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 ： 2016/03/30

Issued Date ： 2016/05/12

Report No. ： 1640078R-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: 2016/05/12
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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 procedures	:	KDB 447498 D01 v06 KDB 865664 D01 v01r04 KDB 941225 D01 v03r01
Test Result	:	Max. SAR Measurement (1g) **1.183** 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 : Elephant Chen
(Adm. Assistant / Elephant Chen)

Tested By : Vorana Chen
(Senior Engineer / Vorana Chen)

Approved By :
(Director / Vincent Lin)

TABLE OF CONTENTS

Description **Page**

1. General Information 4
1.1 EUT Description 4
1.2 Antenna List 4
1.3 SAR Test Exclusion Calculation 5
1.4 Test Environment 6
2. SAR Measurement System 7
2.1 DASY5 System Description 7
2.1.1 Applications 8
2.1.2 Area Scans 8
2.1.3 Zoom Scan (Cube Scan Averaging) 8
2.1.4 Uncertainty of Inter-/Extrapolation and Averaging 8
2.2 DASY5 E-Field Probe 9
2.2.1 Isotropic E-Field Probe Specification 9
2.3 Boundary Detection Unit and Probe Mounting Device 10
2.4 DATA Acquisition Electronics (DAE) and Measurement Server 10
2.5 Robot 11
2.6 Light Beam Unit 11
2.7 Device Holder 12
2.8 SAM Twin Phantom 12
3. Tissue Simulating Liquid 13
3.1 The composition of the tissue simulating liquid 13
3.2 Tissue Calibration Result 13
3.3 Tissue Dielectric Parameters for Head and Body Phantoms 15
4. SAR Measurement Procedure 16
4.1 SAR System Check 16
4.1.1 Dipoles 16
4.1.2 System Check Result 17
4.2 SAR Measurement Procedure 18
5. SAR Exposure Limits 19
6. Test Equipment List 20
7. Measurement Uncertainty 22
8. Conducted Power Measurement (Including tolerance allowed for production unit) 23
9. Proximity Sensor 27
10. Test Results 32
10.1 SAR Test Results Summary 32
10.2 Simultaneous Transmission 37
10.2.1 Simultaneous Transmission Configurations 37
10.2.2 Simultaneous Transmission Summation for Top: 38
10.2.3 Simultaneous Transmission Summation for Back 38
11. SAR measurement variability 39
Appendix 40
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

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	1.18	0.62	0.21
Body-Simultaneous	1.80 (SPLSR=0.02)		

* 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 platfom

Model number: TH10GAx(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-JJ6450	0.35 dBi for 850MHz 1.24 dBi for 1900MHz
2	SOUTH STAR	13H130-JJ6410	2.69dBi for 2.4 GHz

1.3 SAR Test Exclusion Calculation

According to KDB Publication 447498 D01, section 4.3.1, per the calculations of item 1 (Power(mW)/separation (mm)*sqrt(f(GHz)≤3.0), SAR is required as shown in the table below where calculated values are greater than 3.0 :

SAR exclusion calculations for antenna < 50mm from the user:

Antenna	Frequency (MHz)	Output Power		Separation distances (mm)					Calculated Threshold Value (≦3.0 SAR is not required)				
		dBm	mW	Back	Right	Left	Top	Bottom	Back	Right	Left	Top	Bottom
GSM 850	848.8	32.00	1585	2	50	115	3	150	292.0	29.2	>50mm	292.0	>50mm
GSM 1900	1909.9	29.50	891	2	50	115	3	150	246.3	24.6	>50mm	246.3	>50mm
WCDMA 2	1907.6	23.00	200	2	50	115	3	150	55.1	5.5	>50mm	55.1	>50mm
WCDMA 5	846.6	23.00	200	2	50	115	3	150	36.7	3.7	>50mm	36.7	>50mm
WLAN	2462	17.00	50	2	238	5	4	125	15.7	>50mm	15.7	15.7	>50mm
BT	2480	7.00	5	2	238	5	4	125	**1.6**	>50mm	**1.6**	**1.6**	>50mm

SAR exclusion calculations for antenna > 50mm from the user:

Antenna	Frequency (MHz)	Output Power		Separation distances (mm)					Calculated Threshold Value (SAR test exclusion power,mW)				
		dBm	mW	Back	Right	Left	Top	Bottom	Back	Right	Left	Top	Bottom
GSM 850	848.8	32.00	1585	2	50	115	3	150	<50mm	162.8	530.6	<50mm	728.7
GSM 1900	1909.9	29.50	891	2	50	115	3	150	<50mm	108.5	758.5	<50mm	1108.5
WCDMA 2	1907.6	23.00	200	2	50	115	3	150	<50mm	108.6	758.6	<50mm	1108.6
WCDMA 5	846.6	23.00	200	2	50	115	3	150	<50mm	163.0	529.9	<50mm	727.4
WLAN	2462	17.00	50	2	238	5	4	125	<50mm	1975.6	<50mm	<50mm	845.6
BT	2480	7.00	5	2	238	5	4	125	<50mm	1975.3	<50mm	<50mm	845.3

1.4 Test Environment

Ambient conditions in the laboratory:

Test Date: May. 05, 2016

Items	Required	Actual
Temperature (°C)	18-25	22.2 ± 2
Humidity (%RH)	30-70	50

Test Date: May. 09, 2016

Items	Required	Actual
Temperature (°C)	18-25	21.8 ± 2
Humidity (%RH)	30-70	53

Test Date: May. 10, 2016

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

Site Description:

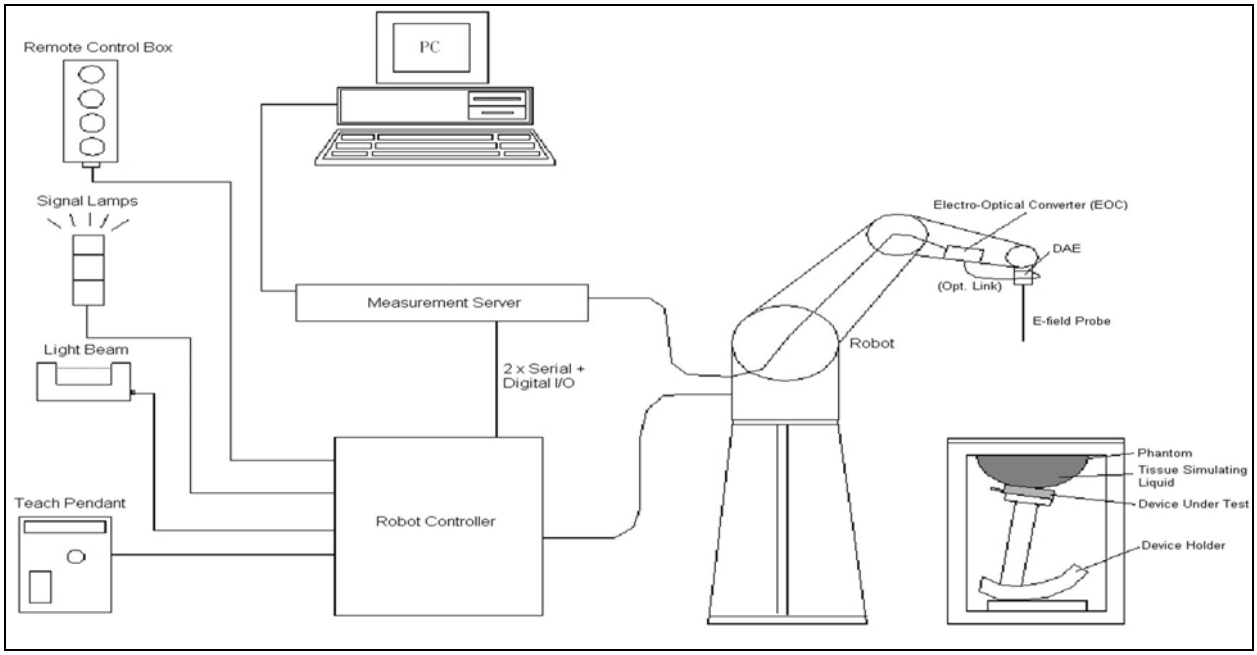
Accredited by TAF
Accredited Number: 3023
Effective through: December 12, 2017

Site Name: Quietek Corporation

Site Address: No.5-22, Ruishukeng, Linkou Dist.,
New Taipei City 24451,
Taiwan, R.O.C.
TEL: 886-2-8601-3788 / FAX: 886-2-8601-3789
E-Mail: service@quietek.com

2. SAR Measurement System

2.1 DASY5 System Description



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

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

2.1.1 Applications

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

2.1.2 Area Scans

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

When an Area Scan has measured all reachable points, it computes the field maxima found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE 1528-2013, 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/m^3 is used to represent the head and body tissue density and not the phantom liquid density, in order to be consistent with the definition of the liquid dielectric properties, i.e. the side length of the 1 g cube is 10mm, with the side length of the 10 g cube 21,5mm.

The zoom scan integer steps can be user defined so as to reduce uncertainty, but normal practice for typical test applications (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.

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

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

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

2.2 DASY5 E-Field Probe

The SAR measurement is conducted with the dosimetric probe manufactured by SPEAG. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency.

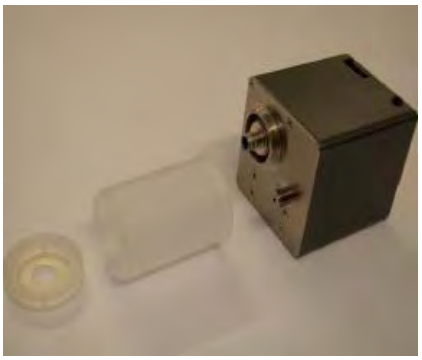
SPEAG conducts the probe calibration in compliance with international and national standards (e.g. IEEE 1528, EN 62209-1, IEC 62209, etc.) under ISO 17025. The calibration data are in Appendix D**.**

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 εr =3 and loss tangent δ = 0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

2.8 SAM Twin Phantom

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

- Left head
- Right head
- Flat phantom

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

3. Tissue Simulating Liquid

3.1 The composition of the tissue simulating liquid

INGREDIENT (% Weight)	835MHz Body	1900MHz Body	2450MHz Body
Water	52.4	40.5	73.2
Salt	1.40	0.50	0.04
Sugar	45	58	0.00
HEC	1.00	0.50	0.00
Preventol	0.20	0.50	0.00
DGBE	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.

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
	10-May-16	56.18	1.01	20.7
824.2 MHz	Low channel	56.25	1.00	20.7
836.4 MHz	Mid channel	56.14	1.01	20.7
848.8 MHz	High channel	55.98	1.02	20.7

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
	09-May-16	54.27	1.58	20.1
1850.2 MHz	Low channel	54.52	1.53	20.1
1880 MHz	Mid channel	54.31	1.56	20.1
1909.8 MHz	High channel	54.17	1.58	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
	05-Mar-16	52.35	1.97	20.7
2412 MHz	Low channel	52.47	1.92	20.7
2437 MHz	Mid channel	52.39	1.95	20.7
2462 MHz	High channel	52.32	1.99	20.7

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.

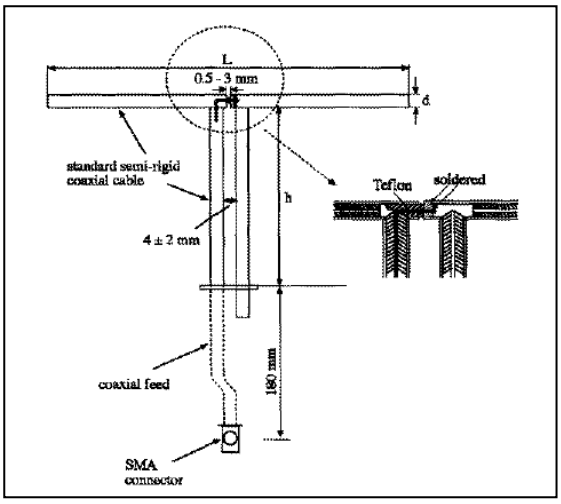
Target Frequency	Head		Body	
(MHz)	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7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

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

4. SAR Measurement Procedure

4.1 SAR System 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: 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
	10-May-16	9.24	6.28	20.7

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	40.80 36.72 to 44.88	21.60 19.44 to 23.76	N/A
	09-May-16	39.24	19.88	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	51.8 46.62 to 56.98	24.00 21.6 to 26.4	N/A
	05-Mar-16	56	26.16	20.7

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.

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

5. SAR Exposure Limits

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

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

Type Exposure	Uncontrolled Environment Limit
Spatial Peak SAR (1g cube tissue for brain or body)	**1.60 W/kg**
Spatial Average SAR (whole body)	**0.08 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	1207	2015/11/20	2016/11/18
E-Field Probe	Speag	EX3DV4	3698	2015/11/24	2016/11/22
SAR Software	Speag	DASY52	V52.8 (8)	N/A	N/A
Aprel Dipole Spaccer	Aprel	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	2015/06/11	2016/06/10
Vector Network	Agilent	E5071C	MY46108013	2015/12/02	2016/12/01
Signal Generator	Anritsu	MG3694A	041902	2015/08/14	2016/08/13
Power Meter	Anritsu	ML2495A	6K00003357	2015/06/13	2016/06/12
Wide Bandwidth Sensor	Anritsu	MA2411B	1339194	2015/09/17	2016/09/16

Note:

Per KDB 865664 D01 requirements for dipole calibration, the following are recommended FCC procedures for SAR dipole calibration.

1. After a dipole is damaged and properly repaired to meet required specifications

2. When the measured SAR deviates from the calibrated SAR value by more than 10% due to changes in physical, mechanical, electrical or other relevant dipole conditions;

3. When the most recent return-loss, measured at least annually, deviates by more than 20% from the previous measurement (i.e. 0.2 of the dB value) or not meeting the required -20 dB return-loss specification

	Frequency	Tissue	Return loss	Limit	Verified Date
Calibration	835	Body	-24.7dB	Within 20%	2015.05.20
Measurement	835	Body	-28.3dB		
Calibration	1900	Body	-19.2dB	Within 20%	2015.05.20
Measurement	1900	Body	-21dB		
Calibration	2450	Body	-29.4dB	Within 20%	2015.11.29
Measurement	2450	Body	-27.85dB		

4. When the most recent measurement of the real or imaginary parts of the impedance, measured at least annually, deviates by more than 5 Ω from the previous measurement

	Frequency	Tissue	Impedance	Limit	Verified Date
Calibration	835	Body	44.6	Within 5Ω	2015.05.20
Measurement	835	Body	47		
Calibration	1900	Body	42.5	Within 5Ω	2015.05.20
Measurement	1900	Body	43.5		
Calibration	2450	Body	51	Within 5Ω	2015.11.29
Measurement	2450	Body	49.5		

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.	(c_i) 1g	(c_i) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(v_i) 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)

Mode		Sensor "OFF" Power (Including tolerance)	Sensor "ON " Reduce Power (Including tolerance)
GSM 850	GPRS 1 slot	32	32
	GPRS 2 slot	29	29
	GPRS 3 slot	27	27
	GPRS 4 slot	26	26
	EGPRS 1	26	26
	EGPRS 2	26	26
	EGPRS 3	26	26
	EGPRS 4	23	23
GSM 1900	GPRS 1 slot	29.5	29.5
	GPRS 2 slot	27	27
	GPRS 3 slot	25	25
	GPRS 4 slot	24	24
	EGPRS 1	25	25
	EGPRS 2	25	25
	EGPRS 3	25	25
	EGPRS 4	23	23
WCDMA BAND 2	RMC	23	19
	HSDPA	23	19
	HSUPA	23	19
WCDMA BAND 5	RMC	23	20.5
	HSDPA	23	20.5
	HSUPA	23	20.5
802.11b	Low	16.5	16.5
802.11b	Mid/High	17	17
802.11g	Low/Mid/High	13	13
802.11n-20M	Low	13.5	13.5
802.11n-20M	Mid	13	13
802.11n-20M	High	12.5	12.5
Note: When sensor “ON”, only WCDMA Band 2 and WCDMA Band 5 are reduce the power, other remain the same.			

GSM/PCS							
CHANNEL	128	189	251	Duty cycle	Frame Average (dBm)		
Frequency	824.2	836.4	848.8				
Maximum Power (Sensor Off)							
GPRS 850 (1 Slot)	31.43	31.44	31.43	0.125	22.40	**22.41**	22.40
GPRS 850 (2 Slot)	28.07	28.07	28.06	0.250	22.05	22.05	22.04
GPRS 850 (3 Slot)	25.99	25.98	25.96	0.375	21.74	21.73	21.71
GPRS 850 (4 Slot)	24.60	24.61	24.58	0.500	21.59	21.60	21.57
EGPRS 850 (1 Slot)	25.25	25.25	25.23	0.125	16.22	16.22	16.20
EGPRS 850 (2 Slot)	25.24	25.22	25.18	0.250	19.22	19.20	19.16
EGPRS 850 (3 Slot)	25.22	25.18	25.15	0.375	20.97	20.93	20.90
EGPRS 850 (4 Slot)	24.62	24.60	24.56	0.500	21.61	21.59	21.55
CHANNEL	512	661	810	Duty cycle	Frame Average (dBm)		
Frequency	1850.2	1880	1909.8				
Maximum Power (Sensor Off)							
GPRS 1900 (1 Slot)	27.76	27.81	27.7	0.125	18.73	18.78	18.67
GPRS 1900 (2 Slot)	25.02	25.16	25.14	0.250	19.00	**19.14**	19.12
GPRS 1900 (3 Slot)	23.11	23.32	23.33	0.375	18.86	19.07	19.08
GPRS 1900 (4 Slot)	21.89	22.06	22.12	0.500	18.88	19.05	19.11
EGPRS 1900 (1 Slot)	21.51	21.81	21.86	0.125	12.48	12.78	12.83
EGPRS 1900 (2 Slot)	21.48	21.75	21.81	0.250	15.46	15.73	15.79
EGPRS 1900 (3 Slot)	21.44	21.72	21.75	0.375	17.19	17.47	17.50
EGPRS 1900 (4 Slot)	16.47	16.78	16.68	0.500	13.46	13.77	13.67

Band	WCDMA Band II			WCDMA Band V		
CHANNEL	9262	9400	9538	4132	4183	4233
Maximum Power (Sensor Off)						
RMC	21.31	**22.20**	21.34	**22.71**	22.23	22.53
HSDPA Set 1	22.19	22.16	22.03	22.70	21.84	22.51
HSDPA Set 2	22.04	21.94	21.82	22.47	21.59	22.25
HSDPA Set 3	21.79	21.72	21.58	22.23	21.32	21.99
HSDPA Set 4	21.53	21.46	21.31	21.97	21.07	21.74
HSUPA Set 1	19.70	21.32	20.92	22.01	21.43	22.01
HSUPA Set 2	18.93	20.02	19.87	19.80	19.68	20.13
HSUPA Set 3	20.02	21.28	20.96	20.90	20.53	21.03
HSUPA Set 4	19.37	20.52	20.41	19.95	19.77	20.33
HSUPA Set 5	21.18	22.18	21.97	22.13	21.54	22.49
Reduce Power (Sensor ON)						
RMC	17.32	**18.50**	17.75	19.46	19.35	**19.64**
HSDPA Set 1	17.11	18.33	18.08	19.60	19.18	19.62
HSDPA Set 2	15.30	16.69	16.51	17.31	17.27	17.93
HSDPA Set 3	14.61	16.10	15.85	16.64	16.81	17.11
HSDPA Set 4	14.52	16.31	15.60	15.76	17.25	16.66
HSUPA Set 1	13.97	15.47	15.23	19.50	18.95	19.54
HSUPA Set 2	16.55	18.16	18.15	19.53	19.31	19.62
HSUPA Set 3	16.96	18.31	18.02	18.49	18.18	18.66
HSUPA Set 4	17.42	18.46	18.47	19.55	19.23	19.61
HSUPA Set 5	14.15	15.94	15.29	18.53	17.95	18.86

Test Mode	CHANNEL	Frequency (MHz)	Average Power (dBm)
802.11b	1	2412	15.12
802.11b	**6**	2437	15.72
802.11b	11	2462	**16.62**
802.11g	1	2412	12.70
802.11g	**6**	2437	12.74
802.11g	11	2462	12.51
802.11n-20M	1	2412	12.93
802.11n-20M	**6**	2437	12.62

802.11n-20M	11	2462	12.35

9. Proximity Sensor

9.1 proximity sensor triggering distances

According the KDB 616217 Section 6.2, The following procedures should be applied to determine proximity sensor triggering distances for the back surface and individual edges of a tablet.

a) The relevant transmitter should be set to operate at its normal maximum output power.

b) The entire back surface or edge of the tablet is positioned below a flat phantom filled with the required tissue-equivalent medium, and positioned at least 20 mm further than the distance that triggers power reduction.

c) It should be ensured that the cables required for power measurements are not interfering with the proximity sensor. Cable losses should be properly compensated to report the measured power results.

d) The back surface or edge is moved toward the phantom in 3 mm steps until the sensor triggers.

e) The back surface or edge is then moved back (further away) from the phantom by at least 5 mm or until maximum output power is returned to the normal maximum level.

f) The back surface or edge is again moved toward the phantom, but in 1 mm steps, until it is at least 5 mm past the triggering point or touching the phantom. If 1 mm resolution is not suitable for the sensor triggering sensitivity, a KDB inquiry should be submitted to determine alternative test configurations.

g) If the tablet is not touching the phantom, it is moved in 3 mm steps until it touches the phantom to confirm that the sensor remains triggered and the maximum power stays reduced.

h) The process is then reversed by moving the tablet away from the phantom according to steps d) to g), to determine triggering release, until it is at least 10 mm beyond the point that triggers the return of normal maximum power.

i) The measured output power within 5 mm of the triggering points, or until the tablet is touching the phantom, for movements to and from the phantom should be tabulated in the SAR report.

j) If the sensor design and implementation allow additional variations for triggering distance tolerances, multiple samples should be tested to determine the most conservative distance required for SAR evaluation.

k) To ensure all production units are compliant, it is generally necessary to reduce the triggering distance determined from the triggering tests by 1 mm, or more if it is necessary, and use the smallest distance for movements to and from the phantom, minus 1 mm, as the sensor triggering distance for determining the SAR measurement distance.

9.2 Procedures for determining antenna and proximity sensor coverage

Proximity sensors are not normally designed to cover the entire back surface or edges of a tablet. The sensing regions are usually limited to areas near the sensor element. The following are used to determine if additional SAR measurements may be necessary due to sensor and antenna offset.

a) The back surface or edge of the tablet is positioned at a test separation distance less than or equal to the distance required for back surface or edge triggering, with both the antenna and sensor pad located at least 20 mm laterally outside the edge (boundary) of the phantom, along the direction of maximum antenna and sensor offset. For the back surface, if the direction of maximum offset is not aligned with the tablet coordinates (physical edges) the tablet test position would not be aligned with the phantom coordinates (orientations). Each applicable tablet edge should be positioned perpendicularly to the phantom to determine sensor coverage. For antennas and/or sensors located near the corner of a tablet, both adjacent edges must be considered.

b) The similar sequence of steps applied to determine sensor triggering distance in 6.2 are used to verify back surface and edge sensor coverage by moving the tablet (sensor and antenna) horizontally toward the phantom while maintaining the same vertical separation between the back surface or edge and the phantom.

c) After the exact location where triggering of power reduction is determined, with respect to the sensor and antenna, the tablet movement should be continued, in 3 mm increments, until both the sensor and antenna(s) are fully under the phantom and at least 20 mm inside the phantom edge.

d) The process is then repeated from the opposite direction, starting at the other end of the maximum antenna and sensor offset, by rotating the tablet 180 along the vertical axis.

e) The triggering points should be documented graphically, with the antenna and sensor clearly identified, along with all relevant dimensions.

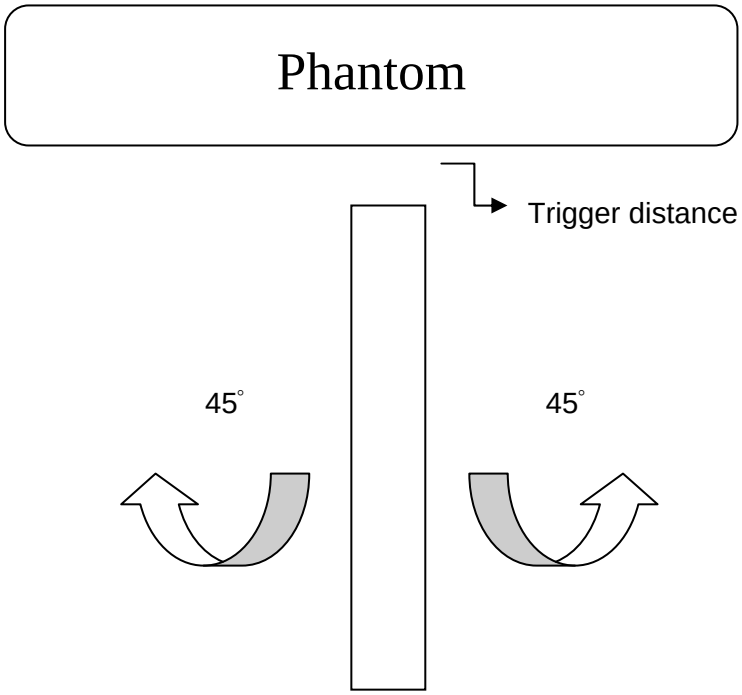
f) If the subsequently measured peak SAR location for the antenna is not between the triggering points, established by the sensor coverage tests from opposite ends of the antenna and sensor, additional SAR tests may be required for conditions where only part of the back surface or edge of a tablet corresponding to the antenna is in proximity to the user and the sensor may not be triggering as desired. A KDB inquiry must be submitted by the test lab to determine if additional tests are required and the proper test configurations to use for testing. This may include situations where the sensor coverage region is too small for the antenna, the sensor is located too far away from the antenna, the sensor location is insufficient to cover multiple antennas or the antenna is at the corner of a tablet etc.

9.3. Procedures for determining tablet tilt angle influences to proximity sensor triggering

a) The influence of table tilt angles to proximity sensor triggering is determined by positioning each tablet edge that contains a transmitting antenna, perpendicular to the flat phantom, at the smallest sensor triggering test distance determined in 9.1 and 9.2 by rotating the tablet around the edge next to the phantom in ≤ 10° increments until the tablet is 45° or more from the vertical position at 0°.

b) If sensor triggering is released and normal maximum output power is restored within the 45° range, the procedures in step a) should be repeated by reducing the tablet to phantom separation distance by 1 mm until the proximity sensor no longer releases triggering, and maximum output power remains in the reduced mode.

c) The smallest separation distance determined in steps a) and b), minus 1 mm, is the sensor triggering distance for tablet tilt coverage. The smallest separation distance determined in 9.1, 9.2 and 9.3 for each triggering condition minus 1 mm should be used in the SAR measurements.

