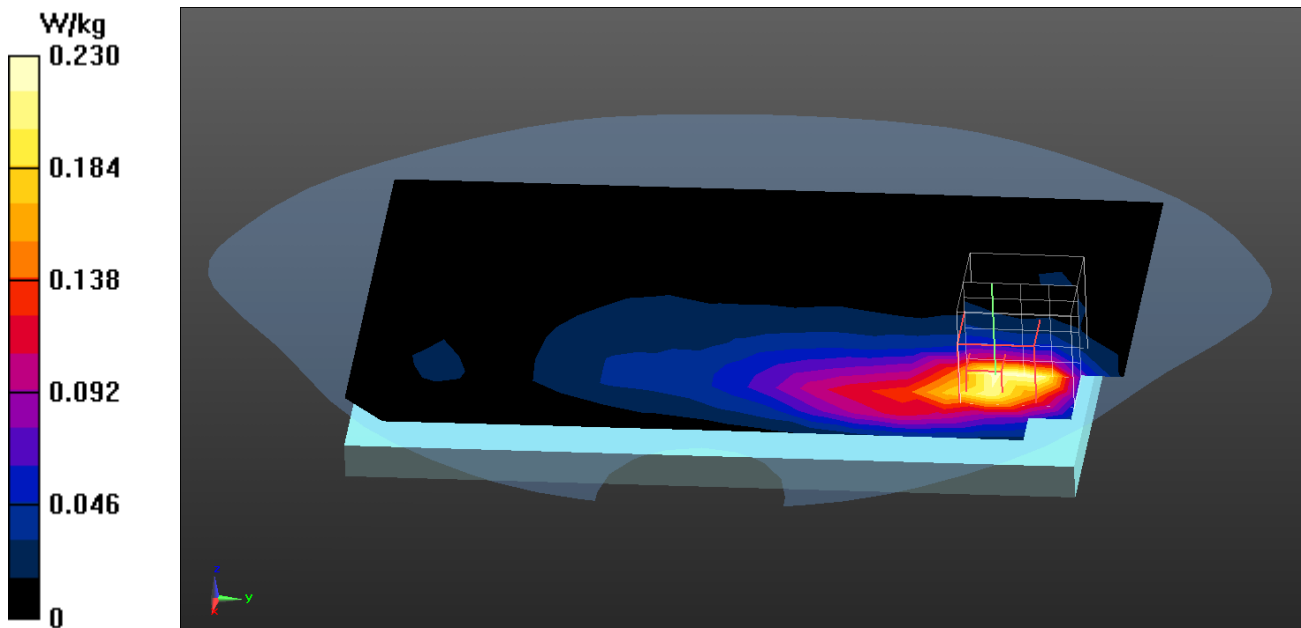
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.386 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 0.403 W/kg

SAR(1 g) = 0.197 W/kg; SAR(10 g) = 0.100 W/kg

Maximum value of SAR (measured) = 0.240 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/3/26

802.11b_11-Back 10mm

DUT: Tablet PC; Type: TH80GAx(x=0~9, A~Z or blank or "-")

Communication System: UID 0, WLAN 2.4G; Frequency: 2462 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 2462$ MHz; $\sigma = 1.99$ S/m; $\epsilon_r = 52.59$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 21.1

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(6.75, 6.75, 6.75); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASYS2, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (12x19x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.146 W/kg

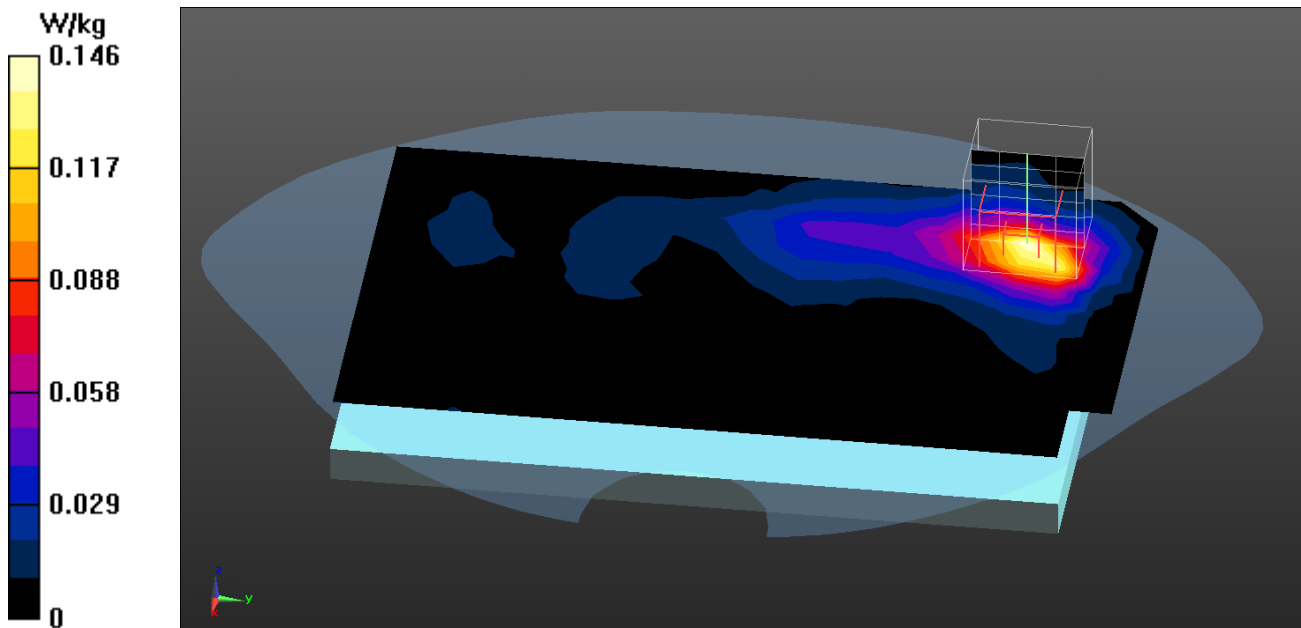
Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.497 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 0.225 W/kg

SAR(1 g) = 0.116 W/kg; SAR(10 g) = 0.061 W/kg

Maximum value of SAR (measured) = 0.149 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/3/26

802.11b_11-Right-Side 10mm

DUT: Tablet PC; Type: TH80GAx(x=0~9, A~Z or blank or "-")

Communication System: UID 0, WLAN 2.4G; Frequency: 2462 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 2462$ MHz; $\sigma = 1.99$ S/m; $\epsilon_r = 52.59$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 21.1

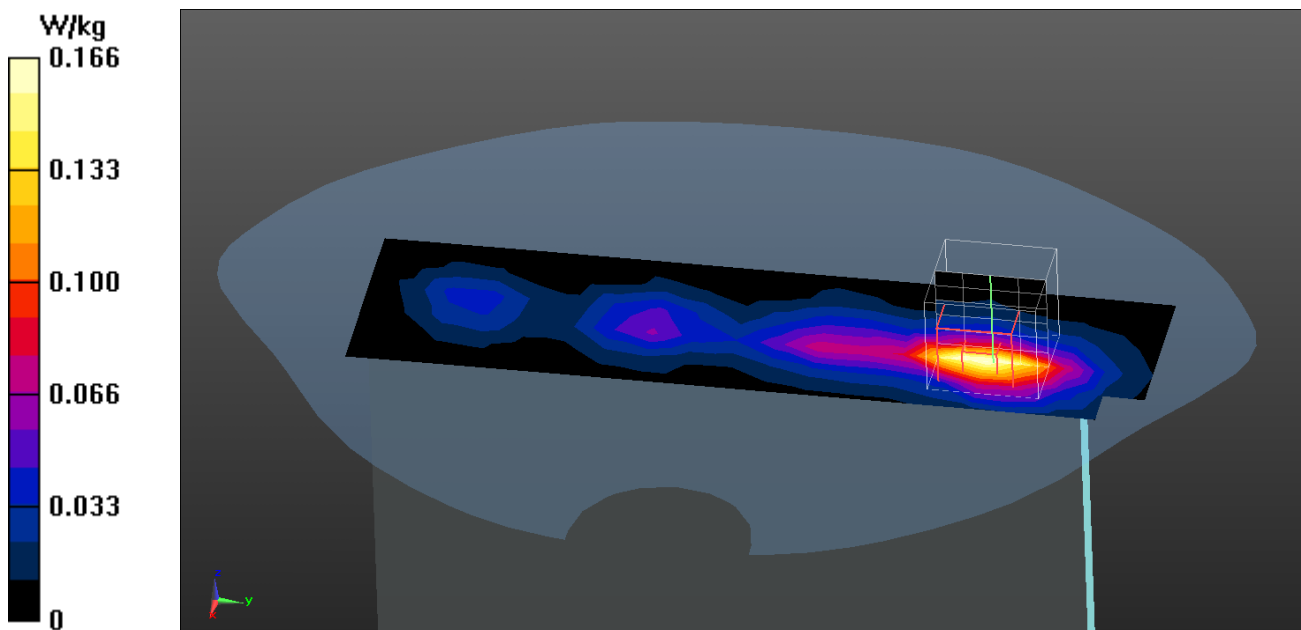
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(6.75, 6.75, 6.75); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (6x20x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.166 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid:
dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.133 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.287 W/kg
SAR(1 g) = 0.143 W/kg; SAR(10 g) = 0.069 W/kg
Maximum value of SAR (measured) = 0.185 W/kg



