

SAR TEST REPORT

Report No. 2015SAR248

FCC ID: SRQ-BLADEA460S
Applicant: ZTE Corporation
Product: WCDMA/LTE Dual -Mode Digital Mobile Phone
Model: ZTE Blade A460
HW Version: P809A20.H01S
SW Version: ETB-CO-P809A20V1.0.0
Issue Date: 2015-06-10

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Remark: This report details the results of the testing carried out on the samples specified in this report, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. The report shall not be reproduced except in full, without written approval of the Company.

Standards

Applicable Limit Regulations	ANSI/IEEE C95.1-2005 Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields. 3 kHz to 300 GHz
	ANSI/IEEE C95.3-2002 Recommended Practice For Measurements and Computations of Radio Frequency Electromagnetic Fields with Respect to Human Exposure to such Fields. 100 kHz-300 GHz
Applicable Standards	IEEE Std 1528™-2013: IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
	KDB865664 D01v01r03: SAR Measurement Requirements for 100 MHz to 6 GHz
	KDB447498 D01v05r02: Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies
	KDB648474 D02v01r02: Review and Approval Policies for SAR Evaluation of Handsets with Multiple Transmitters and Antennas.
	KDB248227 D01v02: SAR Measurement Procedures for IEEE 802.11 Wi-Fi Transmitters
	KDB941225 D01v03: SAR Measurement Procedures for 3G Devices
	KDB941225 D05v02r03: SAR Test Consideration for LTE Handsets and Data Modems
	KDB941225 D06v02: SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities.

Conclusion

Localized Specific Absorption Rate (SAR) of this equipment has been measured in all cases requested by the relevant standards above. Maximum localized SAR is below exposure limits as well.

Change History

Version	Change Contents	Author	Date
V1.0	First edition	Chen Qiang	2015-06-10

Note: The last version will be invalid automatically while the new version is issued.

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1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **ZTE CORPORATION WCDMA/LTE Dual -Mode Digital Mobile Phone ZTE Blade A460** are as follows.

Highest standalone SAR Summary of three versions:

Exposure Position	Frequency Band	Maximum reported 1g SAR (W/kg)	Highest reported 1g SAR (W/kg)
Head	GSM850(voice)	0.497	1.032
	GSM850(DTM)	1.032	
	GSM1900(voice)	0.380	
	PCS1900(DTM)	0.772	
	WCDMA BAND II	0.917	
	WCDMA BAND V	0.516	
	LTE BAND 2	0.590	
	LTE BAND 4	0.398	
	LTE BAND 7	0.231	
	Wi-Fi (2.45G)	0.378	0.378
Body-worn (10mm)	GSM850	1.11	1.390
	GSM1900	1.05	
	WCDMA BAND II	1.390	
	WCDMA BAND V	0.763	
	LTE BAND 2	0.994	
	LTE BAND 4	0.814	
	LTE BAND 7	0.932	
	Wi-Fi (2.45G)	0.083	0.083

Evaluation for Simultaneous SAR

Summation BAND	Exposure Position	Maximum reported 1g SAR (W/kg)	Summation SAR(1g) (W/kg)
WWAN +WiFi	Head	1.032+0.378=1.410	<1.6
	Body-worn(10mm)	1.390+0.083=1.473	<1.6
WWAN +BT	Head	1.032+0.263=1.295	<1.6
	Body-worn(10mm)	1.390+0.132=1.522	<1.6

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits(1.6W/kg) specified in FCC 47 CFR part 2(2.1093) and ANSI/IEEE C95.1-2005, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013.

2. Administrative Information

2.1 Project Information

Date of start test	2015-05-19
Date of end test:	2015-05-26

2.2 Test Laboratory Information

Company:	Shanghai Tejet Communications Technology Co., Ltd Testing Center
Address:	Room 6205-6208, Building 6, No.399 Cailun Rd. Zhangjiang Hi-Tech Park, Shanghai, China
Post Code:	210203
Tel:	+86-21-61650880
Fax:	+86-21-61650881
Website:	www.tejet.cn

2.3 Test Environment

Temperature:	20℃~25℃
Relative Humidity:	20%~70%

3. Client Information

3.1 Applicant information

Company Name: ZTE Corporation
Address: ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan
District, Shenzhen, Guangdong, 518057, P.R.China
City: Shenzhen
Postal Code: 518057
Country: China
Telephone: +86-755-86360200
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3.2 Manufacturer Information

Company Name: ZTE Corporation
Address: ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan
District, Shenzhen, Guangdong, 518057, P.R.China
City: Shenzhen
Postal Code: 518057
Country: China
Telephone: +86-755-86360200
Fax: +86-755-86360298

4. Equipment Under Test (EUT) and Accessory Equipment (AE)

4.1 Information of EUT

Device Type	Portable device	
Product	WCDMA/LTE Dual -Mode Digital Mobile Phone	
Model	ZTE Blade A460	
Type	Identical Prototype	
Exposure Category	Uncontrolled environment / general population	
Device operation configuration:		
Operating Mode(s):	GSM850	
	PCS1900	
	WCDMA BAND II/V	
	LTE BAND 2/4/7	
	802.11b/g/n（20M/40M）	
Test Modulation	(GSM)GMSK,（WCDMA）QPSK,(LTE)QPSK/16QAM	
GPRS Operation Class	A	
GPRS Multislot Class	12	
EDGE Class	12	
DTM Support	Yes（CS :1slot, PS: 2uplink slot, 1downlin slot）	
AP Support	Yes	
Rated Output Power	GSM 850:33dBm	
	PCS1900: 30dBm	
	WCDMA BAND II: 24dBm	
	WCDMA BAND V: 24.5dBm	
	LTE BAND 2/4 : 24dBm	
	LTE BAND 7: 23dBm	
	802.11b: 14.5dBm 802.11g: 14.5dBm 802.11n(20M/40M): 14.5dBm	
	BT（peak power）: 8dBm	
Band Width	LTE BAND 2: 1.4,3,5,10,15,20	
	LTE BAND 4: 1.4,3,5,10,15,20	
	LTE BAND 7: 5,10,15,20	
WCDMA category	6（uplink），24（downlink）	
Antenna Type:	Internal antenna	
Operating Frequency Range(s):	Band	Tx(MHz)
	GSM850	824.2～848.8

	PCS1900	1850.2~1909.8
	WCDMA BAND II	1852.4~1907.6
	WCDMA BAND V	826.4~846.6
	LTE BAND 2	1850~1910
	LTE BAND 4	1710~1755
	LTE BAND 7	2500~2570
Power Class	GSM850: 4, test with power level 5	
	PCS1900: 1, test with power level 0	
	WCDMA BAND II/V: 3, test with maximum output power	
	LTE BAND 2/4/7: test with maximum output power	

Note: The initial model is SRQ-BLADEA460. Only spot check are tested for GSM850/1900 WCDMA BAND II/V LTE BAND 2/4/7 with double card version and Single card version.

4.2 Identification of EUT

EUT ID		SN or IMEI	HW Version	SW Version	Received Date
Double card version	TN02	004401783399 955	P809A20.H01S	ETB-CO-P809A20V 1.0.0	2015-05-1 5
Single card version	TN02	004401783411 651	P809A20.H01S	ETB-CO-P809A20V 1.0.0	2015-05-1 5

*EUT ID: identify the test sample in the lab internally.

4.3 Identification of AE

AE ID*	Description
AE1	Battery
AE2	Travel Adaptor
AE3	Earphone

AE1

Model	Li3822T43P3h736044
Manufacturer	ZTE CORPORATION
Capacitance	2200mAh
Nominal Voltage	3.8V

AE2

Model	STC-A51-Z
Manufacturer	ZTE CORPORATION
Length of DC line	0cm with USB connector

AE3

Model	SH-EJ1033-603
Manufacturer	/
Length of DC line	140cm

*AE ID: identify the test sample in the lab internally.

5. Operational Conditions during Test

5.1 General description of test procedures

A communication link is set up with a system simulator by air link, and a call is established. The absolute radio frequency channel is allocated to low, middle and high respectively in the case of each band. The EUT is commanded to operate at maximum transmitting power.

Connection to the EUT is established via air interface with CMU200, and the EUT is set to maximum output power by CMU200. The antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the EUT. The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the EUT by at least 30dB.

The AP is supported,

According to KDB941225 D06,

1. The device size is 14.5 cm x 7.2 cm > 9 cm x 5 cm, so test separation distance was 10mm. The test separation distance is given by user manual
2. SAR must be tested for all surfaces and edges with a transmit antenna within 2.5cm, at a test separation distance of 10mm. And also the worst position of head are tested with Wi-Fi keep transmitting.

5.2 GSM Test Configuration

SAR test for GSM 850/1900, a communication link is set up with a system simulator by air link. Using CMU200 the power level is set to "5" in SAR of GSM850, set to "0" in SAR of GSM 1900, The tests in the band of GSM850/1900 are performed in the mode of voice and data transfer function.

For Class A devices, the SAR evaluation must take into account the maximum CS and PS time slots defined by the DTM multislot class for the device, with respect to head body-worn accessory and other near body operating configurations and exposure conditions. SAR may be evaluated for DTM with the device operating in DTM using one CS plus the number of PS time-slots that result in the highest source-based time-averaged maximum output or by summing the single time-slot CS and highest maximum output multislot PS SAR.38 A communication test set with DTM support is necessary to configure the test device for SAR measurement in DTM mode. Alternatively, the single slot CS GSM/GMSK voice mode SAR for each applicable exposure condition can be added respectively to the PS (E)GPRS multislot data-mode SAR to demonstrate SAR compliance for DTM.

5.3 WCDMA Test Configuration

SAR test for WCDMA BAND II/V, a communication link is set up with a system simulator by air link. Using CMU200 the power level is set to “3” in SAR of WCDMA BAND II/V. The tests in the band of WCDMA BAND II/V are performed in the mode of RMC 12.2kbps transfer function.

SAR for body exposure configurations in voice and data modes is measured using 12.2kbps RMC with TPC bits configured to all “1’s”. SAR for other spreading codes and multiple DPDCHn, when supported by the DUT, are not required when the maximum average output of each RF channel, for each spreading code and DPDCHn configuration, are less than 1/4 dB higher than those measured in 12.2 kbps RMC. Otherwise, SAR is measured on the maximum output channel with an applicable RMC configuration for the corresponding spreading code or DPDCHn using the exposure configuration that results in the highest SAR with 12.2 kbps RMC. When more than 2 DPDCHn are supported by the DUT, it may be necessary to configure additional DPDCHn for a DUT using FTM(Factory Test Mode) or other chipset based test approaches with parameters similar to those used in 384kbps and 968 kbps RMC.

HSDPA Test Configuration

Body SAR is also measured for HSDPA when the maximum average output of each RF channel with HSDPA active is at least 1/4 dB higher than that measured without HSDPA using 12.2 kbps RMC or the maximum SAR 12.2 kbps RMC is above 75% of the SAR limit. Body SAR is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration in 12.2 kbps RMC without HSDPA. HSDPA should be configured according to the UE category of a test device. The number of HS-DSCH/HS-PDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set f. To maintain a consistent test configuration and stable transmission condition, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4 ms with a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. DPCCH and DODCH gain factors (β_c, β_d), and HS_DPCCH power offset parameters ($\Delta_{ACK}, \Delta_{NACK}, \Delta_{CQI}$) should be set according to values indicated in the Table below. The CQI value is determined by the UE category, transport block size, number of HS_PDSCHs and modulation used in the H-set.

Table 1: Subtest for UMTS Release 5 HSDPA

Sub-set	β_c	β_d	B_d (SF)	B_c/β_d	β_{hs}	CM (dB)
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15	15/15	64	12/15	24/15	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5
Note 1: $\Delta_{ACK}, \Delta_{NACK}, \Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15\beta_c$ Note 2: CM=1 for $\beta_c/\beta_d = 12/15, \beta_{hs}/\beta_c = 24/15$ Note 3: For subset 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factor for the reference TFC						

(TFC1,TF1) to $\beta_c=11/15$ and $\beta_d=15/15$.

Table 2: Settings of required H-set 1 QPSK in HSDPA mode

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	Kbps	534
Inter-TTI Distance	TTI's	3
Number of HARQ Processes	Processes	2
Information Bit Payload	Bitw	3202
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bots	4800
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	9600
Coding Rate	/	0.67
Number of Physical Channel Codes	Codes	5
Modulation	/	QPSK

Table 3: HSDPA UE category

HS-DSCH Category	Maximum HS_DSCH Codes Received	Minimum Inter-TTI Interval	Maximum Transport Bits/HS-DSCH	Total Channel
1	5	3	7298	19200
2	5	3	7298	28800
3	5	2	7298	28800
4	5	2	7298	38400
5	5	1	7298	57600
6	5	1	7298	67200
7	10	1	14411	115200
8	10	1	14411	134400
9	15	1	25251	172800
1 2	15	1	27952	172800
1 1	5	2	3630	14400
1 2	5	1	3630	28800
1 3	15	1	34800	259200
1 4	15	1	42196	259200
1 5	15	1	23370	345600
1 6	15	1	27952	345600

HSUPA Test Configuration

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{tx}^{(1)}$	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM ⁽²⁾ (dB)	MPR (dB)	AG ⁽⁴⁾ Index	E-TFCI
1	11/15 ⁽³⁾	15/15 ⁽³⁾	64	11/15 ⁽³⁾	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed} = 47/15$ $\beta_{ed} = 47/15$	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 ⁽⁴⁾	15/15 ⁽⁴⁾	64	15/15 ⁽⁴⁾	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{tx} = \beta_{tx}/\beta_c = 30/15 \Leftrightarrow \beta_{tx} = 30/15 * \beta_c$.

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{tx}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.

Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$.

Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.

Note 6: β_{ed} can not be set directly; it is set by Absolute Grant Value.

applicable only if Maximum Power Reduction (MPR) is implemented according to Cubic Metric (CM) requirements.³⁷

SAR is required for Rel. 8 DC-HSDPA when SAR is required for Rel. 5 HSDPA; otherwise, the 3G SAR test reduction procedure is applied to DC-HSDPA with 12.2 kbps RMC as the primary mode. Power is measured for DC-HSDPA according to the H-Set 12, FRC configuration in Table C.8.1.12 of 3GPP TS 34.121-1 to determine SAR test reduction. A primary and a secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to be acceptable.

5.4 LTE Test Configuration

SAR tests for LTE are performed with a base station simulator, Anritsu MT8820C. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. All powers were measured with the MT8820C.

Maximum power reduction (MPR)

It must be clearly identified if Maximum Power Reduction (MPR) is implemented and whether it is an optional or permanent feature, i.e., built-in by design. MPR may be considered during SAR testing only when the maximum output power is permanently limited by the MPR implemented within the device, according to the RB (resource block) configurations specified in 3GPP/LTE standards. Regardless of network requirements, only those RB configurations allowed by 3GPP for the channel bandwidth and modulation combinations may be tested with MPR active. Configurations with RB allocations less than the RB thresholds required by 3GPP must be tested without MPR. A-MPR (additional MPR) must be disabled during SAR testing.

The maximum average conducted output power measured according to the following configurations, for the required test channels, channel bandwidths and uplink modulations, in each frequency band, are used to support the SAR test reduction and exclusion.

- 100% RB allocation
- 1 RB and also 50% RB allocation, offset to the upper edge, middle and lower edge of the channel bandwidth of each required test channel

Higher order modulations

For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in sections 4.2.1, 5.2.2 and 4.2.3 to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is $> \frac{1}{2}$ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

5.5 Bluetooth Test Configuration

The Bluetooth transmitter of the device under test can be excluded from stand-alone and simultaneous SAR evaluation, per the requirements from FCC KDB 648474, as follows:

1. The separation between the Bluetooth antenna and the main antenna is $10.1\text{cm} > 5\text{cm}$
 2. The maximum conducted output power of Bluetooth is $1.81\text{dBm} = 1.5\text{mW}$ $P(\text{max}) = 19\text{mW}$
- According to FCC KDB648474, stand along SAR and Simultaneous Transmission SAR are not required.

According to FCC KDB447498v05, Appendix A

Appendix A

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

For 2450MHz, 10mm test distance, $P(\text{max}) = 19\text{mW}$

For Simultaneous Transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01v05 based on the formula below.

(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance,

mm)] • [$\sqrt{f(\text{GHz})/x}$ W/kg for test separation distances ≤ 50 mm;

where $x = 7.5$ for 1-g SAR, and $x = 18.75$ for 10-g SAR.

0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is > 50 mm

Bluetooth	Turn-up Maximum Power(dBm)	Head 0mm gap	Body-worn 10mm gap
Estimated SAR(W/kg)	8	0.263	0.132

According to FCC KDB447498v05, Apppendix D

For 2450MHz, 10mm test distance ,SAR1g (BT) =0.132W/Kg

5.6 Wi-Fi Test Configuration

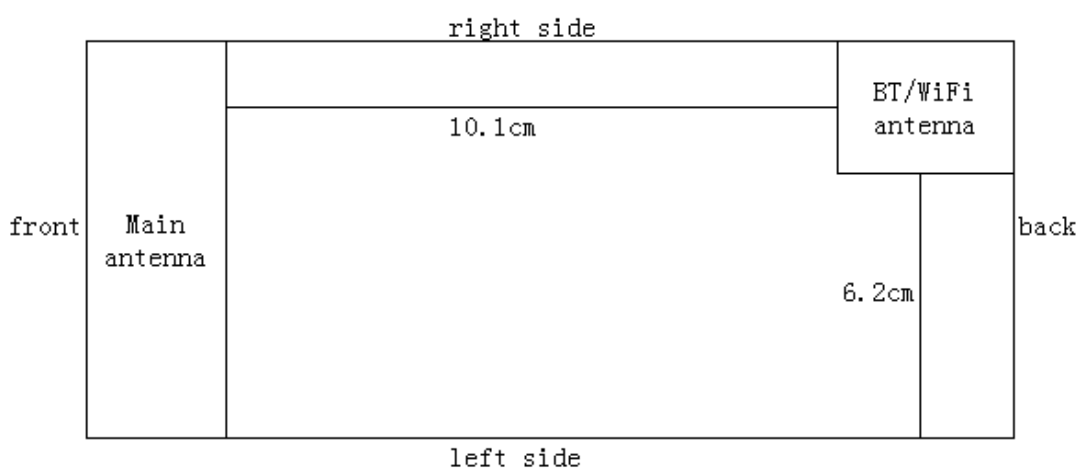
The Wi-Fi is set to different data rate and channels by the software.

According to KDB648474:

1. The separation between the Wi-Fi antenna and the main antenna is 10.1cm >5 cm
 - 2.The maximum conducted output power of Wi-Fi is12.93dBm=19.6mW $>P(\text{max}) =19$ mW
- So stand along SAR is needed。

According to KDB248227

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



Picture of antennas

According to KDB941225 D06

SAR must be tested for all surfaces and edges with a transmit antenna within 2.5cm, at a test separation distance of 10mm

Band	Position for test (yes or n/a)					
	Top	Bottom	Leftside	Rightside	Front	Back
WWAN	yes	yes	yes	yes	yes	n/a 10.1cm>2.5cm
WLAN	yes	yes	n/a 6.2cm>2.5cm	yes	n/a 10.1cm>2.5cm	yes

Top—toward phantom

Bottom---towards ground

6. SAR Measurements system configuration

6.1 SAR Measurement set-up

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

- A standard high precision 6-axis robot (Staubli TX=RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic _field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The generic twin phantom enabling the testing of left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- System validation dipoles allowing to validate the proper functioning of the system.

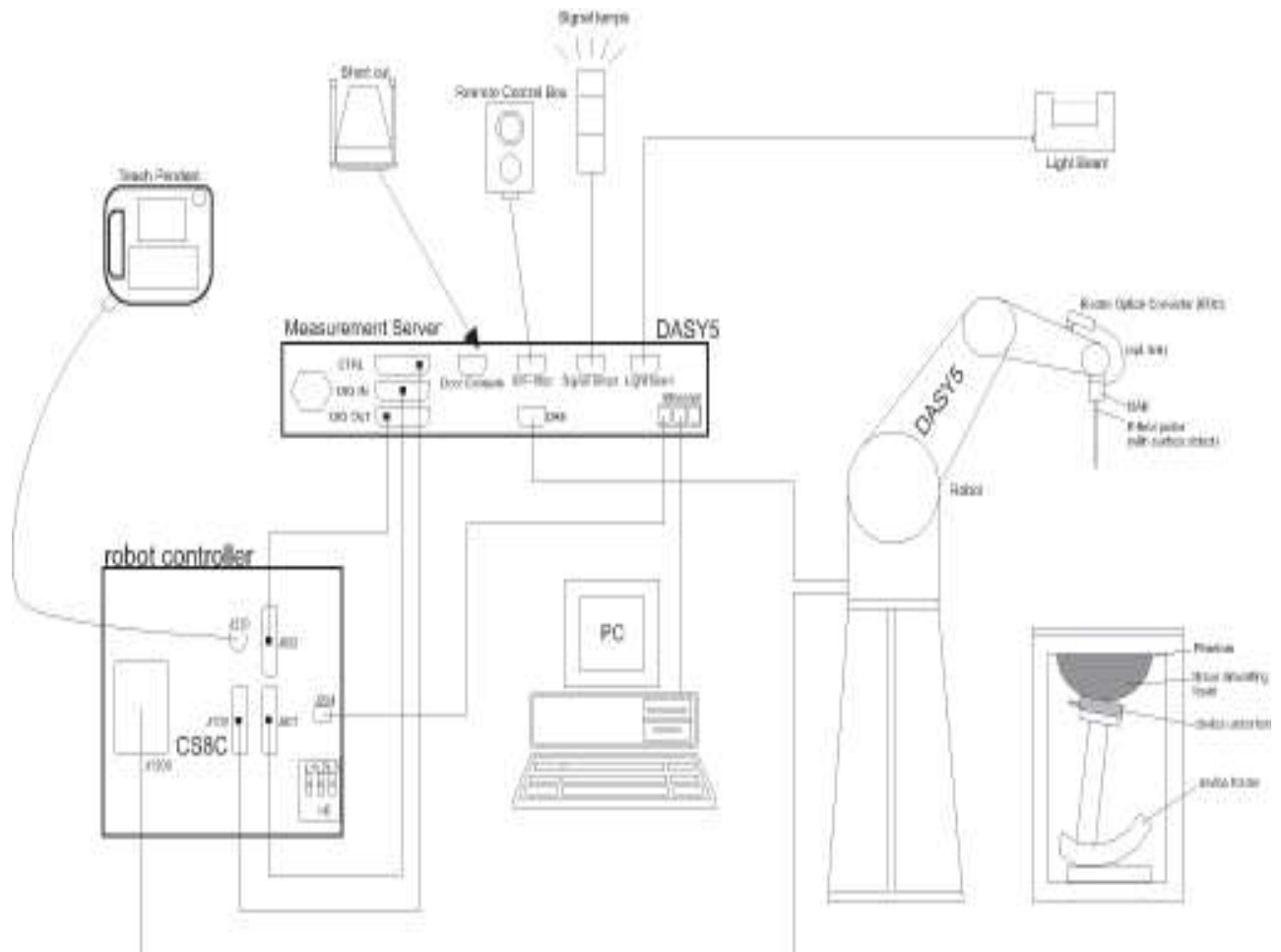


Figure 5-1 SAR Lab Test Measurement Set-up

6.2 DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe ES3DV3 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

6.2.1 Es3DV3 Probe Specification

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Basic Broad Band Calibration in air Conversion Factors (CF) for HSL 850 and HSL 1750 Additional CF for other liquids and frequencies upon request
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 μ W/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μ W/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%.



Figure 5-2.ES3DV3 E-field Probe



Figure 5-3. ES3DV3 E-field probe

6.2.2 E-field Probe Calibration

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

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

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

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

Where: Δt = Exposure time (30 seconds),
 C = Heat capacity of tissue (brain or muscle),
 ΔT = Temperature increase due to RF exposure.
 Or

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

Where:

σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m³).

6.3 Other Test Equipment

6.3.1 Device Holder for Transmitters

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



Figure 5-4. Device Holder

6.3.2 Phantom

The Generic Twin Phantom is constructed of a fiberglass shell integrated in a wooden frame. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90% of all users. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents the evaporation of the liquid. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot.

Shell Thickness	2±0.1 mm
Filling Volume	Approx. 20 liters
Dimensions	810 x 1000 x 500 mm (H x L x W)



Figure 5-5. Generic Twin Phantom

6.4 Scanning procedure

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

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

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

- Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values before running a detailed measurement around the hot spot. Before starting the area scan a grid spacing of 15 mm x 15 mm is set. During the scan the distance of the probe to the phantom remains unchanged.

After finishing area scan, the field maxima within a range of 2 dB will be ascertained.

- Zoom Scan

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

- Spatial Peak Detection

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

- maximum search
- extrapolation
- boundary correction
- peak search for averaged SAR

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

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. Several measurements at different distances are necessary for the extrapolation. Extrapolation routines require at least 10 measurement points in 3-D space.

They are used in the Zoom Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard's method for extrapolation. For a grid using 7x7x7 measurement points with 5mm resolution amounting to 343 measurement points, the uncertainty of the extrapolation routines is less than 1% for 1g and 10g cubes.

- A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube 7x7x7 scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 5mm steps.