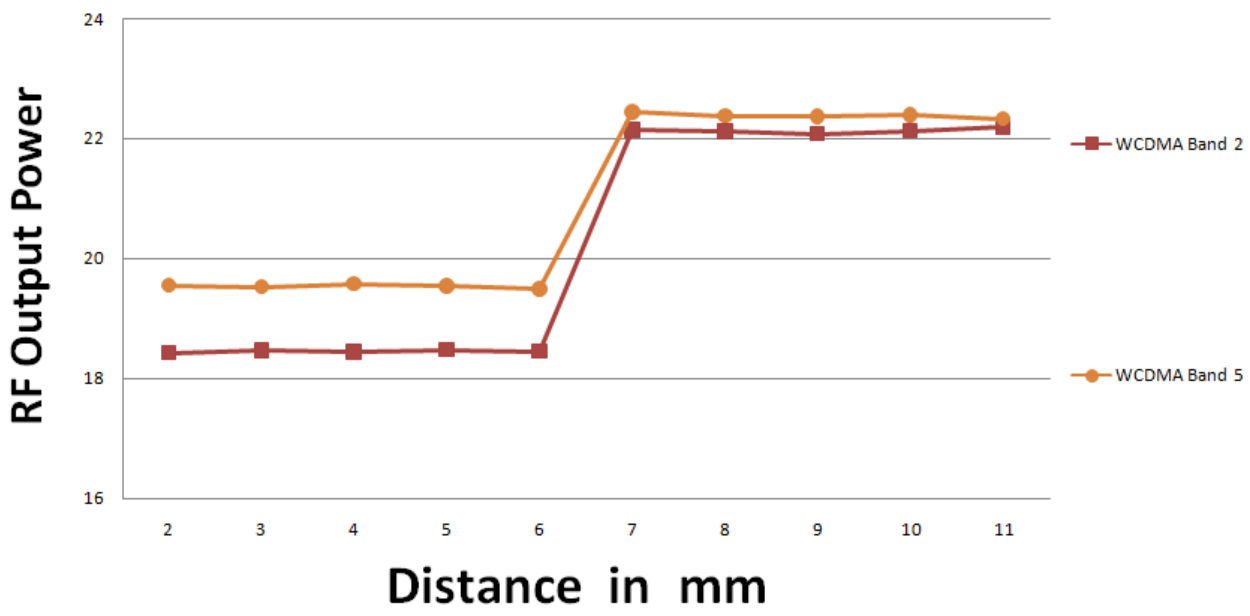


9.4. summary of Trigger Distance

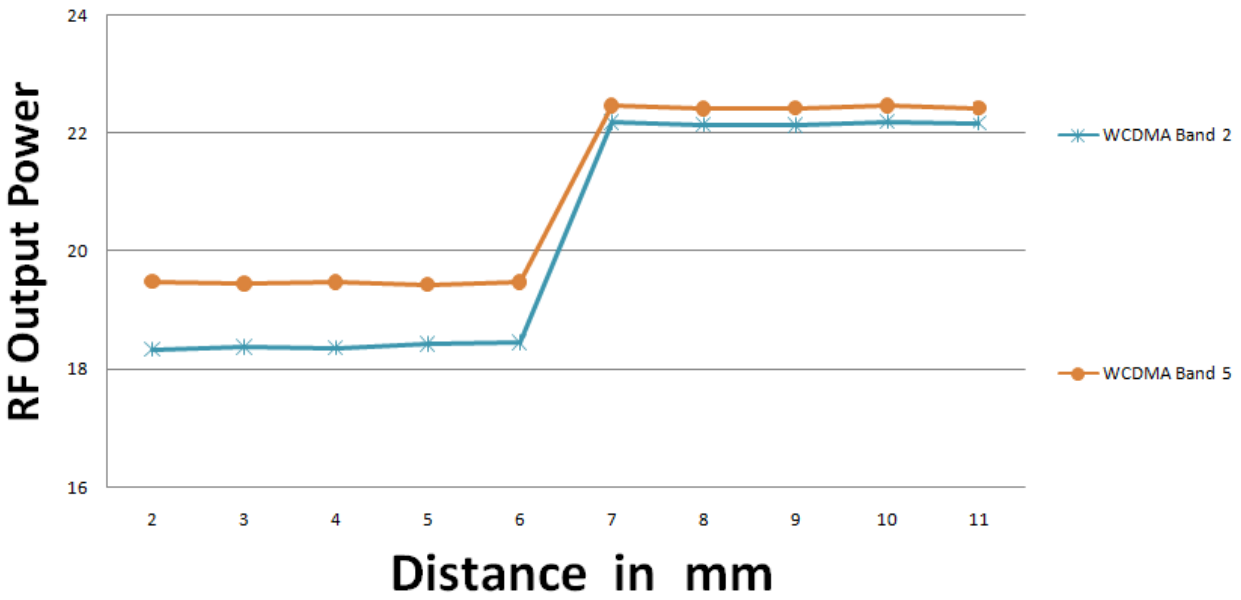
	Back		Top	
	Triggering	Tilt	Triggering	Tilt
WWAN	6mm	6mm	6mm	6mm
WLAN	N/A	N/A	N/A	N/A

Note : The smallest separation distance determined in each triggering condition minus 1 mm should be used in the SAR measurements.

Top										
Distance to DUT vs. Output Power in dBm										
Distance (mm)	2	3	4	5	6	7	8	9	10	11
WCDMA Band 2	18.42	18.46	18.43	18.47	18.44	22.14	22.11	22.08	22.13	22.19
WCDMA Band 5	19.55	19.52	19.57	19.53	19.48	22.44	22.38	22.36	22.39	22.33



Back										
Distance to DUT vs. Output Power in dBm										
Distance (mm)	2	3	4	5	6	7	8	9	10	11
WCDMA Band 2	18.33	18.37	18.36	18.42	18.44	22.18	22.15	22.13	22.19	22.17
WCDMA Band 5	19.48	19.44	19.47	19.43	19.47	22.46	22.41	22.42	22.46	22.42



10. Test Results

10.1 SAR Test Results Summary

SAR MEASUREMENT									
Liquid Temperature (°C): 20.7 ±2					Relative Humidity (%): 54				
Ambient Temperature (°C): 21.9 ±2					Depth of Liquid (cm): >15				
Test Mode: GSM 850 (GPRS 1Slot)									
Test Position Body	Pwr On-Off	Dist (mm)	Frequency		Conducted Power (dBm)		SAR 1g (W/Kg)		Limit (W/kg)
			Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Scaled	
Back	OFF	0	128	824.2	31.43	33	0.795	1.141	1.6
Back	OFF	0	189	836.4	31.44	33	0.826	**1.183**	1.6
Back	OFF	0	251	848.8	31.43	33	0.819	1.176	1.6
Right-side	OFF	0	189	836.4	31.44	33	0.069	0.099	1.6
Top	OFF	0	189	836.4	31.44	33	0.508	0.728	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. (2)We have already evaluated in sensor “off” on 0mm , so don’t need evaluated in sensor “on” on 0mm.									

SAR MEASUREMENT

Liquid Temperature (°C): 20.1 ±2	Relative Humidity (%): 53
Ambient Temperature (°C): 21.8 ±2	Depth of Liquid (cm): >15

Test Mode: PCS 1900 (GPRS 2Slot)

Test Position Body	Pwr On-Off	Dist (mm)	Frequency		Conducted Power (dBm)		SAR 1g (W/Kg)		Limit (W/kg)
			Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Scaled	
Back	OFF	0	512	1850.2	25.02	27	0.561	**0.885**	1.6
Back	OFF	0	661	1880	25.16	27	0.517	0.790	1.6
Back	OFF	0	810	1909.8	25.17	27	0.481	0.733	1.6
Right-side	OFF	0	661	1880	25.16	27	0.023	0.035	1.6
Top	OFF	0	661	1880	25.16	27	0.453	0.692	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.

(2)We have already evaluated in sensor “off” on 0mm , so don’t need evaluated in sensor “on” on 0mm.

SAR MEASUREMENT

Liquid Temperature (°C): 20.1 ±2	Relative Humidity (%): 53
Ambient Temperature (°C): 21.8 ±2	Depth of Liquid (cm): >15

Test Mode: WCDMA RMC Band 2

Test Position Body	Pwr On-Off	Dist (mm)	Frequency		Conducted Power (dBm)		SAR 1g (W/Kg)		Limit (W/kg)
			Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Scaled	
Back	ON	0	9262	1852.4	17.32	19	0.506	0.745	1.6
Back	ON	0	9400	1880	18.5	19	0.745	0.836	1.6
Back	ON	0	9538	1907.6	17.75	19	0.530	0.707	1.6
Top	ON	0	9400	1880	18.5	19	0.592	0.664	1.6
Back	OFF	5	9262	1852.4	21.31	23	0.663	0.978	1.6
Back	OFF	5	9400	1880	22.2	23	0.846	1.017	1.6
Back	OFF	5	9538	1907.6	21.34	23	0.552	0.809	1.6
Right-Side	OFF	0	9400	1880	22.2	23	**0.071**	**0.085**	1.6
Top	OFF	5	9262	1852.4	21.31	23	0.699	**1.032**	1.6
Top	OFF	5	9400	1880	22.2	23	0.791	0.951	1.6
Top	OFF	5	9538	1907.6	21.34	23	0.413	0.605	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.

(2)We have already evaluated Right side in sensor “off” on 0mm , so don’t need evaluated Right side in sensor “on” on 0mm

SAR MEASUREMENT

Liquid Temperature (°C): 20.7 ±2	Relative Humidity (%): 54
Ambient Temperature (°C): 21. ±2	Depth of Liquid (cm): >15

Test Mode: WCDMA RMC Band 5

Test Position Body	Pwr On-Off	Dist (mm)	Frequency		Conducted Power (dBm)		SAR 1g (W/Kg)		Limit (W/kg)
			Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Scaled	
Back	ON	0	4132	824.2	19.46	20.5	0.698	0.887	1.6
Back	ON	0	4183	836.6	19.35	20.5	0.717	0.934	1.6
Back	ON	0	4233	848.8	19.64	20.5	0.903	**1.100**	1.6
Back	OFF	5	4183	836.6	22.23	23	0.564	0.673	1.6
Right-side	OFF	0	4183	836.6	22.23	23	0.099	0.118	1.6
Top	OFF	0	4183	836.6	22.23	23	0.627	0.749	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.

(2)We have already evaluated in sensor “off” on 0mm , so don’t need evaluated in sensor “on” on 0mm.

SAR MEASUREMENT

Liquid Temperature (°C): 20.7 ±2	Relative Humidity (%): 57
Ambient Temperature (°C): 22.2 ±2	Depth of Liquid (cm): >15

Test Mode: 802.11b

Test Position Body	Pwr On-Off	Dist (mm)	Frequency		Conducted Power (dBm)		SAR 1g (W/Kg)		Limit (W/kg)
			Channel	MHz	Measurement	Tune-up Limit	Measurement	Tune-up Scaled	
Back	OFF	0	11	2462	16.62	17	0.567	**0.619**	1.6
Top	OFF	0	11	2462	16.62	17	0.374	0.408	1.6
Right-Side	OFF	0	11	2462	16.62	17	0.228	0.249	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.

(2)We have already evaluated in sensor “off” on 0mm , so don’t need evaluated in sensor “on” on 0mm.

10.2 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)]·[√f(GHz)/7.5]

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

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:

10.2.1 Simultaneous Transmission Configurations

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

10.2.2 Simultaneous Transmission Summation for Top:

Exposure condition	Band	(1) WWAN (W/Kg)	(2) DTS (W/Kg)	(3) BT (W/Kg)	(1)+(2)	(1)+(3)
					Σ 1-g SAR	**Σ 1-g SAR**
Top	GSM 850	0.728	0.408	0.21	1.14	0.94
	PCS 1900	0.692	0.408	0.21	1.10	0.90
	UMTS 850	0.749	0.408	0.21	1.16	0.96
	UMTS 1900	1.032	0.408	0.21	1.44	1.24

Note (1) The sum of value is less than 1.6W/Kg, thus simultaneous SAR testing is not need.

10.2.3 Simultaneous Transmission Summation for Back

Exposure condition	Band	(1) WWAN (W/Kg)	(2) DTS (W/Kg)	(3) BT (W/Kg)	(1)+(2)	(1)+(3)
					Σ 1-g SAR	**Σ 1-g SAR**
Back	GSM 850	1.183	0.619	0.21	1.80*2	1.39
	PCS 1900	0.885	0.619	0.21	1.50	1.10
	UMTS 850	1.100	0.619	0.21	1.72*2	1.31
	UMTS 1900	1.017	0.619	0.21	1.64*2	1.23

Note (1) The sum of value is less than 1.6W/Kg, thus simultaneous SAR testing is not need.

(2)

Simultaneous Transmission (W/Kg)	Antenna pair in mm	Peak location separation ratio
1.80	110	0.02
1.72	110	0.02
1.64	110	0.02

Note : The sum of value is less than 1.6W/Kg or 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 SAR test exclusion.

11. 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)						
Mode	Channel	MHz	Original	First Repeated		Second Repeated		Third Repeated	
				Value	Ratio	Value	Ratio	Value	Ratio
GSM 850	189	836.4	0.826	0.803	1.03	N/A	N/A	N/A	N/A
WCDMA Band 2	9400	1880	0.846	0.814	1.04	N/A	N/A	N/A	N/A
WCDMA Band 5	4233	848.8	0.902	0.900	1.00	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

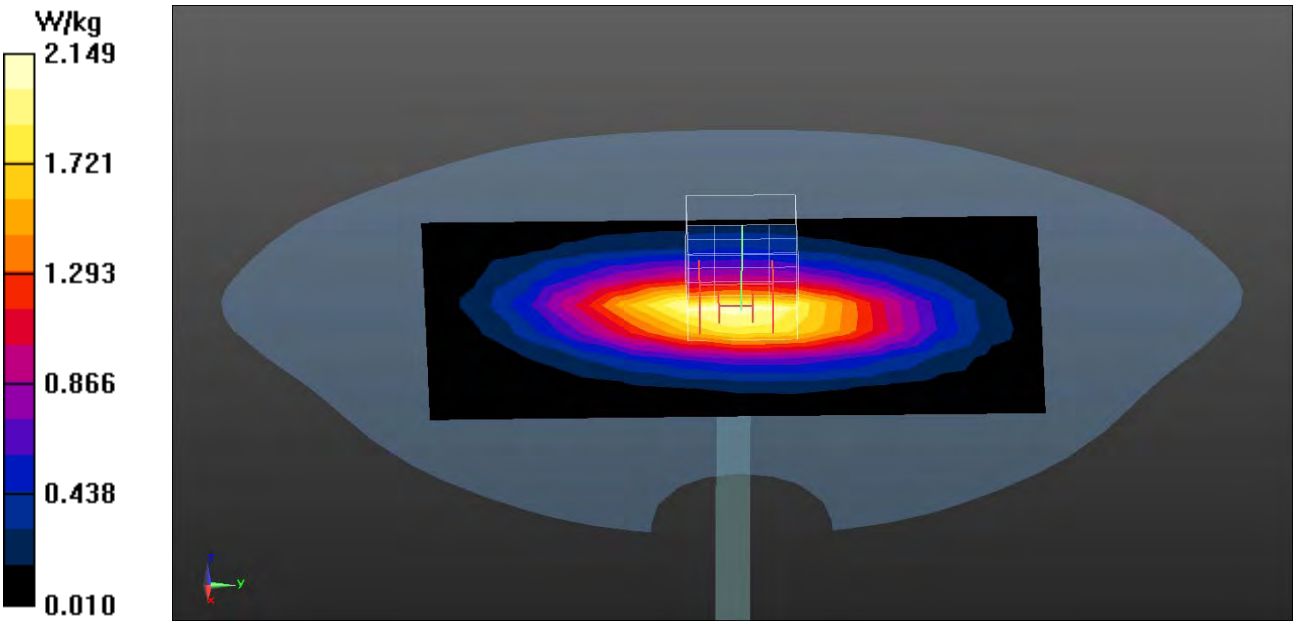
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/10

System Performance Check_835MHz-Body
DUT: Dipole 835 MHz; Type: ASL-D-835
Communication System: UID 0, CW; Frequency: 835 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 835 MHz; σ = 1.01 S/m; ε_r = 56.18; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.7
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 left table; Type: SAM;
- Measurement SW: DASY52, 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) = 2.31 W/kg; SAR(10 g) = 1.57 W/kg
Maximum value of SAR (measured) = 2.26 W/kg



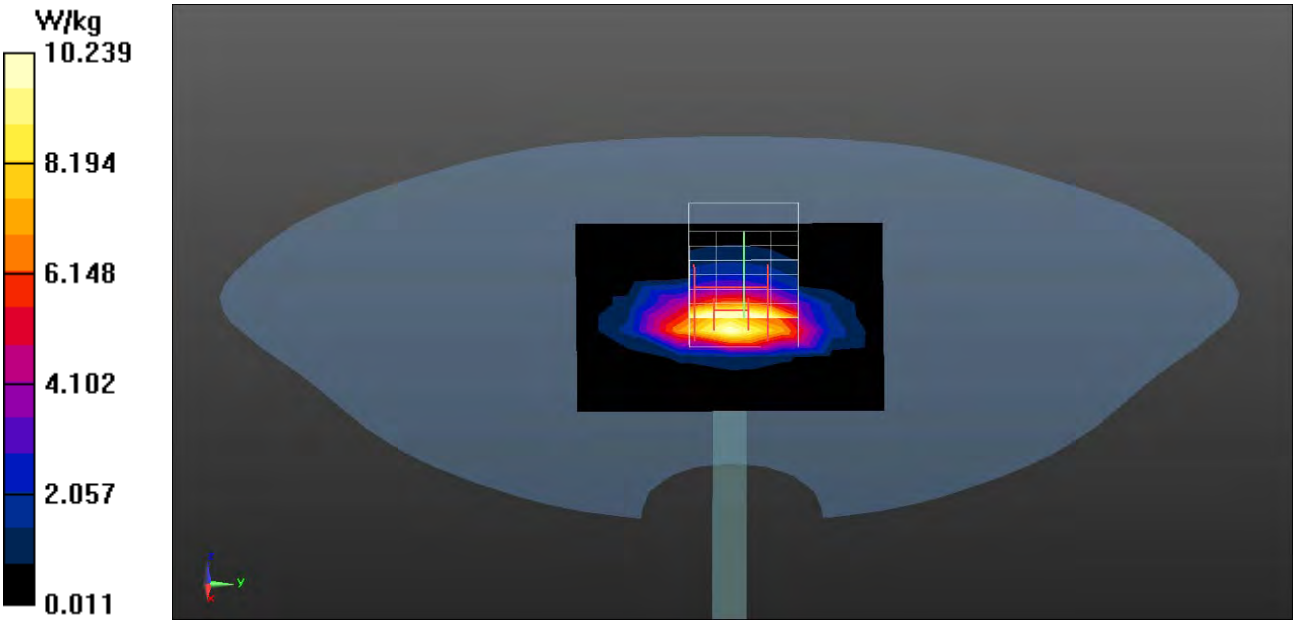
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/09

System Performance Check_1900MHz-Body
DUT: Dipole 1900 MHz; Type: ASL-D-1900
Communication System: UID 10000, CW; Frequency: 1900 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 1900 MHz; σ = 1.58 S/m; ε_r = 54.27; ρ = 1000 kg/m^3
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 right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/1900MHz_Body/Area Scan (8x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 10.2 W/kg

Configuration/1900MHz_Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 90.08 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 16.5 W/kg
SAR(1 g) = 9.81 W/kg; SAR(10 g) = 4.97 W/kg
Maximum value of SAR (measured) = 12.1 W/kg



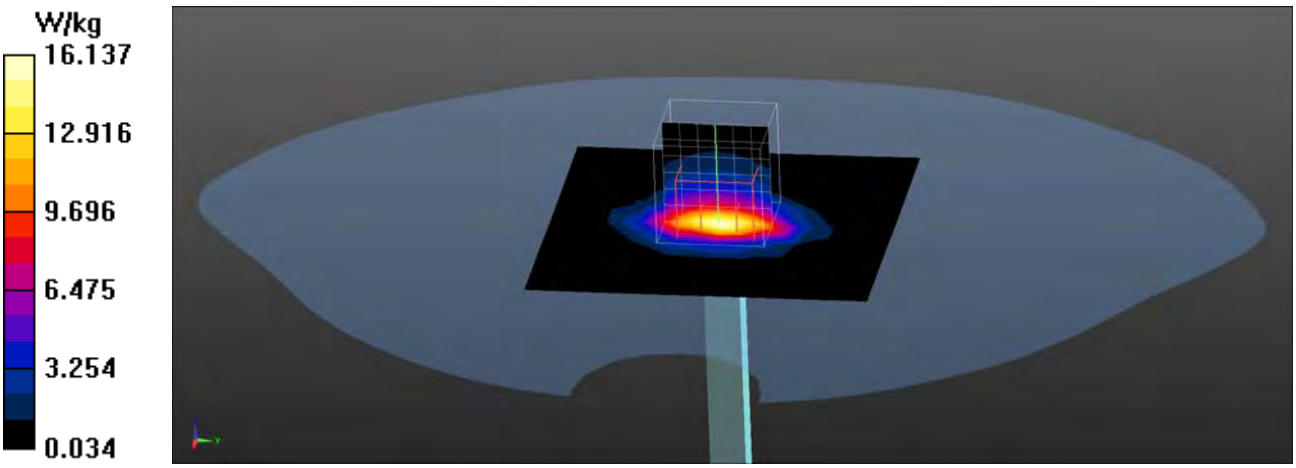
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/05

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; σ = 1.97 S/m; ε_r = 52.35; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 22.2, Liquid Temperature (°C) : 20.7
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 right 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) = 16.1 W/kg

Configuration/2450MHz_Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 90.32 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 30.9 W/kg
SAR(1 g) = 14 W/kg; SAR(10 g) = 6.54 W/kg
Maximum value of SAR (measured) = 15.9 W/kg



Appendix B. SAR measurement Data

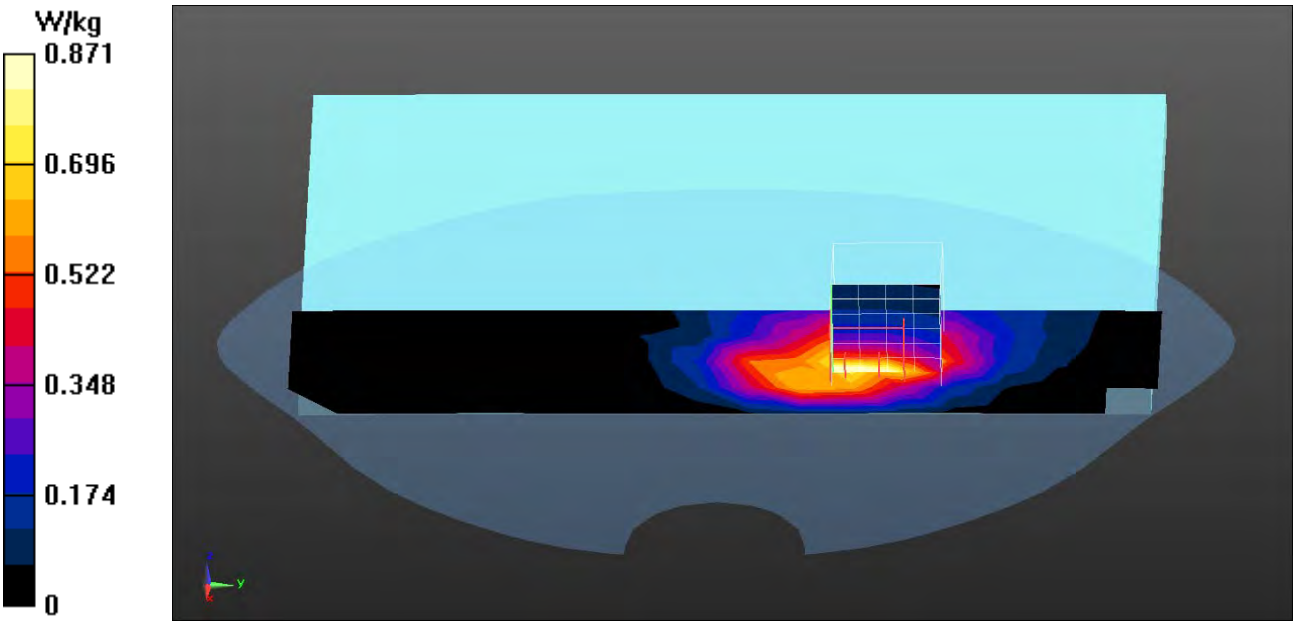
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/10

GSM_835_GPRS_ 1UP_128-Back 0mm Pwr Off
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC GSM_850MHz; Frequency: 824.2 MHz;
Communication System PAR: 9.191 dB
Medium parameters used: f = 824.2 MHz; σ = 1 S/m; ε_r = 56.25; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.7
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 left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x18x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.871 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.15 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 1.57 W/kg
SAR(1 g) = 0.795 W/kg; SAR(10 g) = 0.464 W/kg
Maximum value of SAR (measured) = 1.04 W/kg



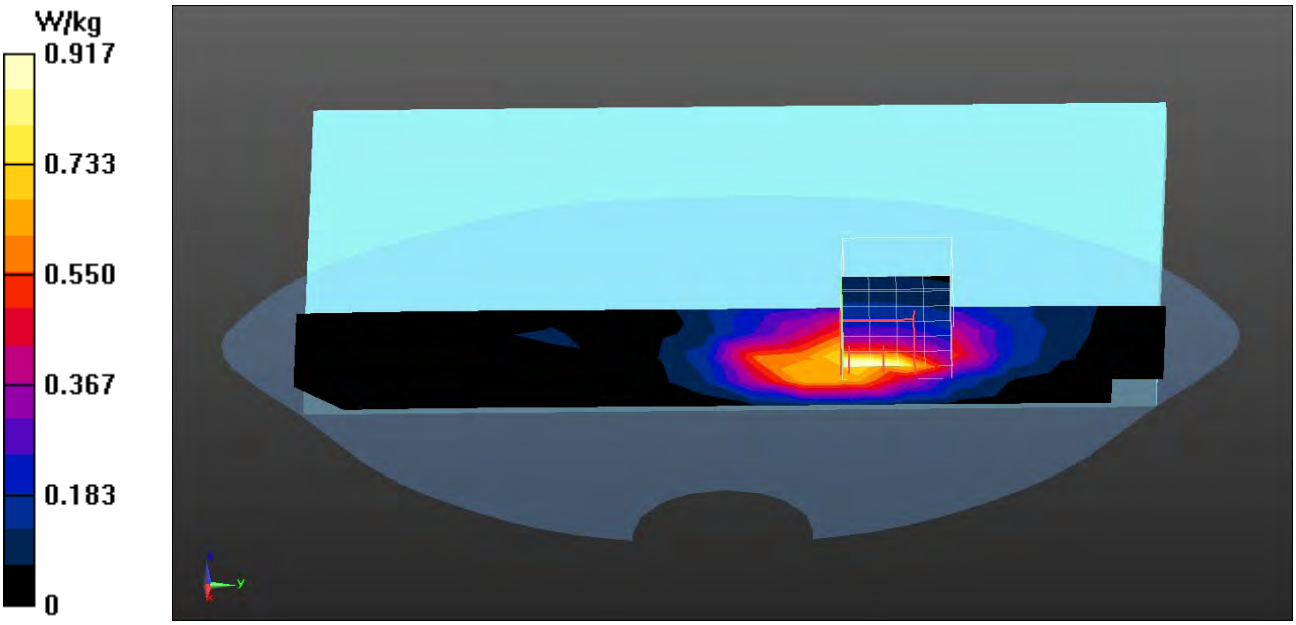
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/10