Test Laboratory: QuieTek-a DEKRA

Date/Time: 2016/3/26

802.11b_11-Top 10mm

DUT: Tablet PC; Type: TH80GAx(x=0~9, A~Z or blank or "-")

Communication System: UID 0, WLAN 2.4G; Frequency: 2462 MHz;

Communication System PAR: 0 dB

Medium parameters used: $f = 2462$ MHz; $\sigma = 1.99$ S/m; $\epsilon_r = 52.59$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 21.1

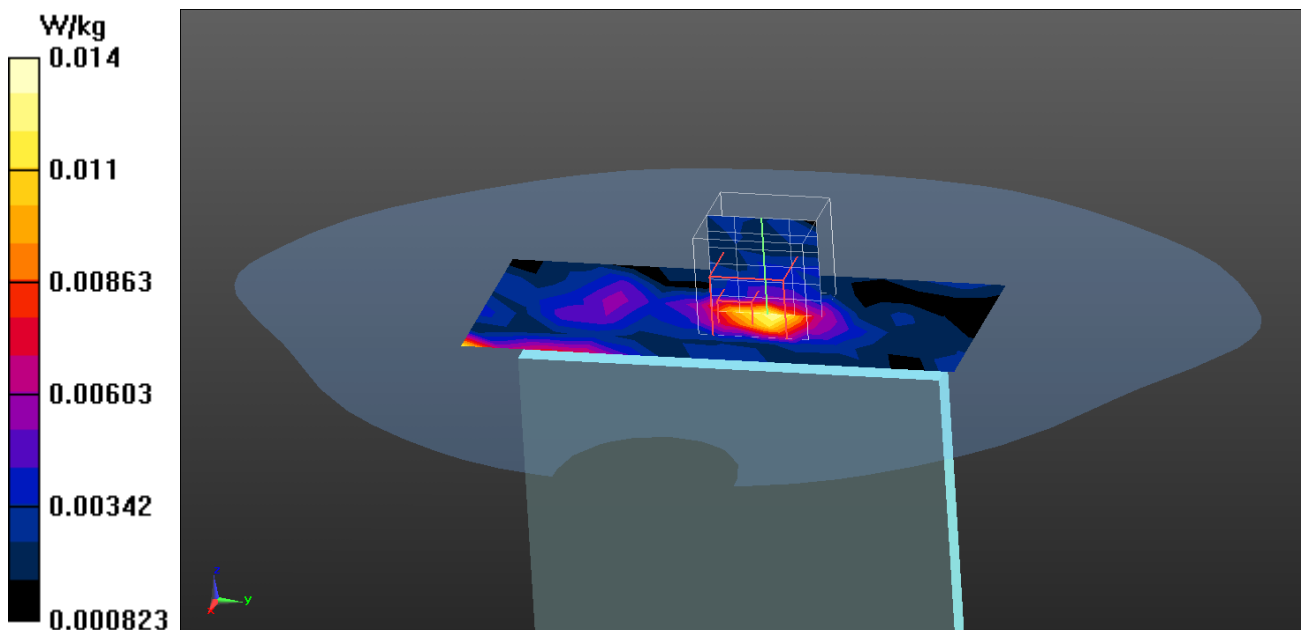
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

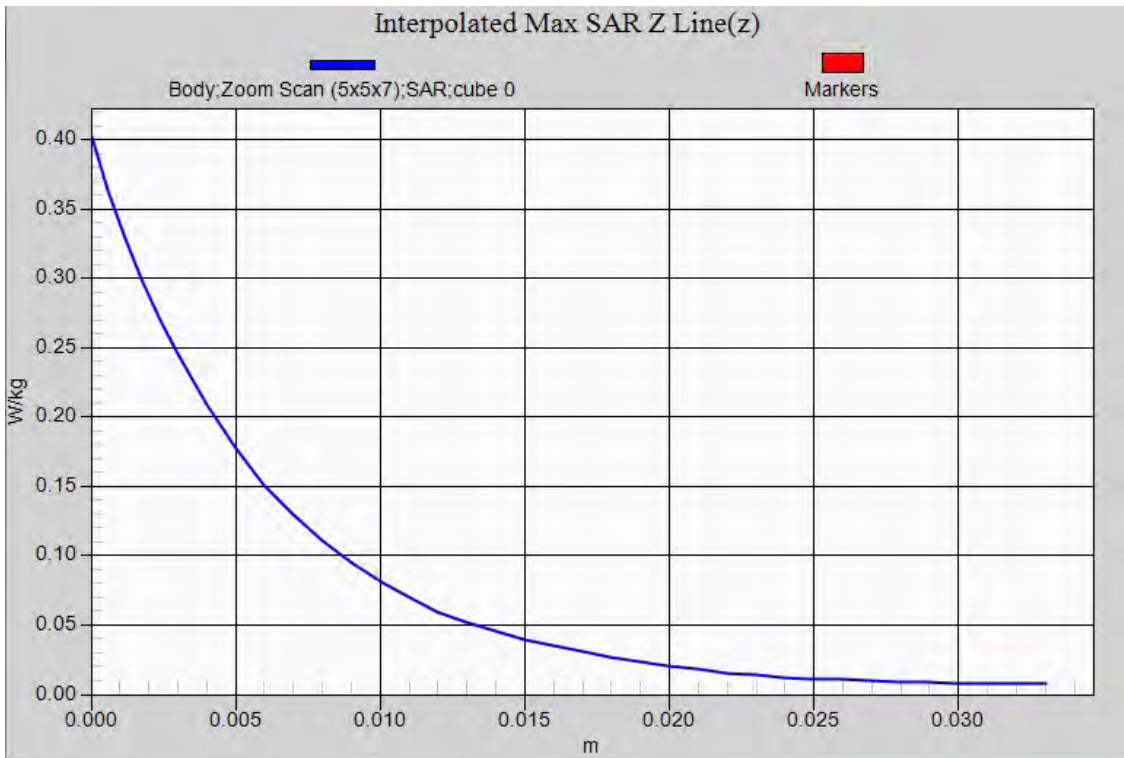
- Probe: EX3DV4 - SN3698; ConvF(6.75, 6.75, 6.75); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (6x13x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.0138 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid:
dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.127 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 0.0220 W/kg
SAR(1 g) = 0.00835 W/kg; SAR(10 g) = 0.00407 W/kg
Maximum value of SAR (measured) = 0.0125 W/kg



802.11b EUT Front (10mm) Z-Axis plot
Channel: 11





Appendix D. Probe Calibration Data

Object: EX3DV4- SN: 3698

1155H

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



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

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

Accreditation No.: **SCS 0108**

Client **Quietek-TW (Auden)**

Certificate No: **EX3-3698_Nov15**

CALIBRATION CERTIFICATE

Object: **EX3DV4 - SN:3698**

Calibration procedure(s): **QA CAL-01.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes**

Calibration date: **November 24, 2015**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	01-Apr-15 (No. 217-02128)	Mar-16
Power sensor E4412A	MY41498087	01-Apr-15 (No. 217-02128)	Mar-16
Reference 3 dB Attenuator	SN: S5054 (3c)	01-Apr-15 (No. 217-02129)	Mar-16
Reference 20 dB Attenuator	SN: S5277 (20x)	01-Apr-15 (No. 217-02132)	Mar-16
Reference 30 dB Attenuator	SN: S5129 (30b)	01-Apr-15 (No. 217-02133)	Mar-16
Reference Probe ES3DV2	SN: 3013	30-Dec-14 (No. ES3-3013_Dec14)	Dec-15
DAE4	SN: 660	14-Jan-15 (No. DAE4-660_Jan15)	Jan-16
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

Calibrated by:	Name Claudio Leubler	Function Laboratory Technician	Signature
Approved by:	Name Katja Pokovic	Function Technical Manager	Signature

Issued: November 26, 2015

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



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

The Swiss Accreditation Service is one of the signatories to the EA
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Glossary:

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

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- *NORM_{x,y,z}*: Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). *NORM_{x,y,z}* are only intermediate values, i.e., the uncertainties of *NORM_{x,y,z}* does not affect the E²-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)_{x,y,z}* = *NORM_{x,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*.
- *DCP_{x,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
- *A_{x,y,z}*; *B_{x,y,z}*; *C_{x,y,z}*; *D_{x,y,z}*; *VR_{x,y,z}*: *A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF* and *Boundary Effect Parameters*: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORM_{x,y,z}* * *ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORM_x* (no uncertainty required).