6.5 Data Storage and Evaluation

6.5.1 Data Storage

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters

for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension “.DA4”. The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated. The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

6.5.2 Data Evaluation by SEMCAD

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

Probe parameters:	- Sensitivity	Normi, ai0, ai1, ai2
	- Conversion factor	ConvFi
	- Diode compression point	Dcpi
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	
	- Density	

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

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

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

$$V_i = U_i + U_i^2 \cdot c f / d c p_i$$

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

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

cf = crest factor of exciting field (DASY parameter)

dcp_i = diode compression point (DASY parameter)

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

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

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

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

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

ConvF = sensitivity enhancement in solution

a_{ij} = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

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

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

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

$$E_{tot} = (E_x^2 + E_y^2 + E_z^2)^{1/2}$$

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

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

with **SAR** = local specific absorption rate in mW/g

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

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

ρ = equivalent tissue density in g/cm³

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

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

with P_{pwe} = equivalent power density of a plane wave in mW/cm²

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

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

6.6 System check

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulates were measured every day using the dielectric probe kit and the network analyzer. A system check measurement was made following the determination of the dielectric parameters of the simulates, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. The system check results (dielectric parameters and SAR values) are given in the 6.2.1 and 6.2.2

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

System check is performed regularly on all frequency bands where tests are performed with the DASY 5 system.

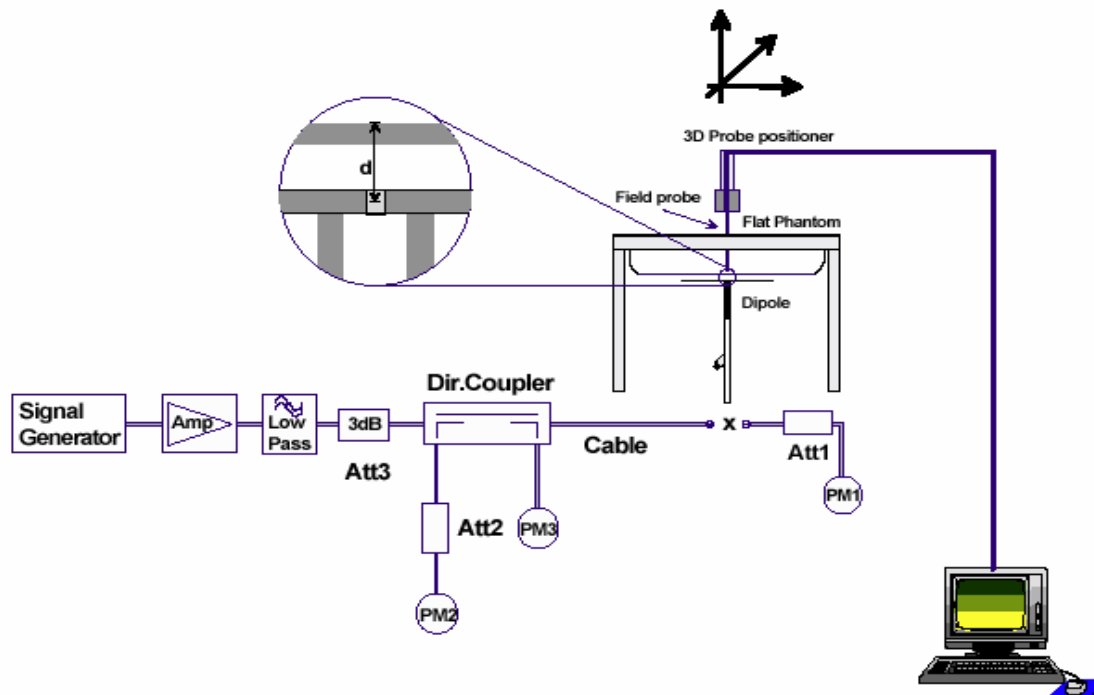


Figure 5-6. System Check Set-up

6.7 Equivalent Tissues

The liquid is consisted of water, salt, Glycol, Sugar, Preventol and Cellulose. The liquid has previously been proven to be suited for worst-case. The Table show the detail solution. It's

satisfying the latest tissue dielectric parameters requirements proposed by the OET 65.

MIXTURE%	FREQUENCY(head) 835MHz
Water	40.4
Sugar	56
Salt	2.5
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=835MHz $\epsilon=41.5$ $\sigma=0.90$
MIXTURE%	FREQUENCY(body) 835MHz
Water	52.5
Sugar	45
Salt	1.4
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=835MHz $\epsilon=55.2$ $\sigma=0.97$
MIXTURE%	FREQUENCY(head)1900MHz
Water	55.242
Glycol monobutyl	44.452
Salt	0.306
Dielectric Parameters Target Value	f=1900MHz $\epsilon=40.0$ $\sigma=1.40$
MIXTURE%	FREQUENCY(body)1900MHz
Water	69.91
Glycol monobutyl	29.96
Salt	0.13
Dielectric Parameters Target Value	f=1900MHz $\epsilon=53.3$ $\sigma=1.52$
MIXTURE%	FREQUENCY(head)2450MHz
Water	56
Glycol monobutyl	44
Salt	0.00
Dielectric Parameters Target Value	f=2450MHz $\epsilon=39.2$ $\sigma=1.8$

MIXTURE%	FREQUENCY(body)2450MHz
Water	70
Glycol monobutyl	30
Salt	0
Dielectric Parameters Target Value	f=2450MHz ϵ =52.7 σ =1.95
MIXTURE%	FREQUENCY(head)2600MHz
Water	55.49
Glycol monobutyl	44.39
Salt	0.12
Dielectric Parameters Target Value	f=2600MHz ϵ =39.0 σ =1.96
MIXTURE%	FREQUENCY(head)1750MHz
Water	55.242
Glycol monobutyl	44.452
Salt	0.306
Dielectric Parameters Target Value	f=1750MHz ϵ =40.0 σ =1.40
MIXTURE%	FREQUENCY(body)1750MHz
Water	69.91
Glycol monobutyl	29.96
Salt	0.13
Dielectric Parameters Target Value	f=1750MHz ϵ =53.3 σ =1.52
MIXTURE%	FREQUENCY(Body)2600MHz
Water	69.5
Glycol monobutyl	30.4
Salt	0
Dielectric Parameters Target Value	f=2600MHz ϵ =52.5 σ =2.16
MIXTURE%	FREQUENCY(head) 750MHz
Water	38.82
Sugar	59.01
Salt	1.86
Preventol	0.16

Cellulose	0.16
Dielectric Parameters Target Value	f=750MHz $\epsilon=41.9$ $\sigma=0.89$
MIXTURE%	FREQUENCY(body) 750MHz
Water	50.92
Sugar	48.01
Salt	0.76
Preventol	0.16
Cellulose	0.16
Dielectric Parameters Target Value	f=750MHz $\epsilon=55.5$ $\sigma=0.96$

7. Summary of Test Results

7.1 Conducted Output Power Measurement

7.1.1 Summary

The DUT is tested using a CMU200 communications tester as controller unit to set test channels and maximum output power to the DUT, as well as for measuring the conducted power.

Conducted output power was measured using an integrated RF connector and attached RF cable.

This result contains conducted output power for the EUT.

7.1.2 Conducted Power Results

GSM850		Conducted output power(dBm)						
		low	middle	high				
		CH128	CH189	CH251				
		824.2MHz	836.6MHz	848.8MHz				
GSM		32.8	32.8	32.8	(dB)	CH128	CH189	CH251
GPRS	1 TX-slot result	32.9	32.9	32.9	-9.03	23.87	23.87	23.87
	2 TX-slot result	32.7	32.7	32.8	-6.02	26.68	26.68	26.78
	3 TX-slot result	32.4	32.4	32.4	-4.26	28.14	28.14	28.14
	4 TX-slot result	31.9	31.9	32.0	-3.01	28.89	28.89	28.99
EDGE (GMSK)	1 TX-slot result	32.9	32.9	32.9	-9.03	23.87	23.87	23.87
	2 TX-slot result	32.7	32.7	32.8	-6.02	26.68	26.68	26.78
	3 TX-slot result	32.4	32.4	32.4	-4.26	28.14	28.14	28.14
	4 TX-slot result	31.9	31.9	32.0	-3.01	28.89	28.89	28.99

GSM850 (DTM)		Conducted output power(dBm)		
		low	middle	high
		CH128	CH189	CH251
		824.2MHz	836.6MHz	848.8MHz
CS:1slot+PS 2uplink slots		32.4	32.4	32.4

GSM1900		Conducted output power(dBm)						
		low	middle	high				
		CH512	CH661	CH810				
		1850.2MHz	1880MHz	1909.8MHz				
GSM		29.8	29.7	29.6	(dB)	CH512	CH661	CH810
GPRS	1 TX-slot result	29.8	29.7	29.6	-9.03	20.77	20.67	20.57
	2 TX-slot result	28.7	28.6	28.5	-6.02	22.68	22.58	22.48
	3 TX-slot result	28.5	28.4	28.3	-4.26	24.24	24.14	24.04
	4 TX-slot result	28.1	28.1	28.0	-3.01	25.09	25.09	24.99
EDGE (GMSK)	1 TX-slot result	29.8	29.7	29.6	-9.03	20.77	20.67	20.57
	2 TX-slot result	28.7	28.6	28.5	-6.02	22.68	22.58	22.48
	3 TX-slot result	28.5	28.4	28.3	-4.26	24.24	24.14	24.04
	4 TX-slot result	28.1	28.1	28.0	-3.01	25.09	25.09	24.99

GSM1900 (DTM)		Conducted output power(dBm)		
		low	middle	high
		CH512	CH661	CH810
		1850.2MHz	1880MHz	1909.8MHz
CS:1slot+PS 2uplink slots		28.5	28.4	28.3

Note: To average the power, the division factor is as follows:

1 TX-slot =1 transmit time slot of 8 time slots

=>conducted power divided by (8/1) =>-9.03dB

2 TX-slot =2 transmit time slot of 8 time slots

=>conducted power divided by (8/2) =>-6.02dB

3 TX-slot =3 transmit time slot of 8 time slots

=>conducted power divided by (8/3) =>-4.26dB

4 TX-slot =4 transmit time slot of 8 time slots

=>conducted power divided by (8/4) =>-3.01dB

Head of GSM850/1900 are tested for voice and DTM mode.

Body-worn of GSM850/1900 are tested with GPRS 4 timeslots

WCDMA BAND II		Conducted Output power (dBm)		
		low	middle	high
		CH9262	CH9400	CH9538
		1852.4MHz	1800MHz	1907.6MHz
12.2kbps RMC		22.9	22.8	23.1
HSDPA	SUB-TEST 1	21.7	21.4	21.7
	SUB-TEST 2	21.1	20.6	21.1
	SUB-TEST 3	21.1	20.6	21.0
	SUB-TEST 4	20.2	19.9	20.2
DC-HSDPA with 12.2kbps RMC		19.6	19.2	19.5
HSUPA	SUB-TEST 1	21.8	21.8	21.5
	SUB-TEST 2	20.7	20.7	20.6
	SUB-TEST 3	21.7	21.7	21.4
	SUB-TEST 4	19.8	19.6	19.6
	SUB-TEST 5	21.7	21.7	21.5

WCDMA BAND V		Conducted Output power (dBm)		
		low	middle	high
		CH4132	CH4183	CH4233
		826.4 MHz	836.6MHz	846.6MHz
12.2kbps RMC		22.4	22.5	22.8
HSDPA	SUB-TEST 1	21.9	21.8	21.7
	SUB-TEST 2	21.5	21.3	21.4
	SUB-TEST 3	19.9	19.6	19.9
	SUB-TEST 4	19.8	19.6	19.9
DC-HSDPA with 12.2kbps RMC		19.2	18.9	19.2
HSUPA	SUB-TEST 1	21.9	21.8	21.7
	SUB-TEST 2	20.8	20.6	20.8
	SUB-TEST 3	21.7	21.6	21.6
	SUB-TEST 4	19.9	19.7	19.8
	SUB-TEST 5	21.9	21.8	21.7

Body-worn of WCDMA BAND II/V are tested with 12.2kbps RMC.

Testing for HSDPA/HSUPA/DC-HSDPA are not required.

LTE Band 2				
Bandwidth	RB	Frequency(MHz)	Actual output power(dBm)	
			QPSK	16QAM
1.4MHz	1RB_low	1909.3	22.83	21.76
		1880	22.43	21.51
		1850.7	22.70	21.87
	1RB_high	1909.3	22.55	22.13
		1880	22.16	21.64
		1850.7	22.40	21.61
	50%RB	1909.3	22.73	21.86
		1880	22.46	21.58
		1850.7	22.60	21.80
	100%RB	1909.3	22.53	21.45
		1880	22.70	21.80
		1850.7	22.82	21.68
3MHz	1RB_low	1851.5	22.45	21.62
		1880	22.55	21.68
		1908.5	22.91	21.72
	1RB_high	1851.5	22.54	21.64
		1880	22.37	21.60
		1908.5	22.58	21.78
	50%RB	1851.5	21.53	20.44
		1880	21.33	20.29
		1908.5	21.77	20.60
	100%RB	1851.5	21.76	20.65
		1880	21.74	20.46
		1908.5	21.76	20.85
5MHz	1RB_low	1852.5	22.28	21.36
		1880	22.41	21.51
		1907.5	22.43	21.59
	1RB_high	1852.5	22.31	21.32
		1880	22.28	21.18
		1907.5	22.38	21.52
	50%RB	1852.5	21.52	20.62
		1880	21.38	20.31
		1907.5	21.73	20.74
	100%RB	1852.5	21.64	20.73
		1880	21.61	20.71
		1907.5	21.84	20.71
10MHz	1RB_low	1905	22.47	22.04
		1880	22.85	21.83
		1855	22.94	21.83
	1RB_high	1905	22.72	21.61

		1880	22.71	21.59
		1855	22.75	22.32
	50%RB	1905	21.71	20.68
		1880	21.43	20.44
		1855	21.70	20.45
	100%RB	1905	21.65	20.77
		1880	21.60	20.70
		1855	21.70	20.80
15MHz	1RB_low	1902.5	22.57	21.81
		1880	22.86	21.95
		1857.5	23.03	22.25
	1RB_high	1902.5	23.41	22.73
		1880	23.01	22.15
		1857.5	22.99	22.10
	50%RB	1902.5	21.59	20.6
		1880	21.51	20.57
		1857.5	21.80	20.84
	100%RB	1902.5	22.00	21.07
		1880	21.64	20.7
		1857.5	21.74	20.77
20MHz	100%RB	1900	21.93	20.84
		1880	21.81	20.91
		1860	21.99	20.96
	50%RB	1900	22.17	21.54
		1880	21.73	20.87
		1860	21.80	21.56
	1RB-low	1900	22.70	22.07
		1880	23.00	21.95
		1860	23.20	21.56
	1RB-mid	1900	22.94	22.53
		1880	22.88	21.50
		1860	22.75	22.03
	1RB-high	1900	22.60	21.83
		1880	22.73	22.28
		1860	22.56	21.93

LTE Band 4				
Bandwidth	RB	Frequency(MHz)	Actual output power(dBm)	
			QPSK	16QAM
1.4MHz	1RB_low	1710.7	21.77	21.20
		1732.5	21.99	21.43
		1754.3	22.26	21.60
	1RB_high	1710.7	22.04	21.00
		1732.5	22.07	21.24
		1754.3	22.11	21.55
	50%RB	1710.7	22.29	21.50
		1732.5	22.03	21.42
		1754.3	22.09	21.39
	100%RB	1710.7	20.89	20.02
		1732.5	21.07	20.18
		1754.3	21.36	20.33
3MHz	1RB_low	1711.5	21.74	21.01
		1732.5	22.38	21.34
		1753.5	22.36	21.36
	1RB_high	1711.5	22.22	21.16
		1732.5	22.21	21.14
		1753.5	22.50	21.37
	50%RB	1711.5	21.45	20.55
		1732.5	21.17	20.20
		1753.5	21.36	20.17
	100%RB	1711.5	20.96	20.04
		1732.5	21.09	20.17
		1753.5	21.33	20.29
5MHz	1RB_low	1712.5	21.75	21.05
		1732.5	21.94	20.82
		1752.5	22.02	21.03
	1RB_high	1712.5	22.17	21.06
		1732.5	21.90	20.87
		1752.5	22.21	21.14
	50%RB	1712.5	21.35	20.32
		1732.5	21.13	20.14
		1752.5	21.36	20.38
	100%RB	1712.5	21.04	19.96
		1732.5	21.09	20.30
		1752.5	21.34	20.36
10MHz	1RB_low	1715	21.83	21.09
		1732.5	22.21	21.37
		1750	22.15	21.27

	1RB_high	1715	22.48	21.83
		1732.5	22.21	21.30
		1750	22.39	21.59
	50%RB	1715	21.42	20.42
		1732.5	21.07	20.22
		1750	21.72	20.93
	100%RB	1715	21.22	20.13
		1732.5	21.13	19.96
		1750	21.26	20.28
15MHz	1RB_low	1717.5	22.11	21.37
		1732.5	22.45	21.69
		1747.5	22.61	21.75
	1RB_high	1717.5	22.47	21.80
		1732.5	22.74	21.68
		1747.5	22.47	21.67
	50%RB	1717.5	21.49	20.47
		1732.5	21.21	20.25
		1747.5	21.69	20.78
	100%RB	1717.5	21.45	20.46
		1732.5	21.29	20.33
		1747.5	21.50	20.62
20MHz	100%RB	1720	21.23	20.22
		1732.5	21.13	20.09
		1745	21.29	20.28
	50%RB	1720	21.49	20.57
		1732.5	21.43	20.50
		1745	21.54	20.58
	1RB-low	1720	22.30	21.57
		1732.5	22.70	22.36
		1745	22.40	21.79
	1RB-mid	1720	22.24	21.84
		1732.5	22.42	21.54
		1745	22.37	21.82
	1RB-high	1720	22.03	20.47
		1732.5	22.41	21.55
		1745	22.18	21.54

LTE Band 7				
Bandwidth	RB	Frequency(MHz)	Actual output power(dBm)	
			QPSK	16QAM
5MHz	1RB_low	2502.5	21.47	20.49
		2535	21.24	20.26
		2567.5	21.07	19.80
	1RB_high	2502.5	21.56	20.16
		2535	20.98	20.17
		2567.5	20.96	20.07
	50%RB	2502.5	20.54	19.55
		2535	20.18	19.26
		2567.5	20.38	19.25
	100%RB	2502.5	20.64	19.74
		2535	20.20	19.24
		2567.5	20.13	19.29
10MHz	1RB_low	2505	21.17	20.66
		2535	21.48	20.37
		2565	21.07	20.35
	1RB_high	2505	21.32	20.91
		2535	20.83	20.01
		2565	20.69	20.27
	50%RB	2505	20.38	19.51
		2535	19.97	19.20
		2565	20.20	19.43
	100%RB	2505	20.32	19.47
		2535	20.05	18.91
		2565	20.11	19.09
15MHz	1RB_low	2507.5	21.53	21.20
		2535	21.38	21.05
		2562.5	21.48	20.37
	1RB_high	2507.5	21.40	20.39
		2535	21.06	20.65
		2562.5	21.21	20.80
	50%RB	2507.5	20.25	19.32
		2535	20.15	19.05
		2562.5	20.24	19.05
	100%RB	2507.5	20.45	19.32
		2535	20.07	19.04
		2562.5	20.22	19.30
20MHz	100%RB	2510	20.11	19.16
		2535	19.86	19.15
		2560	20.04	19.15

	50%RB	2510	20.21	19.27
		2535	20.00	19.00
		2560	20.26	19.11
	1RB-low	2510	21.26	20.74
		2535	21.19	20.62
		2560	21.35	21.03
	1RB-mid	2510	21.22	20.54
		2535	21.14	20.58
		2560	20.88	20.45
	1RB-high	2510	21.30	20.72
		2535	21.40	20.79
		2560	21.50	20.93

LTE BAND 2/4/7 are tested with QPSK 20MHz 1RB low and check for QPAK 20MHz 1RB mid and high

Maximum Power Reduction (MPR) for Power Class 3

BAND	1.4 MHz (RB)	3 MHz (RB)	5 MHz (RB)	10 MHz (RB)	15 MHz (RB)	20MHz (RB)	MPR (dB)	
							QPSK	16QAM
LTE Band 2	> 5	> 4	> 8	> 12	> 16	> 18	≤1	≤2
LTE Band 4	> 5	> 4	> 8	> 12	> 16	> 18	≤1	≤2
LTE Band 7	/	/	> 8	> 12	> 16	> 18	≤1	≤2

For Bluetooth maximum conducted power is 1.81dBm

Wi-Fi Average Conducted Power

802.11b (dBm)

Channel\data rate			1Mbps	2Mbps	5.5Mbps	11Mbps
low	2412MHz	1	11.57	11.46	11.21	10.97
middle	2437MHz	6	12.03	11.90	11.68	11.45
high	2462MHz	11	12.93	12.77	12.55	12.33

802.11g (dBm)

Channel\data rate			6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
low	2412MHz	1	8.42	8.18	7.99	7.66	7.33	6.77	6.29	6.14
middle	2437MHz	6	8.69	8.45	8.26	7.91	7.57	7.02	6.54	6.39
high	2462MHz	11	9.64	9.31	9.19	8.81	8.46	7.92	7.45	7.28

802.11n (20M) (dBm)

Channel\data rate			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
low	2412MHz	1	4.29	3.85	3.49	3.15	2.63	2.22	2.06	1.85
middle	2437MHz	6	4.57	4.11	3.76	3.40	2.89	2.46	2.29	2.09
high	2462MHz	11	5.48	5.02	4.68	4.34	3.83	3.38	3.21	3.00

802.11n (40M) (dBm)

Channel\data rate			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
low	2422MHz	3	4.61	3.92	/	/	/	/	/	/
middle	2437MHz	6	4.75	/	/	/	/	/	/	/
high	2452MHz	9	4.69	/	/	/	/	/	/	/

The maximum conducted output power of Wi-Fi is 12.93dBm=19.6mW>P(max)=19mW..

So stand alone SAR is required.

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

SAR of WLAN should be tested on 802.11b 1Mbps.

Duty cycle of 802.11b 1Mbps is 99.8%.