GSM_835_GPRS_ 1UP_189-Back 0mm Pwr Off
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC GSM_850MHz; Frequency: 836.4 MHz;
Communication System PAR: 9.191 dB
Medium parameters used: f = 836.4 MHz; σ = 1.01 S/m; ε_r = 56.14; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.7
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 left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x18x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.917 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.63 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.62 W/kg
SAR(1 g) = 0.826 W/kg; SAR(10 g) = 0.477 W/kg
Maximum value of SAR (measured) = 1.07 W/kg



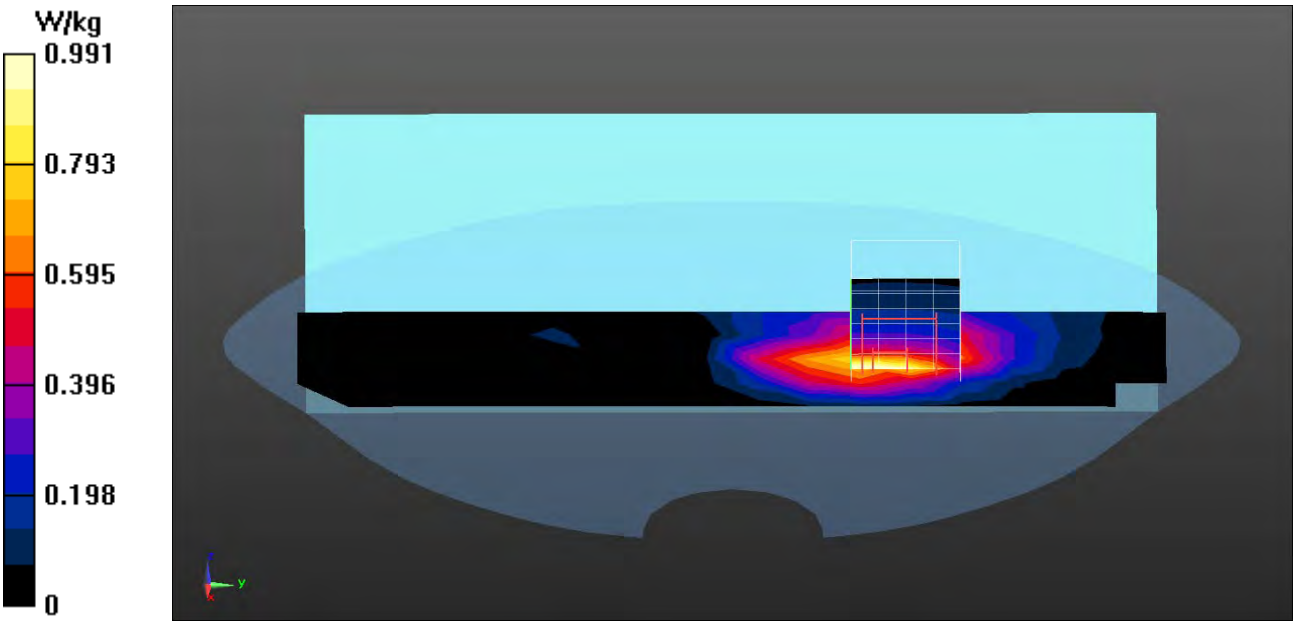
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/10

GSM_835_GPRS_ 1UP_251-Back 0mm Pwr Off
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC GSM_850MHz; Frequency: 848.8 MHz;
Communication System PAR: 9.191 dB
Medium parameters used: f = 848.8 MHz; σ = 1.02 S/m; ε_r = 55.98; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.7
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 left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x18x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.991 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.46 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 1.61 W/kg
SAR(1 g) = 0.819 W/kg; SAR(10 g) = 0.475 W/kg
Maximum value of SAR (measured) = 1.07 W/kg



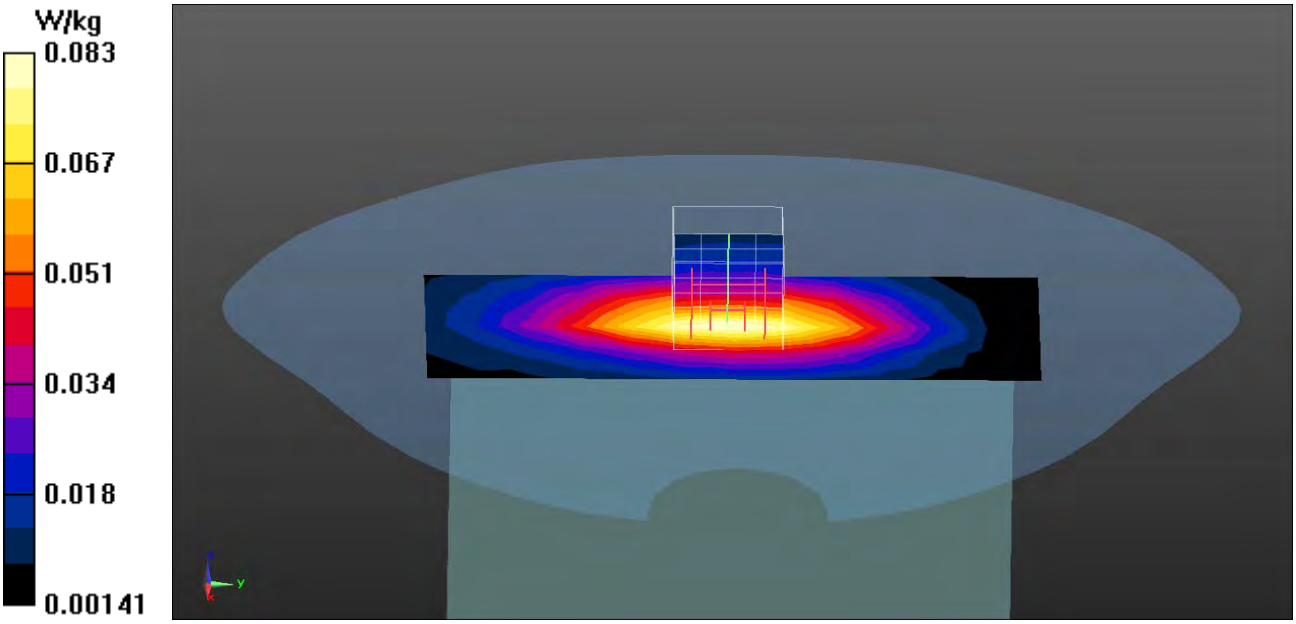
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/10

GSM_835_GPRS_ 1UP_189-Right-side 0mm Pwr Off
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC GSM_850MHz; Frequency: 836.4 MHz;
Communication System PAR: 9.191 dB
Medium parameters used: f = 836.4 MHz; σ = 1.01 S/m; ε_r = 56.14; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.7
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 left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0833 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.177 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 0.103 W/kg
SAR(1 g) = 0.069 W/kg; SAR(10 g) = 0.046 W/kg
Maximum value of SAR (measured) = 0.0804 W/kg



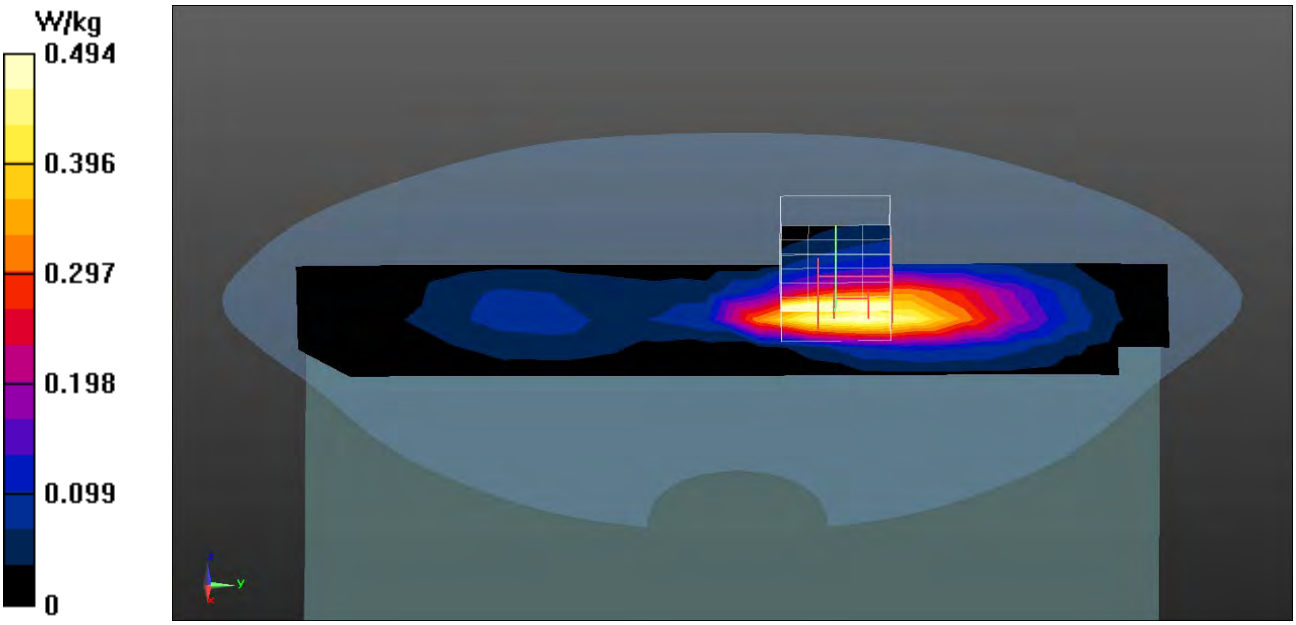
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/10

GSM_835_GPRS_ 1UP_189-Top 0mm Pwr Off
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC GSM_850MHz; Frequency: 836.4 MHz;
Communication System PAR: 9.191 dB
Medium parameters used: f = 836.4 MHz; σ = 1.01 S/m; ε_r = 56.14; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.7
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

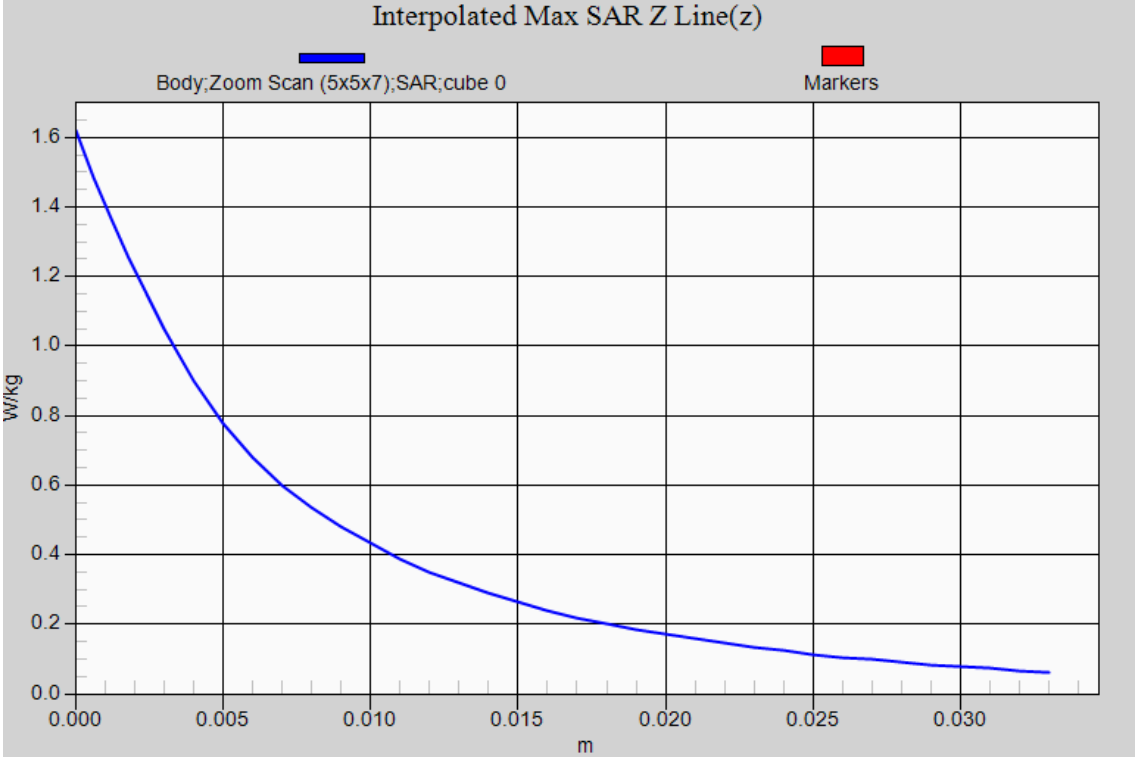
- Probe: EX3DV4 - SN3698; ConvF(8.96, 8.96, 8.96); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x18x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.494 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.32 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.03 W/kg
SAR(1 g) = 0.508 W/kg; SAR(10 g) = 0.267 W/kg
Maximum value of SAR (measured) = 0.682 W/kg



GSM 835 EUT Back (1UP 0mm) Z-Axis plot
Channel: 189



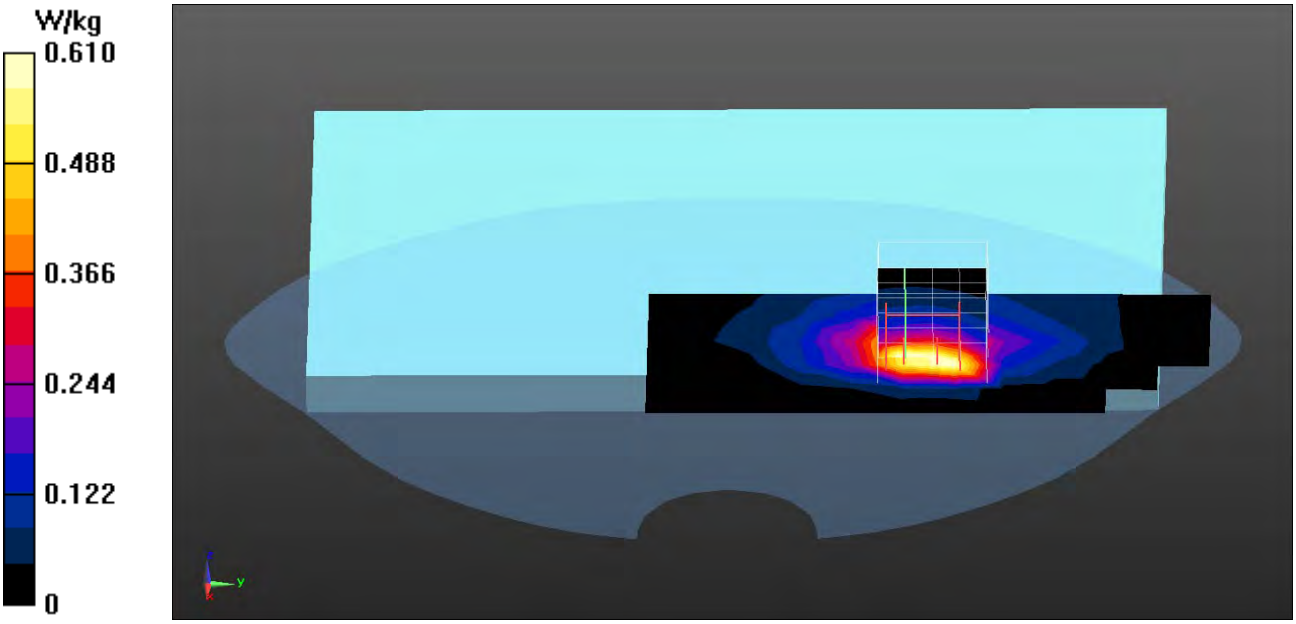
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/09

PCS_1900_GPRS_2UP_512-Back Pwr Off
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC PCS_1900MHz_GPRS&EGPRS-2 Slot;
Frequency: 1850.2 MHz;Communication System PAR: 6.128 dB
Medium parameters used: f = 1850.2 MHz; σ = 1.53 S/m; ε_r = 54.52; ρ = 1000 kg/m^3
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 right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (6x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.610 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.310 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 1.11 W/kg
SAR(1 g) = 0.561 W/kg; SAR(10 g) = 0.302 W/kg
Maximum value of SAR (measured) = 0.692 W/kg



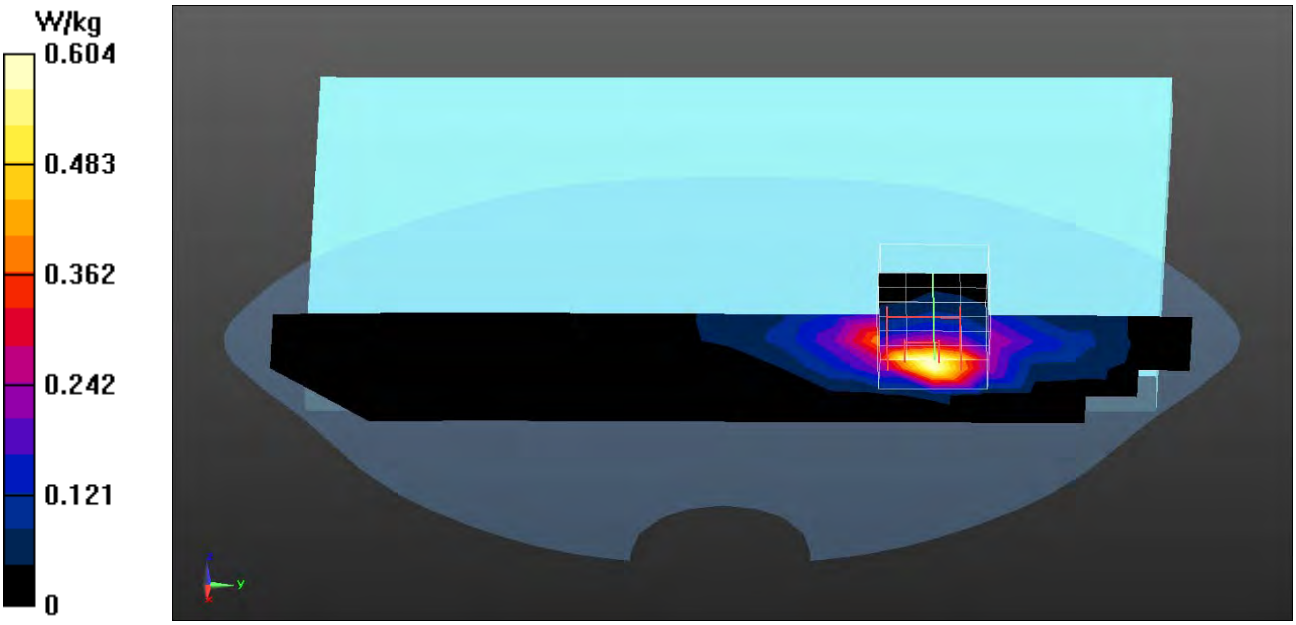
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/09

PCS_1900_GPRS_2UP_661-Back Pwr Off
DUT: Tablet PC; Type: TH10GA3
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 MHz; σ = 1.56 S/m; ε_r = 54.31; ρ = 1000 kg/m^3
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 right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x19x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.604 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.938 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 1.00 W/kg
SAR(1 g) = 0.517 W/kg; SAR(10 g) = 0.277 W/kg
Maximum value of SAR (measured) = 0.627 W/kg



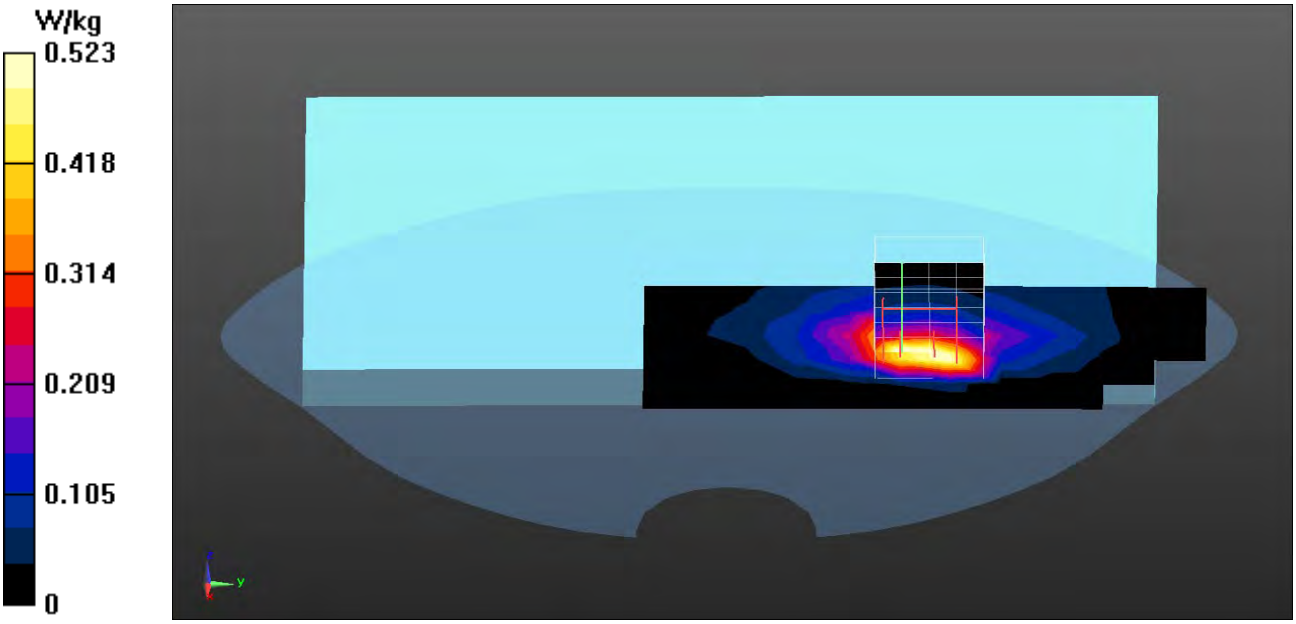
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/09

PCS_1900_GPRS_2UP_810-Back Pwr Off
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC PCS_1900MHz_GPRS&EGPRS-2 Slot;
Frequency: 1909.8 MHz;Communication System PAR: 6.128 dB
Medium parameters used: f = 1909.8 MHz; σ = 1.58 S/m; ε_r = 54.17; ρ = 1000 kg/m^3
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 right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (6x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.523 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.599 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.978 W/kg
SAR(1 g) = 0.481 W/kg; SAR(10 g) = 0.254 W/kg
Maximum value of SAR (measured) = 0.585 W/kg



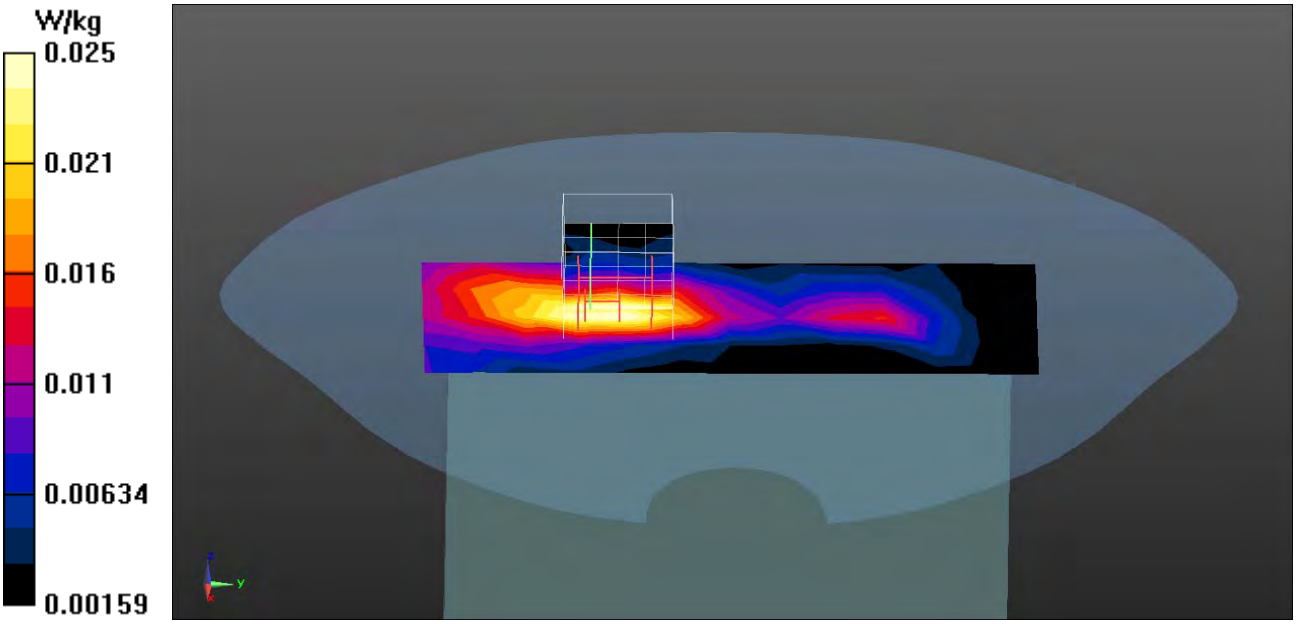
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/09

PCS_1900_GPRS_2UP_661-Right-side Pwr Off
DUT: Tablet PC; Type: TH10GA3
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 MHz; σ = 1.56 S/m; ε_r = 54.31; ρ = 1000 kg/m^3
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 right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0253 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.268 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.0390 W/kg
SAR(1 g) = 0.023 W/kg; SAR(10 g) = 0.013 W/kg
Maximum value of SAR (measured) = 0.0274 W/kg