Probe EX3DV4

SN:3698

Manufactured: April 22, 2009
Calibrated: November 24, 2015

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3698

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V/m})^2$) ^A	0.41	0.35	0.36	$\pm 10.1 \%$
DCP (mV) ^B	101.5	102.9	104.4	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB $\sqrt{\mu\text{V}}$	C	D dB	VR mV	Unc ^E (k=2)
0	CW	X	0.0	0.0	1.0	0.00	137.3	$\pm 3.3 \%$
		Y	0.0	0.0	1.0		148.2	
		Z	0.0	0.0	1.0		149.8	

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

^A The uncertainties of Norm X,Y,Z do not affect the E^2 -field uncertainty inside TSL (see Pages 5 and 6).

^B Numerical linearization parameter: uncertainty not required.

^E Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3698

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unc (k=2)
750	41.9	0.89	9.15	9.15	9.15	0.39	0.92	± 12.0 %
835	41.5	0.90	8.76	8.76	8.76	0.28	1.18	± 12.0 %
900	41.5	0.97	8.63	8.63	8.63	0.27	1.26	± 12.0 %
1450	40.5	1.20	7.82	7.82	7.82	0.20	1.53	± 12.0 %
1640	40.3	1.29	7.77	7.77	7.77	0.40	0.80	± 12.0 %
1750	40.1	1.37	7.72	7.72	7.72	0.34	0.85	± 12.0 %
1810	40.0	1.40	7.52	7.52	7.52	0.43	0.80	± 12.0 %
1900	40.0	1.40	7.41	7.41	7.41	0.39	0.80	± 12.0 %
2000	40.0	1.40	7.47	7.47	7.47	0.39	0.80	± 12.0 %
2300	39.5	1.67	7.15	7.15	7.15	0.31	0.95	± 12.0 %
2450	39.2	1.80	6.77	6.77	6.77	0.39	0.89	± 12.0 %
2600	39.0	1.96	6.63	6.63	6.63	0.24	1.23	± 12.0 %
3500	37.9	2.91	6.60	6.60	6.60	0.42	1.00	± 13.1 %
5200	36.0	4.66	4.90	4.90	4.90	0.35	1.80	± 13.1 %
5300	35.9	4.76	4.63	4.63	4.63	0.40	1.80	± 13.1 %
5500	35.6	4.96	4.50	4.50	4.50	0.45	1.80	± 13.1 %
5600	35.5	5.07	4.23	4.23	4.23	0.50	1.80	± 13.1 %
5800	35.3	5.27	4.32	4.32	4.32	0.50	1.80	± 13.1 %

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

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3698

Calibration Parameter Determined in Body Tissue Simulating Media

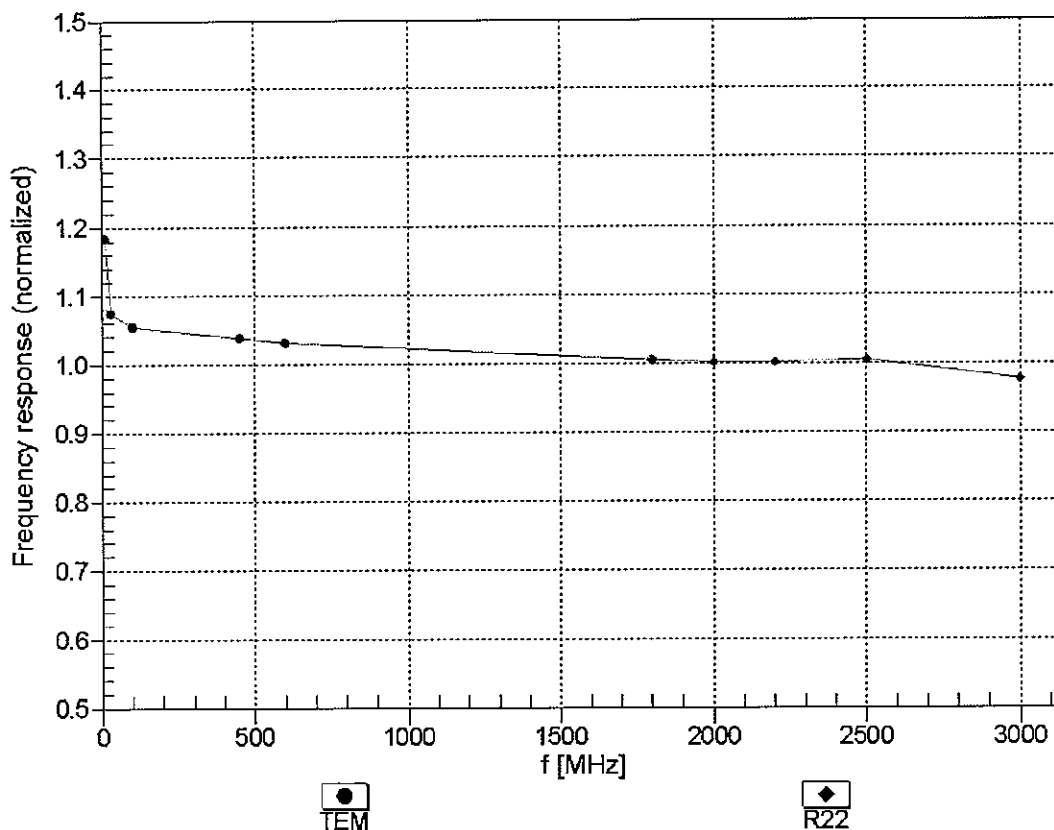
f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unc (k=2)
750	55.5	0.96	9.08	9.08	9.08	0.41	0.92	± 12.0 %
835	55.2	0.97	8.96	8.96	8.96	0.42	0.89	± 12.0 %
900	55.0	1.05	8.72	8.72	8.72	0.35	0.99	± 12.0 %
1450	54.0	1.30	7.84	7.84	7.84	0.25	1.19	± 12.0 %
1640	53.8	1.40	7.72	7.72	7.72	0.43	0.85	± 12.0 %
1750	53.4	1.49	7.41	7.41	7.41	0.31	1.06	± 12.0 %
1810	53.3	1.52	7.29	7.29	7.29	0.47	0.80	± 12.0 %
1900	53.3	1.52	7.08	7.08	7.08	0.45	0.80	± 12.0 %
2000	53.3	1.52	7.28	7.28	7.28	0.22	1.25	± 12.0 %
2300	52.9	1.81	7.04	7.04	7.04	0.32	0.80	± 12.0 %
2450	52.7	1.95	6.75	6.75	6.75	0.70	0.65	± 12.0 %
2600	52.5	2.16	6.59	6.59	6.59	0.75	0.60	± 12.0 %
3500	51.3	3.31	6.08	6.08	6.08	0.39	1.11	± 13.1 %
5200	49.0	5.30	4.20	4.20	4.20	0.50	1.90	± 13.1 %
5300	48.9	5.42	4.05	4.05	4.05	0.50	1.90	± 13.1 %
5500	48.6	5.65	3.67	3.67	3.67	0.60	1.90	± 13.1 %
5600	48.5	5.77	3.50	3.50	3.50	0.60	1.90	± 13.1 %
5800	48.2	6.00	3.72	3.72	3.72	0.60	1.90	± 13.1 %

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

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

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

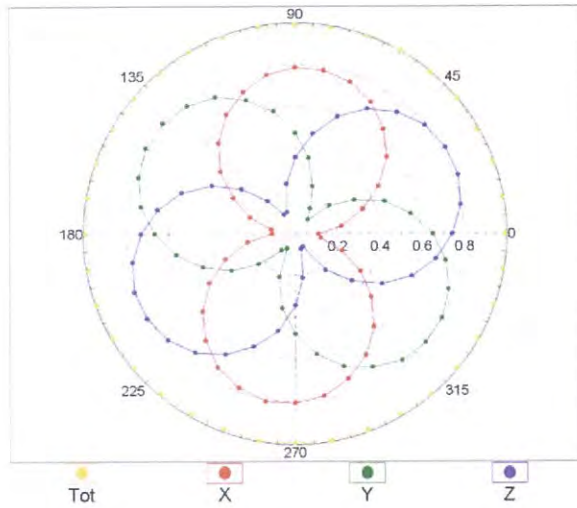
Frequency Response of E-Field (TEM-Cell:ifi110 EXX, Waveguide: R22)