7.2 Test Results

7.2.1. Dielectric Performance

Dielectric Performance of Tissue Simulating Liquid

Frequency	Description	Dielectric Parameters ϵ_r	σ (s/m)	temp °C
835MHz (head)	Target value 5% window	41.5 39.43-43.58	0.90 0.86- 0.95	/
	Measurement value 2015-05-14	41.22	0.88	21.9
	Measurement value 2015-06-04	41.64	0.89	21.8
835MHz (body)	Target value 5% window	55.2 52.44-57.96	0.97 0.92-1.02	/
	Measurement value 2015-05-04	54.63	0.95	21.7
	Measurement value 2015-05-05	54.15	0.94	21.8
1750MHz (head)	Target value 5% window	40.0 38-42	1.40 1.33 -1.47	/
	Measurement value 2015-05-08	39.58	1.39	21.9
1750MHz (body)	Target value 5% window	53.3 50.63-55.96	1.52 1.44 -1.60	/
	Measurement value 2015-05-11	52.35	1.5	21.7
1900MHz (head)	Target value 5% window	40.0 38-42	1.40 1.33 -1.47	/
	Measurement value 2015-04-26	39.65	1.38	21.8
	Measurement value 2015-05-13	39.36	1.38	21.9
	Measurement value 2015-06-04	39.49	1.38	21.8
1900MHz (body)	Target value 5% window	53.3 50.63-55.96	1.52 1.44 -1.60	/
	Measurement value 2015-05-06	52.37	1.49	21.8
	Measurement value 2015-05-07	52.56	1.50	21.9
2450MHz (head)	Target value 5% window	39.2 37.24-41.16	1.8 1.71-1.89	/

	Measurement value 2015-04-28	38.59	1.79	21.7
2450MHz (body)	Target value 5% window	52.7 50.06-55.33	1.95 1.85 -2.05	/
	Measurement value 2015-05-08	51.93	1.93	21.9
2600MHz (head)	Target value 5% window	39.0 37.05-40.95	1.96 1.86-2.06	
	Measurement value 2015-05-18	38.9	1.98	21.8
2600MHz (body)	Target value 5% window	52.5 49.88-55.13	2.16 2.05 -2.27	
	Measurement value 2015-05-08	51.96	2.13	21.8

Dielectric Performance for spot check

Frequency	Description	Dielectric Parameters ϵ_r	σ (s/m)	temp °C
835MHz (head)	Target value 5% window	41.5 39.43-43.58	0.90 0.86- 0.95	/
	Measurement value 2015-05-19	41.23	0.89	21.9
835MHz (body)	Target value 5% window	55.2 52.44-57.96	0.97 0.92-1.02	/
	Measurement value 2015-05-26	54.03	0.95	21.9
1750MHz (head)	Target value 5% window	40.0 38-42	1.40 1.33 -1.47	/
	Measurement value 2015-05-22	39.74	1.39	21.7
1750MHz (body)	Target value 5% window	53.3 50.63-55.96	1.52 1.44 -1.60	/
	Measurement value 2015-05-25	52.44	1.51	21.8
1900MHz (head)	Target value 5% window	40.0 38-42	1.40 1.33 -1.47	/
	Measurement value 2015-05-20	39.54	1.38	21.9
1900MHz (body)	Target value 5% window	53.3 50.63-55.96	1.52 1.44 -1.60	/
	Measurement value 2015-05-23	52.37	1.49	21.9

2600MHz (head)	Target value 5% window	39.0 37.05-40.95	1.96 1.86-2.06	
	Measurement value 2015-05-24	39.2	1.99	21.7
2600MHz (body)	Target value 5% window	52.5 49.88-55.13	2.16 2.05 -2.27	
	Measurement value 2015-05-21	51.87	1.96	21.7

7.2.2. System Check Results

System Check for tissue simulation liquid

Frequency	Description	SAR(W/kg)		Targeted SAR1g (W/kg)	Normalized SAR1g (W/kg)	Deviation (%)
		10g	1g			
835 MHz (head)	Recommended result ±10% window	1.6 1.44-1.76	2.44 2.2-2.68	/	/	/
	Measurement value 2015-05-14	1.61	2.42	9.51	9.68	1.79
	Measurement value 2015-06-04	1.52	2.34	9.51	9.36	-1.58
835MHz (body)	Recommended result ±10% window	1.6 1.44-1.76	2.41 2.17-2.65	/	/	/
	Measurement value 2015-05-04	1.56	2.36	9.52	9.44	-0.84
	Measurement value 2015-05-05	1.52	2.32	9.52	9.28	-2.52
1750MHz (head)	Recommended result ±10% window	4.94 4.45-5.43	9.15 8.24-10.07	/	/	/
	Measurement value 2015-05-08	4.82	9.12	36.3	36.48	0.50
1750MHz (body)	Recommended result ±10% window	5.08 4.57-5.59	9.35 8.42-10.29	/	/	/
	Measurement value 2015-05-11	4.87	9.42	37.9	37.68	-0.58
1900MHz (head)	Recommended result ±10% window	5.04 4.54-5.54	9.70 8.73-10.67	/	/	/
	Measurement value 2015-04-26	5.12	9.75	39.4	39	-1.02

	Measurement value 2015-05-13	5.16	9.82	39.4	39.28	-0.30
	Measurement value 2015-06-04	5.19	10.1	39.4	40.4	2.54
1900MHz (body)	Recommended result ±10% window	5.28 4.75-5.81	10.1 9.09-11.11	/	/	/
	Measurement value 2015-05-06	5.08	9.74	39.6	38.96	-1.62
	Measurement value 2015-05-07	5.11	9.86	39.6	39.44	-0.40
2450MHz (head)	Recommended result ±10% window	6.01 5.41-6.61	12.9 11.61-14.19	/	/	/
	Measurement value 2015-04-28	6.12	13.2	51.1	52.8	3.33
2450MHz (body)	Recommended result ±10% window	5.95 5.36-6.55	12.7 11.43-13.97	/	/	/
	Measurement value 2015-05-08	5.86	12.8	50.3	51.2	1.79
2600MHz (head)	Recommended result ±10% window	6.66 5.99-7.33	14.8 13.32-16.28	/	/	/
	Measurement value 2015-05-18	6.68	14.9	58.9	59.6	1.19
2600MHz (body)	Recommended result ±10% window	6.63 5.88-7.18	14.5 13.05-15.95	/	/	/
	Measurement value 2015-05-08	6.33	13.9	58.1	55.6	-4.30

System Check for spot check

Frequency	Description	SAR(W/kg)		Targeted SAR1g (W/kg)	Normali zed SAR1g (W/kg)	Deviat ion (%)
		10g	1g			
835 MHz (head)	Recommended result ±10% window	1.6 1.44-1.76	2.44 2.2-2.68	/	/	/
	Measurement value 2015-05-19	1.54	2.37	9.51	9.48	-0.32
835MHz (body)	Recommended result ±10% window	1.6 1.44-1.76	2.41 2.17-2.65	/	/	/
	Measurement value 2015-05-26	1.54	2.35	9.52	9.4	-1.26
1750MHz (head)	Recommended result ±10% window	4.94 4.45-5.43	9.15 8.24-10.07	/	/	/

	Measurement value 2015-05-22	5.04	9.33	36.3	37.32	2.81
1750MHz (body)	Recommended result ±10% window	5.08 4.57-5.59	9.35 8.42-10.29	/	/	/
	Measurement value 2015-05-25	4.77	9.22	37.9	36.88	-2.69
1900MHz (head)	Recommended result ±10% window	5.04 4.54-5.54	9.70 8.73-10.67	/	/	/
	Measurement value 2015-05-20	5.14	9.98	39.4	39.92	1.32
1900MHz (body)	Recommended result ±10% window	5.28 4.75-5.81	10.1 9.09-11.11	/	/	/
	Measurement value 2015-05-23	5.08	9.77	39.6	39.08	-1.31
2600MHz (head)	Recommended result ±10% window	6.66 5.99-7.33	14.8 13.32-16.28	/	/	/
	Measurement value 2015-05-24	6.59	14.7	58.9	58.8	-0.17
2600MHz (body)	Recommended result ±10% window	6.63 5.88-7.18	14.5 13.05-15.95	/	/	/
	Measurement value 2015-05-21	6.46	14.1	58.1	56.4	-2.93

Note: 1. the graph results see ANNEX B.1.

2 .Recommended Values used derive from the calibration certificate and 250 mW is used as feeding power to the calibrated dipole.

7.2.3 Test Results

7.2.3.1 Summary of Measurement Results (GSM850)

SAR Values (GSM850)

Test Case		Measurement Result(W/kg)	Power Drift(dB)	Note
Different Test Position	Channel	1 g		
		Average		
Test position of Head with voice				
Left head, Touch cheek	middle	0.304	-0.12	
Left head, Tilt 15 Degree	middle	0.197	-0.07	
Right head, Touch cheek	middle	0.331	0.17	
Right head, Tilt 15 Degree	middle	0.223	-0.16	
Right head, Touch cheek	low	0.379	-0.11	max
	high	0.303	-0.04	
Test position of Head with DTM mode				
Left head, Touch cheek	middle	0.721	0.03	
Left head, Tilt 15 Degree	middle	0.467	-0.01	
Right head, Touch cheek	middle	0.785	-0.11	
Right head, Tilt 15 Degree	middle	0.529	-0.06	
Right head, Touch cheek	low	0.899	0.04	max
	high	0.719	-0.02	
Test position of Body with GPRS(4UP) (Distance 10mm)				
Towards phantom	middle	0.607	-0.12	
Towards Ground	middle	0.863	-0.04	
Front	middle	0.307	0.12	

Left side	middle	0.544	0.02	
Right side	middle	0.782	-0.12	
Towards Ground	low	1.06	-0.07	MAX
	high	0.926	-0.09	
Worst case position of Body with (Distance 10mm)				
Towards Ground	low	0.631	-0.09	earphone
Towards Ground	low	1.02	-0.03	repeat

Note: 1. The value with blue color is the maximum SAR Value of test case of head and body in each test band.

- Upper and lower frequencies were measured at the worst position.
- The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is lower than the SAR limit ($< 0.4\text{W/kg}$), testing at the high and low channels is optional.
- Per KDB 865664 d01v01, for each frequency band, repeated SAR measurement is required only when the measured SAR is $\geq 0.8\text{(W/kg)}$.

7.2.3.2 Summary of Measurement Results (PCS1900)

SAR Values (PCS1900)

Test Case		Measurement Result(W/kg)	Power Drift(dB)	Note
Different Test Position	Channel	1 g		
		Average		
Test position of Head with DTM mode				
Left head, Touch cheek	middle	0.130	-0.03	
Left head, Tilt 15 Degree	middle	0.0902	-0.06	
Right head, Touch cheek	middle	0.238	0.16	
Right head, Tilt 15 Degree	middle	0.0857	0.01	

Right head, Touch cheek	low	0.238	0.01	
	high	0.307	0.12	max
Test position of Head with DTM mode				
Left head, Touch cheek	middle	0.224	0.02	
Left head, Tilt 15 Degree	middle	0.135	0.05	
Right head, Touch cheek	middle	0.459	0.12	
Right head, Tilt 15 Degree	middle	0.143	0.06	
Right head, Touch cheek	low	0.380	0.09	
	high	0.493	0.15	max
Test position of Body with GPRS(4UP) (Distance 10mm)				
Towards phantom	middle	0.423	-0.07	
Towards Ground	middle	0.561	-0.12	
Front	middle	0.842	-0.15	
Left side	middle	0.152	0.08	
Right side	middle	0.358	0.05	
Front	low	0.734	0.15	
	high	0.958	0.12	max
Worst case position of Body with (Distance 10mm)				
Front	high	0.925	-0.09	earphone
Front	high	0.938	-0.07	repeat

Note: 1.The value with blue color is the maximum SAR Value of test case of head and body in each test band.

2. Upper and lower frequencies were measured at the worst position.

3. The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is lower than the SAR limit ($< 0.4\text{W/kg}$), testing at the high and low channels is optional.

4.Per KDB 865664 d01v01, for each frequency band ,repeated SAR measurement is required only when the measured SAR is $\geq 0.8(\text{W/kg})$.

7.2.3.3 Summary of Measurement Results (WCDMA BAND II)

SAR Values (WCDMA BANDII)

Test Case		Measurement Result(W/kg)	Power Drift(dB)	Note
Different Test Position	Channel	1 g		
		Average		
Test position of Head				
Left head, Touch cheek	middle	0.283	-0.12	
Left head, Tilt 15 Degree	middle	0.201	0.08	
Right head, Touch cheek	middle	0.498	0.17	
Right head, Tilt 15 Degree	middle	0.199	-0.01	
Right head, Touch cheek	low	0.559	0.14	
	high	0.661	0.13	MAX
Test position of Body (Distance 10mm)				
Towards phantom	middle	0.679	-0.11	
Towards Ground	middle	0.951	0.15	
Front	middle	0.975	0.02	
Left side	middle	0.263	0.16	
Right side	middle	0.237	0.13	
Towards Ground	low	0.973	0.14	
	high	1.07	0.01	
Front	low	1.04	0.10	
	high	1.05	0.07	
Worst case position of Body with (Distance 10mm)				
Towards Ground	high	1.13	0.09	Max earphone
Towards Ground	high	1.11	0.03	repeat

Note: 1.The value with blue color is the maximum SAR Value of test case of head and body in each test band.

2. Upper and lower frequencies were measured at the worst position.
3. The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is lower than the SAR limit ($< 0.4\text{W/kg}$), testing at the high and low channels is optional.
4. Per KDB 865664 d01v01, for each frequency band, repeated SAR measurement is required only when the measured SAR is $\geq 0.8\text{(W/kg)}$.

7.2.3.4 Summary of Measurement Results (WCDMA BAND V)

SAR Values (WCDMA BAND V)

Test Case		Measurement Result(W/kg)	Power Drift(dB)	Note
Different Test Position	Channel	1 g		
		Average		
Test position of Head				
Left head, Touch cheek	middle	0.298	-0.13	
Left head, Tilt 15 Degree	middle	0.191	-0.16	
Right head, Touch cheek	middle	0.166	-0.14	
Right head, Tilt 15 Degree	middle	0.192	0.04	
Left head, Touch cheek	low	0.296	0.07	
	high	0.337	0.07	MAX
Test position of Body (Distance 10mm)				
Towards phantom	middle	0.317	0.13	
Towards Ground	middle	0.384	0.02	
Front	middle	0.235	0.20	
Left side	middle	0.232	-0.08	
Right side	middle	0.212	0.10	

Towards Ground	low	0.46	-0.09	
	high	0.472	-0.13	max
Worst case position of Body with (Distance 10mm)				
Towards Ground	high	0.424	-0.17	earphone

Note: 1. The value with blue color is the maximum SAR Value of test case of head and body in each test band.

- Upper and lower frequencies were measured at the worst position.
- The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is lower than the SAR limit ($< 0.4\text{W/kg}$), testing at the high and low channels is optional.
- Per KDB 865664 d01v01, for each frequency band, repeated SAR measurement is required only when the measured SAR is $\geq 0.8\text{W/kg}$.

7.2.3.5 Summary of Measurement Results (LTE BAND 2)

SAR Values (LTE BAND 2)

Test Case			Measurement Result(W/kg)	Power Drift(dB)	Note
Different Test Position	Channel	10 g			
		Average			
Test position of Head					
QPSK_20M_1RB_low	Left head, Touch cheek	middle	0.161	0.12	
	Left head, Tilt 15 Degree	middle	0.101	-0.03	
	Right head, Touch cheek	middle	0.304	-0.12	
	Right head, Tilt 15 Degree	middle	0.100	-0.01	
	Right head, Touch cheek	low	0.259	-0.12	
		high	0.456	0.13	MAX
QPSK_20M_1RB_mid	Right head, Touch cheek	high	0.330	0.09	
QPSK_20M_1RB_high	Right head, Touch cheek	high	0.376	0.12	

Worst case position of Body with (Distance 10mm)					
QPSK_20M_1RB_ low	Towards phantom	middle	0.500	-0.15	
	Towards Ground	middle	0.351	0.12	
	front	middle	0.524	0.10	
	left side	middle	0.0728	-0.02	
	right side	middle	0.175	0.04	
	front	low	0.462	0.09	
		high	0.764	0.10	
QPSK_20M_1RB_ mid	front	high	0.584	0.02	
QPSK_20M_1RB_ high	front	high	0.578	0.02	
Worst case position of Body with (Distance 10mm)					
QPSK_20M_1RB_ low	front	high	0.827	-0.09	maxearphone
QPSK_20M_1RB_ low	front	high	0.809	0.03	repeat

Note: 1. The value with blue color is the maximum SAR Value of test case of head and body in each test band.

- Upper and lower frequencies were measured at the worst position.
- The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit ($< 1.0\text{W/kg}$), testing at the high and low channels is optional.
- 16QAM SAR for body was not required since the average output power of the 16QAM was not more than 0.25dB higher than the QPSK level and the maximum SAR for QPSK_20M_1RB was less than 75% SAR limit

7.2.3.6 Summary of Measurement Results (LTE BAND4)

SAR Values (LTE BAND 4)

Test Case			Measurement Result(W/kg)	Power Drift(dB)	Note
Different Test Position	Channel	10 g			
		Average			
Test position of Head					
QPSK_20M_1RB_low	Left head, Touch cheek	middle	0.238	-0.12	
	Left head, Tilt 15 Degree	middle	0.0779	0.17	
	Right head, Touch cheek	middle	0.268	0.07	MAX
	Right head, Tilt 15 Degree	middle	0.0795	-0.07	
	Right head, Touch cheek	low	0.162	0.07	
		high	0.250	0.03	
QPSK_20M_1RB_mid	Right head, Touch cheek	middle	0.212	0.15	
QPSK_20M_1RB_high	Right head, Touch cheek	middle	0.165	-0.01	
Worst case position of Body with (Distance 10mm)					
QPSK_20M_1RB_low	Towards phantom	middle	0.428	0.05	
	Towards Ground	middle	0.516	0.14	
	front	middle	0.427	0.00	
	left side	middle	0.187	0.02	
	right side	middle	0.125	0.02	
	Towards Ground	low	0.333	-0.03	
		high	0.489	-0.09	
QPSK_20M_1RB_mid	Towards Ground	middle	0.526	0.12	
QPSK_20M_1RB_high	Towards Ground	middle	0.381	-0.08	
Worst case position of Body with (Distance 10mm)					
QPSK_20M_1RB_mid	Towards Ground	middle	0.563	-0.09	Max earphone

Note: 1.The value with blue color is the maximum SAR Value of test case of head and body in each test band.

2. Upper and lower frequencies were measured at the worst position.
3. The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit ($< 1.0\text{W/kg}$), testing at the high and low channels is optional.
4. 16QAM SAR for body was not required since the average output power of the 16QAM was not more than 0.25dB higher than the QPSK level and the maximum SAR for QPSK_20M_1RB was less than 75% SAR limit

7.2.3.7 Summary of Measurement Results (LTE BAND 7)

SAR Values (LTE BAND 7)

Test Case			Measurement Result(W/kg)	Power Drift(dB)	Note
Different Test Position	Channel	10 g			
		Average			
Test position of Head					
QPSK_20M_1RB_low	Left head, Touch cheek	middle	0.030	0.05	
	Left head, Tilt 15 Degree	middle	0.019	0.02	
	Right head, Touch cheek	middle	0.056	0.12	
	Right head, Tilt 15 Degree	middle	0.018	0.06	
	Right head, Touch cheek	low	0.084	-0.15	max
		high	0.048	0.11	
QPSK_20M_1RB_mid	Right head, Touch cheek	middle	0.061	0.05	
QPSK_20M_1RB_high	Right head, Touch cheek	middle	0.069	0.04	
Worst case position of Body with (Distance 10mm)					
QPSK_20M_1RB_low	Towards phantom	middle	0.232	-0.02	
	Towards Ground	middle	0.54	0.02	

	front	middle	0.325	0.09	
	left side	middle	0.133	0.05	
	right side	middle	0.0786	0.09	
	Towards Ground	low	0.567	0.11	
		high	0.524	-0.08	
QPSK_20M_1RB_mid	Towards Ground	low	0.54	-0.09	
QPSK_20M_1RB_high	Towards Ground	low	0.630	-0.08	MAX
Worst case position of Body with (Distance 10mm)					
QPSK_20M_1RB_high	Towards Ground	low	0.611	-0.12	earphone

Note: 1. The value with blue color is the maximum SAR Value of test case of head and body in each test band.

2. Upper and lower frequencies were measured at the worst position.

3. The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit ($< 1.0\text{W/kg}$), testing at the high and low channels is optional.

4. 16QAM SAR for body was not required since the average output power of the 16QAM was not more than 0.25dB higher than the QPSK level and the maximum SAR for QPSK_20M_1RB was less than 75% SAR limit

7.2.3.8 Summary of Measurement Results (802.11b/g/n)

SAR Values (802.11b/g/n)

Test Case		Measurement Result(W/kg)	Power Drift(dB)	Note
Different Test Position	Channel	1 g		
		Average		
Test position of Head				
Left head, Touch cheek	middle	0.149	0.03	
Left head, Tilt 15 Degree	middle	0.0965	0.11	
Right head, Touch cheek	middle	0.051	0.16	

Right head, Tilt 15 Degree	middle	0.0436	0.13	
Left head, Touch cheek	low	0.108	0.12	
	high	0.263	-0.09	max
Test position of Body (Distance 10mm)				
Towards phantom	middle	0.023	0.01	
Towards Ground	middle	0.048	-0.14	
Back	middle	0.0196	0.18	
Left side	middle	0.00435	0.06	
right side	middle	0.047	0.16	
Towards Ground	low	0.0328	-0.03	
	high	0.058	-0.06	max

Note: 1.The value with blue color is the maximum SAR Value of test case of head and body in each test band.

- Upper and lower frequencies were measured at the worst position.
- The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is lower than the SAR limit ($< 0.4\text{W/kg}$), testing at the high and low channels is optional.
- Per KDB 865664 d01v01, for each frequency band ,repeated SAR measurement is required only when the measured SAR is $\geq 0.8\text{(W/kg)}$.

7.2.4 Measurement Results for Spot check of double card version

Test Case				Measurement Result (W/kg)	Power Drift (dB)
band	Different Test Position		Ch	1g Average	
GSM 850	head	Right head, Touch cheek with voice	low	0.475	0.14
		Right head, Touch cheek with voice card2	low	0.443	-0.14
		Right head, Touch cheek with DTM	low	0.476	0.08
		Right head, Touch cheek with DTM card2	low	0.492	-0.03
	body	Towards Ground with GPRS(4up)	low	0.405	-0.18
		Towards Ground with GPRS(4up) card 2	low	0.445	-0.09
GSM 1900	head	Right head, Touch cheek with voice	high	0.173	-0.04
		Right head, Touch cheek with voice card2	high	0.193	-0.11
		Right head, Touch cheek with DTM	high	0.318	-0.19
		Right head, Touch cheek with DTM card2	high	0.302	0.01
	body	Front with GPRS(4up)	high	0.820	-0.12
		Front with GPRS(4up) card2	high	0.723	-0.13
WCDMA BAND II	head	Right head, Touch cheek	high	0.351	-0.09
	body	Towards Ground	high	0.791	-0.08

WCDMA BAND V	head	Left head, Touch cheek	high	0.349	-0.06
	body	Towards Ground	high	0.516	-0.05
LTE BAND 2	head	QPSK_20M_1RB_lo w Right head, Touch cheek	high	0.295	0.11
	body	QPSK_20M_1RB_lo w front with earphone	high	0.805	-0.05
LTE BAND 4	head	QPSK_20M_1RB_lo w Right head, Touch cheek	middle	0.280	-0.02
	body	QPSK_20M_1RB_mi d Towards Ground with earphone	middle	0.533	-0.06
LTE BAND 7	head	QPSK_20M_1RB_lo w Right head, Touch cheek	low	0.139	0.07
	body	QPSK_20M_1RB_hig h Towards Ground	low	0.426	-0.09

7.2.5 Measurement Results for Spot check of single card version

Test Case				Measurement Result (W/kg)	Power Drift (dB)
band	Different Test Position		Ch	1g Average	
GSM 850	head	Right head, Touch cheek with voice	low	0.398	-0.12
		Right head, Touch cheek with DTM	low	0.582	-0.18
	body	Towards Ground with GPRS(4up)	low	0.718	0.15
GSM 1900	head	Right head, Touch cheek with voice	high	0.347	-0.19
		Right head, Touch cheek with DTM	high	0.522	-0.19

	body	Front with GPRS(4up)	high	0.946	-0.02
WCDMA BAND II	head	Right head, Touch cheek	high	0.745	-0.01
	body	Towards Ground	high	0.829	-0.03
WCDMA BAND V	head	Left head, Touch cheek	high	0.314	-0.09
	body	Towards Ground	high	0.451	-0.17
LTE BAND 2	head	QPSK_20M_1RB_lo w Right head, Touch cheek	high	0.491	-0.06
	body	QPSK_20M_1RB_lo w front with earphone	high	0.623	0.07
LTE BAND 4	head	QPSK_20M_1RB_lo w Right head, Touch cheek	middle	0.295	-0.19
	body	QPSK_20M_1RB_mi d Towards Ground with earphone	middle	0.489	-0.05
LTE BAND 7	head	QPSK_20M_1RB_lo w Right head, Touch cheek	low	0.155	0.09
	body	QPSK_20M_1RB_hig h Towards Ground	low	0.508	-0.05

7.2.6 Maximum SAR

Maximum SAR of each band is chosen the maximum SAR of three versions for evaluation..