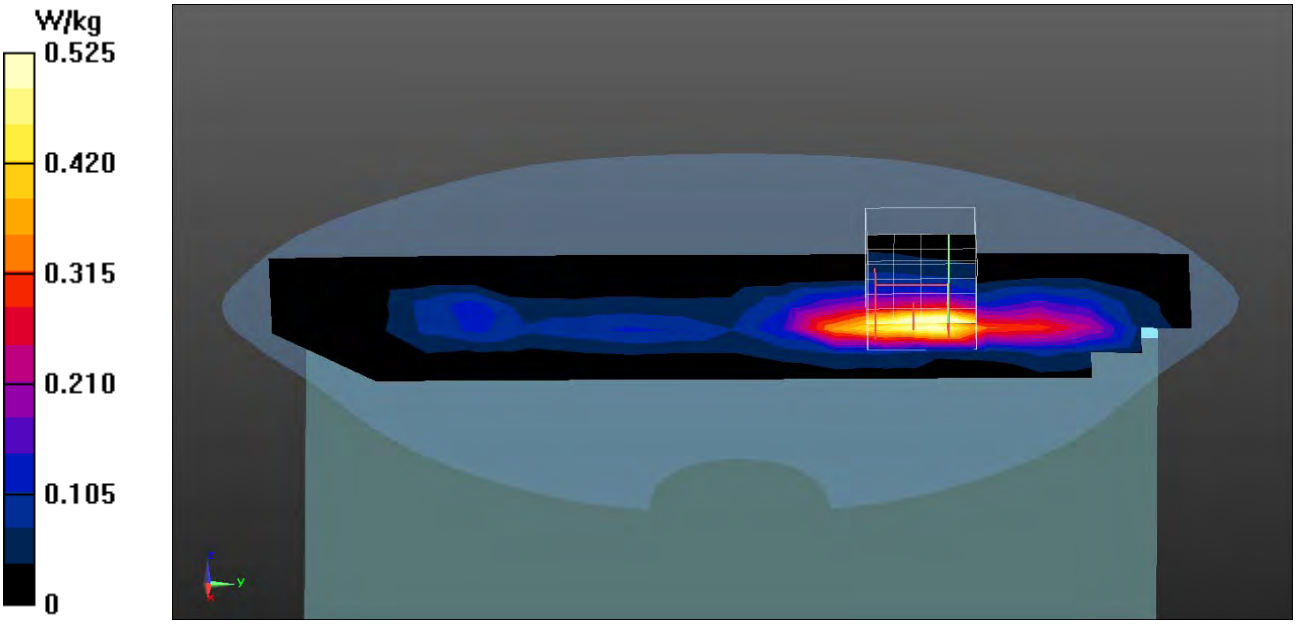
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/09

PCS_1900_GPRS_2UP_661-Top Pwr Off
DUT: Tablet PC; Type: TH10GA3
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 MHz; σ = 1.56 S/m; ε_r = 54.31; ρ = 1000 kg/m^3
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:

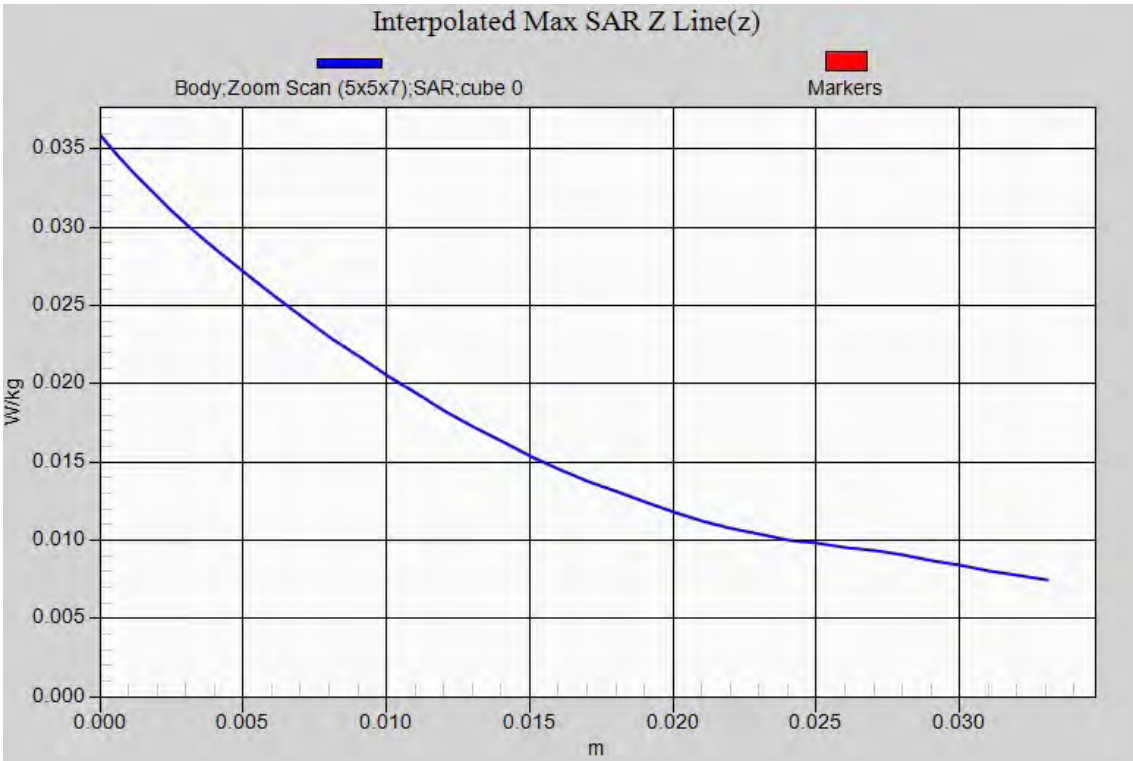
- Probe: EX3DV4 - SN3698; ConvF(7.08, 7.08, 7.08); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (6x19x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.525 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.025 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.976 W/kg
SAR(1 g) = 0.453 W/kg; SAR(10 g) = 0.214 W/kg
Maximum value of SAR (measured) = 0.643 W/kg



PCS 1900 EUT Back (2UP) Z-Axis plot
Channel: 512



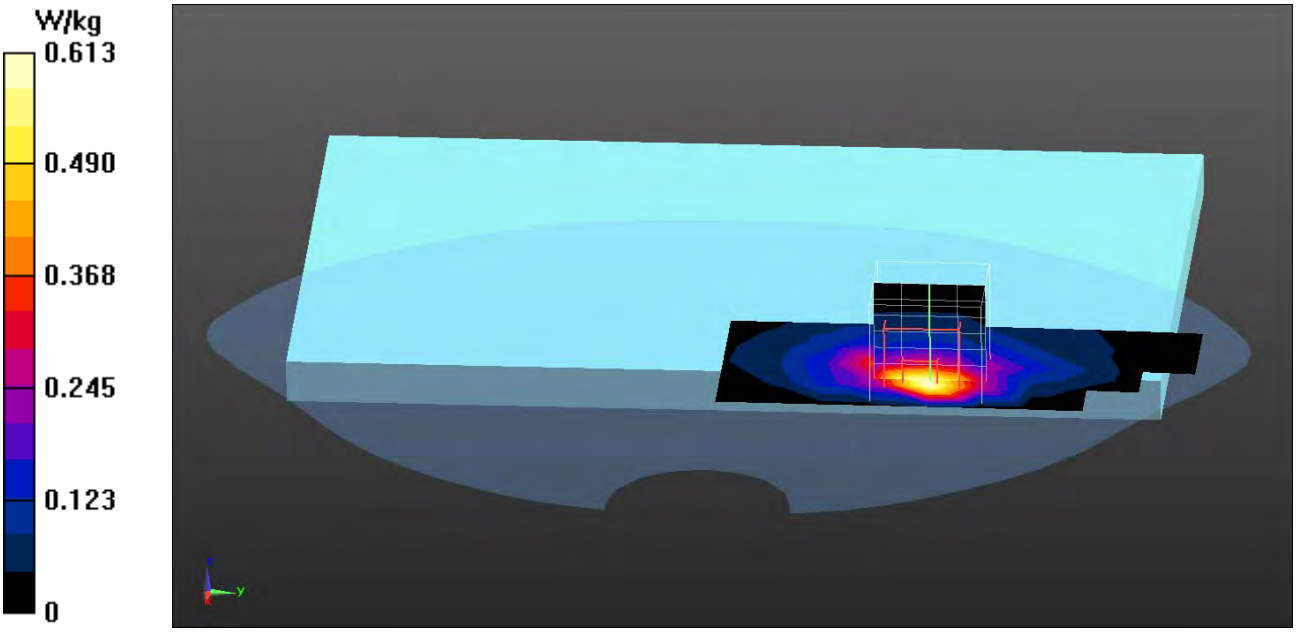
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/09

WCDMA_Band 2_RMC_9262-Back 0mm Pwr On
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC WCDMA_Band-2; Frequency: 1852.4 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 1852.4 MHz; σ = 1.53 S/m; ε_r = 54.2; ρ = 1000 kg/m^3
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 right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x10x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.613 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.143 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.01 W/kg
SAR(1 g) = 0.506 W/kg; SAR(10 g) = 0.268 W/kg
Maximum value of SAR (measured) = 0.611 W/kg



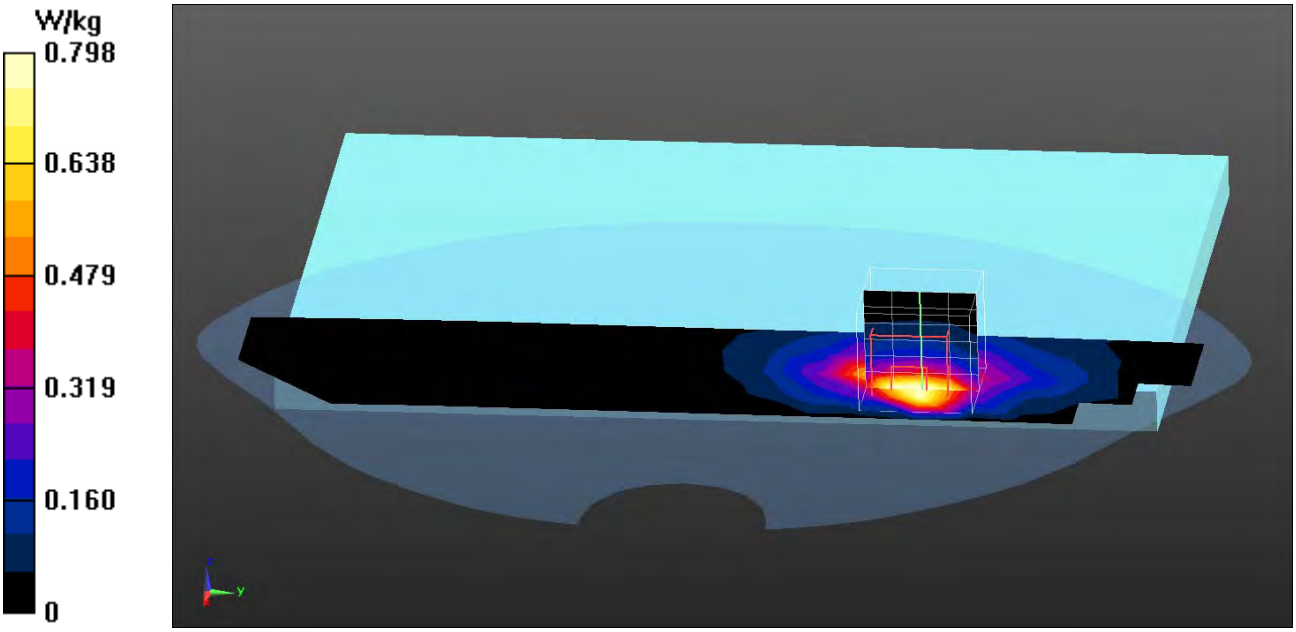
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/09

WCDMA_Band 2_RMC_9400-Back 0mm Pwr On
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC WCDMA_Band-2; Frequency: 1880 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 1880 MHz; σ = 1.56 S/m; ε_r = 54.31; ρ = 1000 kg/m^3
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 right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x19x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.798 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.816 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 1.54 W/kg
SAR(1 g) = 0.745 W/kg; SAR(10 g) = 0.388 W/kg
Maximum value of SAR (measured) = 0.893 W/kg



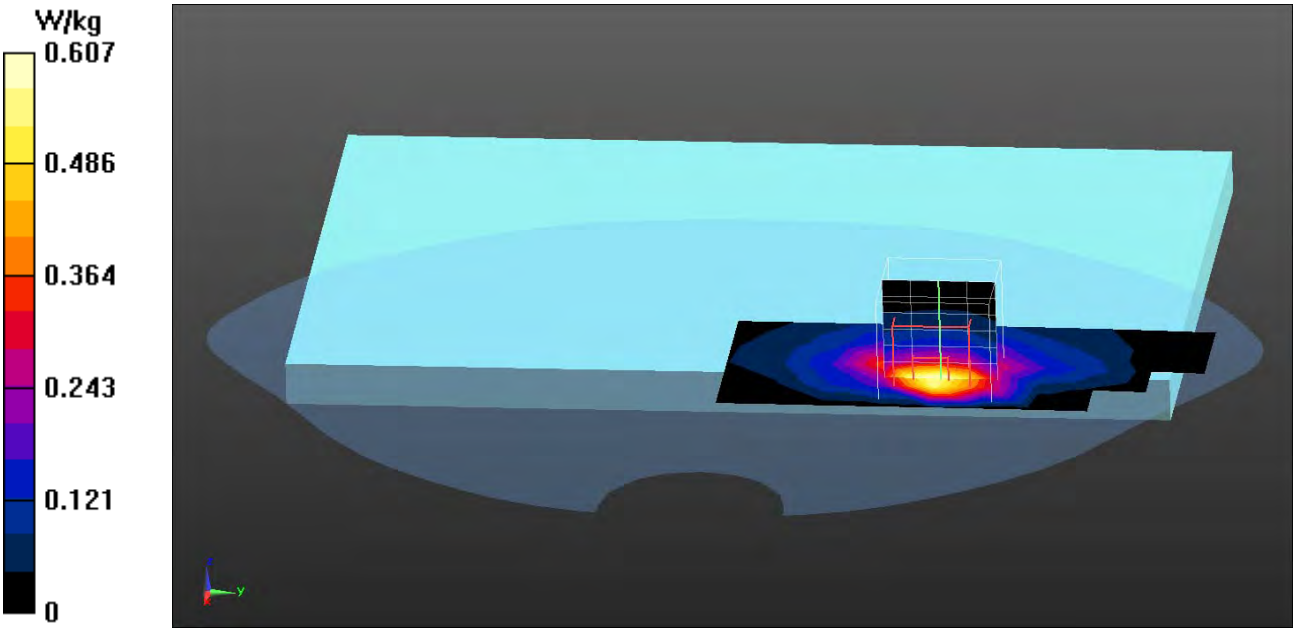
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/09

WCDMA_Band 2_RMC_9538-Back 0mm Pwr On
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC WCDMA_Band-2; Frequency: 1907.6 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 1907.6 MHz; σ = 1.58 S/m; ε_r = 54.22; ρ = 1000 kg/m^3
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 right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x10x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.607 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.313 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.08 W/kg
SAR(1 g) = 0.530 W/kg; SAR(10 g) = 0.278 W/kg
Maximum value of SAR (measured) = 0.647 W/kg



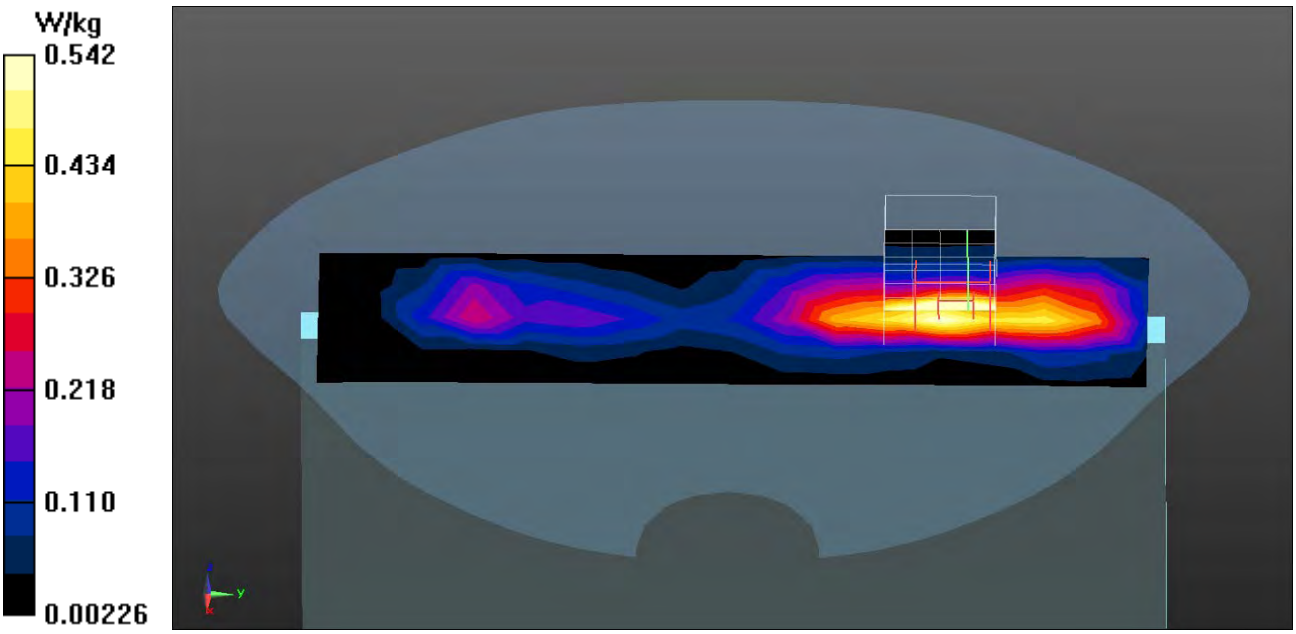
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/09

WCDMA_Band 2_RMC_9400-Top 0mm Pwr On
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC WCDMA_Band-2; Frequency: 1880 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 1880 MHz; σ = 1.56 S/m; ε_r = 54.31; ρ = 1000 kg/m^3
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 right table; 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) = 0.542 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.510 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.26 W/kg
SAR(1 g) = 0.592 W/kg; SAR(10 g) = 0.267 W/kg
Maximum value of SAR (measured) = 0.829 W/kg



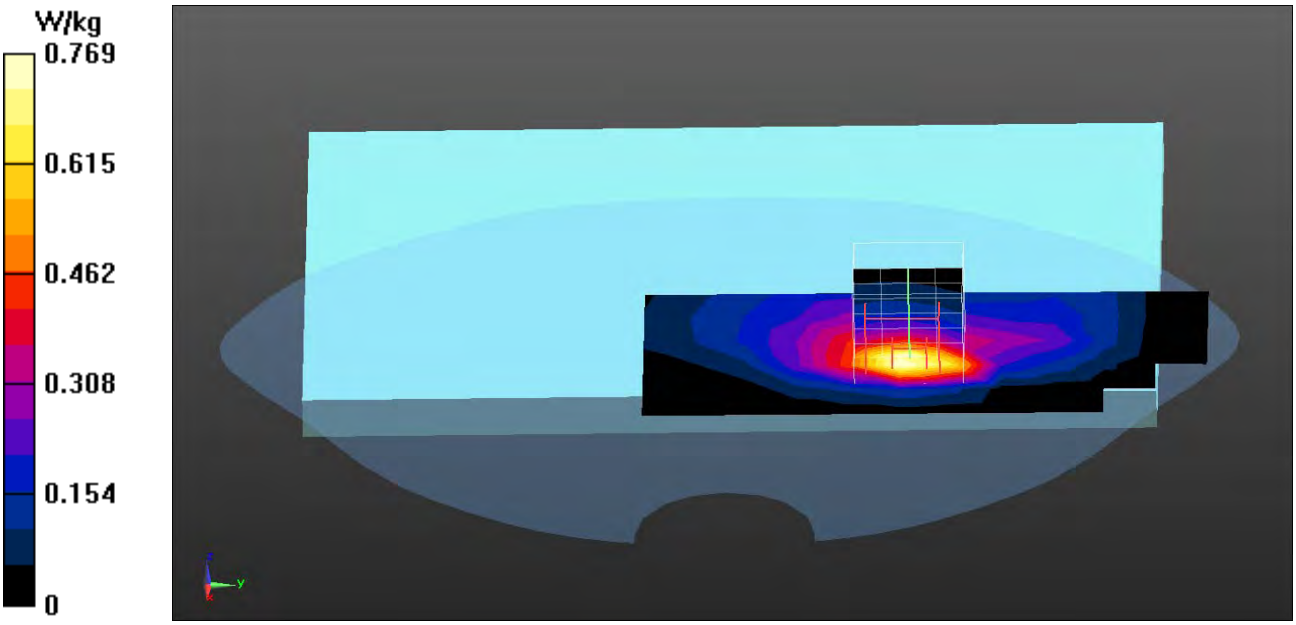
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/09

WCDMA_Band 2_RMC_9262-Back 5mm Pwr Off
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC WCDMA_Band-2; Frequency: 1852.4 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 1852.4 MHz; σ = 1.53 S/m; ε_r = 54.46; ρ = 1000 kg/m^3
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 right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (6x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.769 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.898 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 1.22 W/kg
SAR(1 g) = 0.663 W/kg; SAR(10 g) = 0.367 W/kg
Maximum value of SAR (measured) = 0.821 W/kg



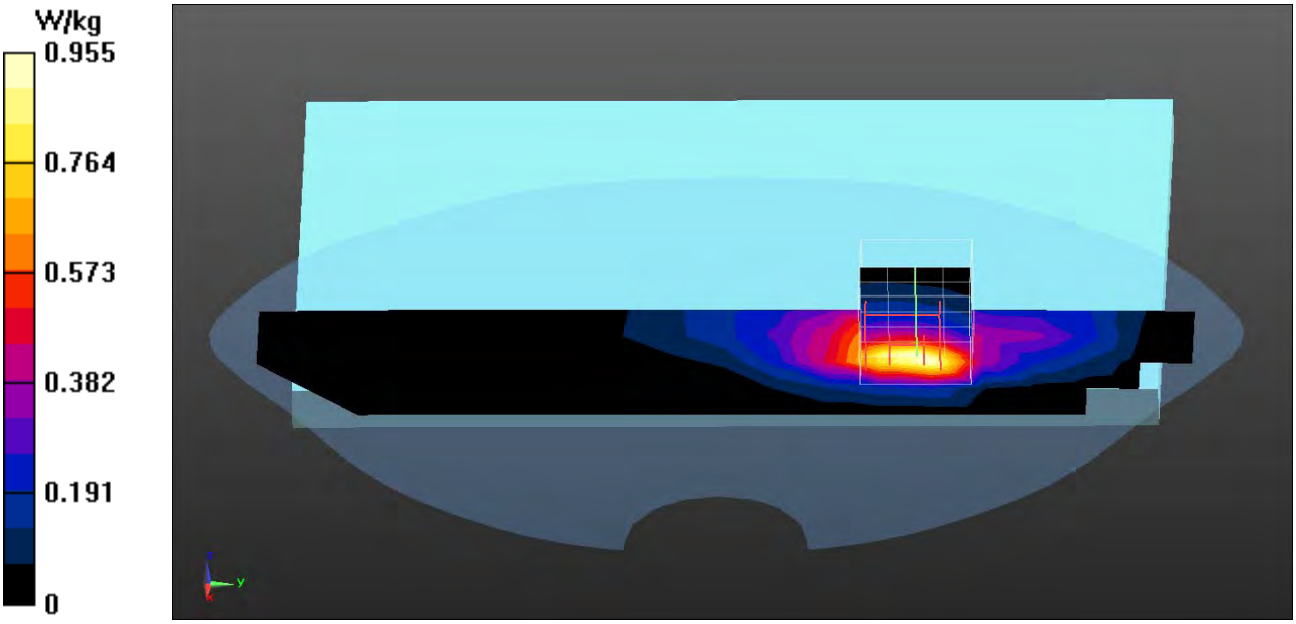
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/09

WCDMA_Band 2_RMC_9400-Back 5mm Pwr Off
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC WCDMA_Band-2; Frequency: 1880 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 1880 MHz; σ = 1.56 S/m; ε_r = 54.31; ρ = 1000 kg/m^3
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 right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x19x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.955 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.467 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 1.50 W/kg
SAR(1 g) = 0.846 W/kg; SAR(10 g) = 0.464 W/kg
Maximum value of SAR (measured) = 1.01 W/kg



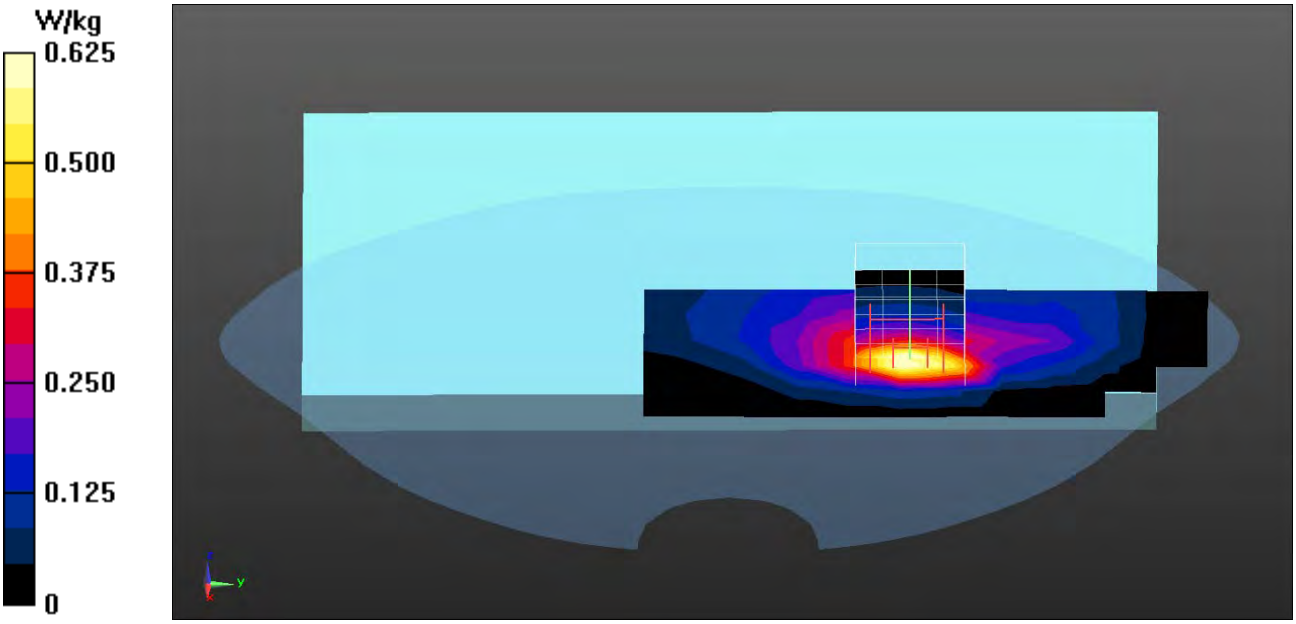
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/09