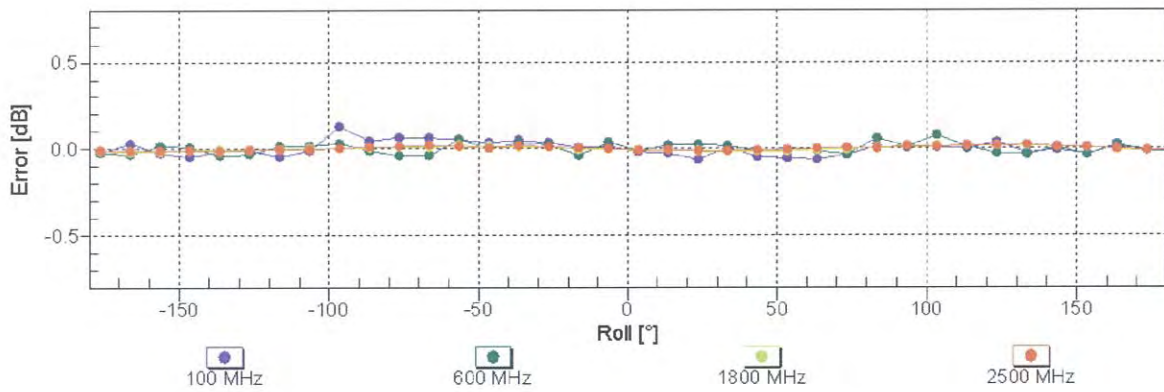
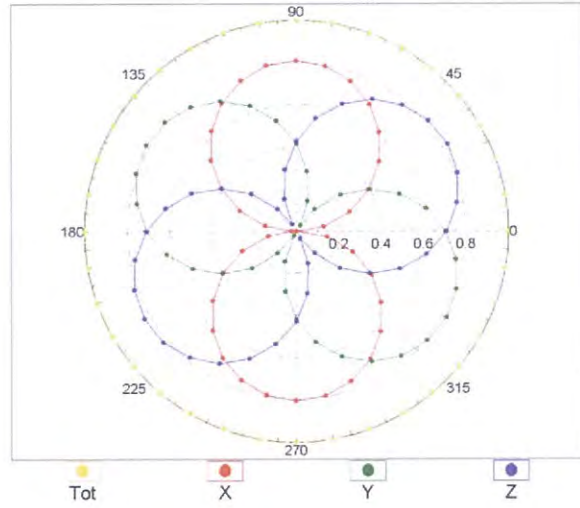
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

Receiving Pattern (ϕ), $\vartheta = 0^\circ$

f=600 MHz, TEM

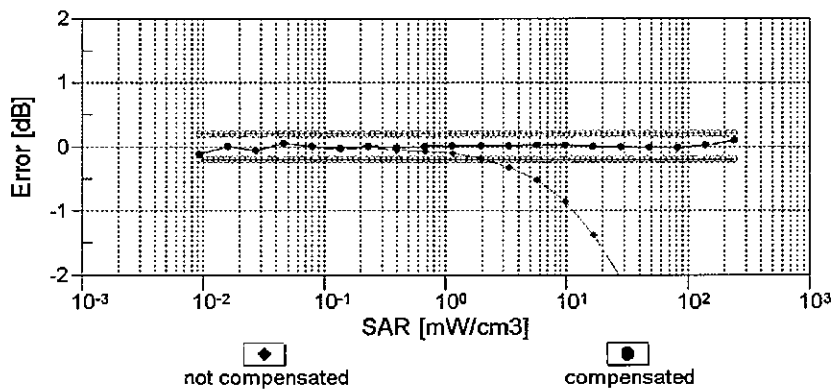
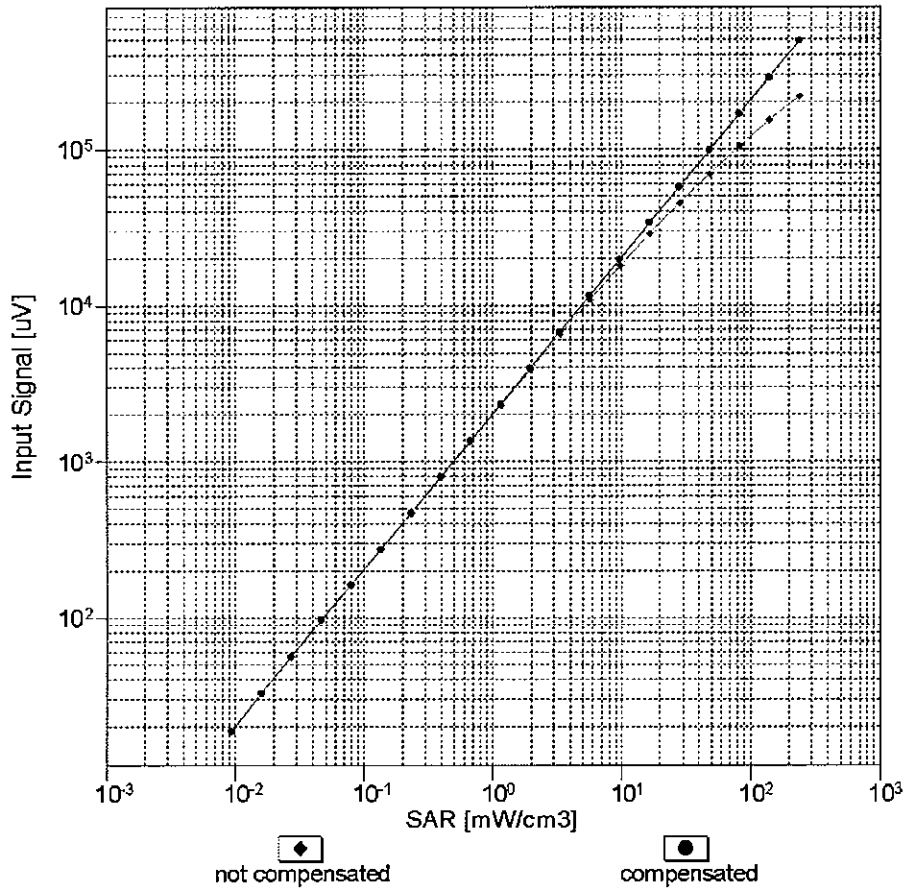


f=1800 MHz, R22



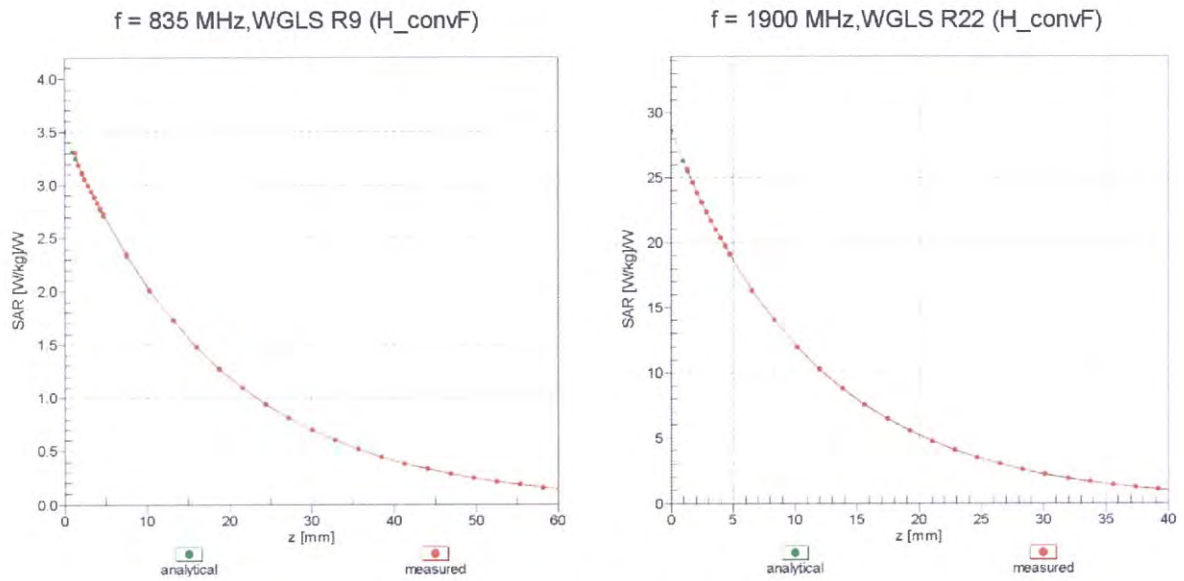
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

Dynamic Range f(SAR_{head}) (TEM cell , f_{eval}= 1900 MHz)