Test Case				Measureme nt Result (W/kg)	conducte d power (dBm)	maximu m power (dBm)	Maximum reported 1g SAR (W/kg)	Limit 1g SAR (W/kg)
band	Different Test Position		Ch	1g Average				
GSM 850	head	Right head, Touch cheek with voice	low	0.475	32.8	33	0.497	1.6
		Right head, Touch cheek with DTM	low	0.899	32.4		1.032	1.6
	body	Towards Ground with GPRS(4up)	low	1.06	32.8		1.11	1.6
GSM 1900	head	Right head, Touch cheek with voice	high	0.347	29.6	30	0.380	1.6
		Right head, Touch cheek with DTM	high	0.522	28.3		0.772	1.6
	body	Front with GPRS(4up)	high	0.958	29.6		1.05	1.6
WCDMA BAND II	head	Right head, Touch cheek	high	0.745	23.1	24	0.917	1.6
	body	Towards Ground	high	1.13	23.1		1.390	1.6
WCDMA BAND V	head	Left head, Touch cheek	high	0.349	22.8	24.5	0.516	1.6
	body	Towards Ground	high	0.516	22.8		0.763	1.6
LTE BAND 2	head	QPSK_20M_1RB_lo w Right head, Touch cheek	high	0.491	23.2	24	0.590	1.6
	body	QPSK_20M_1RB_lo w front with earphone	high	0.827	23.2		0.994	1.6
LTE BAND 4	head	QPSK_20M_1RB_lo w Right head, Touch cheek	middl e	0.295	22.7	24	0.398	1.6
	body	QPSK_20M_1RB_mi d Towards Ground with earphone	middl e	0.563	22.4		0.814	1.6

LTE BAND 7	head	QPSK_20M_1RB_low Right head, Touch cheek	low	0.155	21.26	23	0.231	1.6
	body	QPSK_20M_1RB_high Towards Ground	low	0.630	21.3		0.932	1.6
Wi-Fi	head	Left head, Touch cheek	high	0.263	12.93	14.5	0.378	1.6
	body	Towards Ground	high	0.058	12.93		0.083	1.6

Evaluation for Simultaneous SAR

Summation BAND	Exposure Position	Maximum reported 1g SAR (W/kg)	Summation SAR(1g) (W/kg)	SAR -to-peak-location Separation Ratio	Simultaneous Measurement Required?
WWAN +WiFi	Head	1.032+0.378=1.410	<1.6	/	No
	Body-worn(10mm)	1.390+0.083=1.473	<1.6	/	No
WWAN+BT	Head	1.032+0.263=1.295	<1.6	/	No
	Body-worn(10mm)	1.390+0.132=1.522	<1.6	/	No

General Judgment: PASS

8. Test Equipments Utilized

No.	Name	Type	S/N	Calibration Date	Valid Period
01	Network analyzer	Agilent E5071E	MY46109425	Oct 30 th , 2014	One year
02	Dielectric Probe Kit	Agilent 85070E	MY44300524	No Calibration Requested	
03	Power meter	Agilent E4418B	MY50000852	Oct 30 th , 2014	One year
04	Power sensor	Agilent E9200B	MY50300011	Oct 30 th , 2014	One year
05	Signal Generator	Agilent N5182A	MY49071248	Oct 30 th , 2014	One year
06	Amplifier	ZHL-42W	QA1020005	No Calibration Requested	
07	BTS	CMU200	121464	Oct 30 th , 2014	One year
08	BTS	MT8820C	6201107310	May 23 th , 2014	One year
09	E-field Probe	ES3DV3	3241	Sep 29 th , 2014	One year
10	E-field Probe	EX3DV4	3717	Sep 02 th , 2014	One year
11	DAE	DAE4	1226	Sep 15 th , 2014	One year
12	DAE	DAE4	1327	Apr 21 th , 2015	One year
13	DAE	DAE4	905	July 14 th , 2014	One year
14	Validation Kit 835MHz	D835V2	4d100	Sep 23 th , 2014	One year
15	Validation Kit 1900MHz	D1900V2	5d155	Apr 21 th , 2015	One year
16	Validation Kit 2450MHz	D2450V2	845	Sep 17 th , 2014	One year
17	Validation Kit 1750MHz	D1750V2	1034	Sep 19 th , 2014	One year
18	Validation Kit 2600MHz	D2600V2	1059	Apr 27 th , 2015	One year

9. Measurement Uncertainty

No	Source of Uncertainty	Type	Uncertainty value ± %	Probability Distribution	Div.	c_i (1 g)	c_i (10 g)	Standard Unc ± %, (1 g)	Standard Unc ± %, (10 g)	v_i or v_{eff}
1	System repetivity	A	2.7	N	1	1	1	2.7	2.7	9
<i>Measurement System</i>										
2	Probe Calibration	B	5.9	N	1	1	1	5.9	5.9	∞
3	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
4	Boundary Effect	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
5	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
6	Detection Limits	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
7	Readout Electronics	B	0.3	N	1	1	1	0.3	0.3	∞
8	Response Time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
9	Integration Time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
10	RF ambient conditions – noise	B	0	R	$\sqrt{3}$	1	1	0	0	∞
11	RF ambient conditions – reflections	B	0	R	$\sqrt{3}$	1	1	0	0	∞
12	Probe Positioner Mech. Restrictions	B	0.4	R	$\sqrt{3}$	1	1	0.2	0.2	∞
13	Probe Positioning with respect to Phantom Shell	B	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
14	Post-Processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
<i>Test Sample Related</i>										

15	Test Sample Positioning	A	3.3	N	1	1	1	3.3	3.3	71
16	Device Holder Uncertainty	A	4.1	N	1	1	1	4.1	4.1	5
17	Drift of Output Power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
<i>Phantom and Set-up</i>										
18	Phantom Uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
19	Liquid Conductivity (target.)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
20	Liquid Conductivity (meas.)	A	2.06	N	1	0,64	0,43	1.7	1.4	43
21	Liquid Permittivity (target.)	B	5.0	R	$\sqrt{3}$	0,6	0,49	1.7	1.4	∞
22	Liquid Permittivity (meas.)	A	1.6	N	1	0,6	0,49	1.0	0.8	521
Combined standard uncertainty		$u_c = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$						10.54	10.34	
Expanded uncertainty (95 % confidence interval)		k=2						21.08	20.68	

ANNEX A: Detailed Test Results

Annex A.1 System Check Results

System check 835 head

Date/Time: 14/05/2015 08:13:38

Communication System: UID 10000, CW; Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz; Communication System PAR: 0 dB

Medium parameters used (interpolated): $f = 835$ MHz; $\sigma = 0.883$ S/m; $\epsilon_r = 41.223$; $\rho = 1000$ kg/m³

Measurement Standard: DASYS (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(6.41, 6.41, 6.41); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: SAM1; Type: SAM; Serial: TP1576
- Measurement SW: DASYS2, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

835head/d=15mm, Pin=250 mW/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 3.16 W/kg

835head/d=15mm, Pin=250 mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

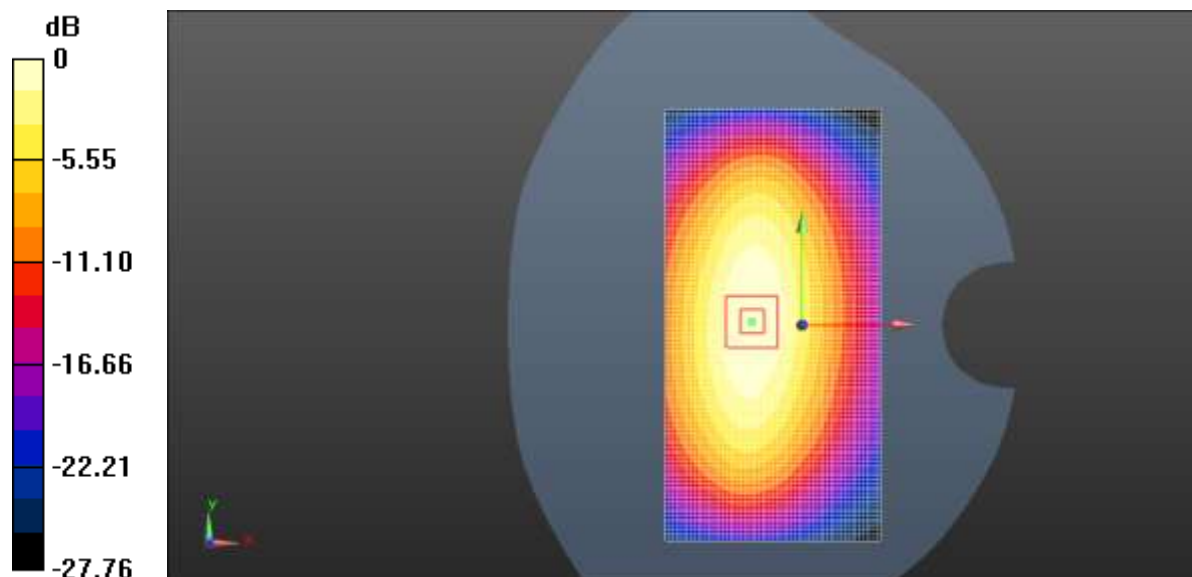
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56.676 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 4.17 W/kg

SAR(1 g) = 2.42 W/kg; SAR(10 g) = 1.61 W/kg

Maximum value of SAR (measured) = 3.21 W/kg



0 dB = 3.16 W/kg = 5.00 dBW/kg

System check 835 head

Date/Time: 04/06/2015 09:10:58

Communication System: UID 10000, CW; Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz; Communication System PAR: 0 dB

Medium parameters used (interpolated): $f = 835$ MHz; $\sigma = 0.892$ S/m; $\epsilon_r = 41.642$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(9.08, 9.08, 9.08); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM1; Type: SAM; Serial: TP1576
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

835head/d=15mm, Pin=250 mW/Area Scan (61x121x1): Interpolated grid:

dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 2.64 W/kg

835head/d=15mm, Pin=250 mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

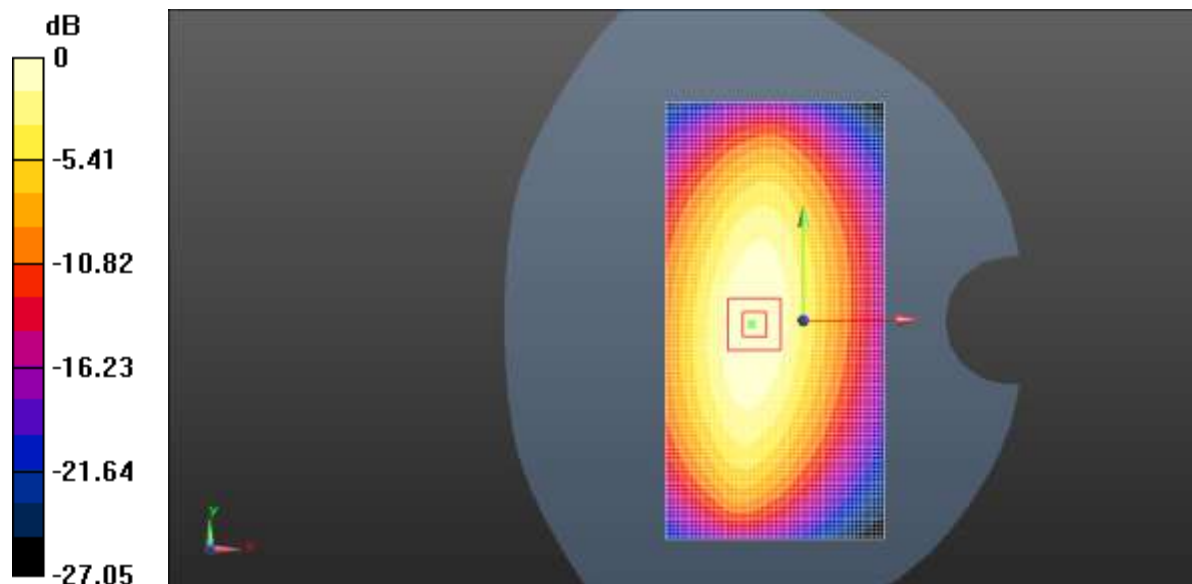
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.873 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 3.43 W/kg

SAR(1 g) = 2.34 W/kg; SAR(10 g) = 1.52 W/kg

Maximum value of SAR (measured) = 2.64 W/kg



0 dB = 2.64 W/kg = 4.22 dBW/kg

System check 835body

Date/Time: 04/05/2015 08:48:00

Communication System: UID 10000, CW; Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 835$ MHz; $\sigma = 0.948$ S/m; $\epsilon_r = 54.625$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(6.37, 6.37, 6.37); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: ELI v4.0; Type: ELI4; Serial: TP:1086
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

835body/d=15mm, Pin=250 mW/Area Scan (61x121x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 2.39 W/kg

835body/d=15mm, Pin=250 mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

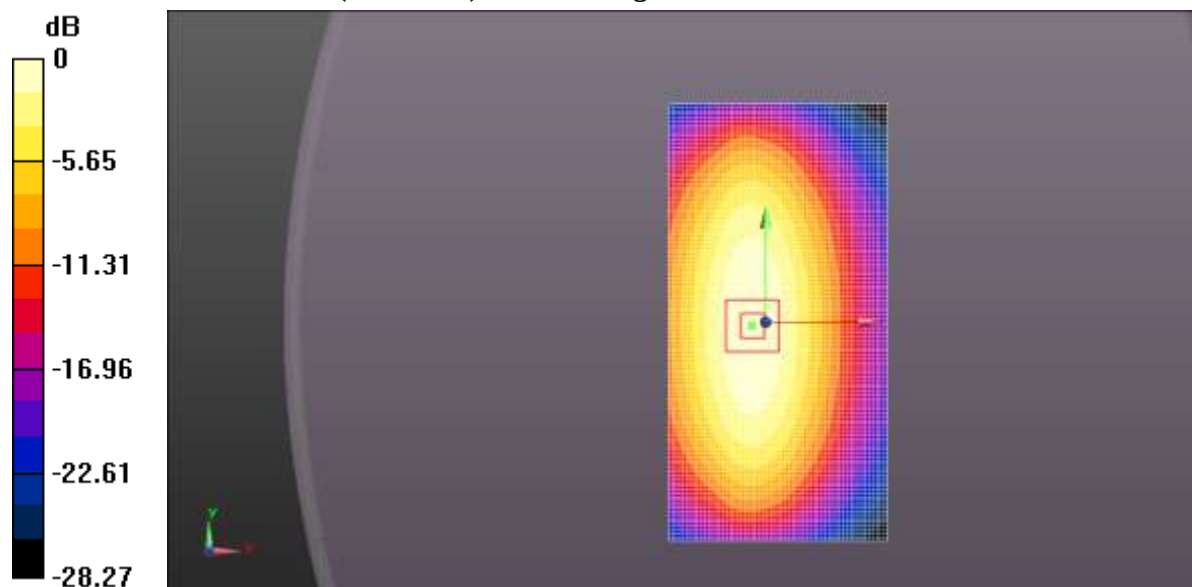
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 51.344 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 3.19 W/kg

SAR(1 g) = 2.36 W/kg; SAR(10 g) = 1.56 W/kg

Maximum value of SAR (measured) = 2.38 W/kg



0 dB = 2.39 W/kg = 3.78 dBW/kg

System check 835body

Date/Time: 05/05/2015 09:23:13

Communication System: UID 10000, CW; Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 835$ MHz; $\sigma = 0.935$ S/m; $\epsilon_r = 54.145$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(6.37, 6.37, 6.37); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: ELI v4.0; Type: ELI4; Serial: TP:1086
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

835body/d=15mm, Pin=250 mW/Area Scan (61x121x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 2.78 W/kg

835body/d=15mm, Pin=250 mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

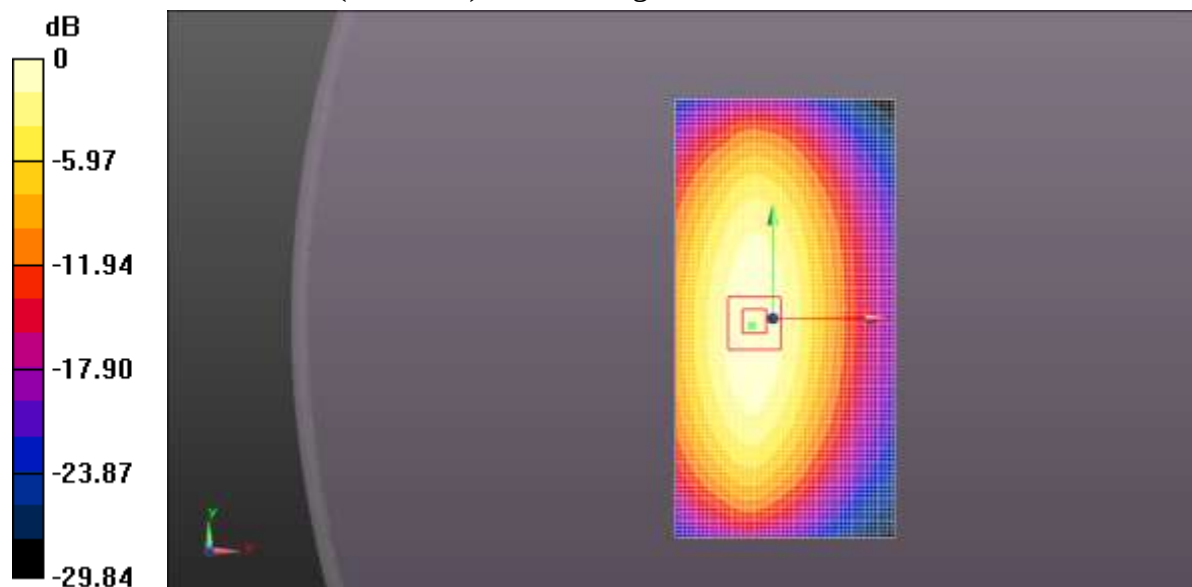
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 50.978 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.46 W/kg

SAR(1 g) = 2.32 W/kg; SAR(10 g) = 1.52 W/kg

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



0 dB = 2.78 W/kg = 4.43 dBW/kg

System check 1750 head

Date/Time: 08/05/2015 09:35:08

Communication System: UID 10000, CW; Communication System Band: D1750 (1750.0 MHz); Frequency: 1750 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.39$ S/m; $\epsilon_r = 39.584$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.98, 7.98, 7.98); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM2; Type: SAM; Serial: TP-1575
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

1750 head/d=10mm, Pin=250 mW/Area Scan (41x61x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 11.3 W/kg

1750 head/d=10mm, Pin=250 mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

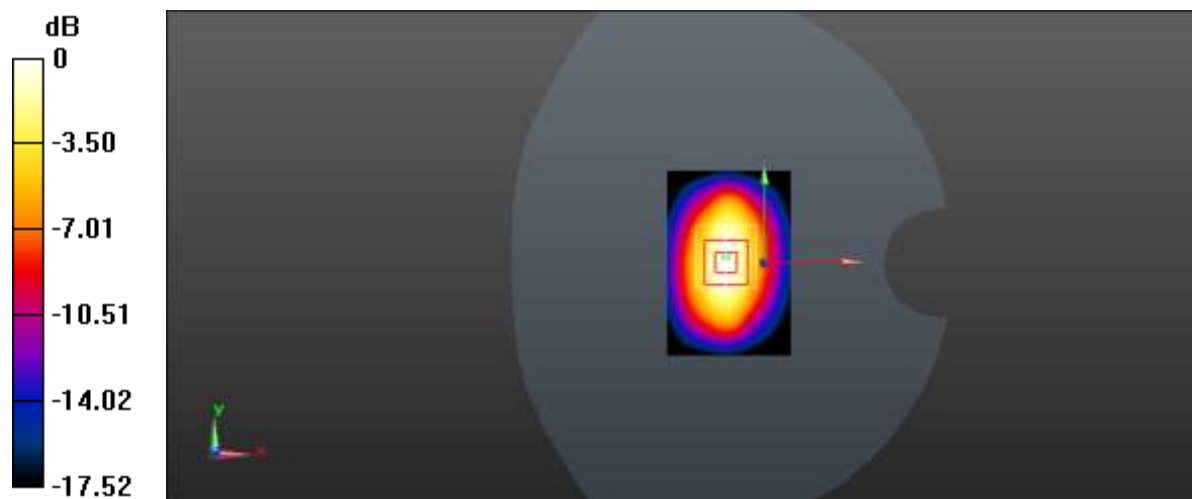
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.144 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 15.9 W/kg

SAR(1 g) = 9.12 W/kg; SAR(10 g) = 4.82 W/kg

Maximum value of SAR (measured) = 11.3 W/kg



0 dB = 11.3 W/kg = 10.53 dBW/kg

System check 1750body

Date/Time: 11/05/2015 09:21:41

Communication System: UID 10000, CW; Communication System Band: D1750 (17500.0 MHz); Frequency: 1750 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.503$ S/m; $\epsilon_r = 52.348$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(5.01, 5.01, 5.01); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

1750 body/d=10mm, Pin=250 mW/Area Scan (41x61x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 11.5 W/kg

1750 body/d=10mm, Pin=250 mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

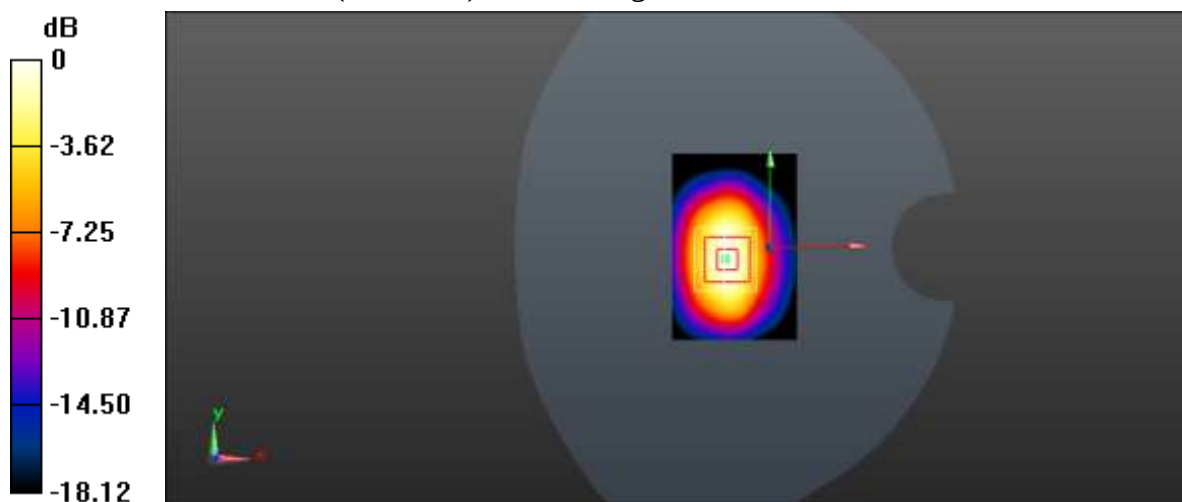
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 57.887 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 18.1 W/kg

SAR(1 g) = 9.42 W/kg; SAR(10 g) = 4.87 W/kg

Maximum value of SAR (measured) = 10.7 W/kg



0 dB = 10.7 W/kg = 10.29 dBW/kg

System check 1900 head

Date/Time: 26/04/2015 08:03:19

Communication System: UID 10000, CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.381$ S/m; $\epsilon_r = 39.648$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.74, 7.74, 7.74); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 14/07/2014
- Phantom: SAM2; Type: SAM; Serial: TP-1575
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

1900head/d=10mm, Pin=250 mW/Area Scan (41x61x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 11.2 W/kg

1900head/d=10mm, Pin=250 mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

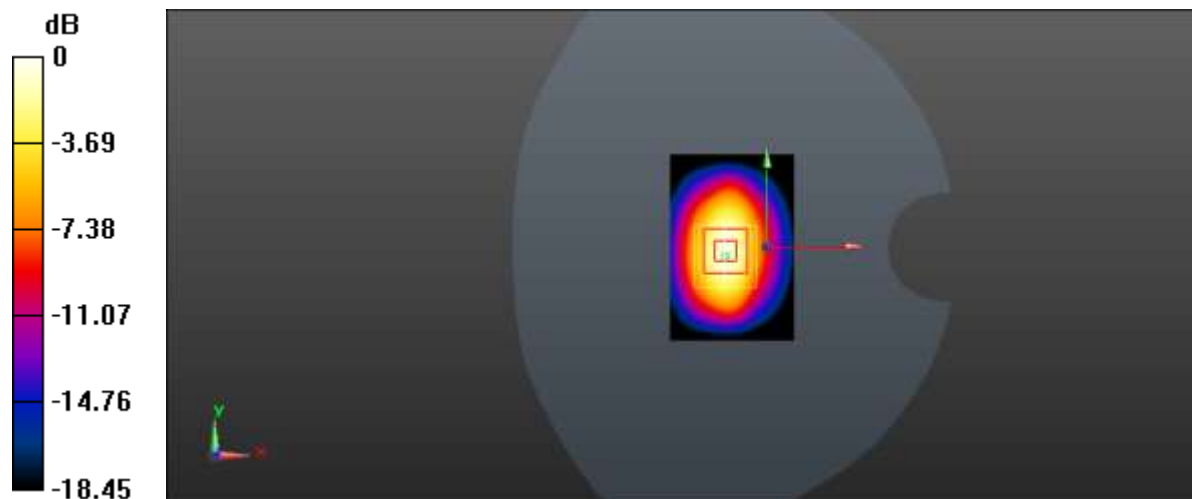
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.797 V/m; Power Drift = 0.33 dB

Peak SAR (extrapolated) = 18.8 W/kg

SAR(1 g) = 9.75 W/kg; SAR(10 g) = 5.12 W/kg

Maximum value of SAR (measured) = 10.3 W/kg



0 dB = 11.2 W/kg = 10.49 dBW/kg

System check 1900head

Date/Time: 13/05/2015 06:08:27

Communication System: UID 10000, CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.383$ S/m; $\epsilon_r = 39.358$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(5.12, 5.12, 5.12); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: SAM2; Type: SAM; Serial: TP-1575
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

1900head/d=10mm, Pin=250 mW/Area Scan (41x61x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 12.0 W/kg

1900head/d=10mm, Pin=250 mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

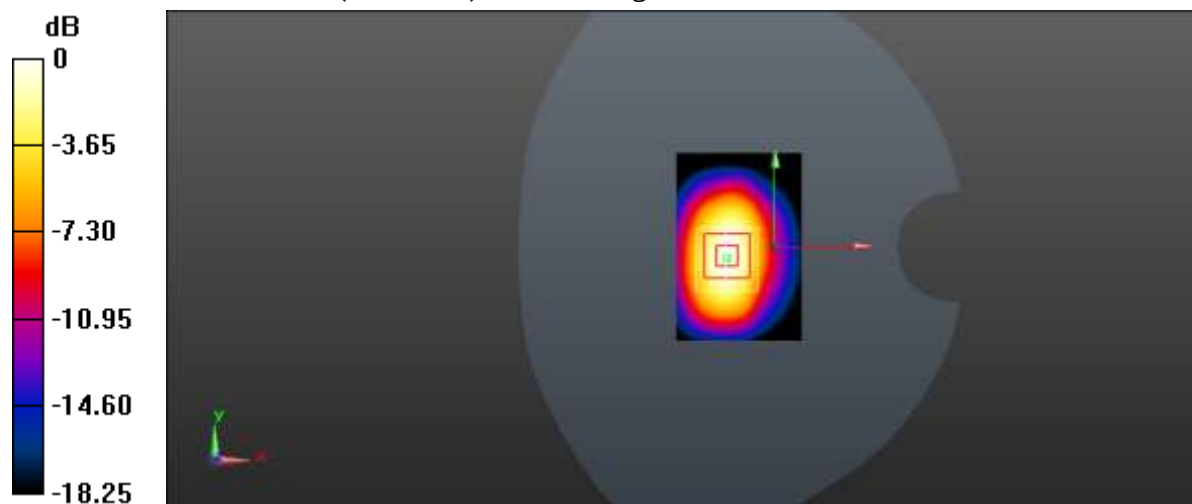
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 57.925 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 19.1 W/kg