WCDMA_Band 2_RMC_9538-Back 5mm Pwr Off
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC WCDMA_Band-2; Frequency: 1907.6 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 1907.6 MHz; σ = 1.58 S/m; ε_r = 54.22; ρ = 1000 kg/m^3
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 right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (6x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.625 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.301 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.03 W/kg
SAR(1 g) = 0.552 W/kg; SAR(10 g) = 0.302 W/kg
Maximum value of SAR (measured) = 0.694 W/kg



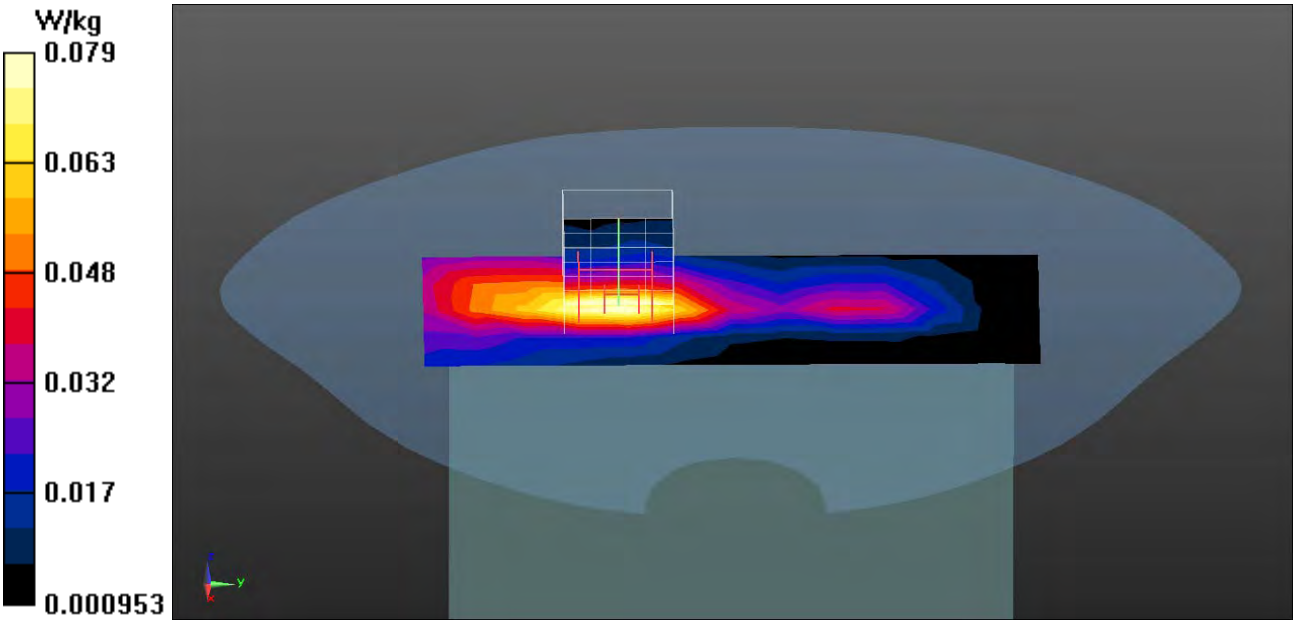
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/09

WCDMA_Band 2_RMC_9400-Right-side 0mm Pwr Off
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC WCDMA_Band-2; Frequency: 1880 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 1880 MHz; σ = 1.56 S/m; ε_r = 54.31; ρ = 1000 kg/m^3
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 right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0791 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.681 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 0.122 W/kg
SAR(1 g) = 0.071 W/kg; SAR(10 g) = 0.042 W/kg
Maximum value of SAR (measured) = 0.0881 W/kg



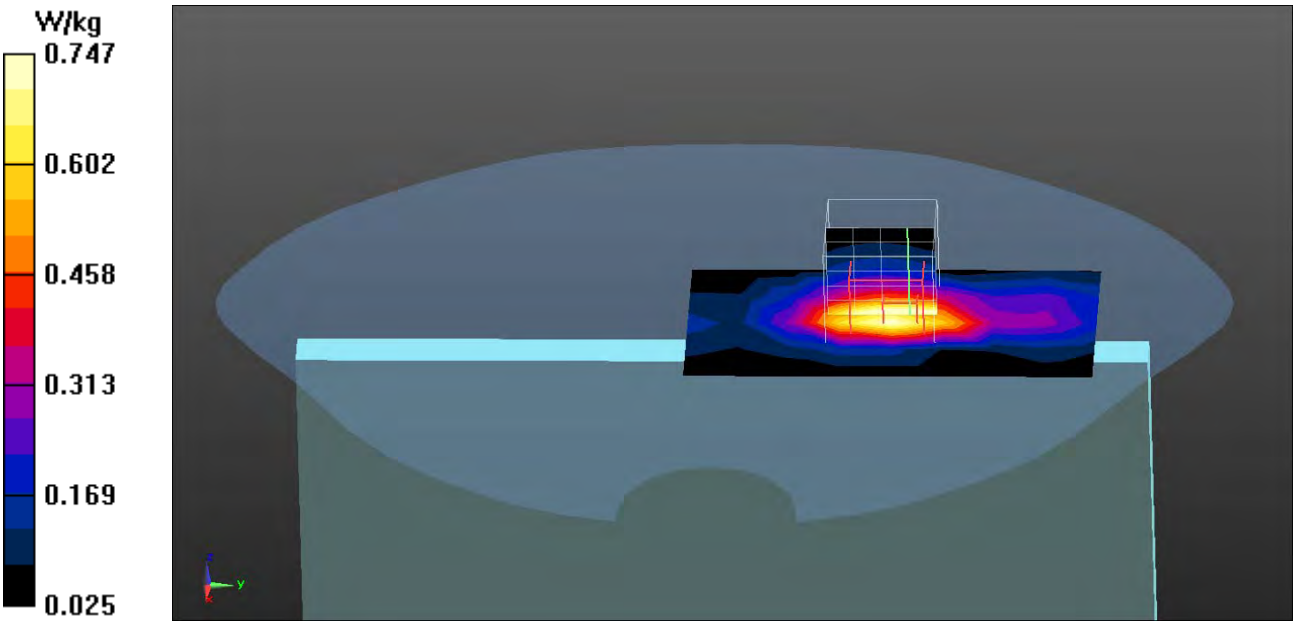
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/09

WCDMA_Band 2_RMC_9262-Top 5mm Pwr Off
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC WCDMA_Band-2; Frequency: 1852.4 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 1852.4 MHz; σ = 1.53 S/m; ε_r = 54.46; ρ = 1000 kg/m^3
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 right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.747 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.618 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 1.25 W/kg
SAR(1 g) = 0.699 W/kg; SAR(10 g) = 0.382 W/kg
Maximum value of SAR (measured) = 0.878 W/kg



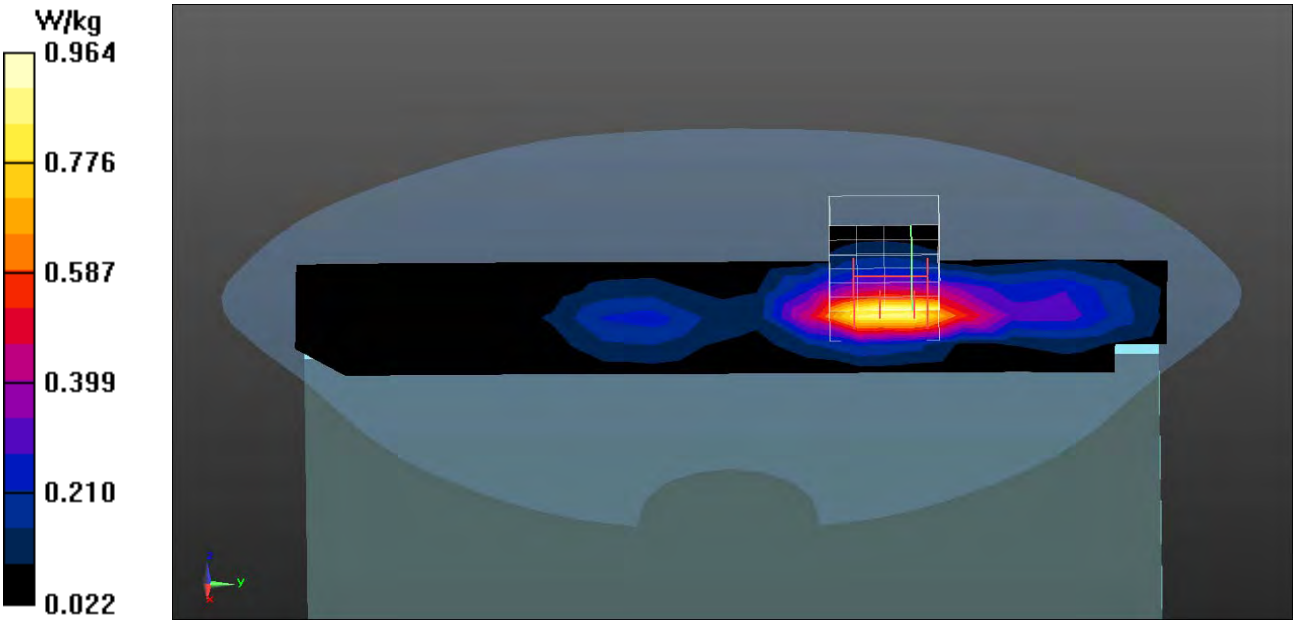
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/09

WCDMA_Band 2_RMC_9400-Top 5mm Pwr Off
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC WCDMA_Band-2; Frequency: 1880 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 1880 MHz; σ = 1.56 S/m; ε_r = 54.31; ρ = 1000 kg/m^3
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 right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x18x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.889 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.629 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 1.39 W/kg
SAR(1 g) = 0.791 W/kg; SAR(10 g) = 0.438 W/kg
Maximum value of SAR (measured) = 0.964 W/kg



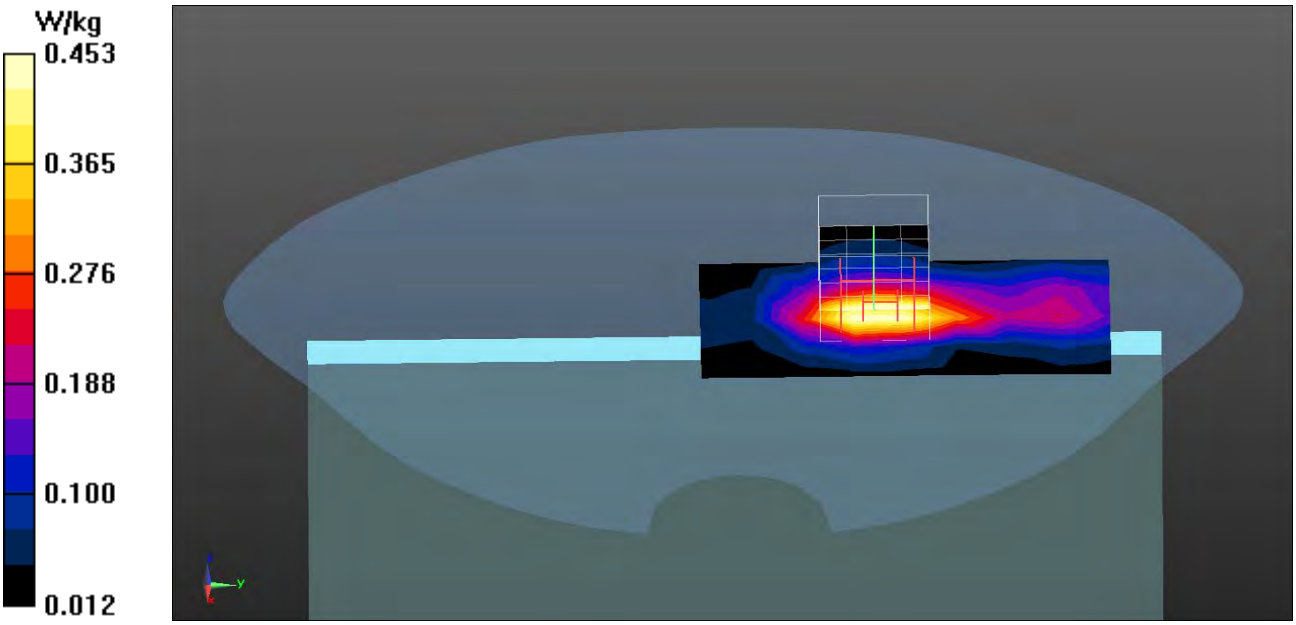
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/09

WCDMA_Band 2_RMC_9538-Top 5mm Pwr Off
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC WCDMA_Band-2; Frequency: 1907.6 MHz;Communication System PAR: 0 dB
Medium parameters used: f = 1907.6 MHz; σ = 1.58 S/m; ε_r = 54.22; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

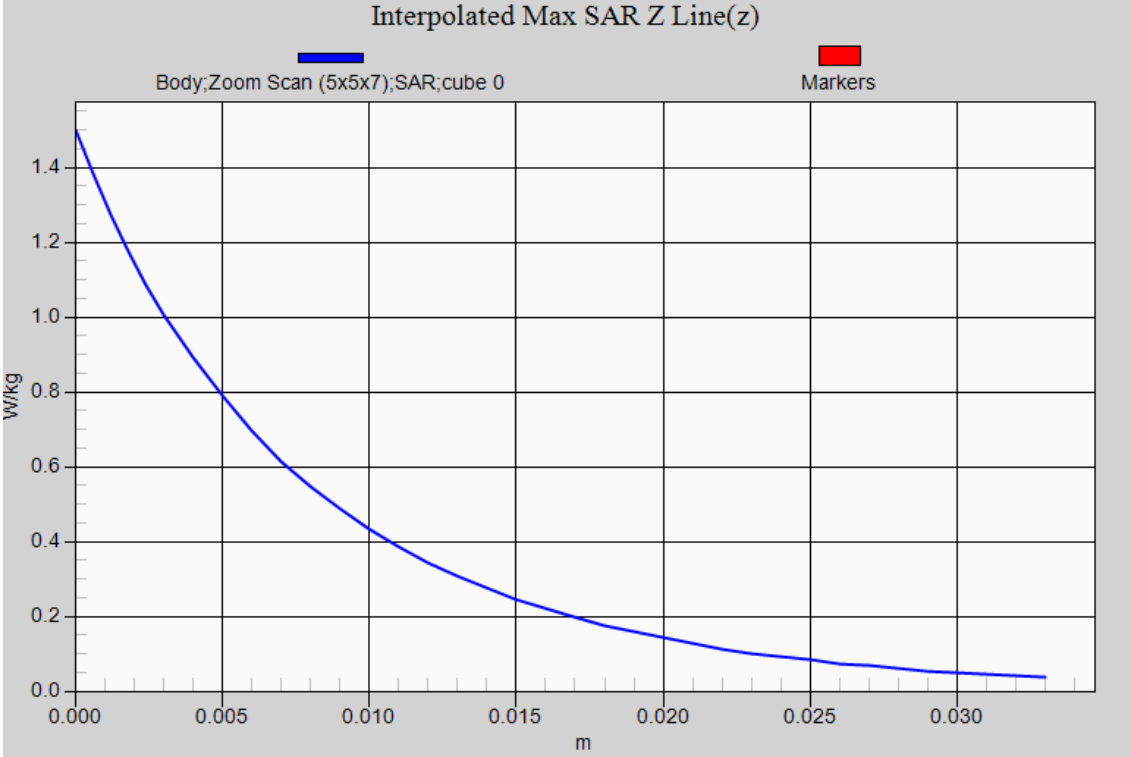
- Probe: EX3DV4 - SN3698; ConvF(7.08, 7.08, 7.08); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.453 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.656 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.704 W/kg
SAR(1 g) = 0.413 W/kg; SAR(10 g) = 0.233 W/kg
Maximum value of SAR (measured) = 0.503 W/kg



WCDMA Band 2 EUT (5mm) Back Z-Axis plot
Channel: 9400



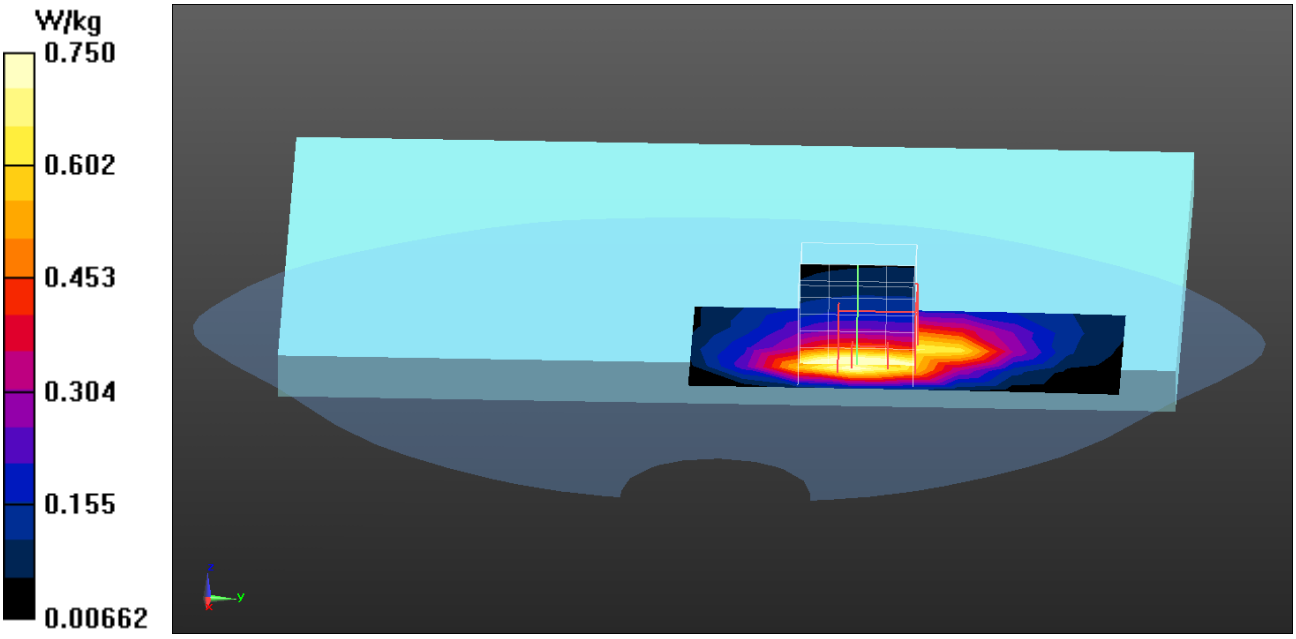
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/10

WCDMA_Band 5_RMC_4132-Back 0mm Pwr On
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC WCDMA_Band-5; Frequency: 826.4 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 826.4 MHz; σ = 1 S/m; ε_r = 56.21; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.7
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 left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.750 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.74 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 1.37 W/kg
SAR(1 g) = 0.698 W/kg; SAR(10 g) = 0.398 W/kg
Maximum value of SAR (measured) = 0.922 W/kg



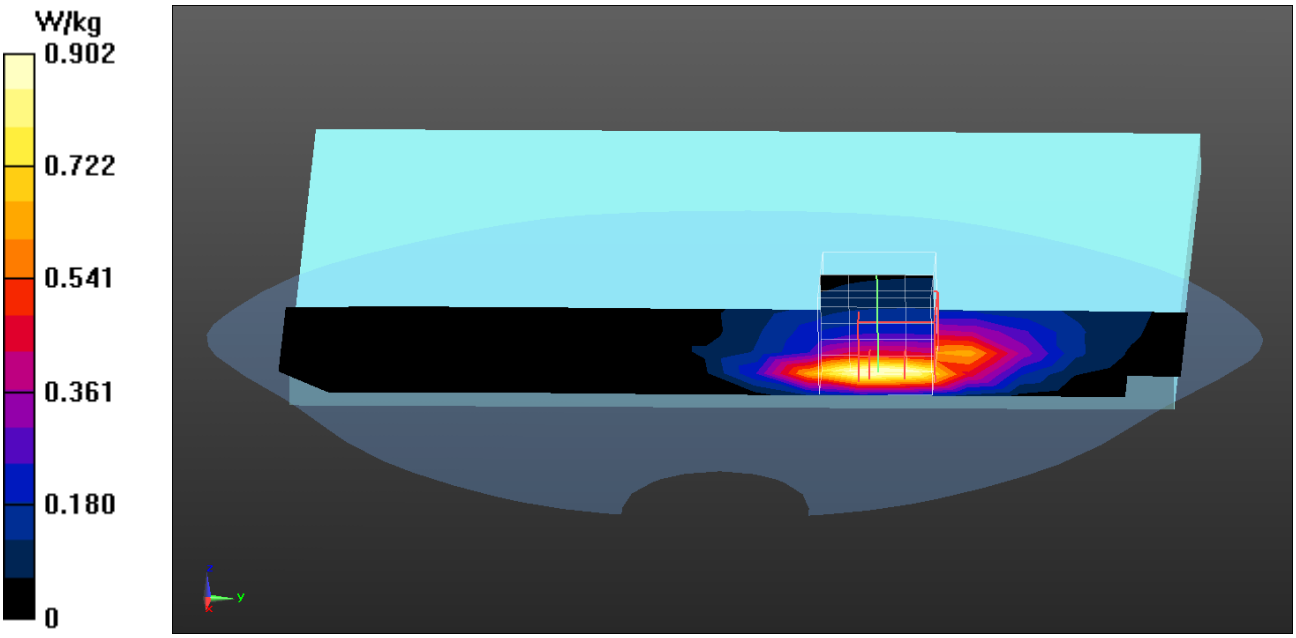
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/10

WCDMA_Band 5_RMC_4183-Back 0mm Pwr On
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC WCDMA_Band-5; Frequency: 836.6 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 836.6 MHz; σ = 1.01 S/m; ε_r = 56.12; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.7
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 left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x18x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.902 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.472 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 1.42 W/kg
SAR(1 g) = 0.717 W/kg; SAR(10 g) = 0.406 W/kg
Maximum value of SAR (measured) = 0.962 W/kg



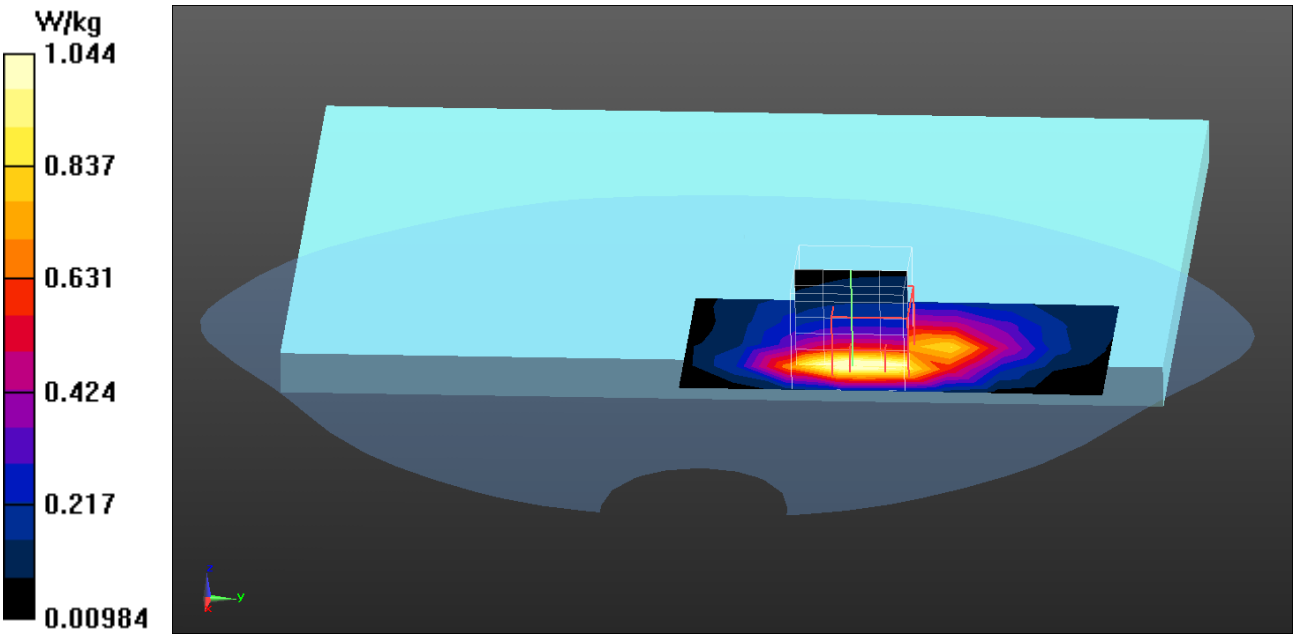
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/10

WCDMA_Band 5_RMC_4233-Back 0mm Pwr On
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC WCDMA_Band-5; Frequency: 846.6 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 846.6 MHz; σ = 1.02 S/m; ε_r = 56.05; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.7
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 left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.04 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.794 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.76 W/kg
SAR(1 g) = 0.902 W/kg; SAR(10 g) = 0.504 W/kg
Maximum value of SAR (measured) = 1.19 W/kg



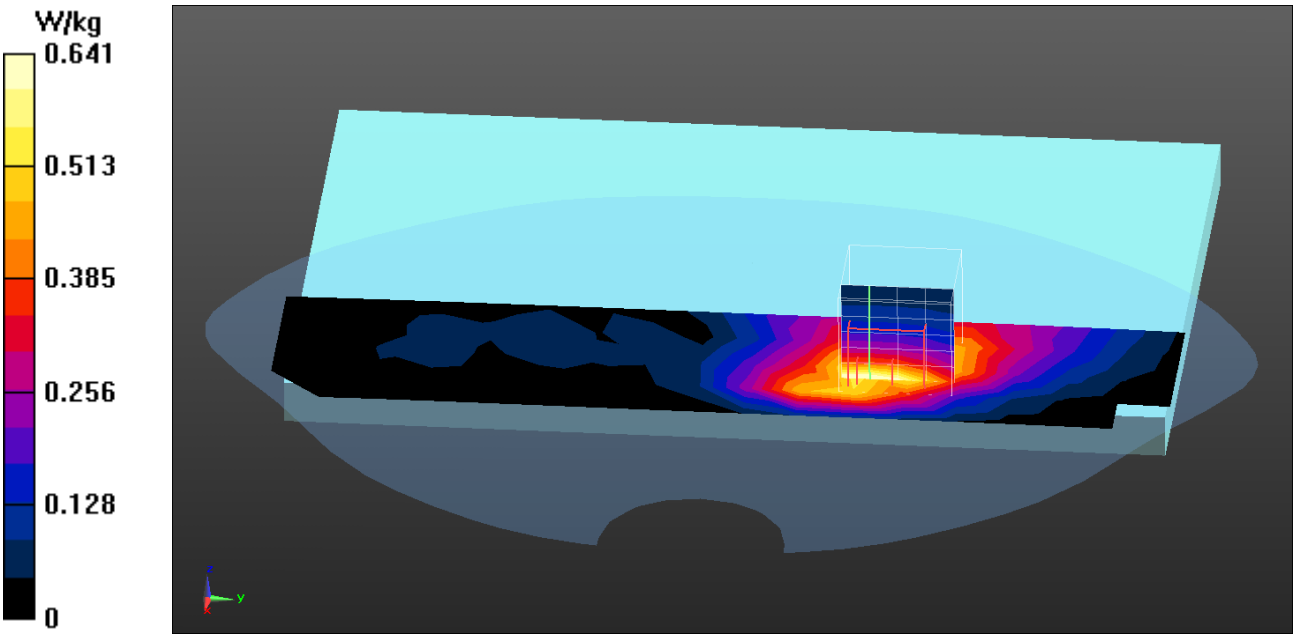
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/10