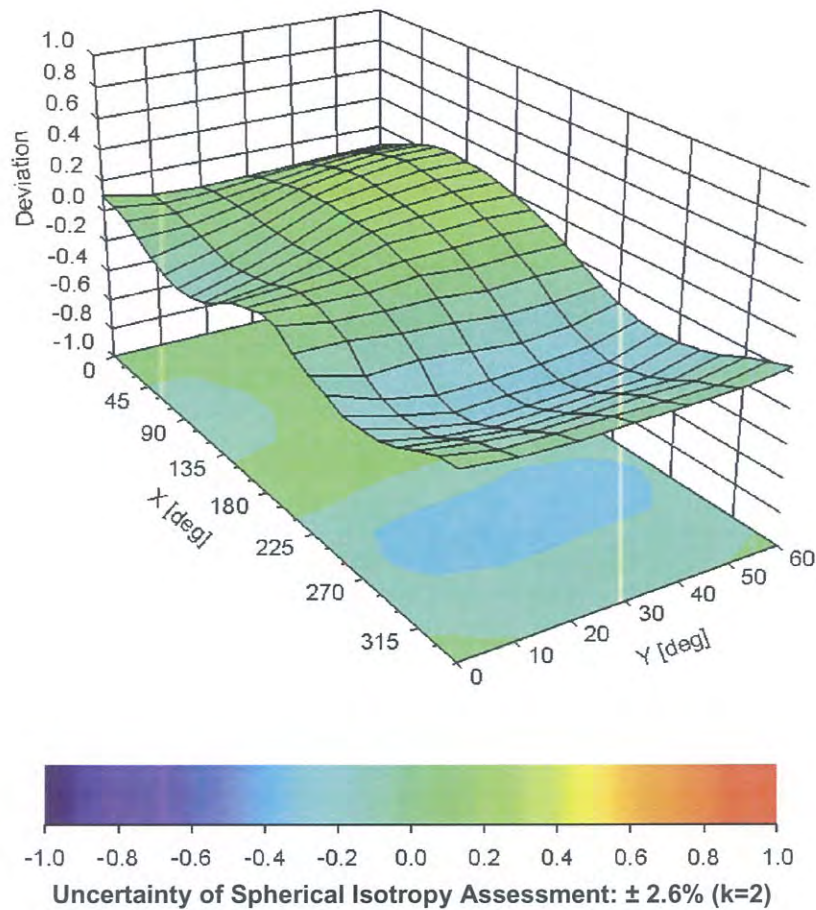


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



Deviation from Isotropy in Liquid Error (ϕ, ϑ), f = 900 MHz



DASY/EASY - Parameters of Probe: EX3DV4 - SN:3698

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	43.5
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

Appendix E. Dipole Calibration

Validation Dipole 835 MHz

M/N: ALS-D-835

S/N: QTK-315

Validation Dipole 1900 MHz

M/N: ALS-D1900

S/N: 318

Validation Dipole 2450 MHz

M/N: D2450V2

S/N: 930

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



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

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Accreditation No.: **SCS 108**

Client **Quietek-TW (Auden)**

Certificate No: **ALS-D-835-QTK-315_May14**

CALIBRATION CERTIFICATE

Object **ALS-D-835 - SN: QTK-315**

Calibration procedure(s) **QA CAL-05.v9
 Calibration procedure for dipole validation kits above 700 MHz**

Calibration date: **May 16, 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)°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	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	30-Apr-14 (No. DAE4-601_Apr14)	Apr-15

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

Calibrated by: **Name** Claudio Leubler **Function** Laboratory Technician **Signature**

Approved by: **Name** Katja Pokovic **Function** Technical Manager **Signature**

Issued: May 20, 2014

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



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

Accreditation No.: **SCS 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:

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

Additional Documentation:

- 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%.

Measurement Conditions

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

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz \pm 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 \pm 0.2) °C	40.2 \pm 6 %	0.94 mho/m \pm 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.32 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.92 W/kg \pm 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.49 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.78 W/kg \pm 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 \pm 0.2) °C	56.6 \pm 6 %	1.02 mho/m \pm 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.45 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	9.49 W/kg \pm 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.60 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	6.23 W/kg \pm 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.6 Ω + 1.4 j Ω
Return Loss	- 34.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	44.6 Ω + 1.0 j Ω
Return Loss	- 24.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	0.985 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	APREL
Manufactured on	Unknown

DASY5 Validation Report for Head TSL

Date: 16.05.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: ALS-D-835; Serial: ALS-D-835 - SN: QTK-315

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: $f = 835$ MHz; $\sigma = 0.94$ S/m; $\epsilon_r = 40.2$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.22, 6.22, 6.22); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm 2/Zoom Scan (7x7x7)/Cube 0:

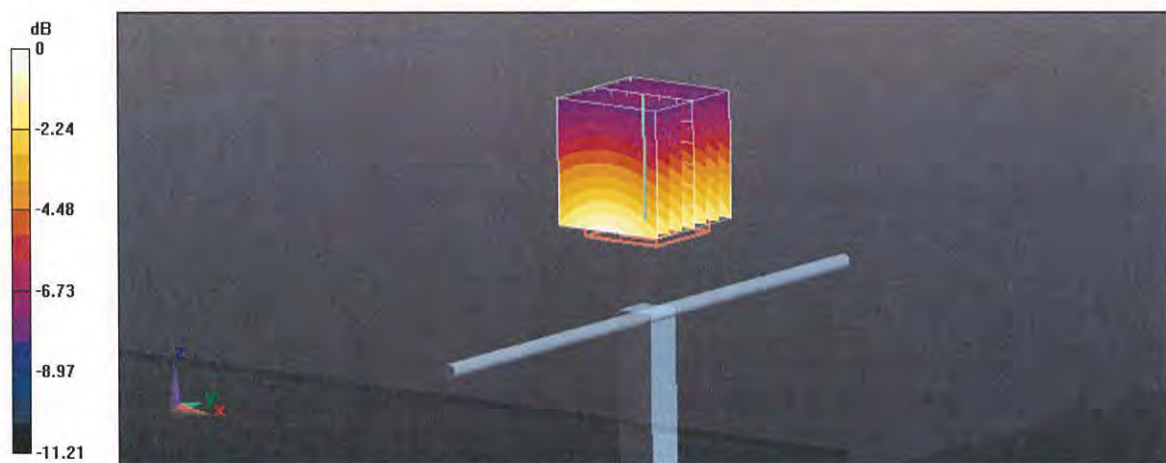
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.23 V/m; Power Drift = 0.05 dB

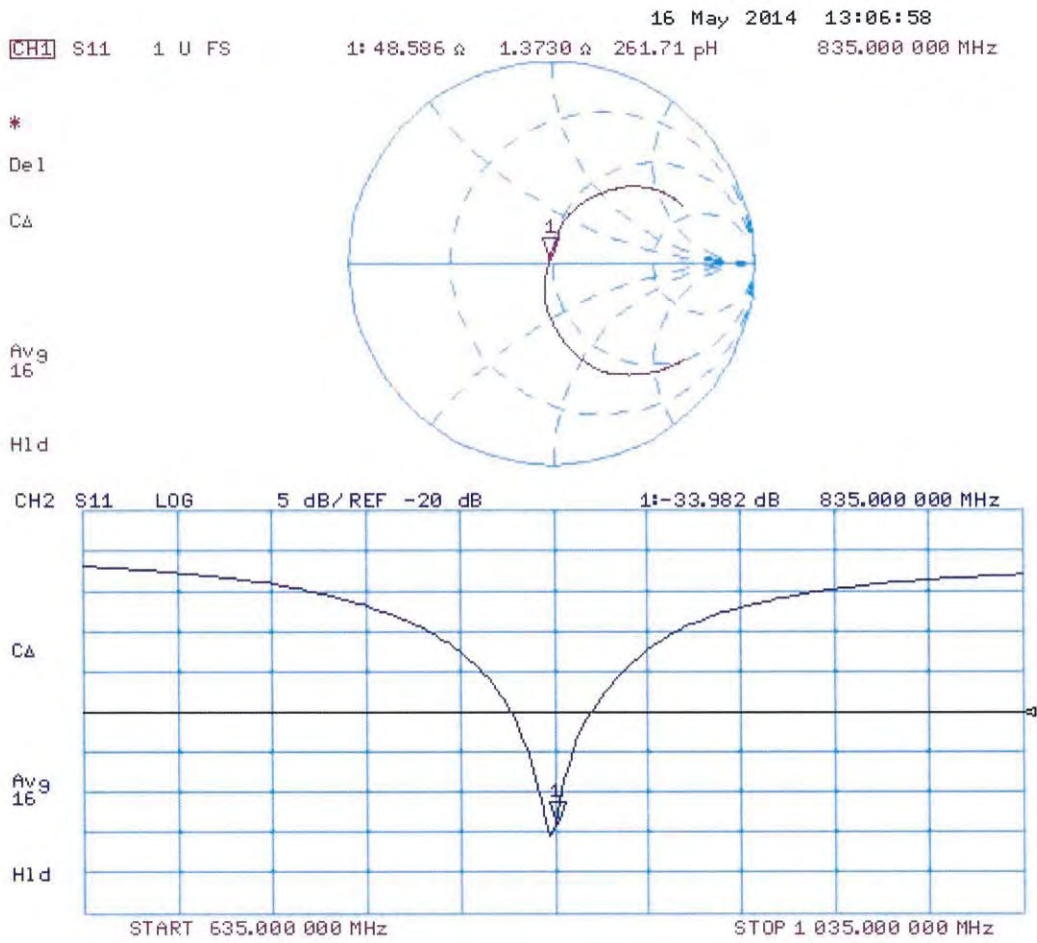
Peak SAR (extrapolated) = 3.50 W/kg

SAR(1 g) = 2.32 W/kg; SAR(10 g) = 1.49 W/kg

Maximum value of SAR (measured) = 2.72 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 15.05.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: ALS-D-835; Serial: ALS-D-835 - SN: QTK-315