SAR(1 g) = 9.82 W/kg; SAR(10 g) = 5.16 W/kg

Maximum value of SAR (measured) = 11.3 W/kg



0 dB = 12.0 W/kg = 10.79 dBW/kg

System check 1900 head

Date/Time: 04/06/2015 08:08:27

Communication System: UID 10000, CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.383$ S/m; $\epsilon_r = 39.488$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(5.12, 5.12, 5.12); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

1900head/d=10mm, Pin=250 mW/Area Scan (41x61x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 12.0 W/kg

1900head/d=10mm, Pin=250 mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

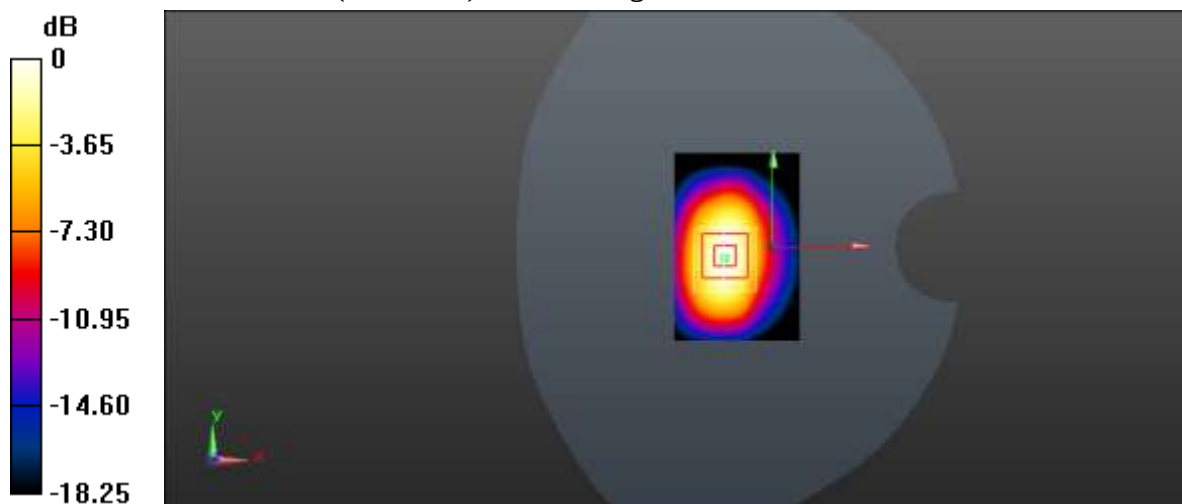
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 57.925 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 19.1 W/kg

SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.19 W/kg

Maximum value of SAR (measured) = 11.3 W/kg



0 dB = 11.3 W/kg = 10.53 dBW/kg

System check 1900body

Date/Time: 06/05/2015 03:37:35

Communication System: UID 0, CW (0); Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.492$ S/m; $\epsilon_r = 52.367$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.85, 4.85, 4.85); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: ELI v4.0; Type: ELI4; Serial: TP:1086
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

1900body/d=10mm, Pin=250 mW/Area Scan (61x71x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm

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

1900body/d=10mm, Pin=250 mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

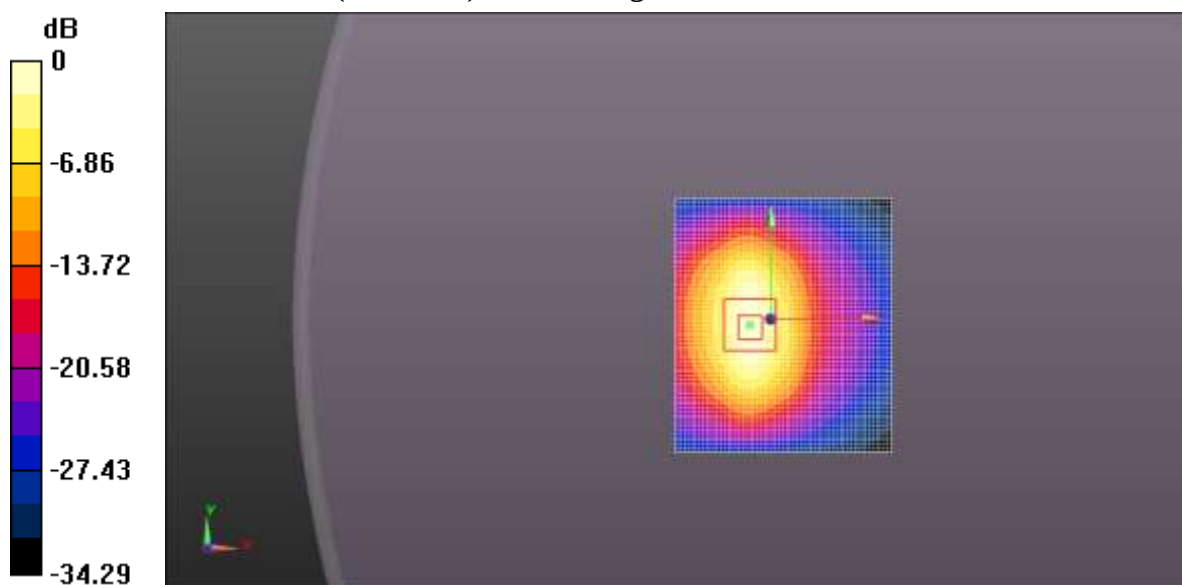
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 70.500 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 16.0 W/kg

SAR(1 g) = 9.74 W/kg; SAR(10 g) = 5.08 W/kg

Maximum value of SAR (measured) = 11.7 W/kg



0 dB = 12.6 W/kg = 11.01 dBW/kg

System check 1900body

Date/Time: 07/05/2015 09:08:41

Communication System: UID 0, CW (0); Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.503$ S/m; $\epsilon_r = 52.564$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.85, 4.85, 4.85); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: ELI v4.0; Type: ELI4; Serial: TP:1086
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

1900body/d=10mm, Pin=250 mW/Area Scan (61x71x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 12.8 W/kg

1900body/d=10mm, Pin=250 mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

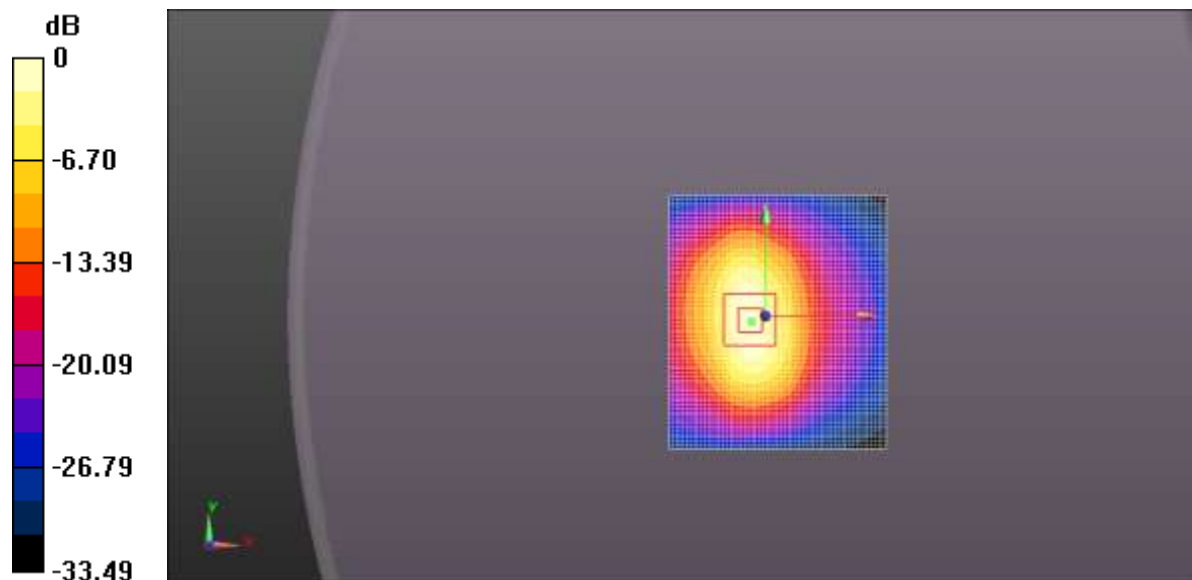
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 80.747 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 16.3 W/kg

SAR(1 g) = 9.86 W/kg; SAR(10 g) = 5.11 W/kg

Maximum value of SAR (measured) = 11.8 W/kg



0 dB = 12.8 W/kg = 11.06 dBW/kg

System check 2450head

Date/Time: 28/04/2015 09:34:20

Communication System: UID 0, CW (0); Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.785$ S/m; $\epsilon_r = 38.592$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.24, 7.24, 7.24); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 14/07/2014
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

2450head/d=10mm, Pin=250 mW/Area Scan (41x61x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 17.7 W/kg

2450head/d=10mm, Pin=250 mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

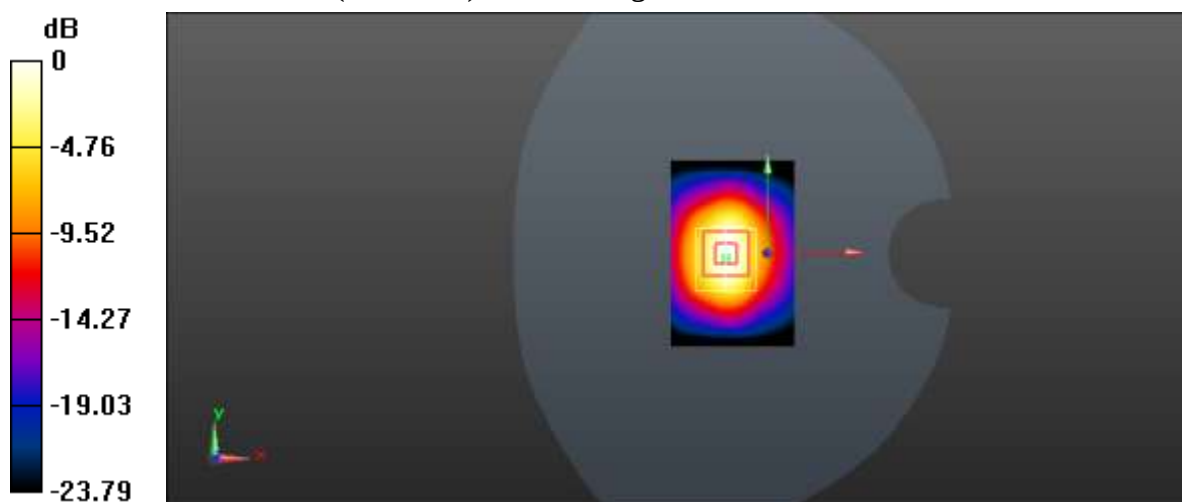
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.244 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 28.1 W/kg

SAR(1 g) = 13.2 W/kg; SAR(10 g) = 6.12W/kg

Maximum value of SAR (measured) = 17.0 W/kg



0 dB = 17.0 W/kg = 12.30 dBW/kg

System check 2450body

Date/Time: 08/05/2015 02:20:12

Communication System: UID 10000, CW; Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.931$ S/m; $\epsilon_r = 51.932$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.46, 4.46, 4.46); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

2450body/d=10mm, Pin=250 mW/Area Scan (41x61x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 17.6 W/kg

2450body/d=10mm, Pin=250 mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

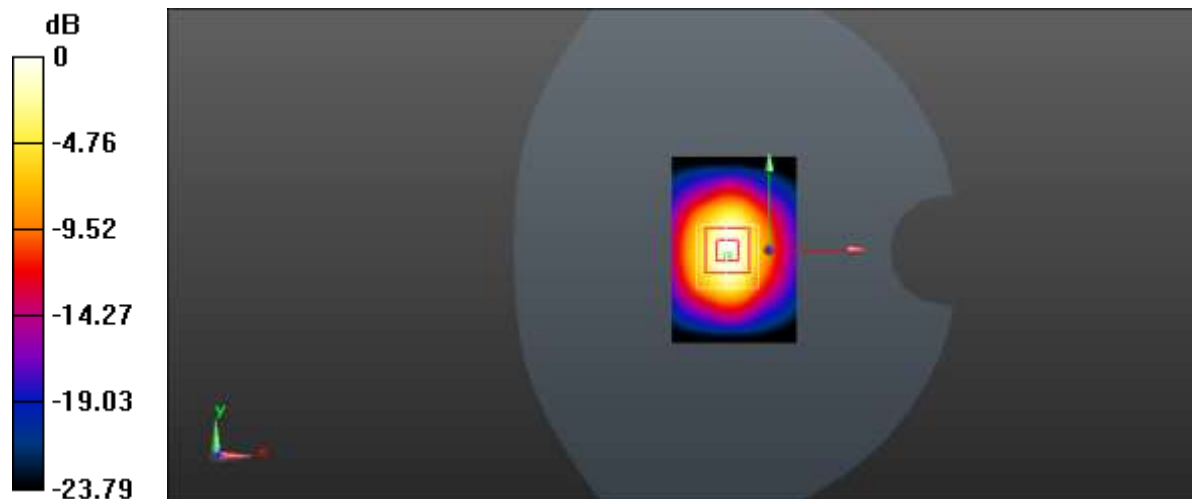
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 71.463 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 26.2 W/kg

SAR(1 g) = 12.8 W/kg; SAR(10 g) = 5.86 W/kg

Maximum value of SAR (measured) = 16.8 W/kg



0 dB = 17.6 W/kg = 12.46 dBW/kg

System check 2600head

Date/Time: 18/05/2015 08:26:17

Communication System: UID 0, CW; Communication System Band: D2600 (2600.0 MHz);

Frequency: 2600 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2600$ MHz; $\sigma = 1.981$ S/m; $\epsilon_r = 38.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.01, 7.01, 7.01); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

2600head/d=10mm, Pin=250 mW/Area Scan (61x101x1): Interpolated grid:
dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 18.8 W/kg

2600head/d=10mm, Pin=250 mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

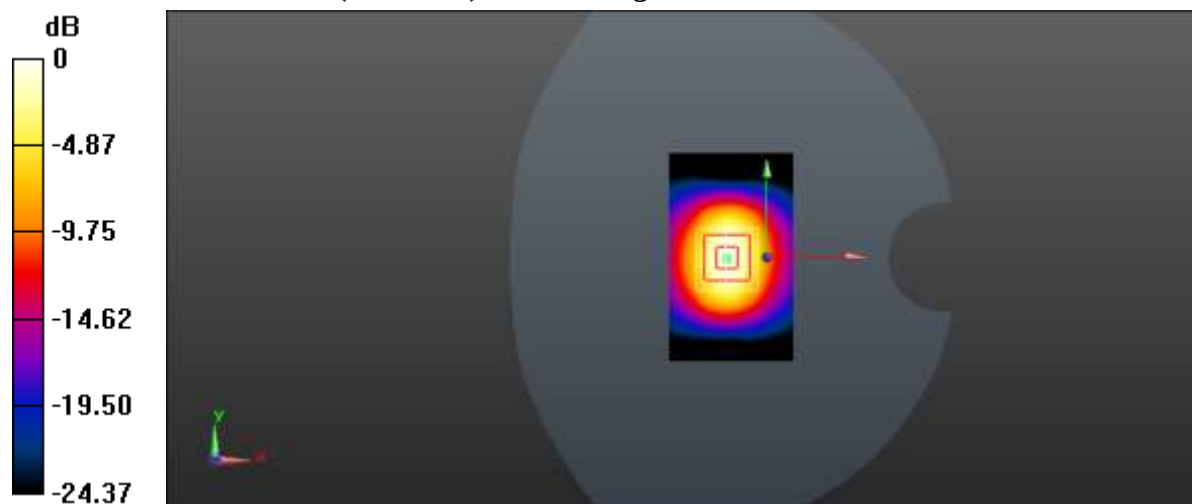
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.316 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 36.2 W/kg

SAR(1 g) = 14.9 kg; SAR(10 g) = 6.68 W/kg

Maximum value of SAR (measured) = 18.4 W/kg



0 dB = 18.8 W/kg = 12.74 dBW/kg

System check 2600body

Date/Time: 08/05/2015 17:20:12

Communication System: UID 10000, CW; Communication System Band: D2600 (2600.0 MHz); Frequency: 2600 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2600$ MHz; $\sigma = 2.132$ S/m; $\epsilon_r = 51.962$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(6.99, 6.99, 6.99); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASYS2, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

2600body/d=10mm, Pin=250 mW/Area Scan (41x61x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 17.6 W/kg

2600body/d=10mm, Pin=250 mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

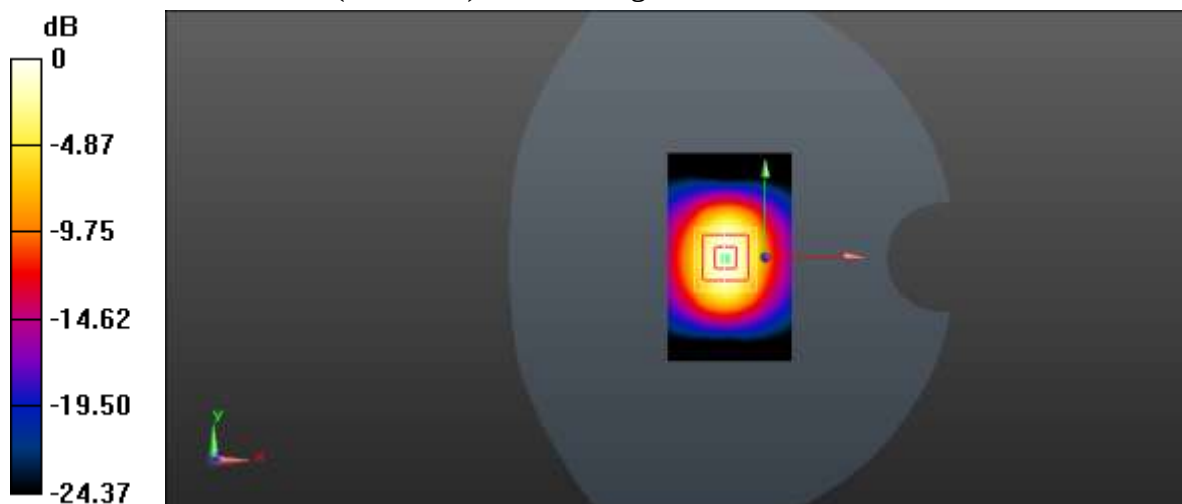
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 71.463 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 26.2 W/kg

SAR(1 g) = 13.9 W/kg; SAR(10 g) = 6.33 W/kg

Maximum value of SAR (measured) = 16.8 W/kg



0 dB = 17.6 W/kg = 12.46 dBW/kg

System check for spot check

System check 835 head

Date/Time: 19/05/2015 08:10:58

Communication System: UID 10000, CW; Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz; Communication System PAR: 0 dB

Medium parameters used (interpolated): $f = 835$ MHz; $\sigma = 0.892$ S/m; $\epsilon_r = 41.232$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(9.08, 9.08, 9.08); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM1; Type: SAM; Serial: TP1576
- Measurement SW: DASYS2, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

835head/d=15mm, Pin=250 mW/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 2.64 W/kg

835head/d=15mm, Pin=250 mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

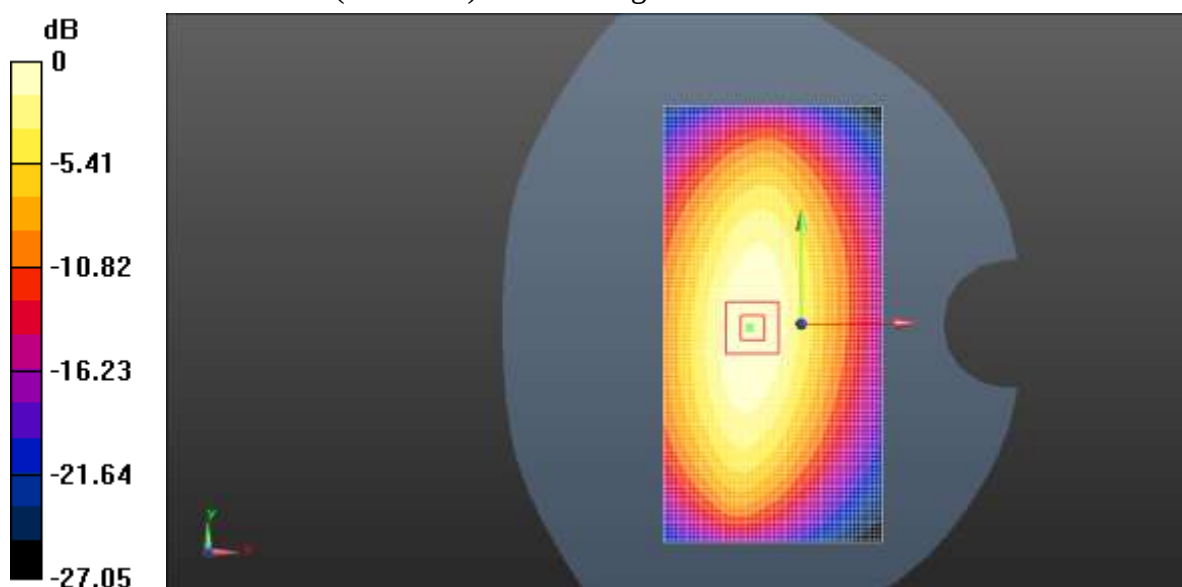
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.873 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 3.43 W/kg

SAR(1 g) = 2.37 W/kg; SAR(10 g) = 1.54 W/kg

Maximum value of SAR (measured) = 2.64 W/kg



0 dB = 2.64 W/kg = 4.22 dBW/kg

System check 835body

Date/Time: 26/05/2015 07:38:00

Communication System: UID 10000, CW; Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 835$ MHz; $\sigma = 0.948$ S/m; $\epsilon_r = 54.025$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(6.37, 6.37, 6.37); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: ELI v4.0; Type: ELI4; Serial: TP:1086
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

835body/d=15mm, Pin=250 mW/Area Scan (61x121x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 2.39 W/kg

835body/d=15mm, Pin=250 mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

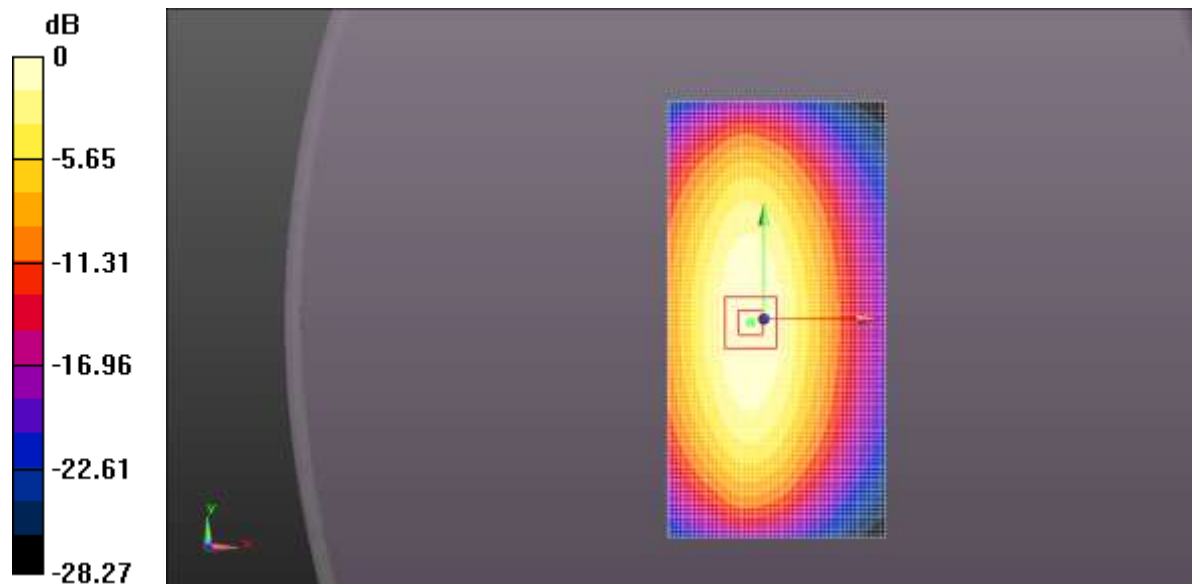
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 51.344 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 3.19 W/kg

SAR(1 g) = 2.35 W/kg; SAR(10 g) = 1.54 W/kg

Maximum value of SAR (measured) = 2.38 W/kg



0 dB = 2.39 W/kg = 3.78 dBW/kg

System check 1750 head

Date/Time: 22/05/2015 08:29:15

Communication System: UID 10000, CW; Communication System Band: D1750 (1750.0 MHz); Frequency: 1750 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.39$ S/m; $\epsilon_r = 39.741$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.98, 7.98, 7.98); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM 1; Type: SAM; Serial: TP-1575
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

1750 head/d=10mm, Pin=250 mW/Area Scan (41x61x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 11.8 W/kg