WCDMA_Band 5_RMC_4183-Back 5mm Pwr Off
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC WCDMA_Band-5; Frequency: 836.6 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 836.6 MHz; σ = 1.01 S/m; ε_r = 56.12; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.7
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 left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x18x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.641 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.49 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.964 W/kg
SAR(1 g) = 0.564 W/kg; SAR(10 g) = 0.349 W/kg
Maximum value of SAR (measured) = 0.690 W/kg



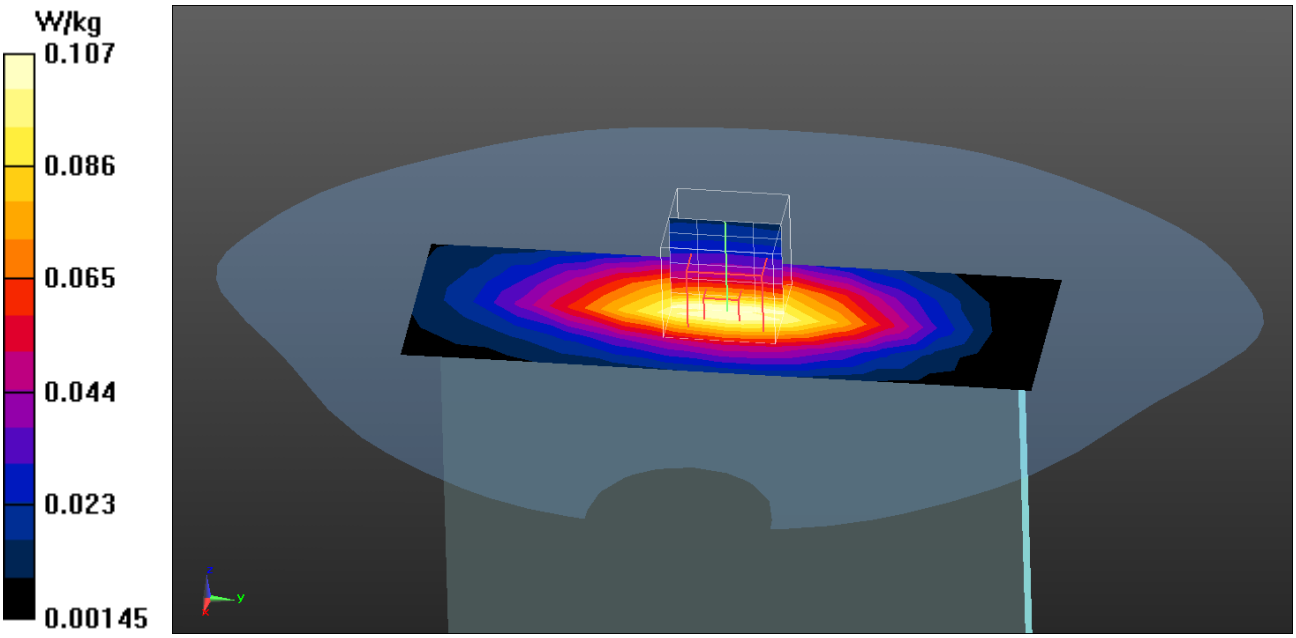
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/10

WCDMA_Band 5_RMC_4183-Right-side 0mm Pwr Off
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC WCDMA_Band-5; Frequency: 836.6 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 836.6 MHz; σ = 1.01 S/m; ε_r = 56.12; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.7
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 left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.107 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.35 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 0.148 W/kg
SAR(1 g) = 0.099 W/kg; SAR(10 g) = 0.066 W/kg
Maximum value of SAR (measured) = 0.116 W/kg



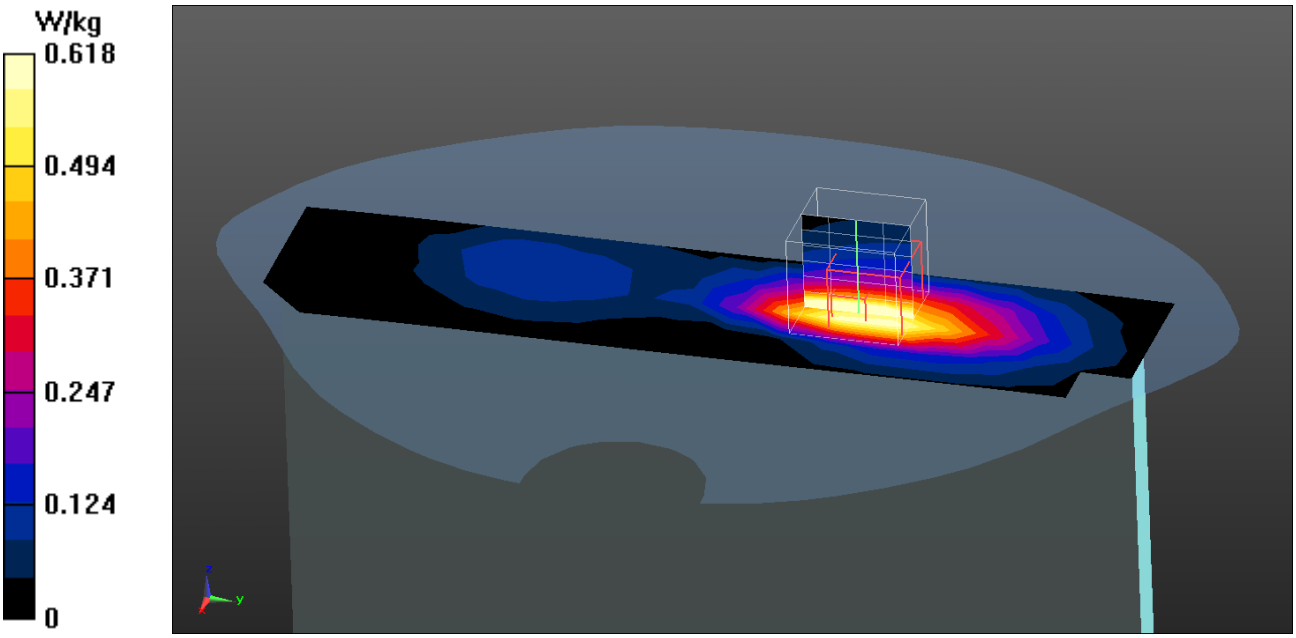
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/10

WCDMA_Band 5_RMC_4183-Top 0mm Pwr Off
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC WCDMA_Band-5; Frequency: 836.6 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 836.6 MHz; σ = 1.01 S/m; ε_r = 56.12; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.7
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

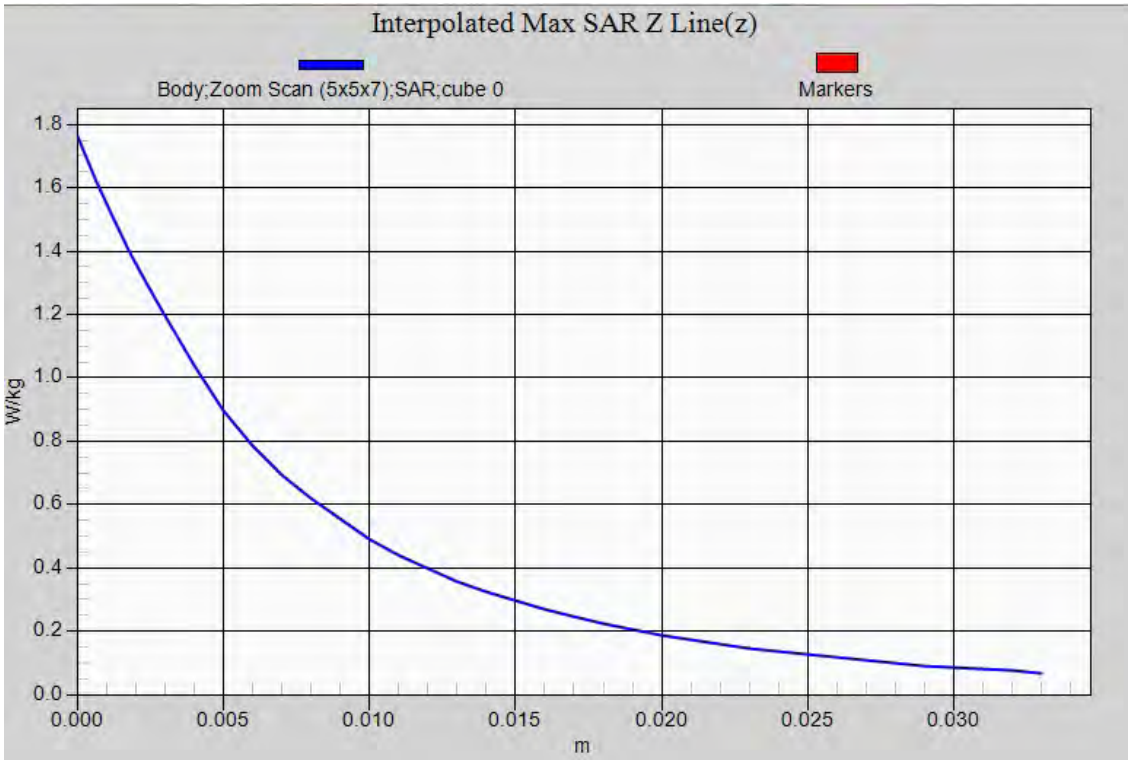
- Probe: EX3DV4 - SN3698; ConvF(8.96, 8.96, 8.96); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x18x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.618 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.00 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 1.31 W/kg
SAR(1 g) = 0.627 W/kg; SAR(10 g) = 0.328 W/kg
Maximum value of SAR (measured) = 0.843 W/kg



WCDMA Band 5 EUT Back (0mm) Z-Axis plot
Channel: 4233



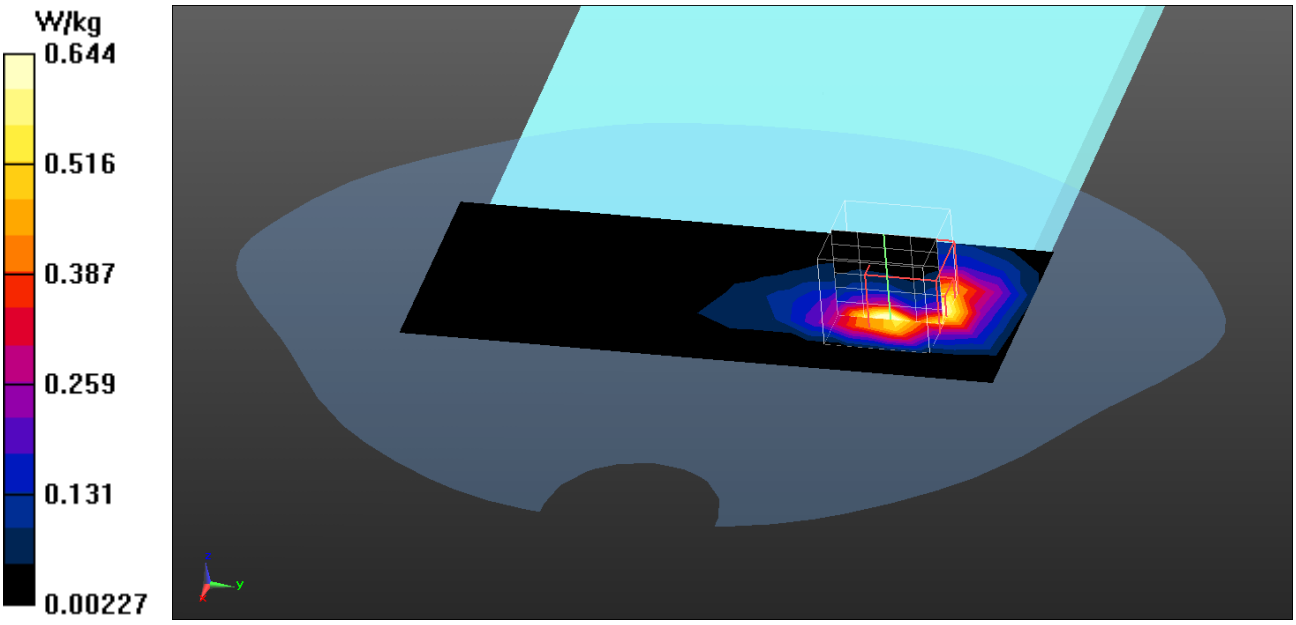
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/05

802.11b_11-Back TX1
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, WLAN 2.4G; Frequency: 2462 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 2462 MHz; σ = 1.99 S/m; ε_r = 52.32; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 22.2, Liquid Temperature (°C) : 20.7
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 right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (7x16x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.644 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.242 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 1.35 W/kg
SAR(1 g) = 0.567 W/kg; SAR(10 g) = 0.292 W/kg
Maximum value of SAR (measured) = 0.776 W/kg



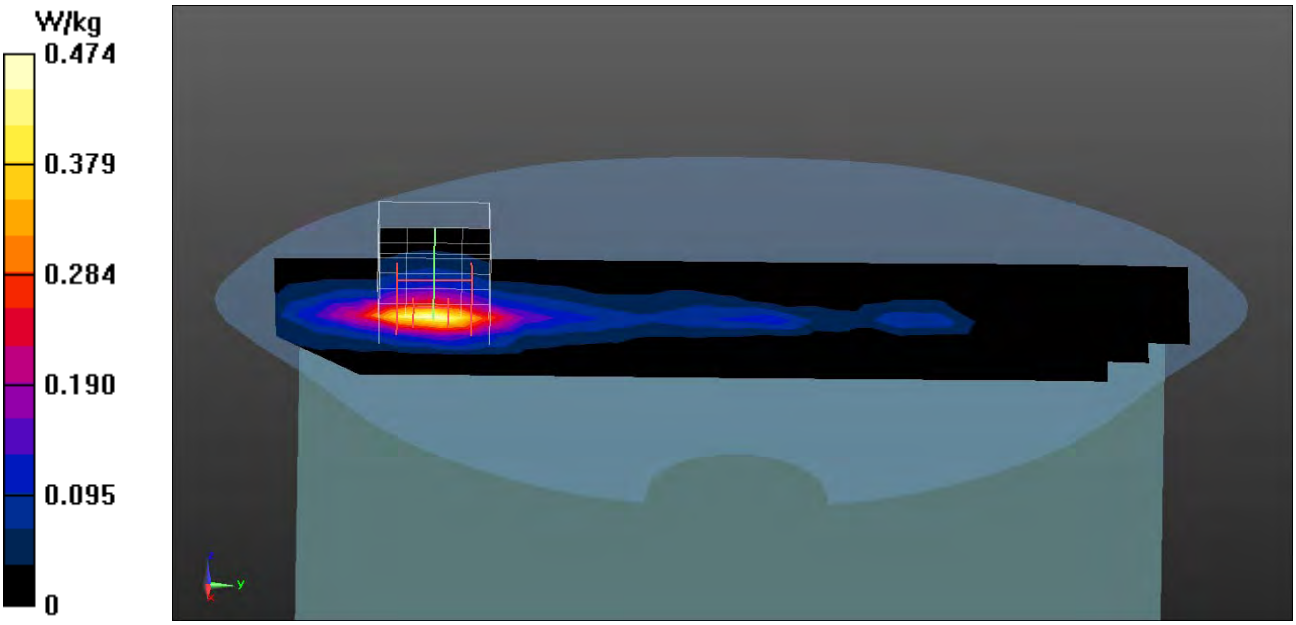
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/05

802.11b_11-Top TX1
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, WLAN 2.4G; Frequency: 2462 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 2462 MHz; σ = 1.99 S/m; ε_r = 52.32; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 22.2, Liquid Temperature (°C) : 20.7
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 right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (7x23x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.474 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.235 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.747 W/kg
SAR(1 g) = 0.374 W/kg; SAR(10 g) = 0.173 W/kg
Maximum value of SAR (measured) = 0.508 W/kg



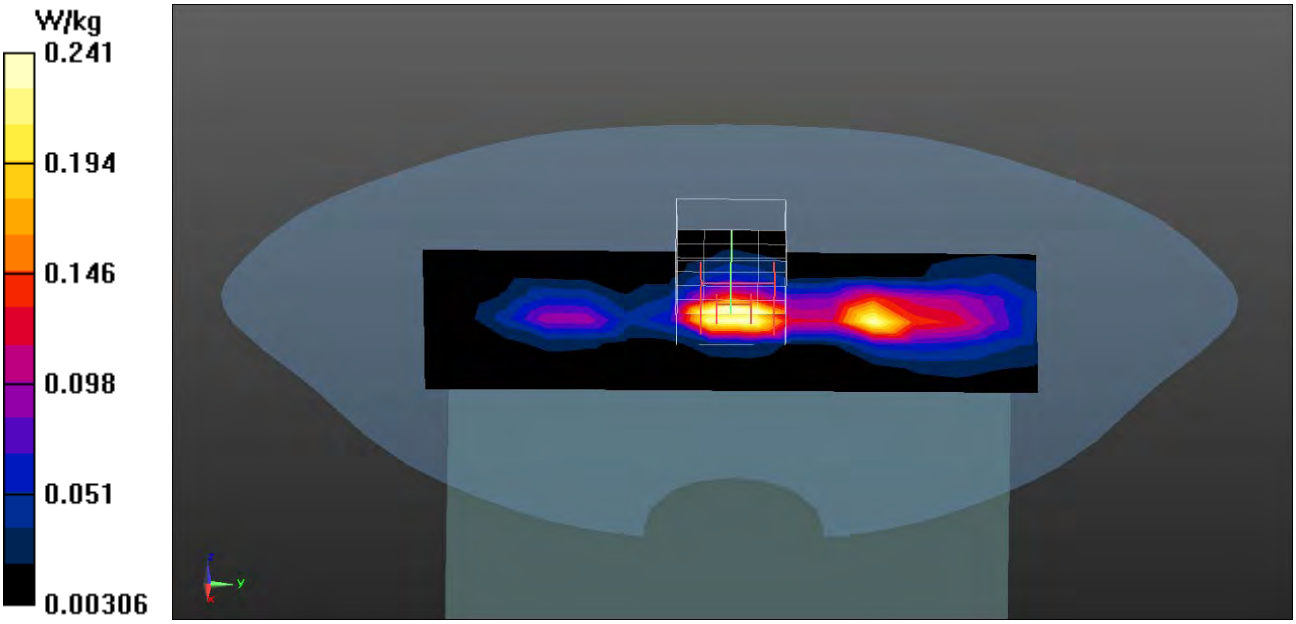
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/05

802.11b_11-Right-side TX1
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, WLAN 2.4G; Frequency: 2462 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 2462 MHz; σ = 1.99 S/m; ε_r = 52.32; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 22.2, Liquid Temperature (°C) : 20.7
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

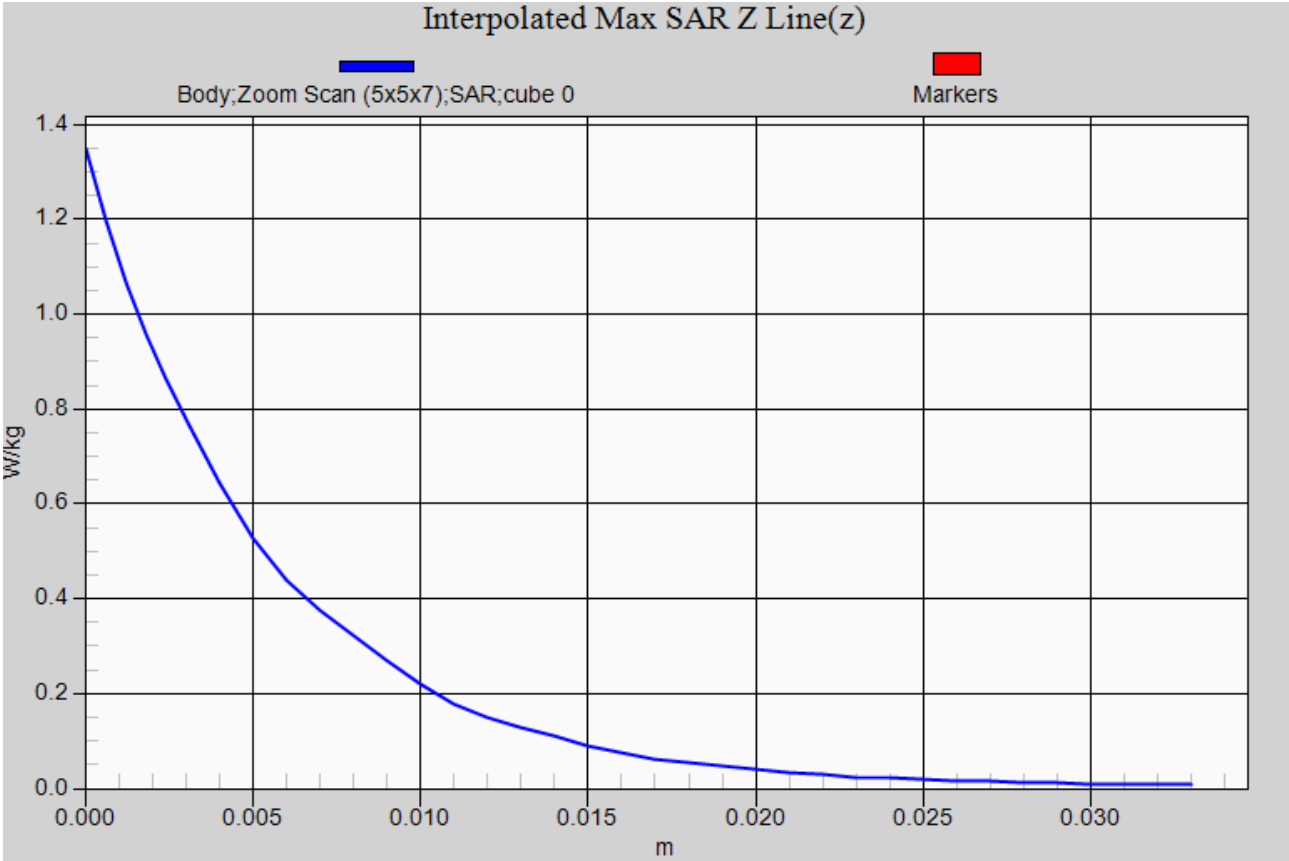
- Probe: EX3DV4 - SN3698; ConvF(6.75, 6.75, 6.75); Calibrated: 2015/11/24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2015/11/20
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (7x16x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.241 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.53 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.475 W/kg
SAR(1 g) = 0.228 W/kg; SAR(10 g) = 0.102 W/kg
Maximum value of SAR (measured) = 0.310 W/kg



802.11b EUT Back TX1 Z-Axis plot
Channel: 11



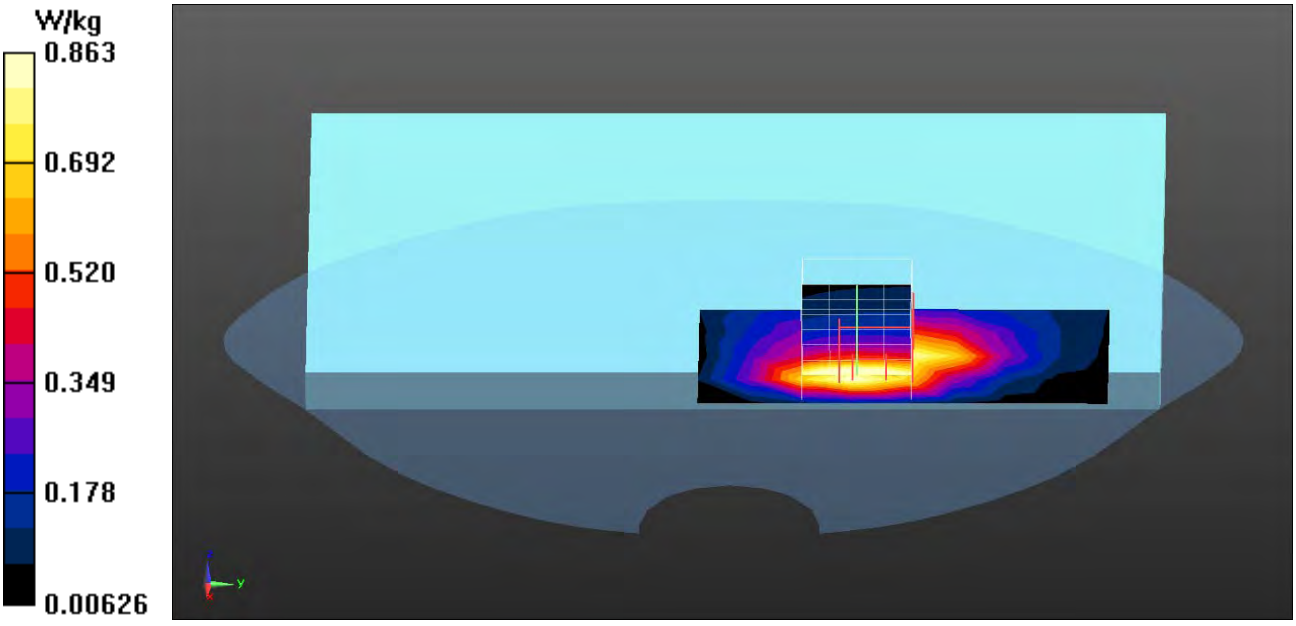
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/10

GSM_835_GPRS_ 1UP_189-Back 0mm Pwr Off-Verify
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC GSM_850MHz; Frequency: 836.4 MHz;
Communication System PAR: 9.191 dB
Medium parameters used: f = 836.4 MHz; σ = 1.01 S/m; ε_r = 56.14; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.7
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 left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.863 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.35 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 1.57 W/kg
SAR(1 g) = 0.803 W/kg; SAR(10 g) = 0.464 W/kg
Maximum value of SAR (measured) = 1.05 W/kg