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: $f = 835$ MHz; $\sigma = 1.02$ S/m; $\epsilon_r = 56.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.09, 6.09, 6.09); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

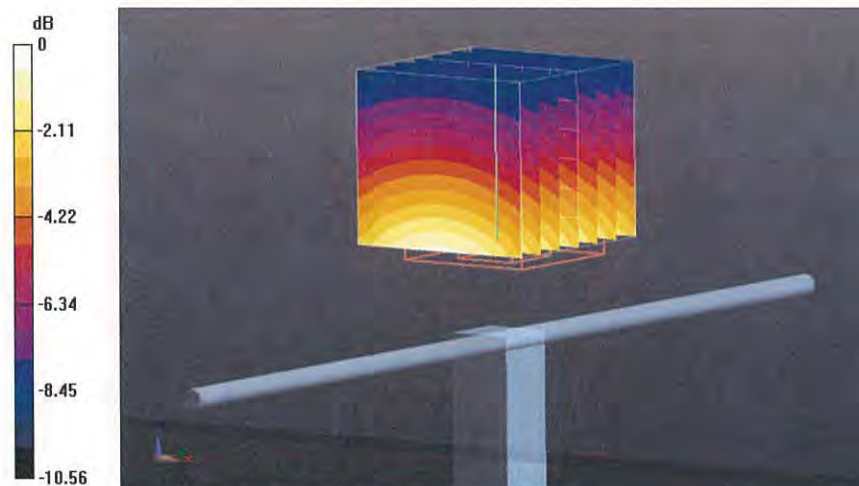
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.71 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 3.64 W/kg

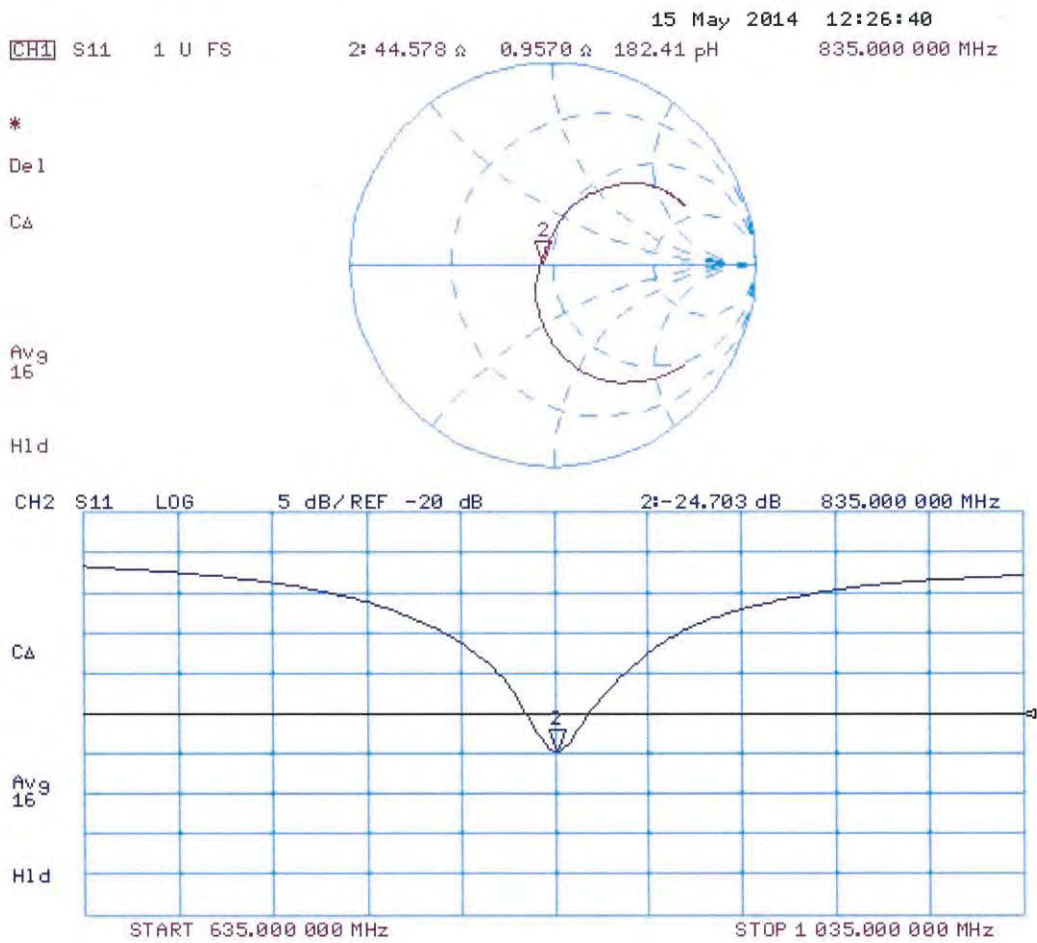
SAR(1 g) = 2.45 W/kg; SAR(10 g) = 1.6 W/kg

Maximum value of SAR (measured) = 2.86 W/kg



0 dB = 2.86 W/kg = 4.56 dBW/kg

Impedance Measurement Plot for Body TSL





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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Quietek (Auden)**

Certificate No: **ALS-D1900-318_May14**

CALIBRATION CERTIFICATE

Object **ALS-D1900 - SN: 318**

Calibration procedure(s) **QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz**

Calibration date: **May 19, 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)°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	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	30-Apr-14 (No. DAE4-601_Apr14)	Apr-15
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

Calibrated by:	Name Leif Klysner	Function Laboratory Technician	Signature
Approved by:	Name Katja Pokovic	Function Technical Manager	Signature

Issued: May 20, 2014

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



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

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

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:

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

Additional Documentation:

- 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%.

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz \pm 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 \pm 0.2) °C	39.3 \pm 6 %	1.37 mho/m \pm 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.96 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	40.2 W/kg \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.24 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	21.1 W/kg \pm 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 \pm 0.2) °C	52.5 \pm 6 %	1.50 mho/m \pm 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.2 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	41.0 W/kg \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.40 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	21.7 W/kg \pm 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.7 Ω + 10.4 j Ω
Return Loss	- 19.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	42.5 Ω + 6.8 j Ω
Return Loss	- 19.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	0.981 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	-

DASY5 Validation Report for Head TSL

Date: 19.05.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: ALS-D1900; Serial: ALS-D1900 - SN: 318

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.37$ S/m; $\epsilon_r = 39.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.06, 5.06, 5.06); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

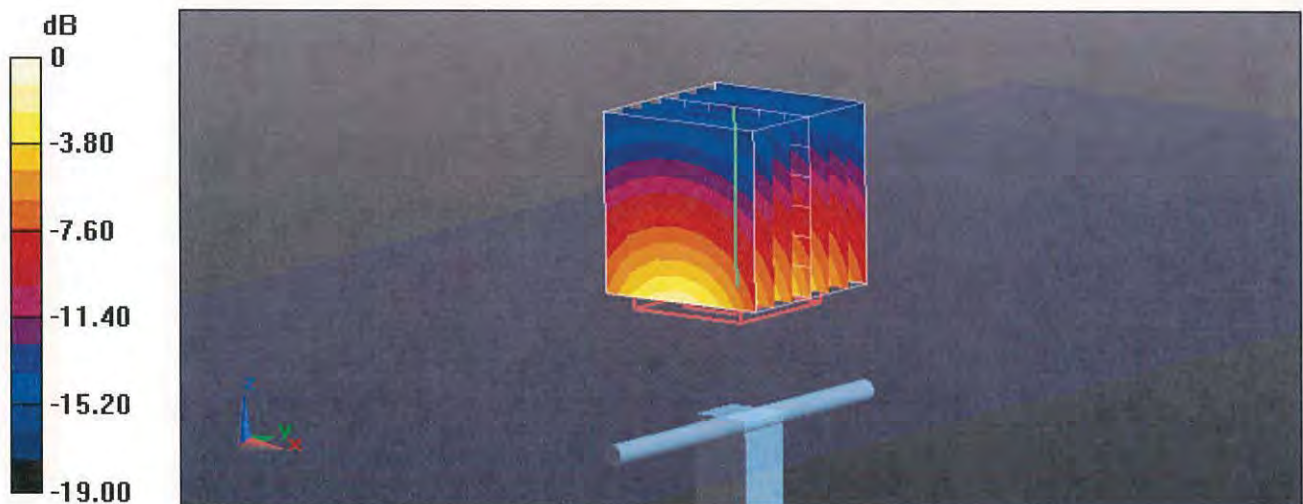
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 98.37 V/m; Power Drift = 0.02 dB