1750 head/d=10mm, Pin=250 mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

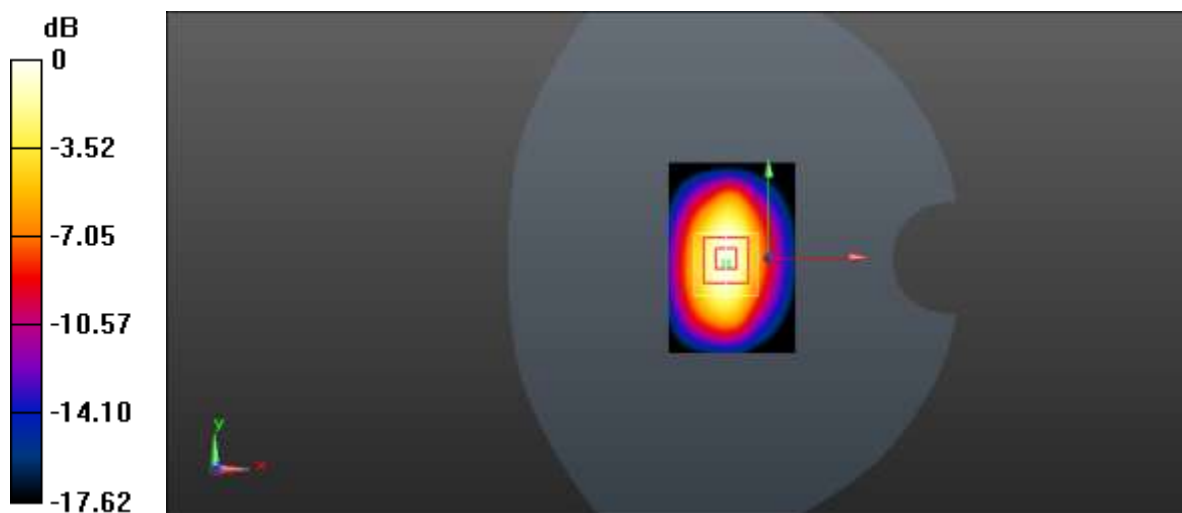
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 92.155 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 17.0 W/kg

SAR(1 g) = 9.33 W/kg; SAR(10 g) = 5.04 W/kg

Maximum value of SAR (measured) = 12.0 W/kg



0 dB = 12.0 W/kg = 10.79 dBW/kg

System check 1750body

Date/Time: 25/05/2015 09:21:41

Communication System: UID 10000, CW; Communication System Band: D1750 (17500.0 MHz); Frequency: 1750 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.513$ S/m; $\epsilon_r = 52.435$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(5.01, 5.01, 5.01); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

1750 body/d=10mm, Pin=250 mW/Area Scan (41x61x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 11.5 W/kg

1750 body/d=10mm, Pin=250 mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

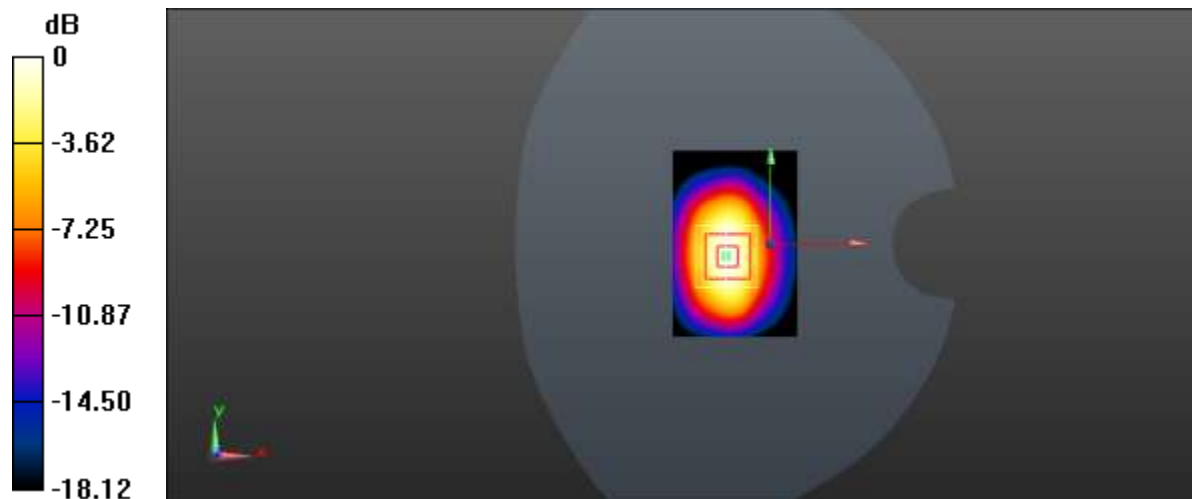
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 57.887 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 18.1 W/kg

SAR(1 g) = 9.22 W/kg; SAR(10 g) = 4.77 W/kg

Maximum value of SAR (measured) = 10.7 W/kg



0 dB = 10.7 W/kg = 10.29 dBW/kg

System check 1900head

Date/Time: 20/05/2015 08:08:27

Communication System: UID 10000, CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.383$ S/m; $\epsilon_r = 39.538$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.74, 7.74, 7.74); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

1900head/d=10mm, Pin=250 mW/Area Scan (41x61x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 12.0 W/kg

1900head/d=10mm, Pin=250 mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

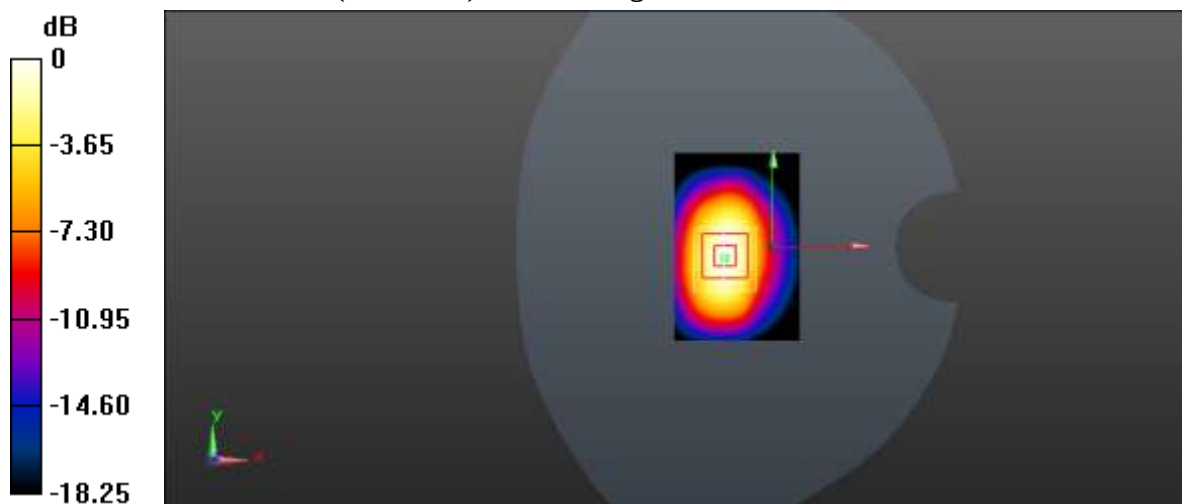
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 57.925 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 19.1 W/kg

SAR(1 g) = 9.98 W/kg; SAR(10 g) = 5.14 W/kg

Maximum value of SAR (measured) = 11.3 W/kg



0 dB = 12.0 W/kg = 10.79 dBW/kg

System check 1900body

Date/Time: 23/05/2015 08:37:35

Communication System: UID 0, CW (0); Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.492$ S/m; $\epsilon_r = 52.367$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.85, 4.85, 4.85); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASYS2, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

1900body/d=10mm, Pin=250 mW/Area Scan (61x71x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm

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

1900body/d=10mm, Pin=250 mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

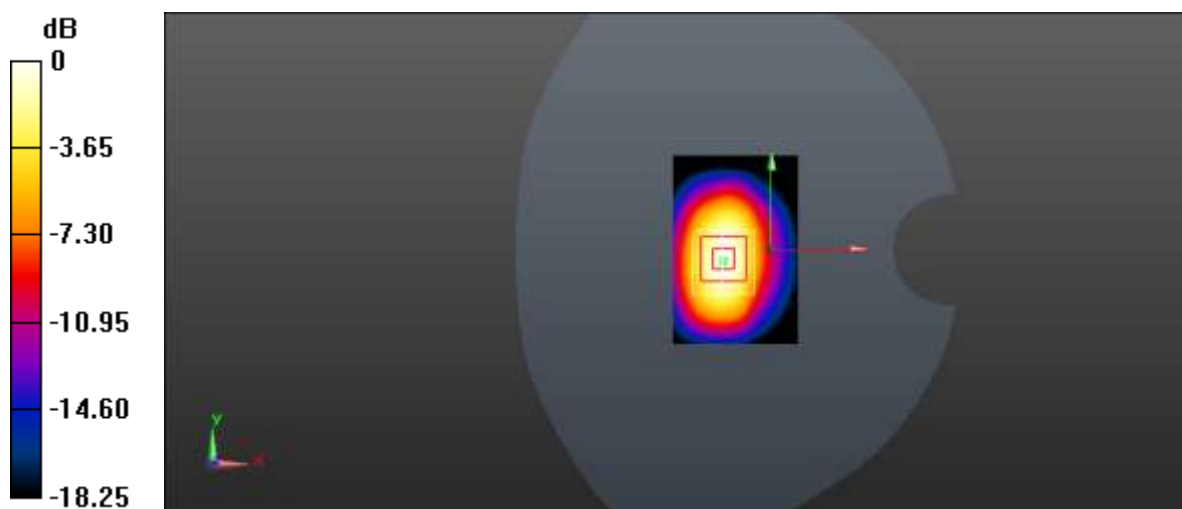
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 70.500 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 16.0 W/kg

SAR(1 g) = 9.77 W/kg; SAR(10 g) = 5.08 W/kg

Maximum value of SAR (measured) = 11.7 W/kg



0 dB = 12.6 W/kg = 11.01 dBW/kg

System check 2600head

Date/Time: 24/05/2015 07:26:17

Communication System: UID 0, CW; Communication System Band: D2600 (2600.0 MHz);

Frequency: 2600 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2600$ MHz; $\sigma = 1.991$ S/m; $\epsilon_r = 39.2$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.64, 4.64, 4.64); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

2600head/d=10mm, Pin=250 mW/Area Scan (61x101x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 18.8 W/kg

2600head/d=10mm, Pin=250 mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

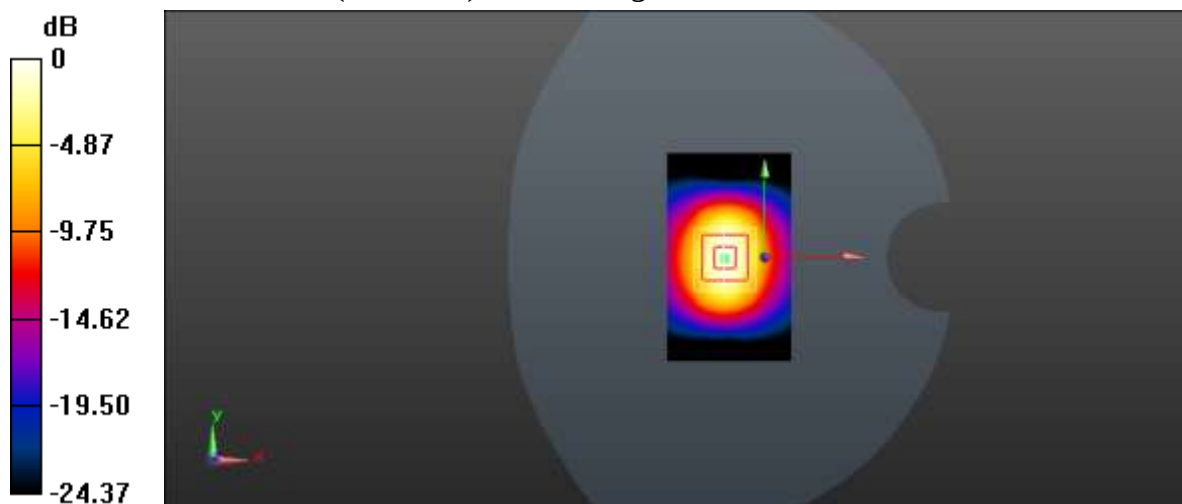
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.316 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 36.2 W/kg

SAR(1 g) = 14.7 kg; SAR(10 g) = 6.59 W/kg

Maximum value of SAR (measured) = 18.4 W/kg



0 dB = 18.8 W/kg = 12.74 dBW/kg

System check 2600body

Date/Time: 21/05/2015 08:20:12

Communication System: UID 0, CW; Communication System Band: D2600 (2600.0 MHz);

Frequency: 2600 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2600$ MHz; $\sigma = 1.961$ S/m; $\epsilon_r = 51.872$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.11, 7.11, 7.11); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: ELI v4.0; Type: ELI4; Serial: TP:1086
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

2600body/d=10mm, Pin=250 mW/Area Scan (41x61x1): Interpolated grid:

dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 17.6 W/kg

2600body/d=10mm, Pin=250 mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

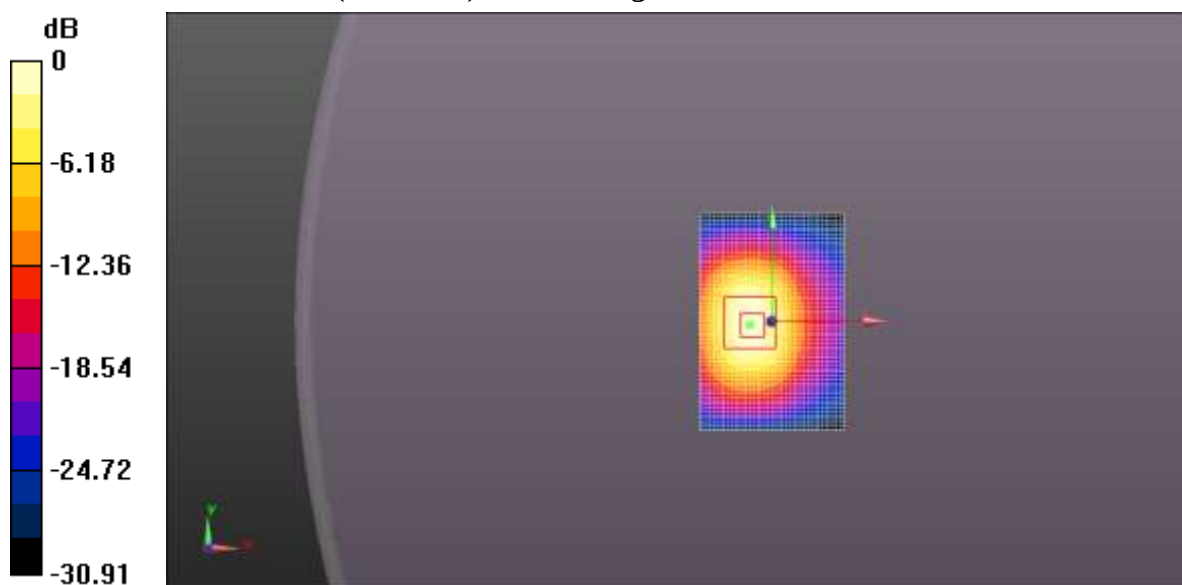
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 71.463 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 26.2 W/kg

SAR(1 g) = 14.1 W/kg; SAR(10 g) = 6.46 W/kg

Maximum value of SAR (measured) = 16.8 W/kg



0 dB = 17.6 W/kg = 12.46 dBW/kg

Annex A.2 Graph Result

GSM850 voice right touch low

Date/Time: 14/05/2015 20:23:38

Communication System: UID 0, GSM (0); Communication System Band: GSM850(824.0-849.0MHz); Frequency: 824.2 MHz; Communication System PAR: 9.191 dB

Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.868$ S/m; $\epsilon_r = 41.82$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASYS (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(9.08, 9.08, 9.08); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 14/07/2014
- Phantom: SAM1; Type: SAM; Serial: TP1576
- Measurement SW: DASYS2, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

right/touch low/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.399 W/kg

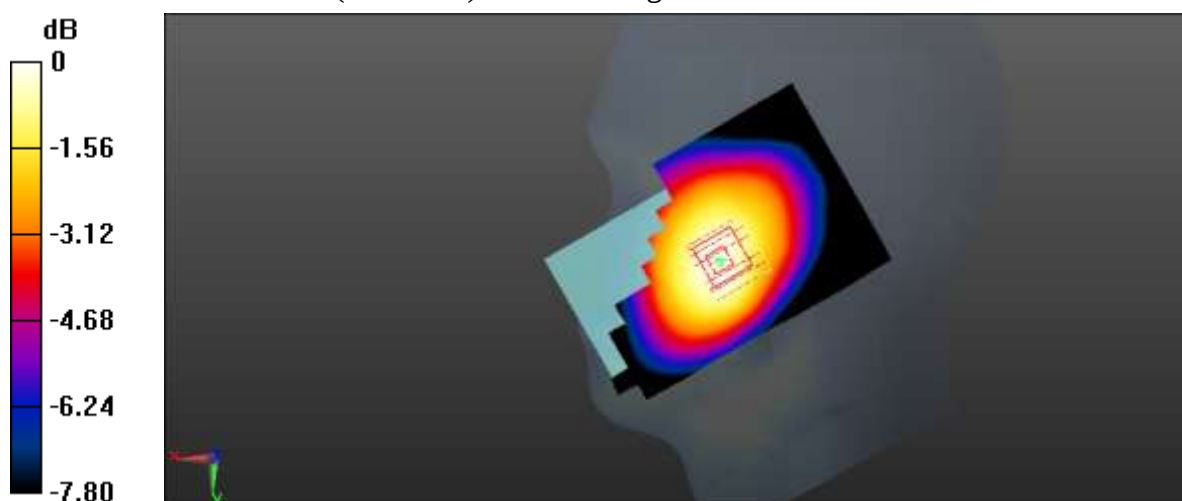
right/touch low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.306 V/m; Power Drift = -0.11 dB

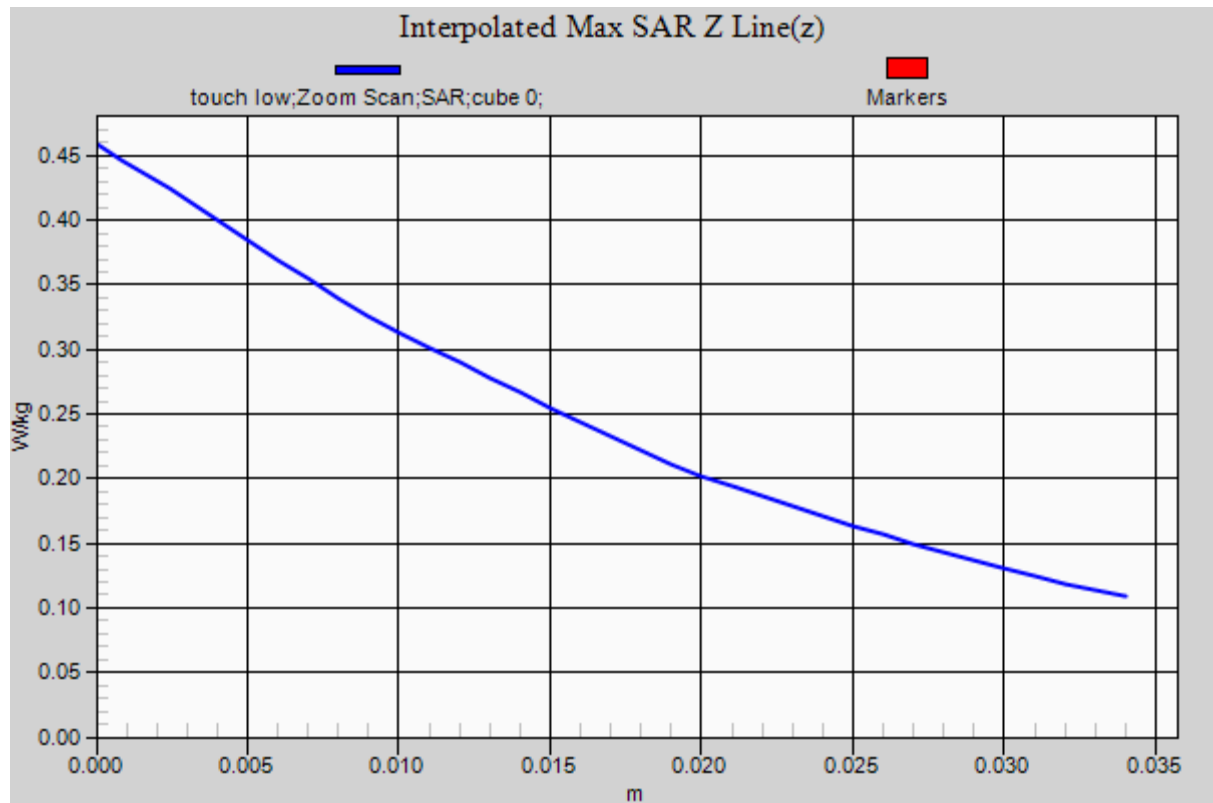
Peak SAR (extrapolated) = 0.459 W/kg

SAR(1 g) = 0.379 W/kg; SAR(10 g) = 0.293 W/kg

Maximum value of SAR (measured) = 0.401 W/kg



0 dB = 0.401 W/kg = -3.97 dBW/kg



GSM850 DTM right touch low

Date/Time: 04/06/2015 12:50:57

Communication System: UID 0, GPRS/EGPRS(3UP) (0); Communication System Band: GSM850; Frequency: 824.2 MHz; Communication System PAR: 4.42 dB

Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.868$ S/m; $\epsilon_r = 41.82$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(9.08, 9.08, 9.08); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM1; Type: SAM; Serial: TP1576
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

right /touch low/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.954 W/kg

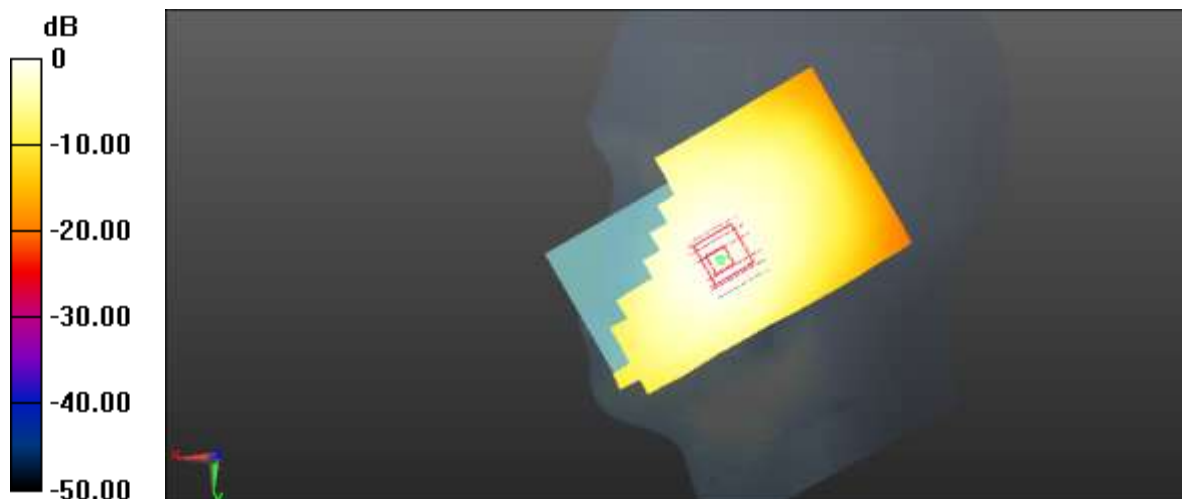
right /touch low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 15.550 V/m; Power Drift = 0.04 dB