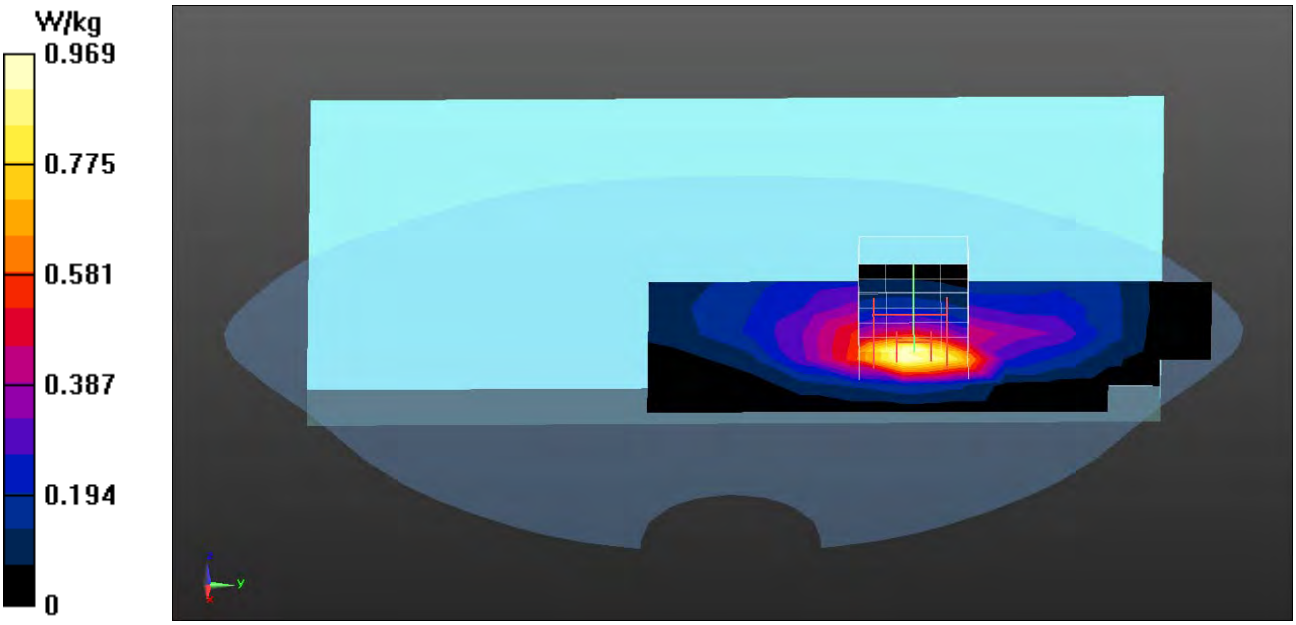
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/09

WCDMA_Band 2_RMC_9400-Back 5mm Pwr Off-Verify
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC WCDMA_Band-2; Frequency: 1880 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 1880 MHz; σ = 1.56 S/m; ε_r = 54.31; ρ = 1000 kg/m^3
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 right table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (6x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.969 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.981 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 1.59 W/kg
SAR(1 g) = 0.814 W/kg; SAR(10 g) = 0.450 W/kg
Maximum value of SAR (measured) = 1.06 W/kg



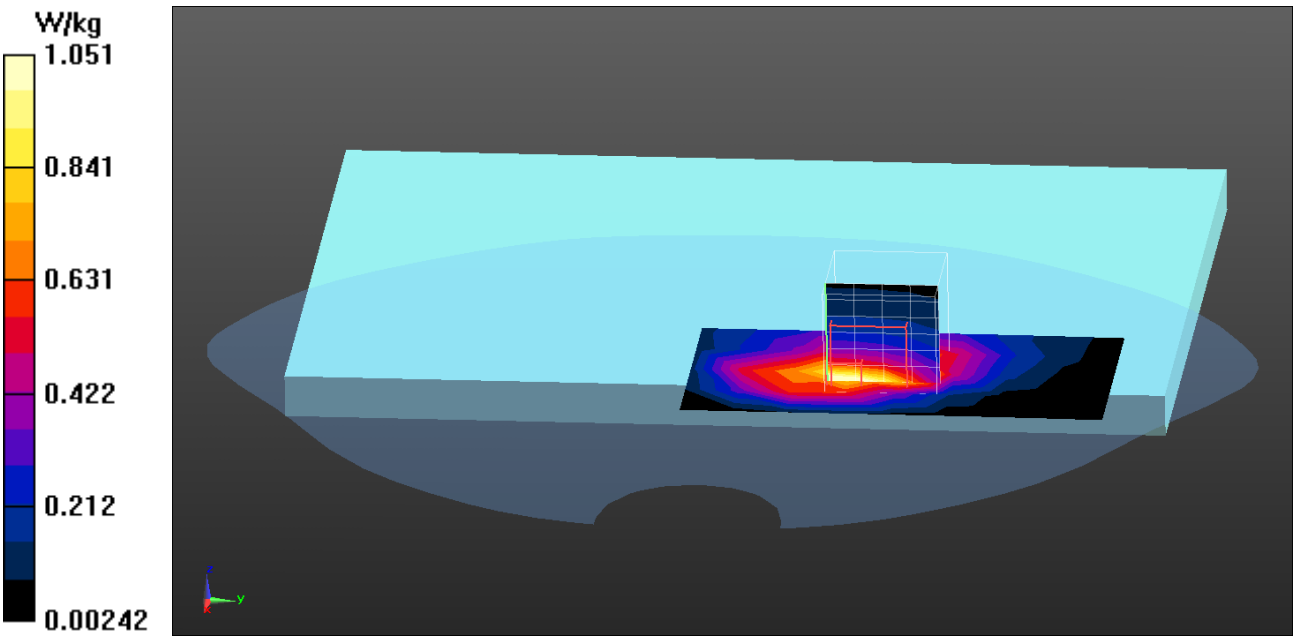
Test Laboratory: QuieTek-a DEKRA Date/Time: 2016/05/10

WCDMA_Band 5_RMC_4233-Back 0mm Pwr On-Verify
DUT: Tablet PC; Type: TH10GA3
Communication System: UID 0, FCC WCDMA_Band-5; Frequency: 846.6 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 846.6 MHz; σ = 1.02 S/m; ε_r = 56.05; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature (°C) : 21.9, Liquid Temperature (°C) : 20.7
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 left table; Type: SAM;
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.05 W/kg

Configuration/Body/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.27 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.84 W/kg
SAR(1 g) = 0.900 W/kg; SAR(10 g) = 0.514 W/kg
Maximum value of SAR (measured) = 1.21 W/kg



Appendix D. Probe Calibration Data

Object: EX3DV4- SN: 3698

1155 H

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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

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

Issued: November 26, 2015

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

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe EX3DV4

SN: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 ($\mu V/(V/m)^2$)[A]	0.41	0.35	0.36	± 10.1 %
DCP (mV)[B]	101.5	102.9	104.4	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	137.3	±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 %

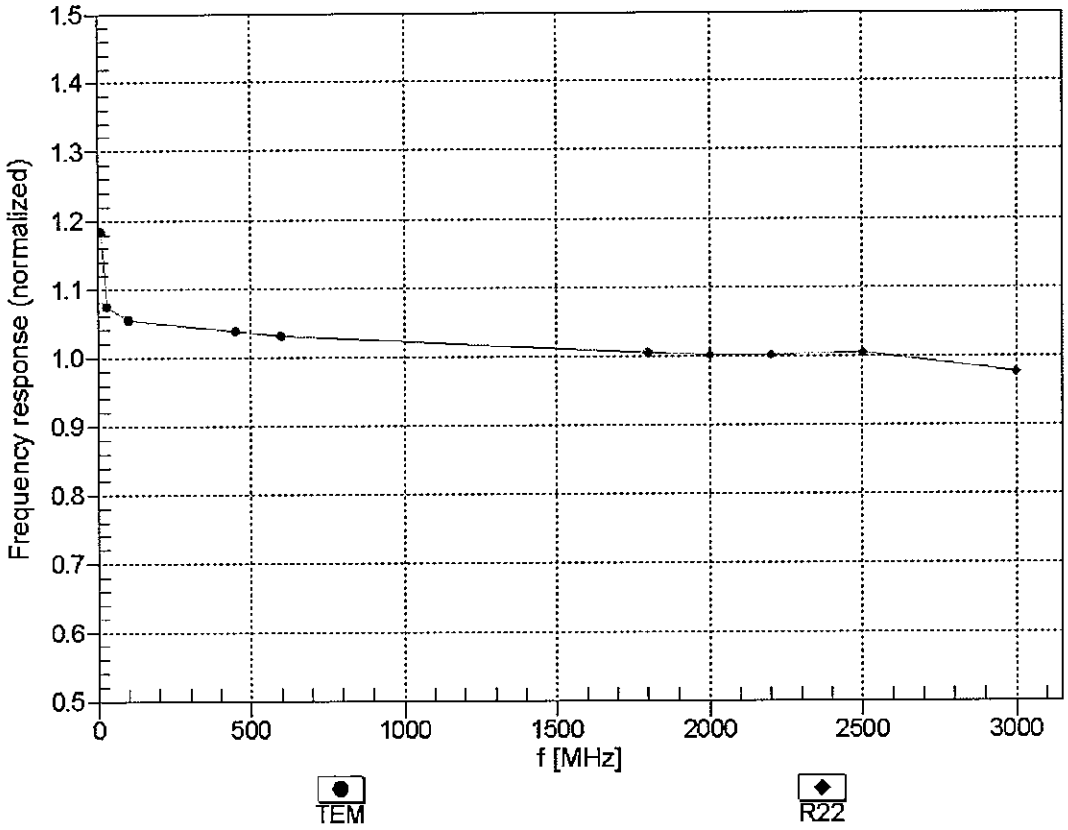
[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz 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

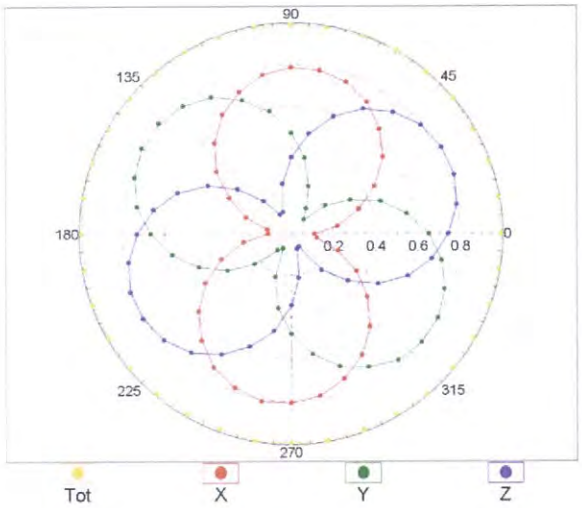
(TEM-Cell:ifi110 EXX, Waveguide: R22)



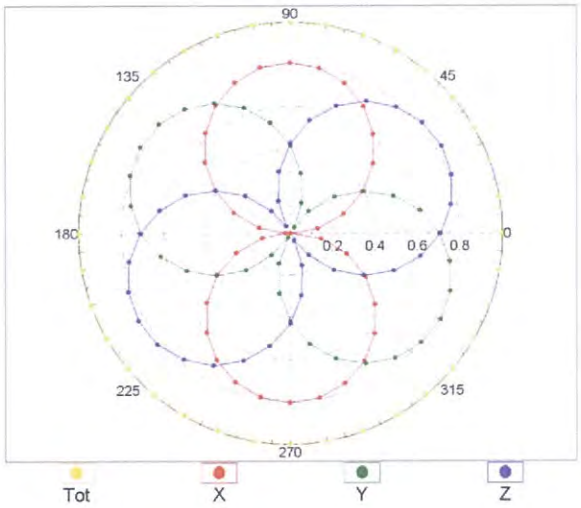
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

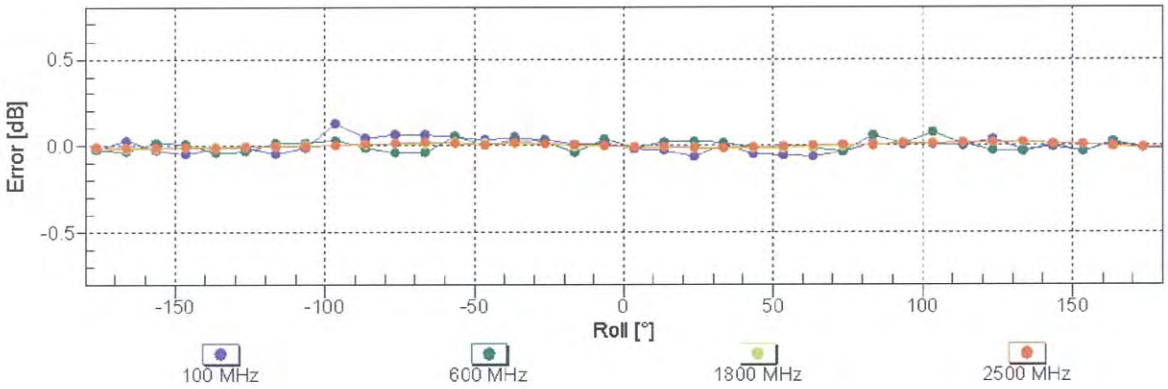
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



f=1800 MHz,R22

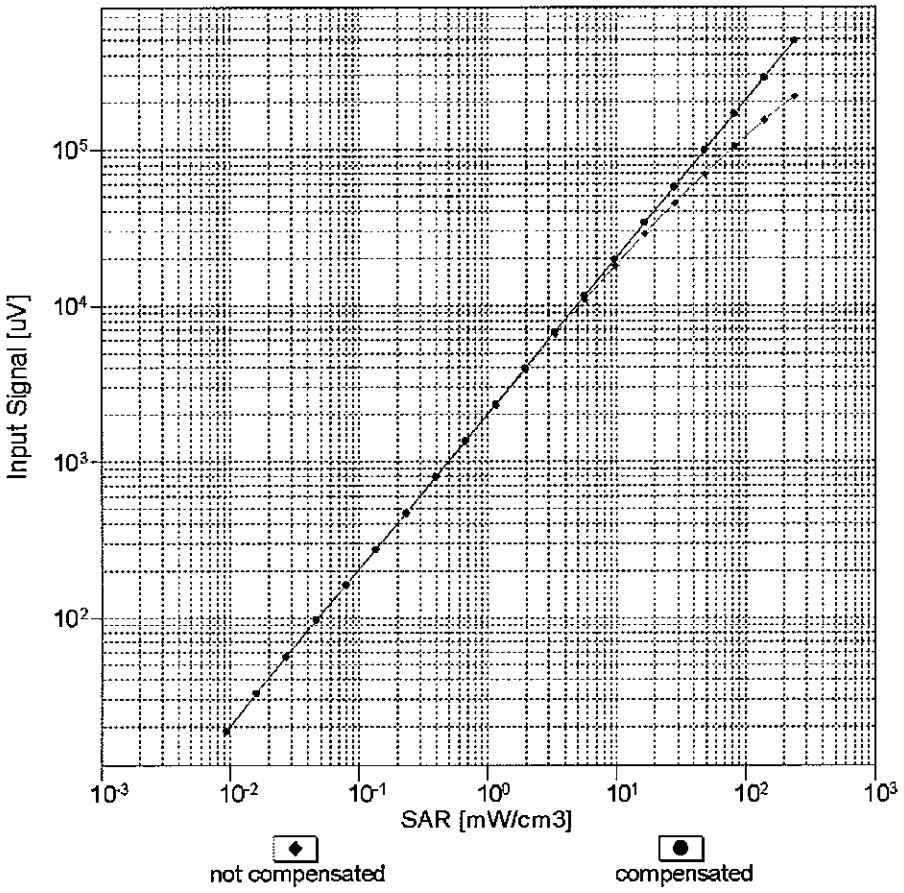


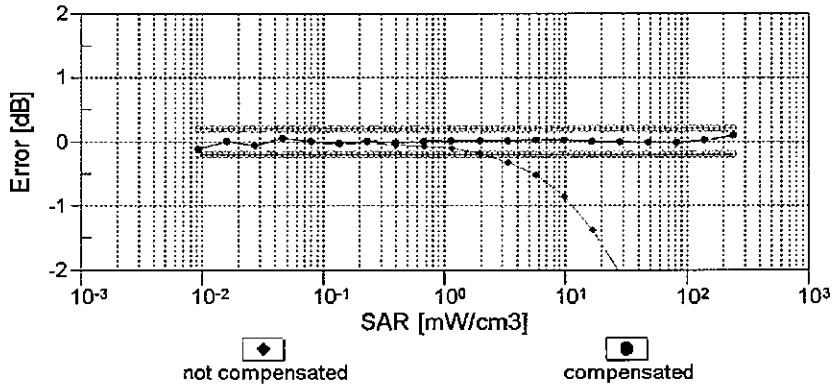


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

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

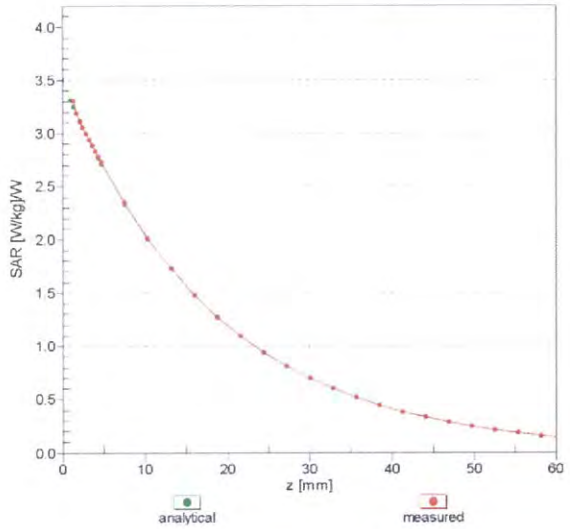




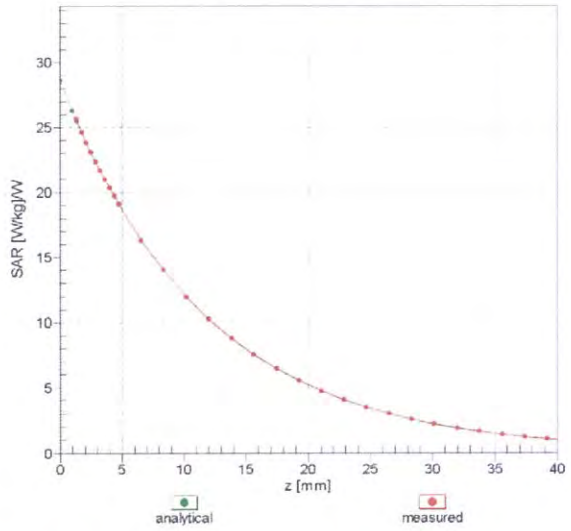
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

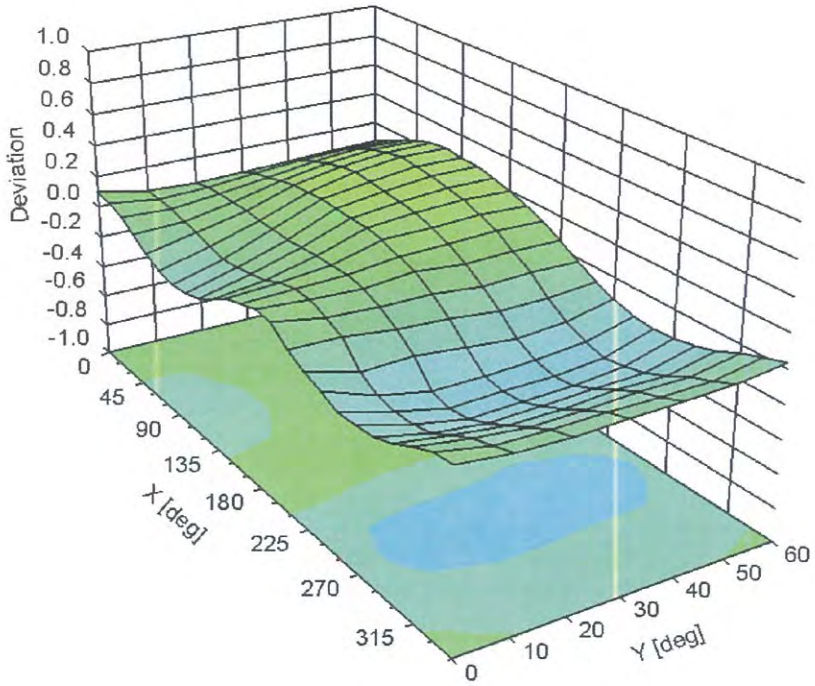


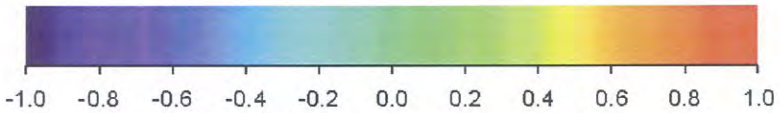
f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





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

DASY/EASY - Parameters of Probe: EX3DV4 - SN: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
C Service suisse d'étalonnage
Servizio svizzero di taratura
S Swiss Calibration Service

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

Accreditation No.: SCS 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

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

Issued: May 20, 2014

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

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "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) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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 ± 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 ± 0.2) °C	40.2 ± 6 %	0.94 mho/m ± 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	2.32 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.92 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (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 ± 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 ± 0.2) °C	56.6 ± 6 %	1.02 mho/m ± 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	2.45 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.49 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (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 ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

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

Antenna Parameters with Body TSL

Impedance, transformed to feed point	44.6 Ω + 1.0 jΩ
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

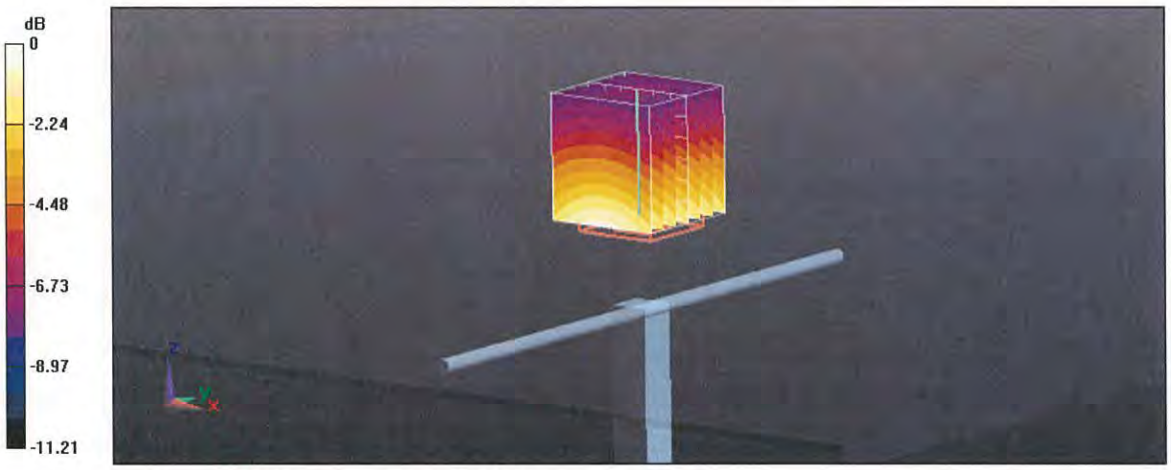
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.94 S/m; ε_r = 40.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

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)

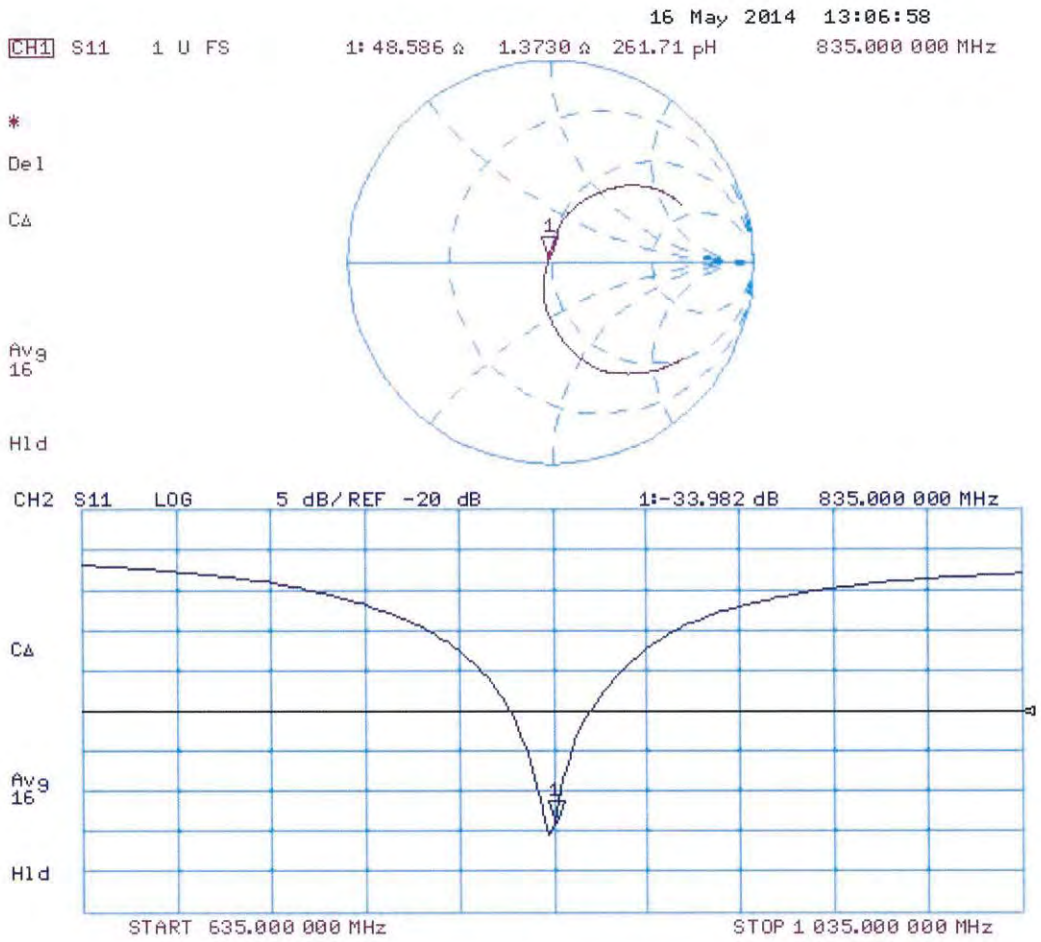
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm 2/Zoom Scan (7x7x7)/Cube 0:

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



0 dB = 2.72 W/kg = 4.35 dBW/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