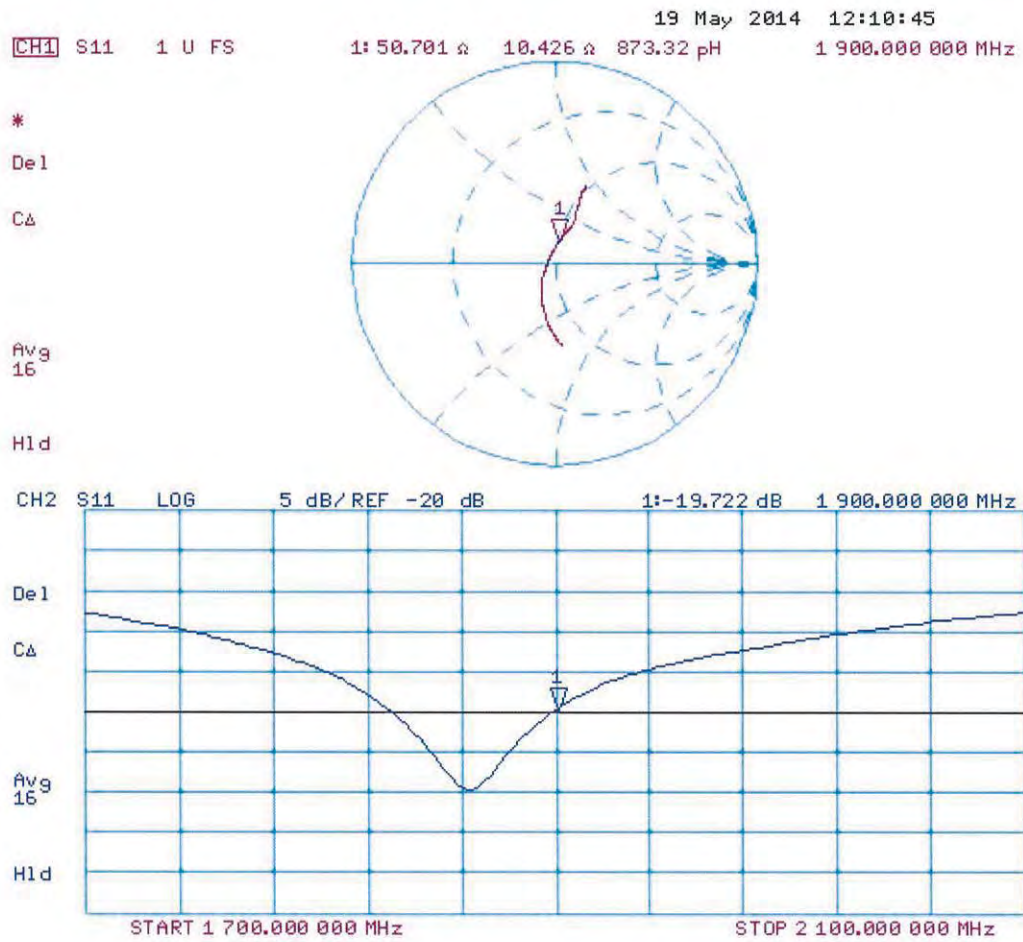
Peak SAR (extrapolated) = 18.2 W/kg

SAR(1 g) = 9.96 W/kg; SAR(10 g) = 5.24 W/kg

Maximum value of SAR (measured) = 12.6 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 16.05.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: ALS-D1900; Serial: ALS-D1900 - SN: 318

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.5$ S/m; $\epsilon_r = 52.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.76, 4.76, 4.76); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

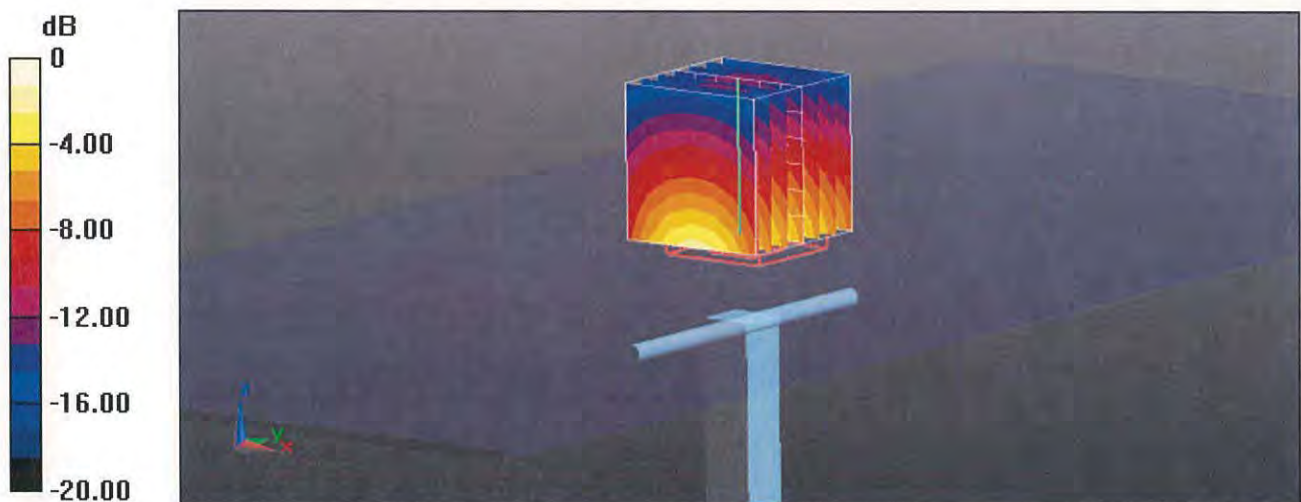
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.88 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 17.9 W/kg

SAR(1 g) = 10.2 W/kg; SAR(10 g) = 5.4 W/kg

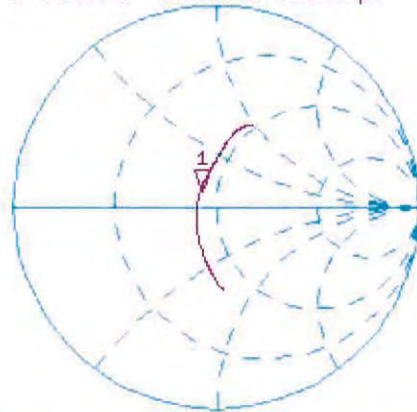
Maximum value of SAR (measured) = 13.0 W/kg



Impedance Measurement Plot for Body TSL

16 May 2014 14:24:05
[CH1] S11 1 U FS 1: 42.459 Ω 6.7637 Ω 566.56 pF 1 900.000 000 MHz

*
De l
C Δ



Avg
16

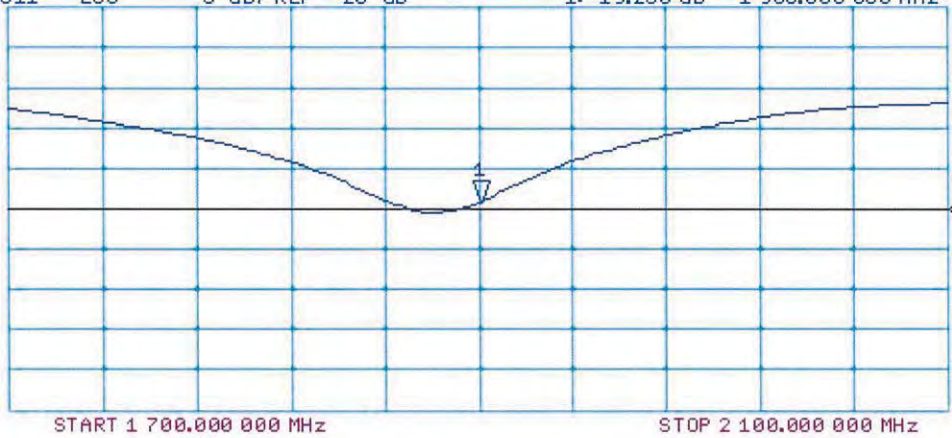
H1 d

CH2 S11 LOG 5 dB/REF -20 dB 1:-19.230 dB 1 900.000 000 MHz

C Δ

Avg
16

H1 d



1398 HP

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



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

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Quietek-TW (Auden)**

Certificate No: **D2450V2-930_Nov14**

CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 930**

Calibration procedure(s) **QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz**

Calibration date: **November 19, 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)°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	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-15
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

Calibrated by:	Name Michael Weber	Function Laboratory Technician	Signature
Approved by:	Name Katja Pokovic	Technical Manager	

Issued: November 20, 2014

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



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

Accreditation No.: **SCS 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:

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

Additional Documentation:

- 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%.