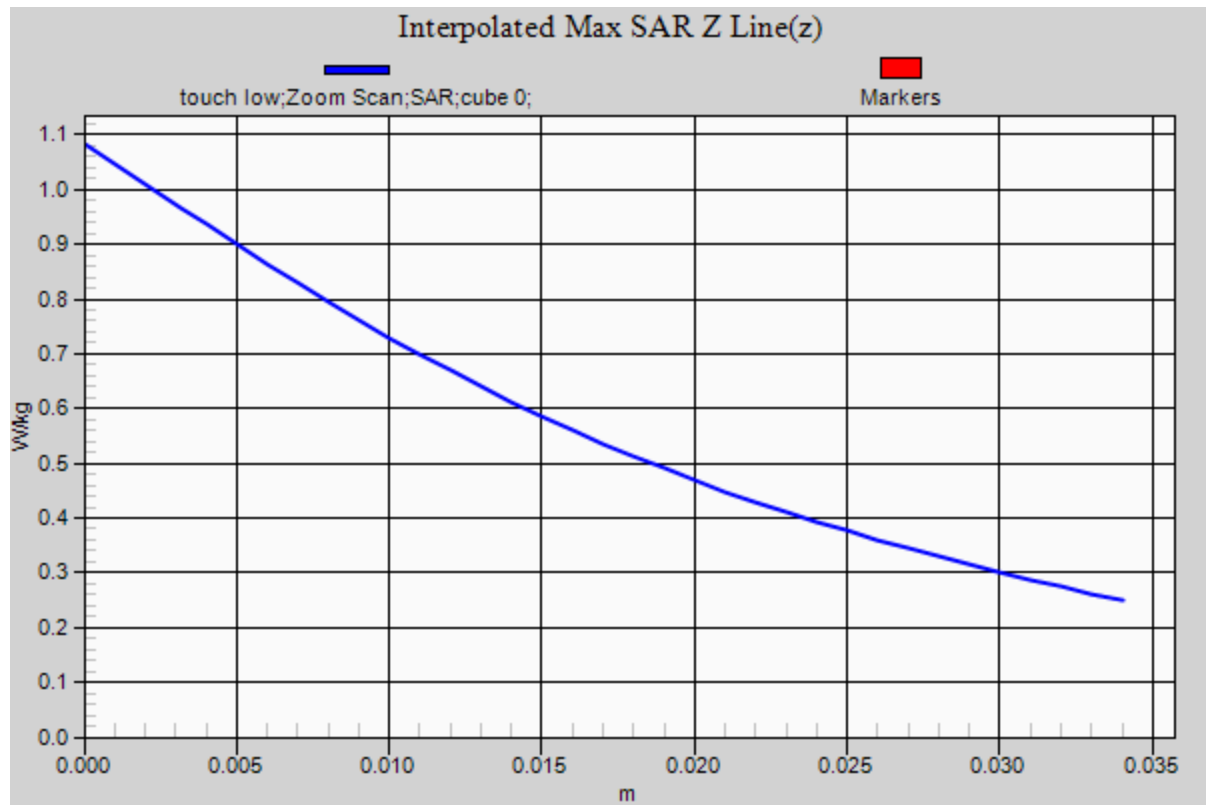
Peak SAR (extrapolated) = 1.08 W/kg

SAR(1 g) = 0.899 W/kg; SAR(10 g) = 0.699 W/kg

Maximum value of SAR (measured) = 0.941 W/kg



0 dB = 0.954 W/kg = -0.20 dBW/kg



GSM850 GPRS(4UP)towards ground low

Date/Time: 05/05/2015 17:18:07

Communication System: UID 0, GPRS/EGPRS(4UP) (0); Communication System Band: GSM850; Frequency: 824.2 MHz; Communication System PAR: 3.18 dB

Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.933$ S/m; $\epsilon_r = 54.311$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(6.37, 6.37, 6.37); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: ELI v4.0; Type: ELI4; Serial: TP:1086
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Configuration/towards ground low/Area Scan (101x171x1): Interpolated grid:

$dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 1.15 W/kg

Configuration/towards ground low/Zoom Scan (7x7x7)/Cube 0: Measurement

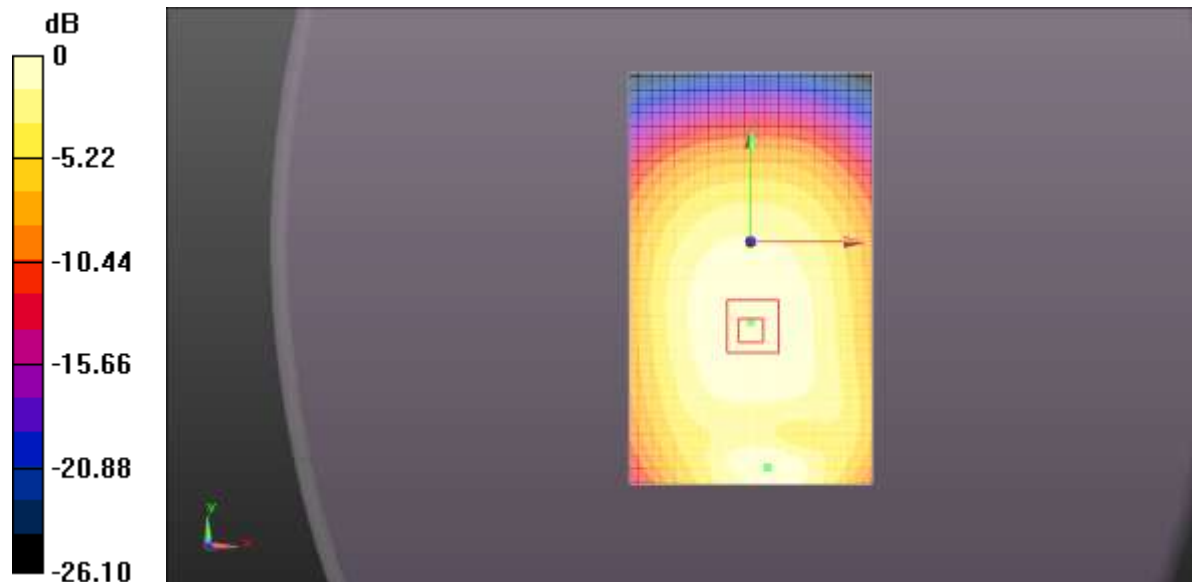
grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 30.916 V/m; Power Drift = -0.07 dB

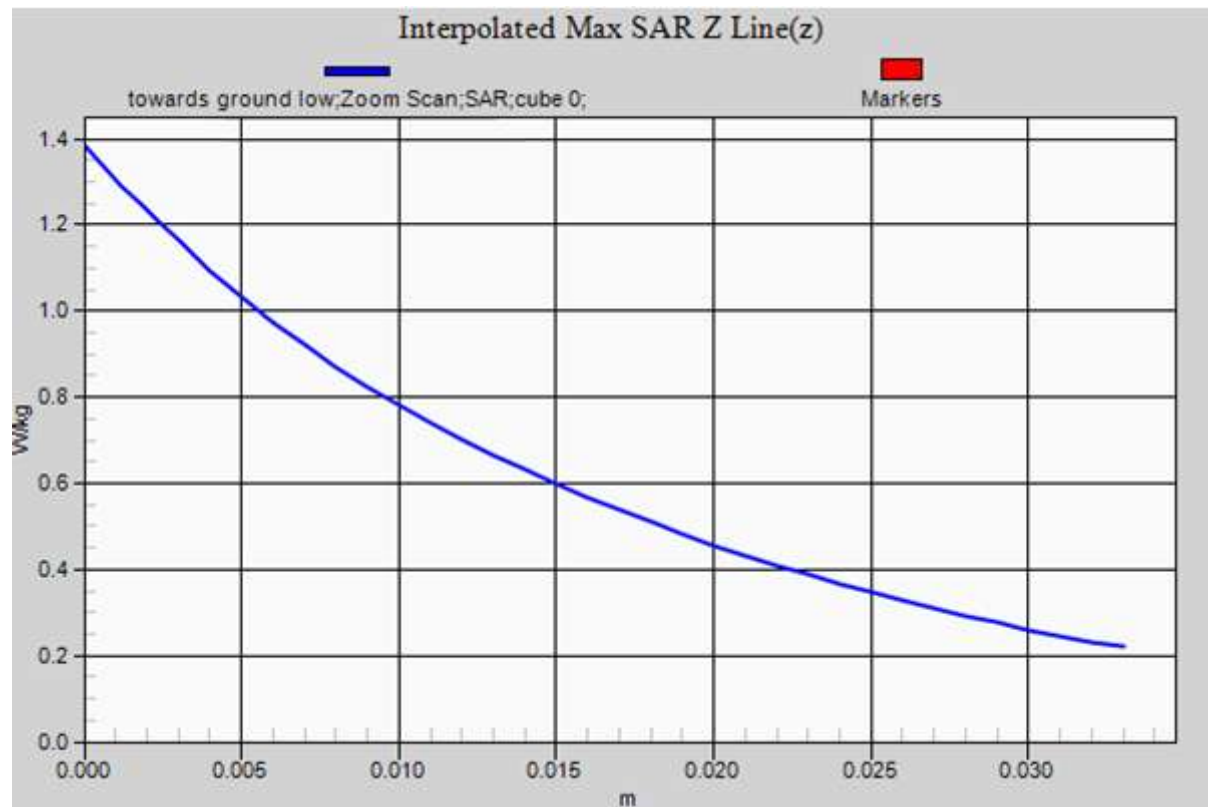
Peak SAR (extrapolated) = 1.38 W/kg

SAR(1 g) = 1.06 W/kg; SAR(10 g) = 0.813 W/kg

Maximum value of SAR (measured) = 1.16 W/kg



0 dB = 1.15 W/kg = 0.60 dBW/kg



GSM1900 voice right touch high

Date/Time: 26/04/2015 17:20:36

Communication System: UID 0, GSM(0); Communication System Band: PCS1900(1850.0-1910.0MHz); Frequency: 1909.8 MHz; Communication System PAR: 9.191 dB

Medium parameters used: $f = 1909.8$ MHz; $\sigma = 1.48$ S/m; $\epsilon_r = 39.6$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.74, 7.74, 7.74); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 14/07/2014
- Phantom: SAM2; Type: SAM; Serial: TP-1575
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

right/touch high/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.327 W/kg

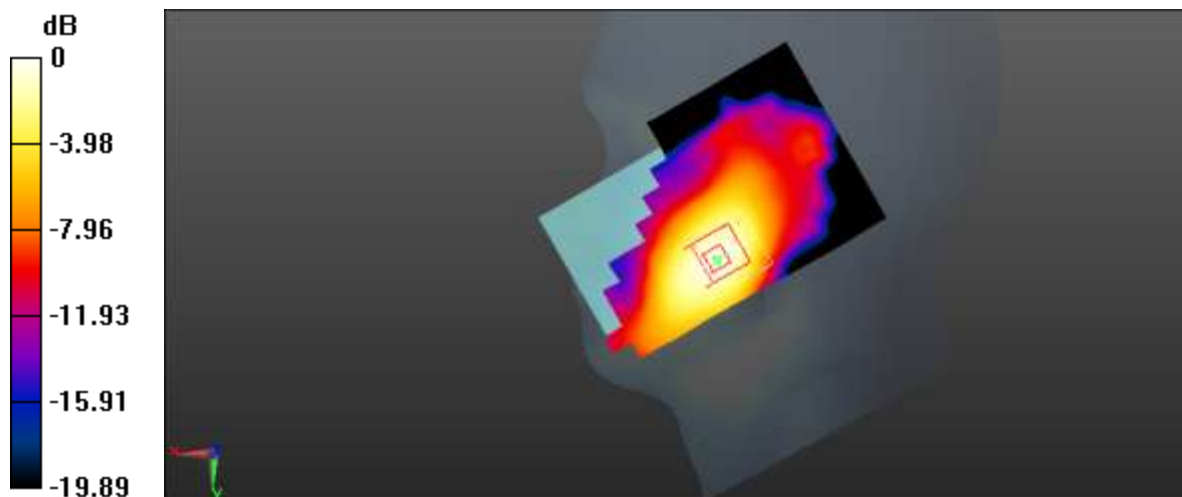
right/touch high/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.879 V/m; Power Drift = 0.12 dB

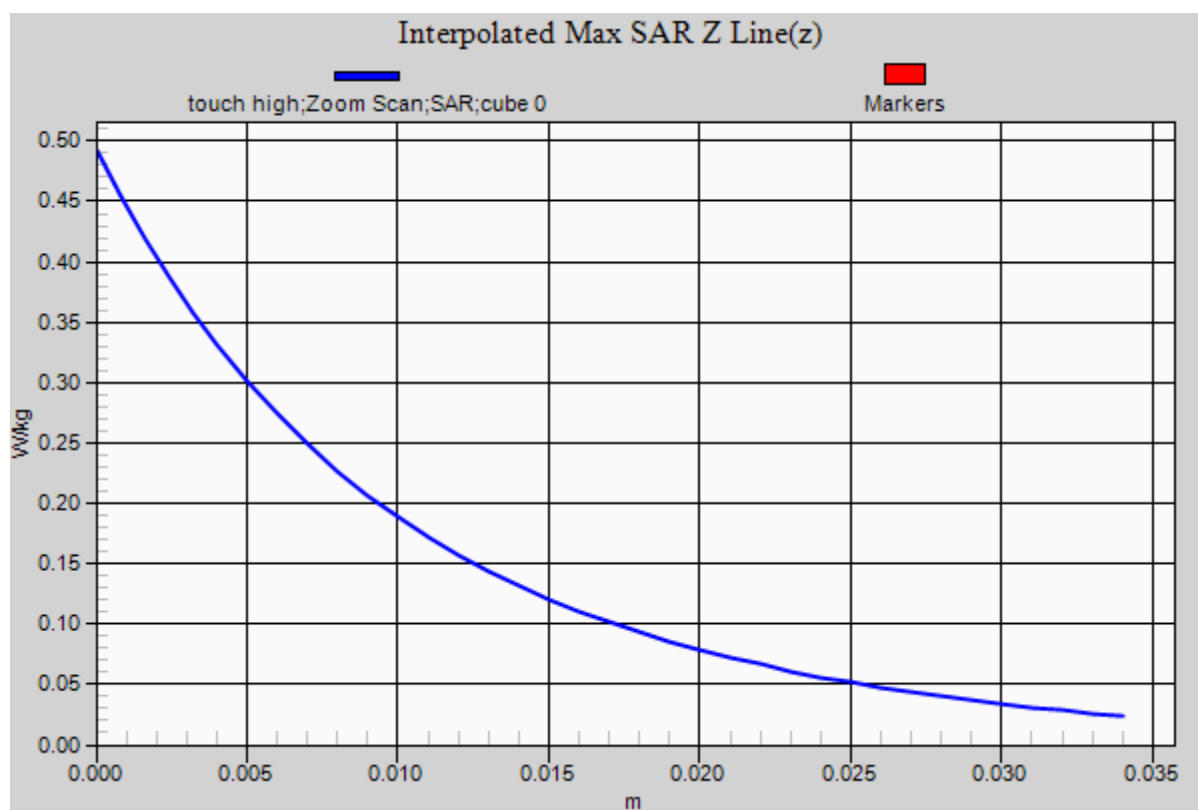
Peak SAR (extrapolated) = 0.492 W/kg

SAR(1 g) = 0.307 W/kg; SAR(10 g) = 0.182 W/kg

Maximum value of SAR (measured) = 0.337 W/kg



0 dB = 0.337 W/kg = -4.72 dBW/kg



GSM1900 DTM right touch high

Date/Time: 04/06/2015 10:03:45

Communication System: UID 0, GPRS/EGPRS(3UP) (0); Communication System Band: PCS1900; Frequency: 1909.8 MHz; Communication System PAR: 4.42 dB

Medium parameters used: $f = 1909.8$ MHz; $\sigma = 1.48$ S/m; $\epsilon_r = 39.6$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(5.12, 5.12, 5.12); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

right/touch high/Area Scan (101x171x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.595 W/kg

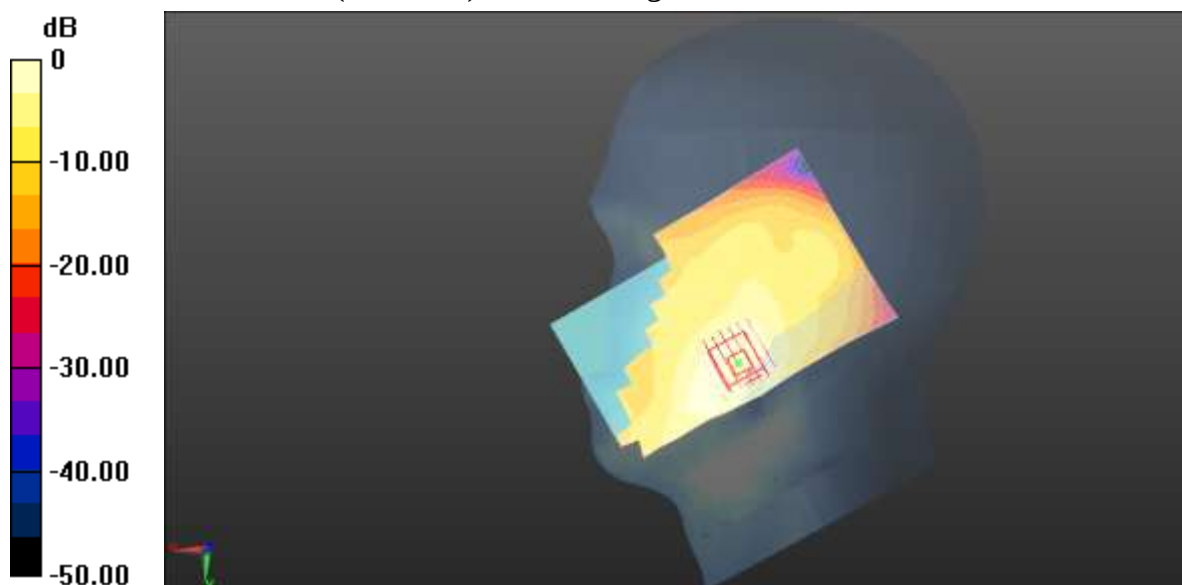
right/touch high/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 8.693 V/m; Power Drift = 0.15 dB

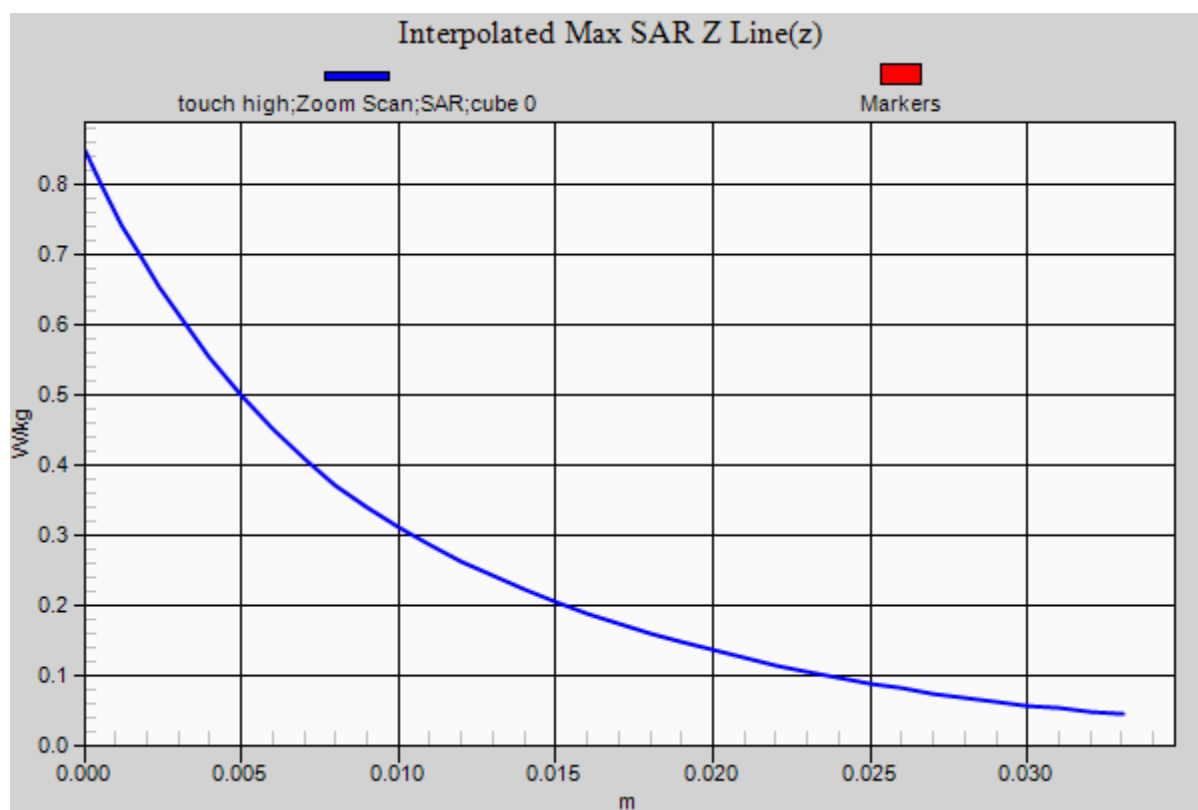
Peak SAR (extrapolated) = 0.847 W/kg

SAR(1 g) = 0.493 W/kg; SAR(10 g) = 0.285 W/kg

Maximum value of SAR (measured) = 0.608 W/kg



0 dB = 0.595 W/kg = -2.25 dBW/kg



GSM1900 GPRS(4UP) front high

Date/Time: 06/05/2015 13:02:52

Communication System: UID 0, GPRS/EGPRS(4UP) (0); Communication System Band: PCS1900; Frequency: 1909.8 MHz; Communication System PAR: 3.18 dB

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.503$ S/m; $\epsilon_r = 52.325$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.85, 4.85, 4.85); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: ELI v4.0; Type: ELI4; Serial: TP:1086
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

body/front high/Area Scan (61x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.21 W/kg

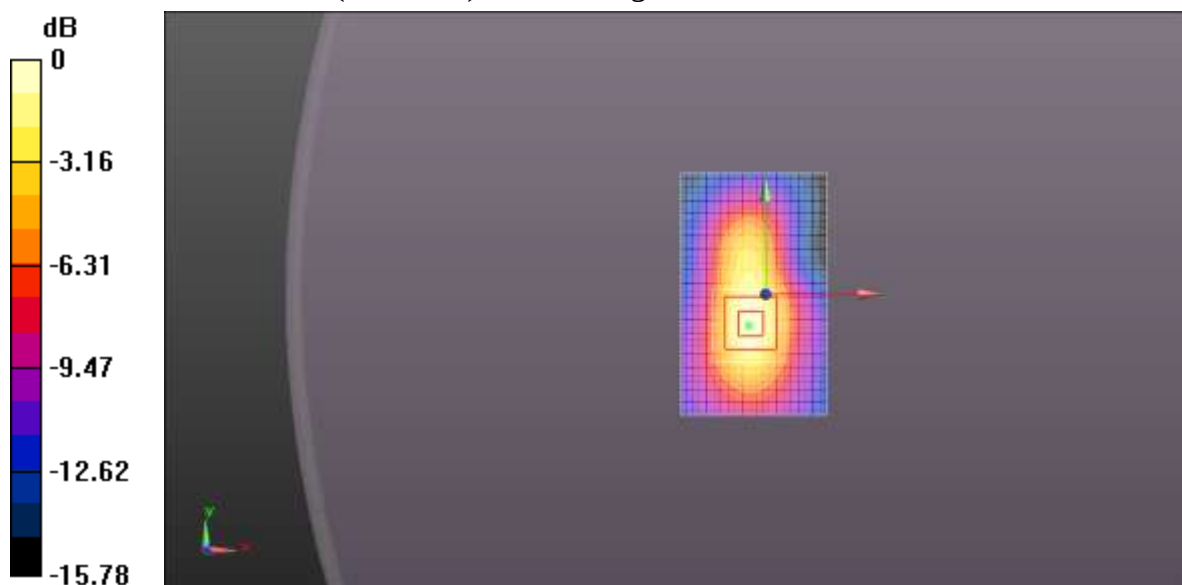
body/front high/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 22.598 V/m; Power Drift = 0.12dB

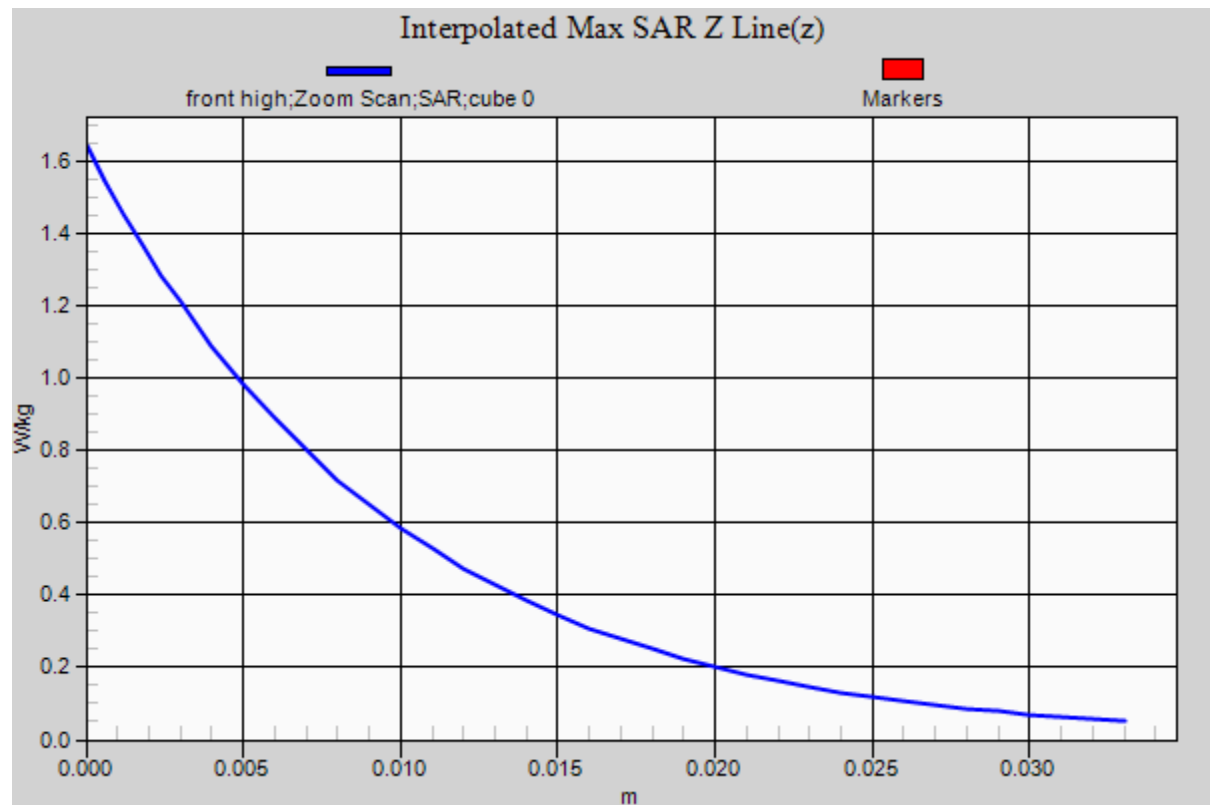
Peak SAR (extrapolated) = 1.64 W/kg

SAR(1 g) = 0.958 W/kg; SAR(10 g) = 0.500 W/kg

Maximum value of SAR (measured) = 1.20 W/kg



0 dB = 1.21 W/kg = 0.81 dBW/kg



WCDMA BAND II right touch high

Date/Time: 26/04/2015 13:29:47

Communication System: UID 0, WCDMA (0); Communication System Band: BAND 2;
Frequency: 1907.6 MHz; Communication System PAR: 0 dB