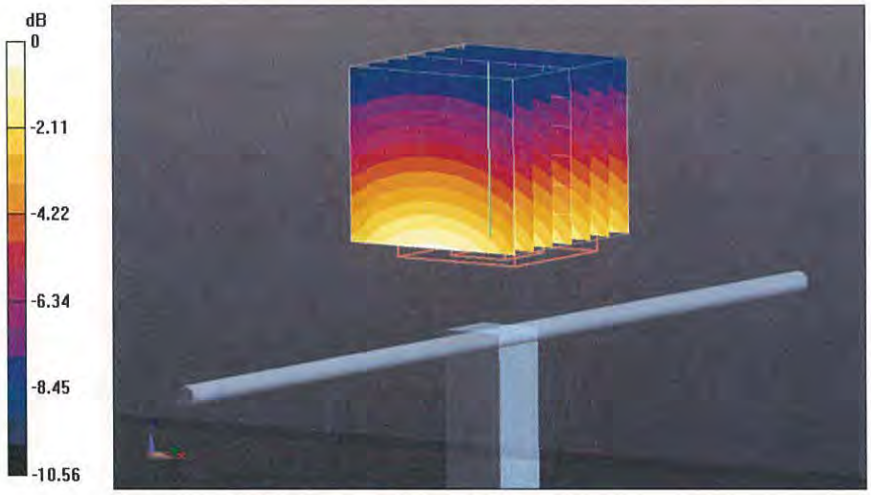
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1.02 S/m; ε_r = 56.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

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)

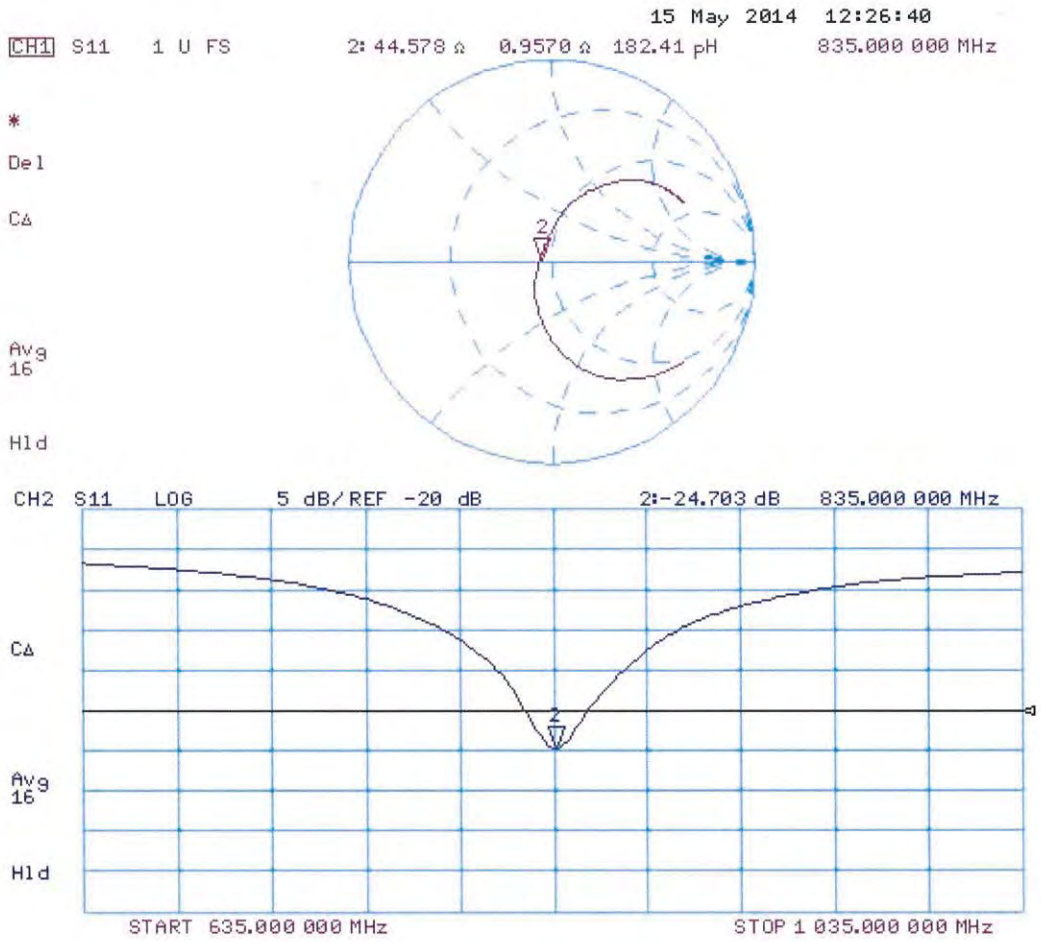
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

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



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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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 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

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

Issued: May 20, 2014

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

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "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) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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 ± 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 ± 0.2) °C	39.3 ± 6 %	1.37 mho/m ± 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 ± 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 ± 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 ± 0.2) °C	52.5 ± 6 %	1.50 mho/m ± 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 ± 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 ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

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

Antenna Parameters with Body TSL

Impedance, transformed to feed point	42.5 Ω + 6.8 jΩ
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

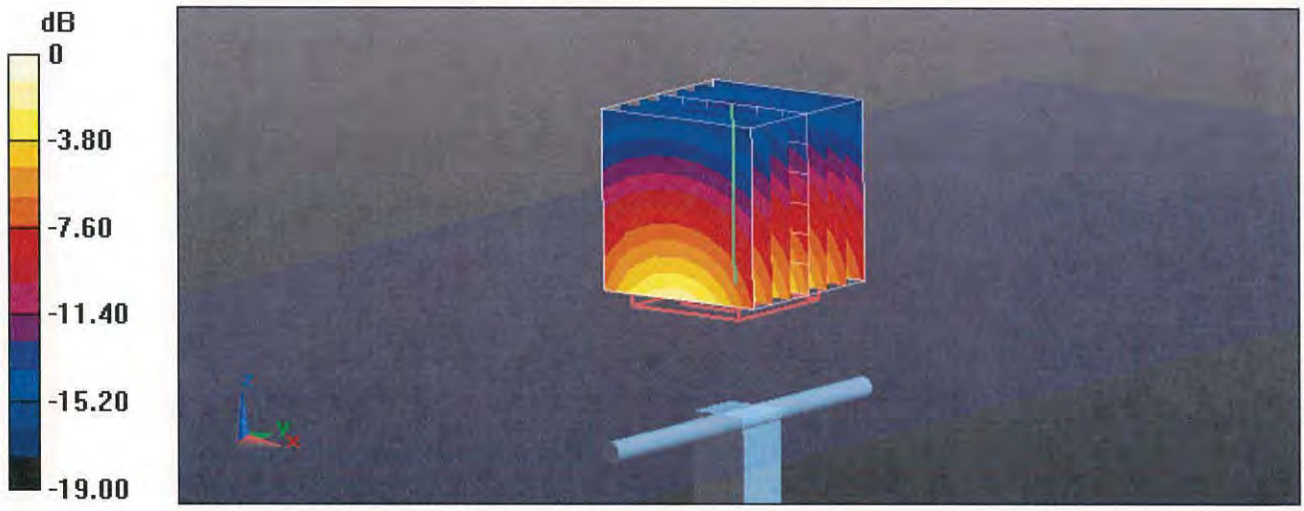
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.37 S/m; ε_r = 39.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

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)

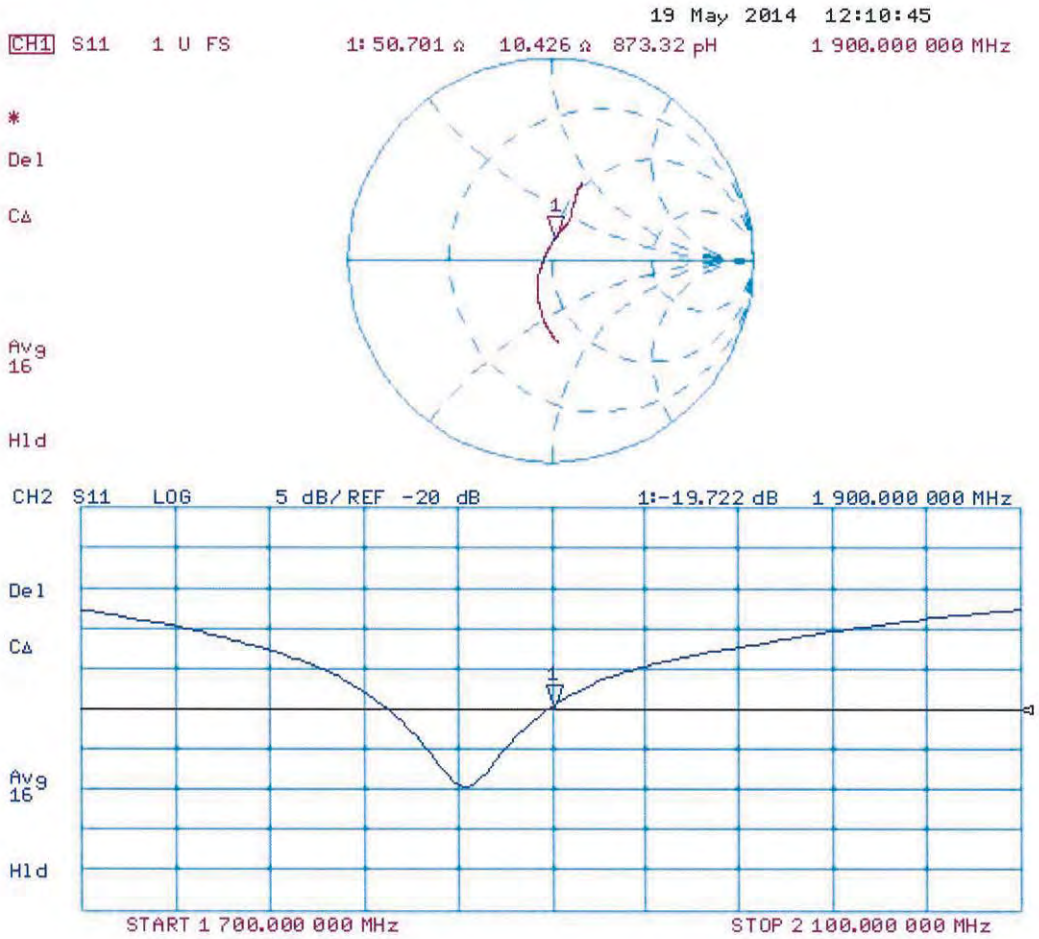
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

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



0 dB = 12.6 W/kg = 11.00 dBW/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

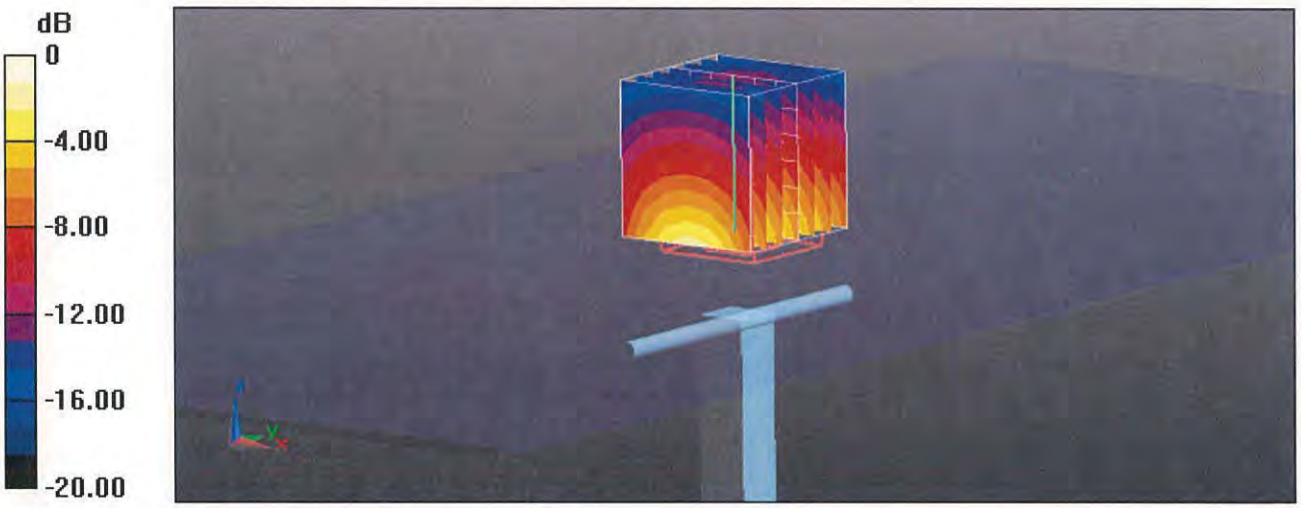
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.5 S/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

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)

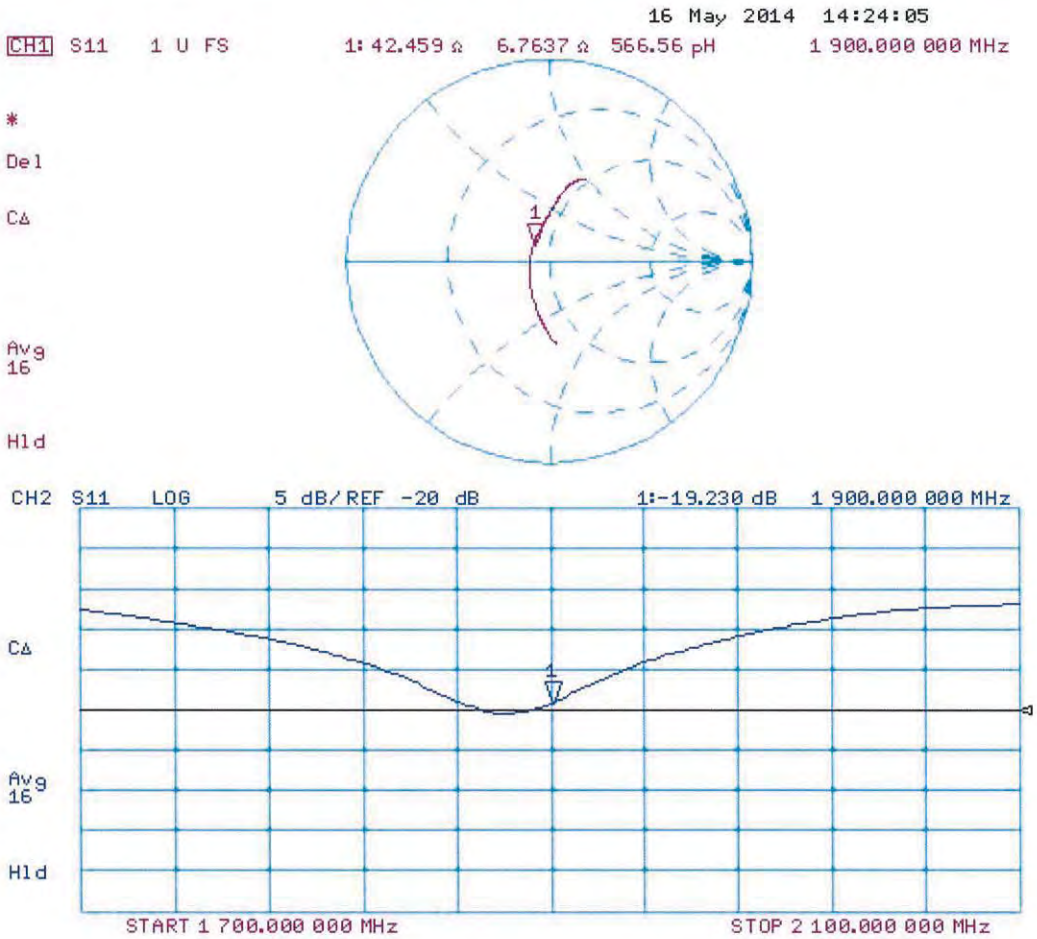
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

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



0 dB = 13.0 W/kg = 11.14 dBW/kg

Impedance Measurement Plot for Body TSL



1798 MP

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

S Schweizerischer Kalibrierdienst
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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

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	M.Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: November 20, 2014

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

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "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) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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 ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.0 ± 6 %	1.86 mho/m ± 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 ± 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 ± 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 ± 0.2) °C	50.9 ± 6 %	2.03 mho/m ± 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 ± 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 ± 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 jΩ
Return Loss	- 25.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	51.0 Ω + 3.3 jΩ
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

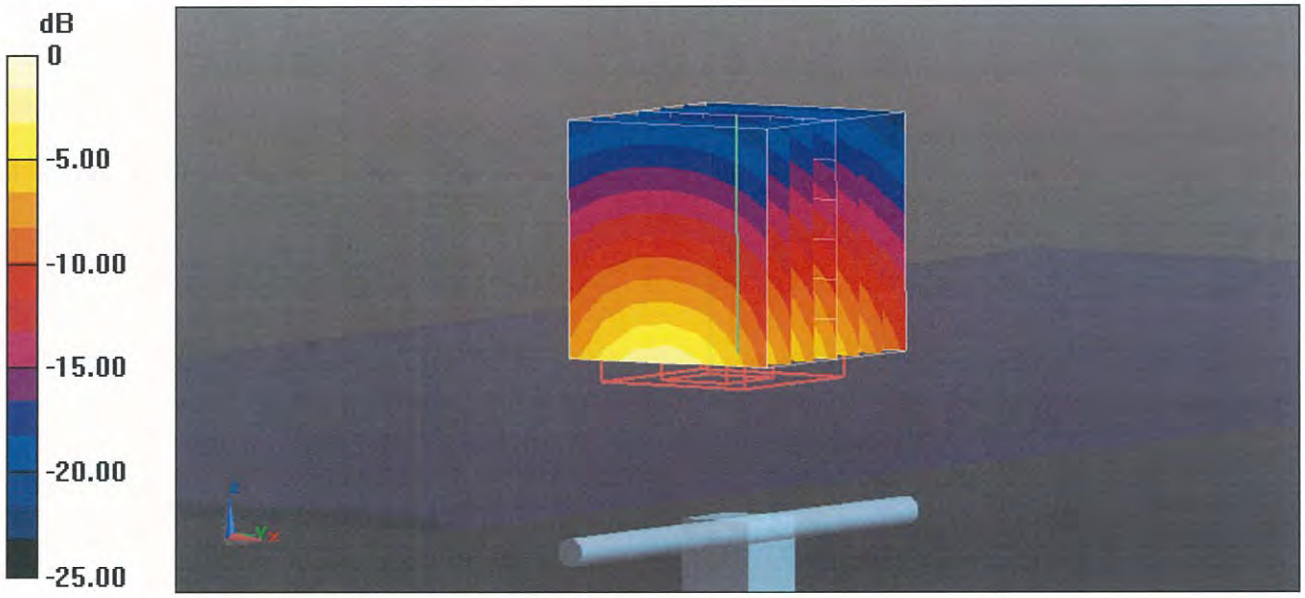
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.86 S/m; ε_r = 39; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

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)

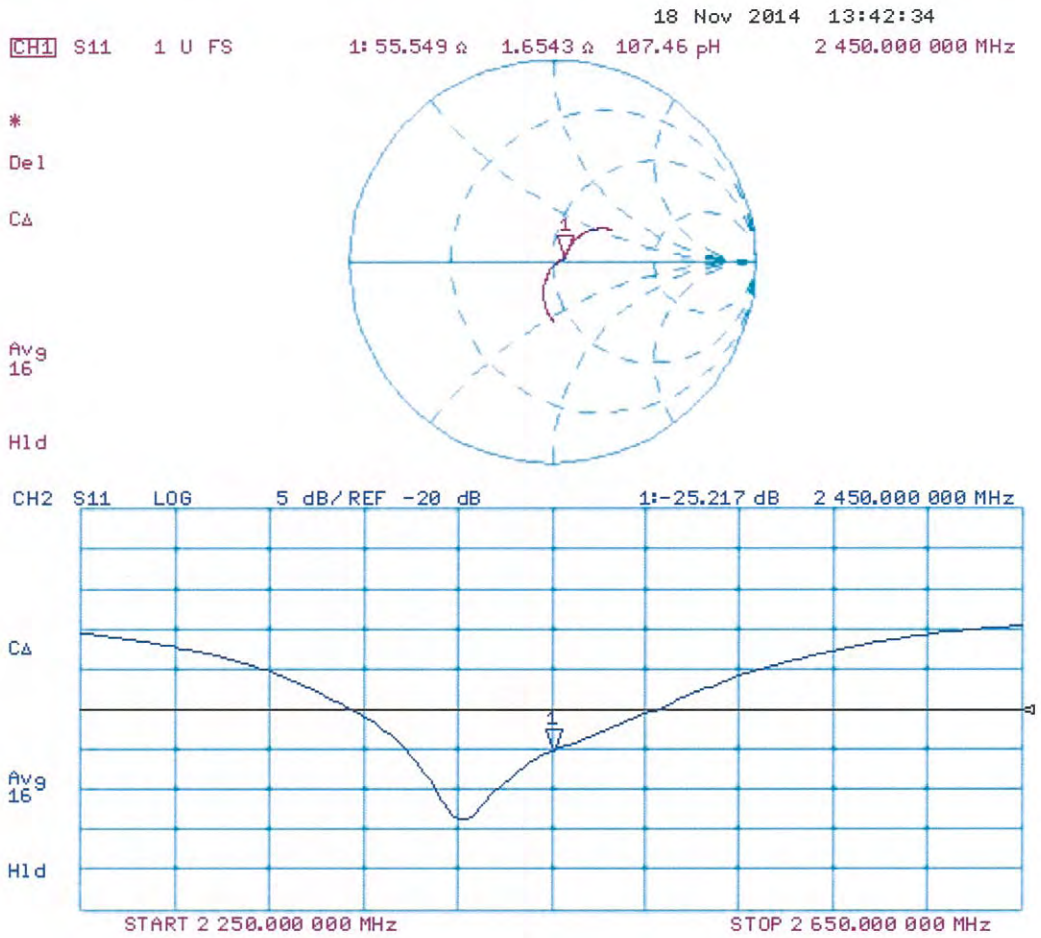
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

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



0 dB = 17.3 W/kg = 12.38 dBW/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

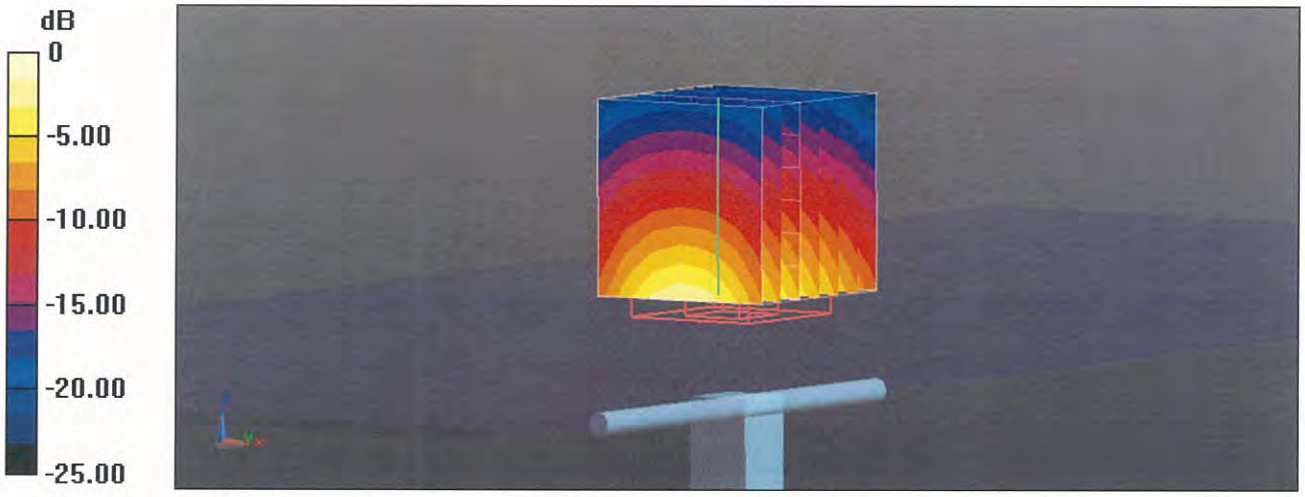
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.03 S/m; ε_r = 50.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

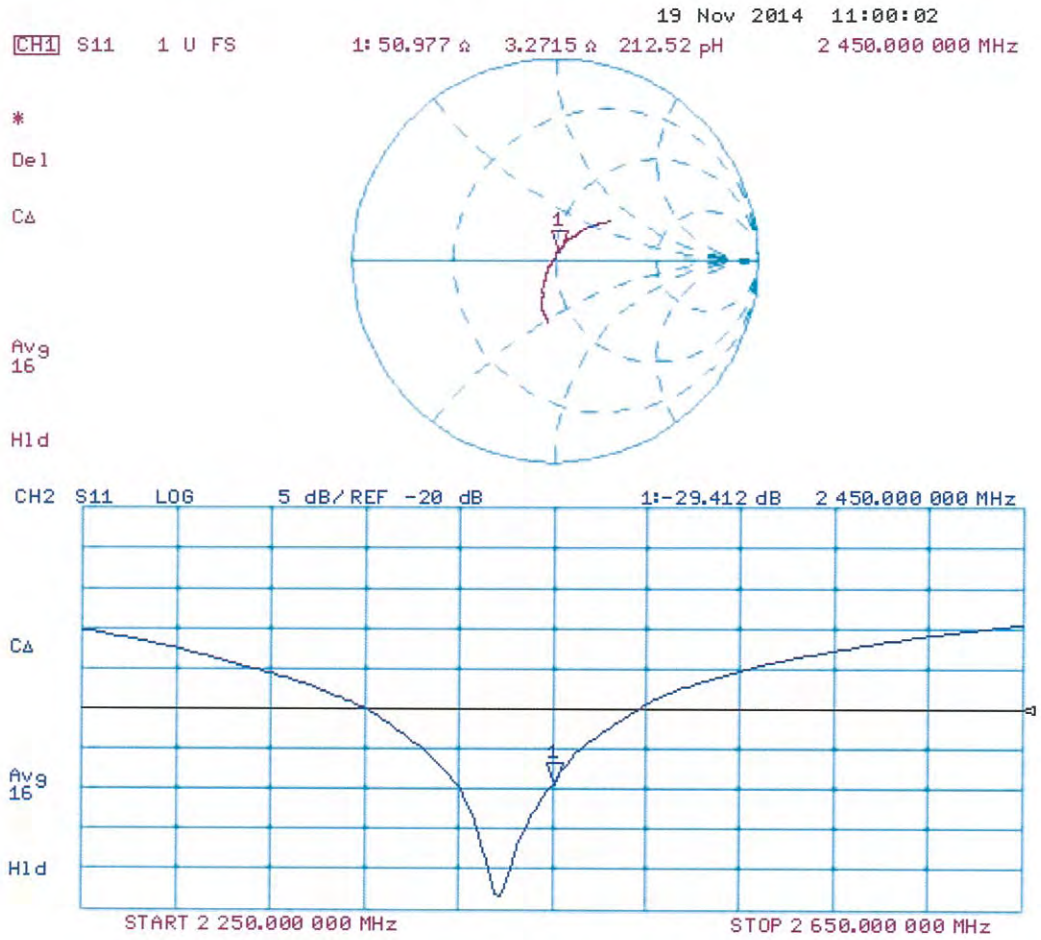
DASY52 Configuration:

- 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



0 dB = 17.3 W/kg = 12.38 dBW/kg

Impedance Measurement Plot for Body TSL