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz \pm 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 \pm 0.2) °C	39.0 \pm 6 %	1.86 mho/m \pm 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.2 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	51.9 W/kg \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.09 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.1 W/kg \pm 16.5 % (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 \pm 0.2) °C	50.9 \pm 6 %	2.03 mho/m \pm 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.3 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	51.8 W/kg \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.09 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	24.0 W/kg \pm 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.5 Ω + 1.7 j Ω
Return Loss	- 25.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	51.0 Ω + 3.3 j Ω
Return Loss	- 29.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.156 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, 2013

DASY5 Validation Report for Head TSL

Date: 18.11.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 930

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.86$ S/m; $\epsilon_r = 39$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

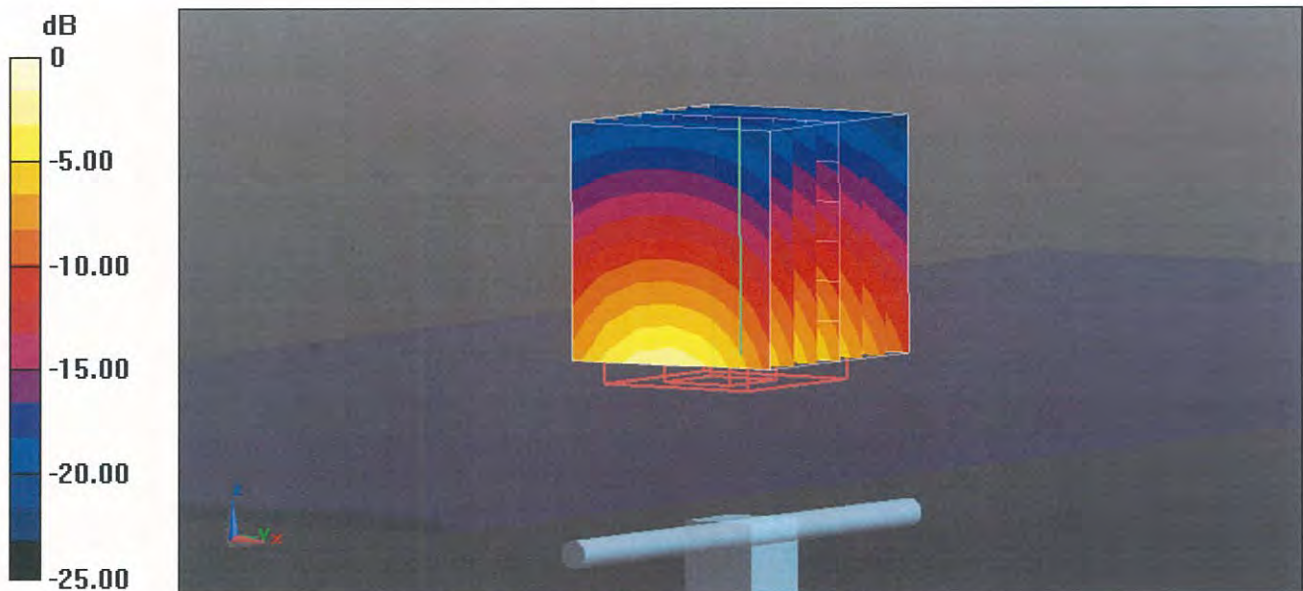
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 99.79 V/m; Power Drift = 0.04 dB

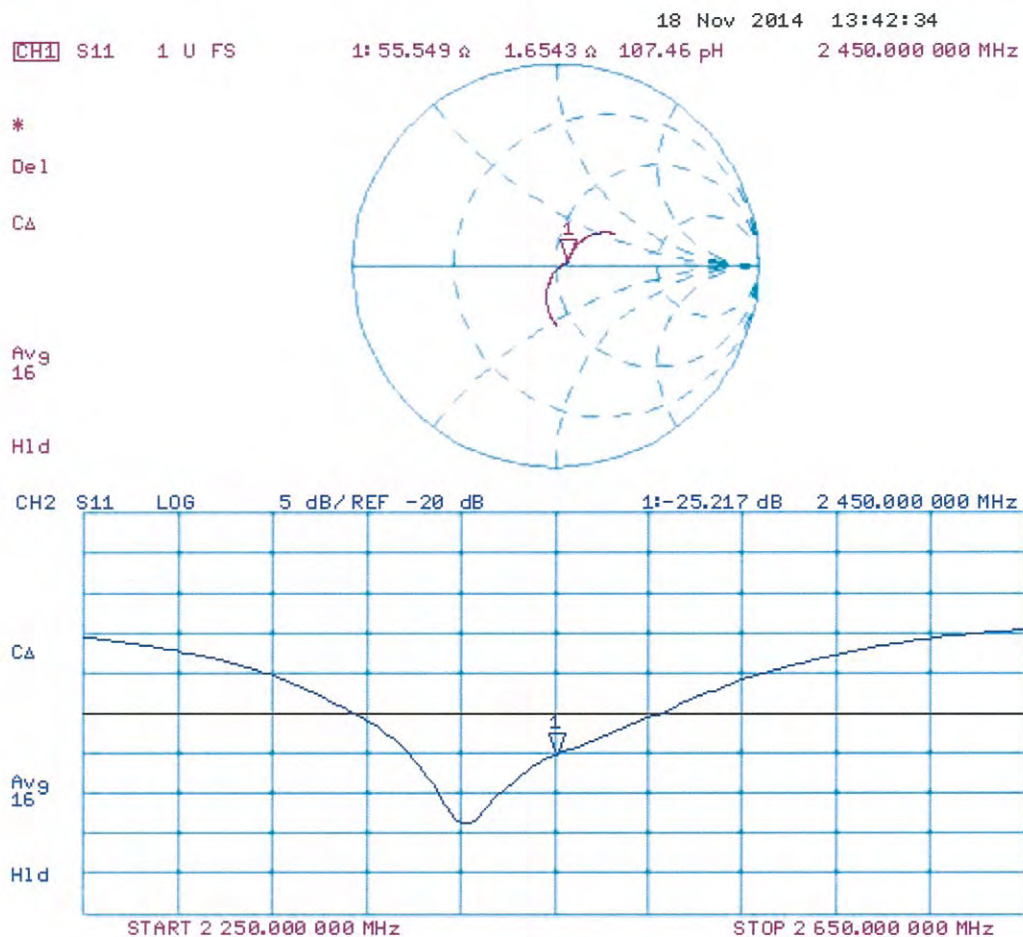
Peak SAR (extrapolated) = 27.5 W/kg

SAR(1 g) = 13.2 W/kg; SAR(10 g) = 6.09 W/kg

Maximum value of SAR (measured) = 17.3 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 19.11.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 930

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 2.03$ S/m; $\epsilon_r = 50.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.35, 4.35, 4.35); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

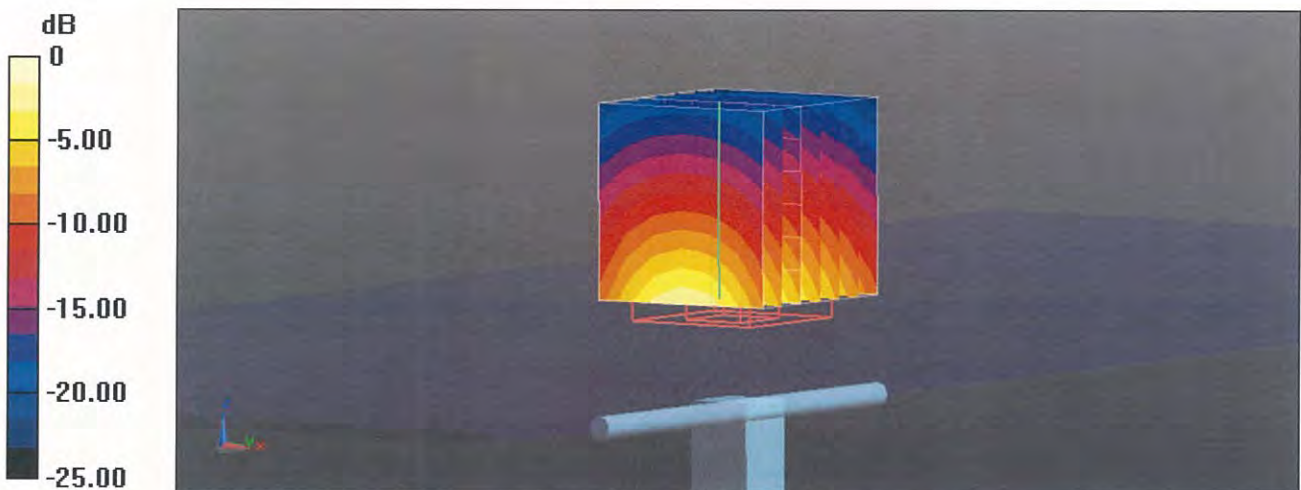
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.06 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 28.0 W/kg

SAR(1 g) = 13.3 W/kg; SAR(10 g) = 6.09 W/kg

Maximum value of SAR (measured) = 17.3 W/kg



Impedance Measurement Plot for Body TSL