Medium parameters used (interpolated): $f = 1907.6$ MHz; $\sigma = 1.473$ S/m; $\epsilon_r = 39.634$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.74, 7.74, 7.74); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 14/07/2014
- Phantom: SAM2; Type: SAM; Serial: TP-1575
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

right/touch high/Area Scan (101x171x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.702 W/kg

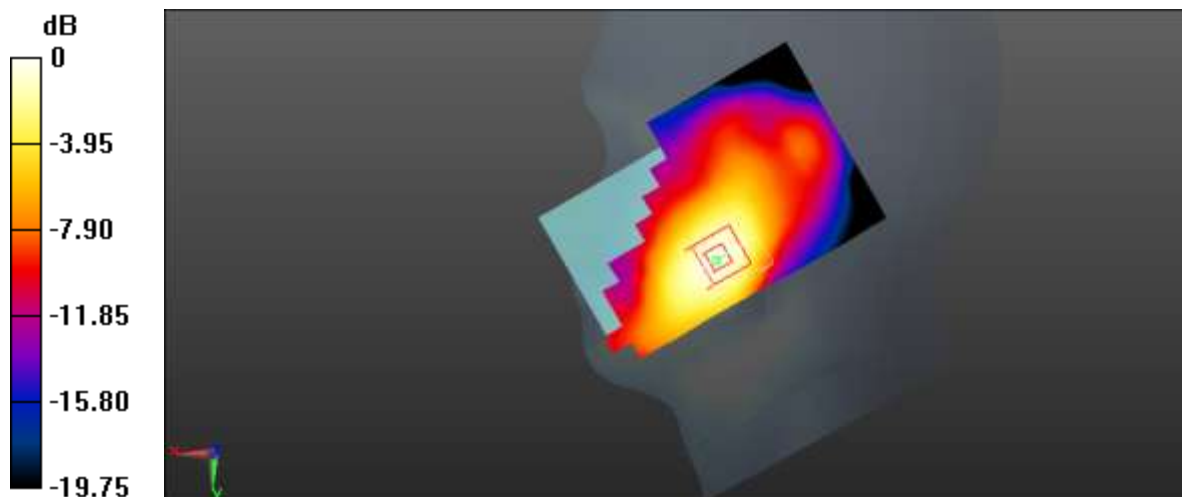
right/touch high/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 8.572 V/m; Power Drift = 0.13 dB

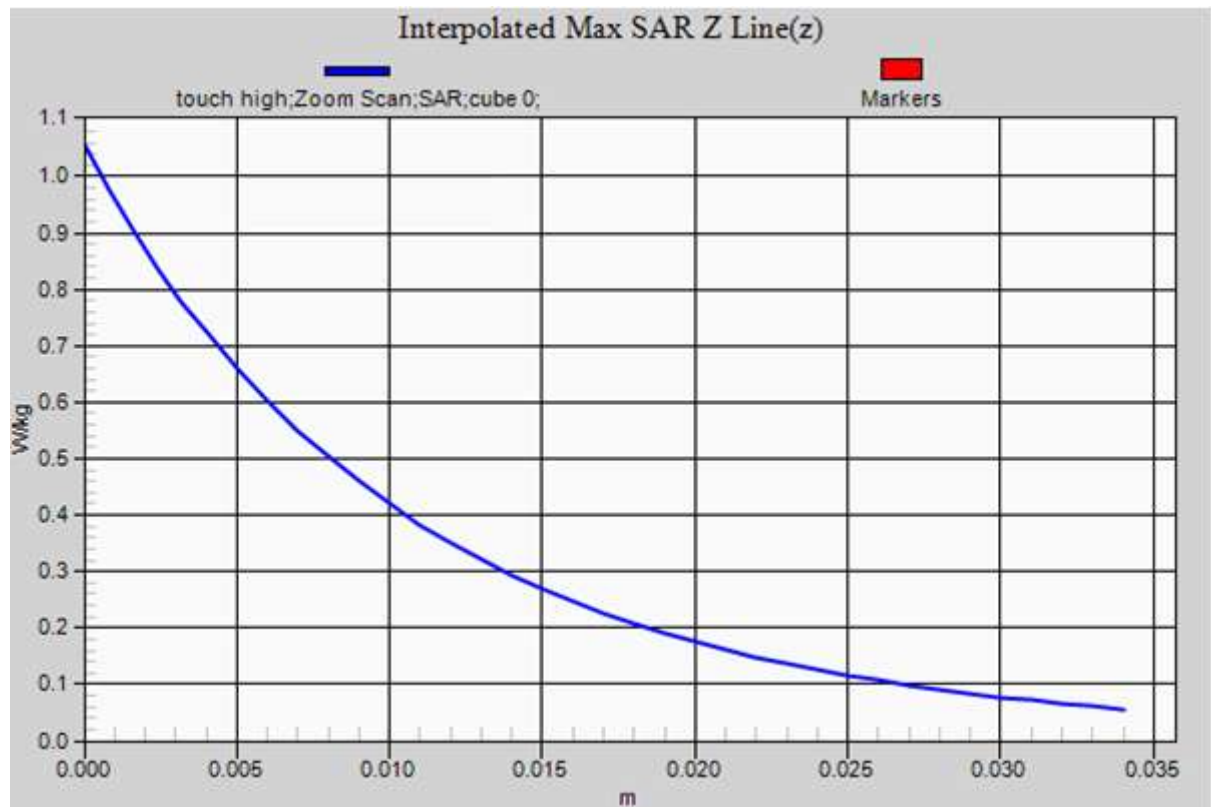
Peak SAR (extrapolated) = 1.05 W/kg

SAR(1 g) = 0.661 W/kg; SAR(10 g) = 0.392 W/kg

Maximum value of SAR (measured) = 0.728 W/kg



0 dB = 0.728 W/kg = -1.38 dBW/kg



WCDMA BAND II towards ground high with earphone

Date/Time: 06/05/2015 06:26:53

Communication System: UID 0, WCDMA (0); Communication System Band: BAND 2;

Frequency: 1907.6 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 1908$ MHz; $\sigma = 1.502$ S/m; $\epsilon_r = 52.332$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.85, 4.85, 4.85); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: ELI v4.0; Type: ELI4; Serial: TP:1086
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Configuration/towards ground high with earphone/Area Scan (101x171x1):

Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 1.38 W/kg

Configuration/towards ground high with earphone/Zoom Scan (7x7x7)/Cube

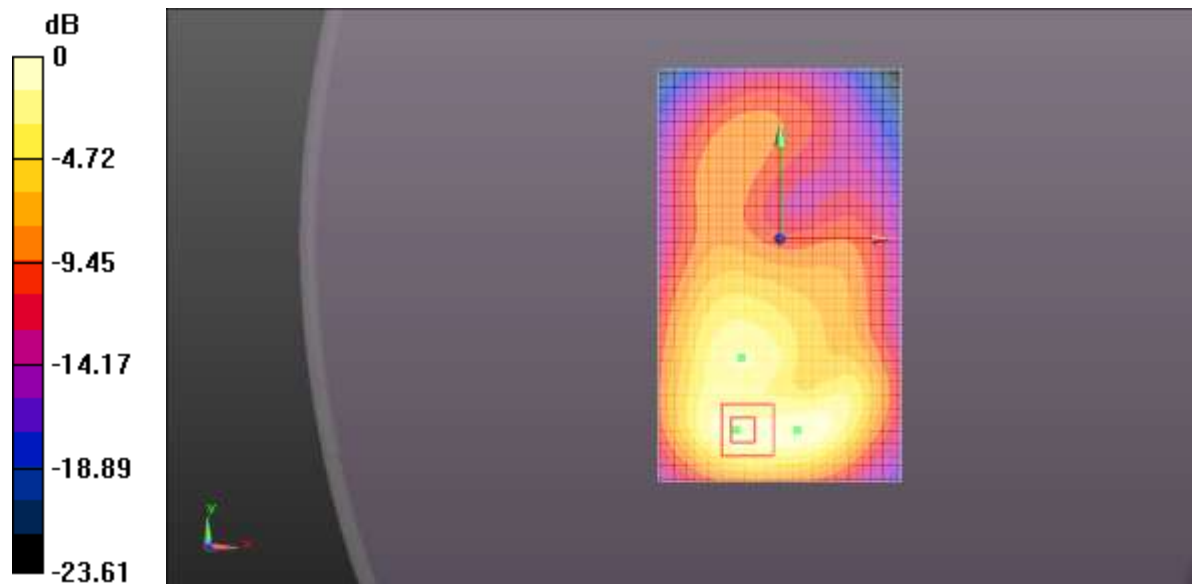
0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 9.529 V/m; Power Drift = 0.09 dB

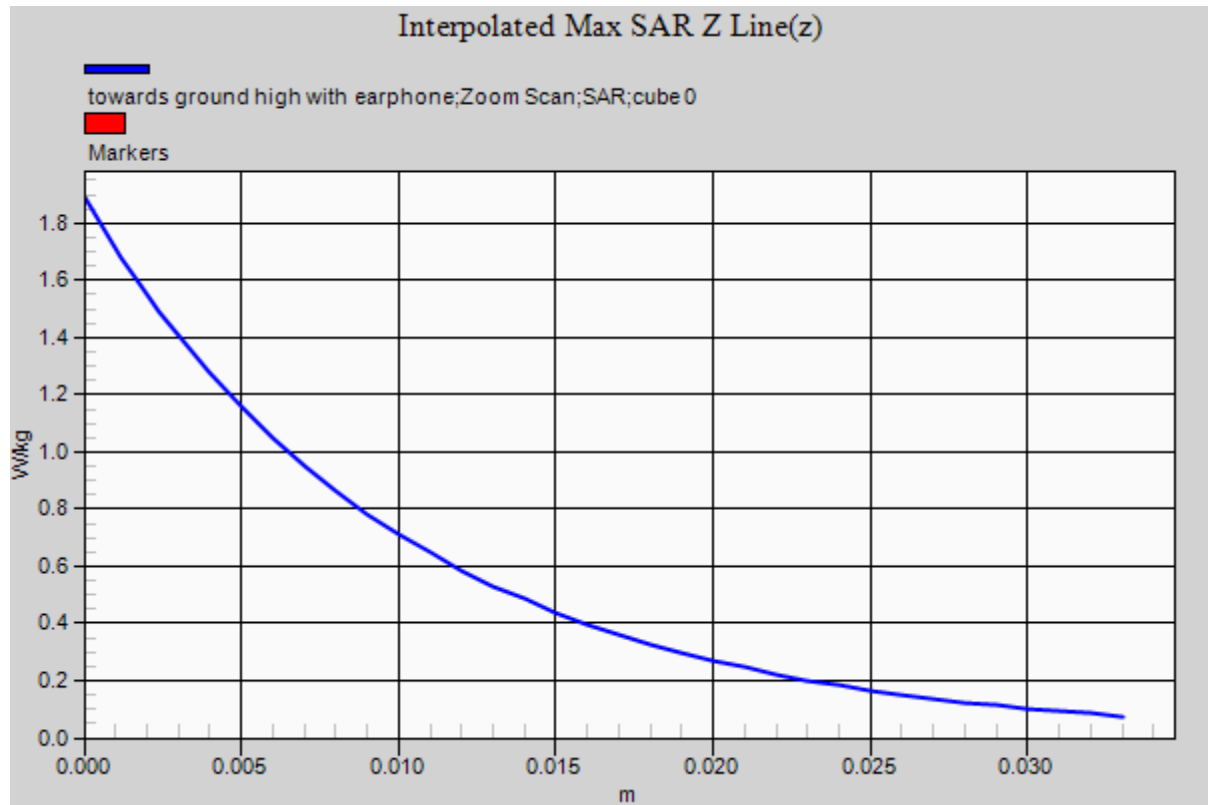
Peak SAR (extrapolated) = 1.89 W/kg

SAR(1 g) = 1.13 W/kg; SAR(10 g) = 0.627 W/kg

Maximum value of SAR (measured) = 1.40 W/kg



0 dB = 1.38 W/kg = 1.39 dBW/kg



WCDMA BAND V left touch high

Date/Time: 14/05/2015 11:31:49

Communication System: UID 0, WCDMA (0); Communication System Band: BAND 5;

Frequency: 846.6 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 847$ MHz; $\sigma = 0.892$ S/m; $\epsilon_r = 41.467$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(6.41, 6.41, 6.41); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: SAM1; Type: SAM; Serial: TP1576
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

left/touch high/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.350 W/kg

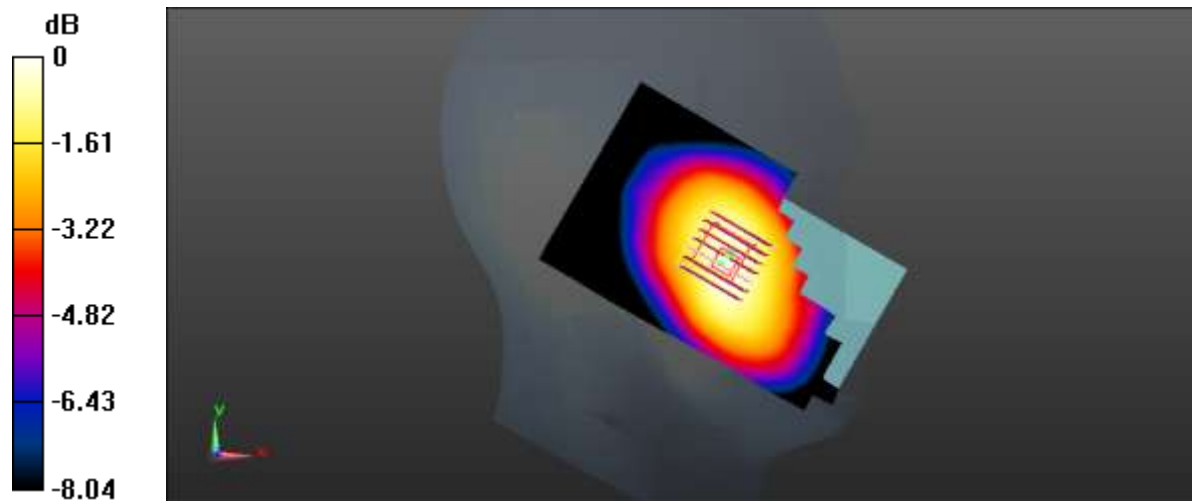
left/touch high/Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.724 V/m; Power Drift = 0.07 dB

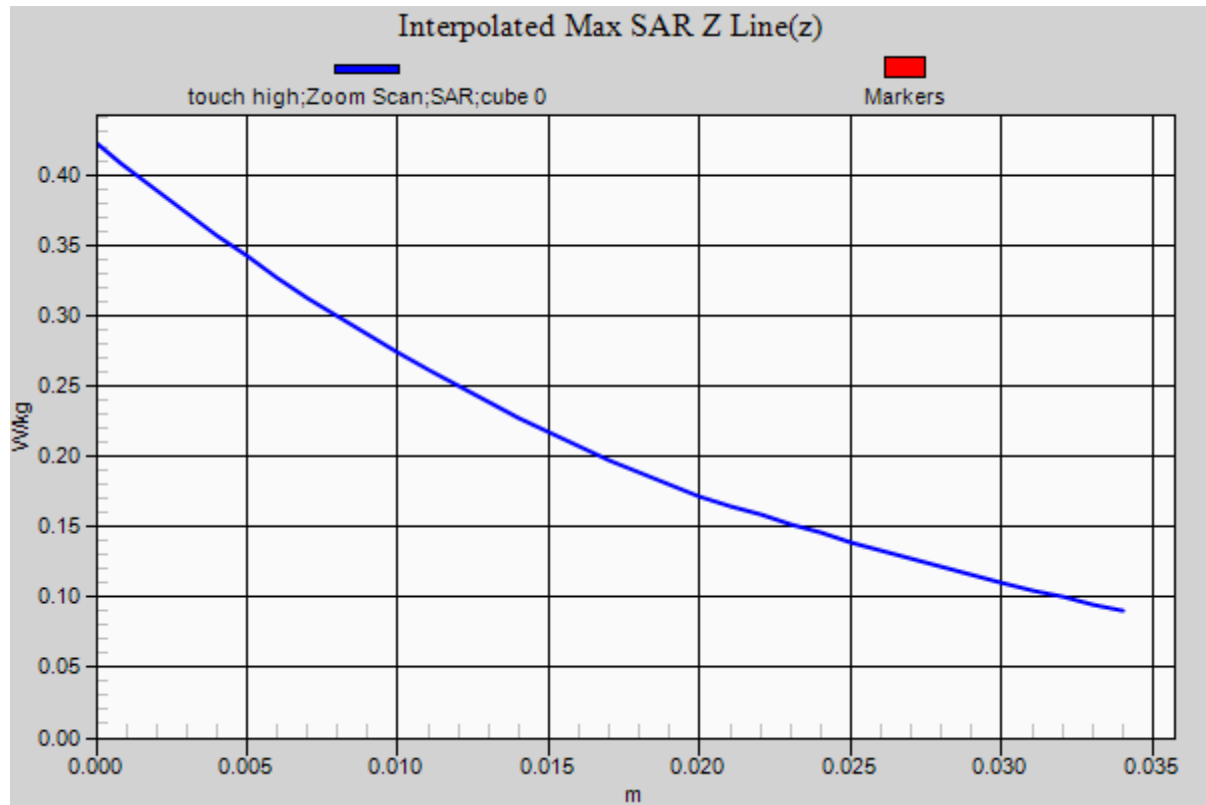
Peak SAR (extrapolated) = 0.422 W/kg

SAR(1 g) = 0.337 W/kg; SAR(10 g) = 0.258 W/kg

Maximum value of SAR (measured) = 0.359 W/kg



0 dB = 0.359 W/kg = -4.45 dBW/kg



WCDMA BAND V towards ground high

Date/Time: 04/05/2015 14:52:51

Communication System: UID 0, WCDMA (0); Communication System Band: BAND 5;

Frequency: 846.6 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 847$ MHz; $\sigma = 0.965$ S/m; $\epsilon_r = 54.169$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(6.37, 6.37, 6.37); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: ELI v4.0; Type: ELI4; Serial: TP:1086
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Configuration/towards ground high/Area Scan (101x171x1): Interpolated grid:

$dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.553 W/kg

Configuration/towards ground high/Zoom Scan (7x7x7)/Cube 0: Measurement

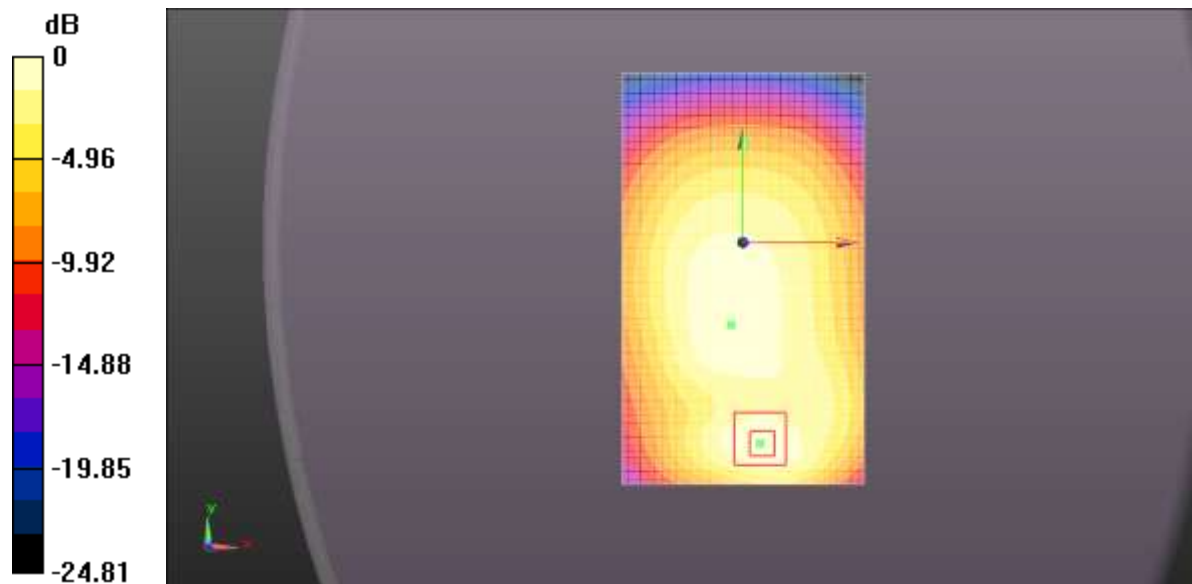
grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 21.318 V/m; Power Drift = -0.13 dB

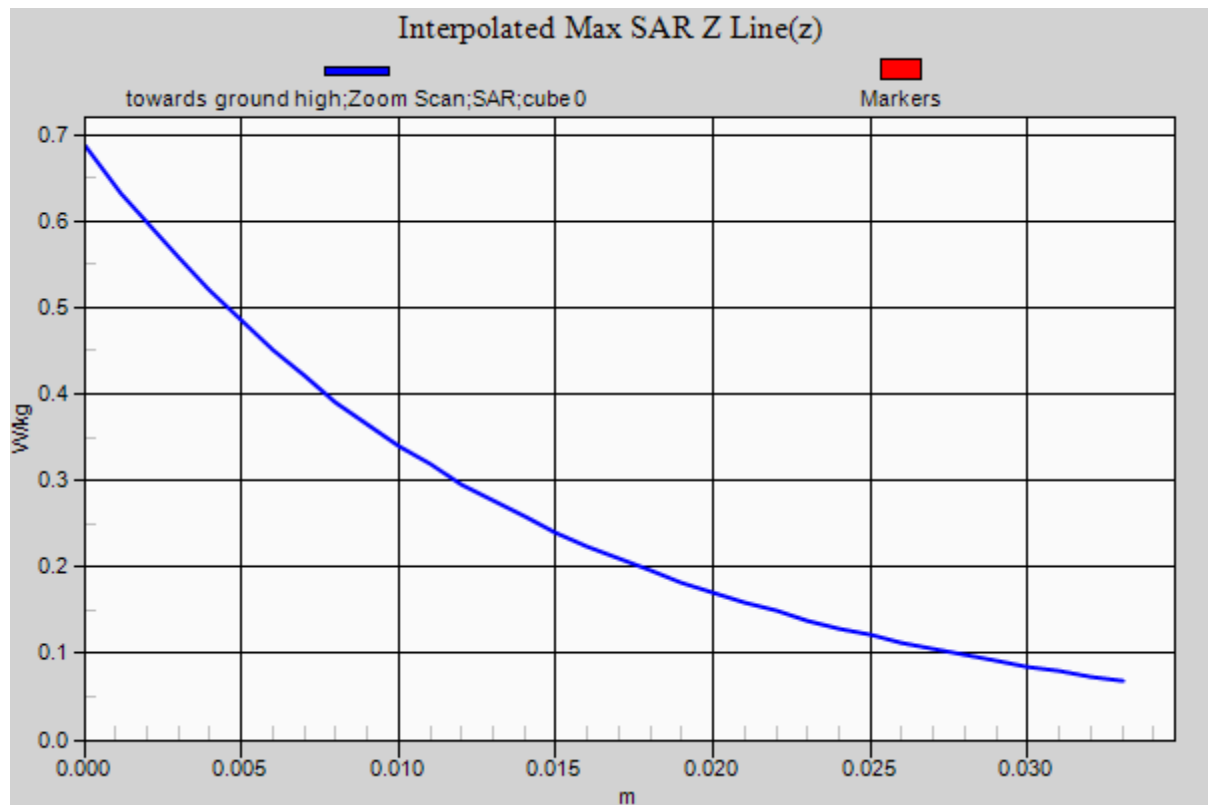
Peak SAR (extrapolated) = 0.687 W/kg

SAR(1 g) = 0.472 W/kg; SAR(10 g) = 0.301 W/kg

Maximum value of SAR (measured) = 0.558 W/kg



0 dB = 0.553 W/kg = -2.57 dBW/kg



LTE BAND 2 right touch high QPSK_20M_1RB_low

Date/Time: 13/05/2015 18:01:21

Communication System: UID 0, FDD-LTE(QPSK_20M_1RB) (0); Communication System

Band: BAND 2; Frequency: 1900 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.383$ S/m; $\epsilon_r = 39.048$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(5.12, 5.12, 5.12); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: SAM2; Type: SAM; Serial: TP-1575
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

right/touch high QPSK_20M_1RB low/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.485 W/kg

right/touch high QPSK_20M_1RB low/Zoom Scan (7x8x7)/Cube 0:

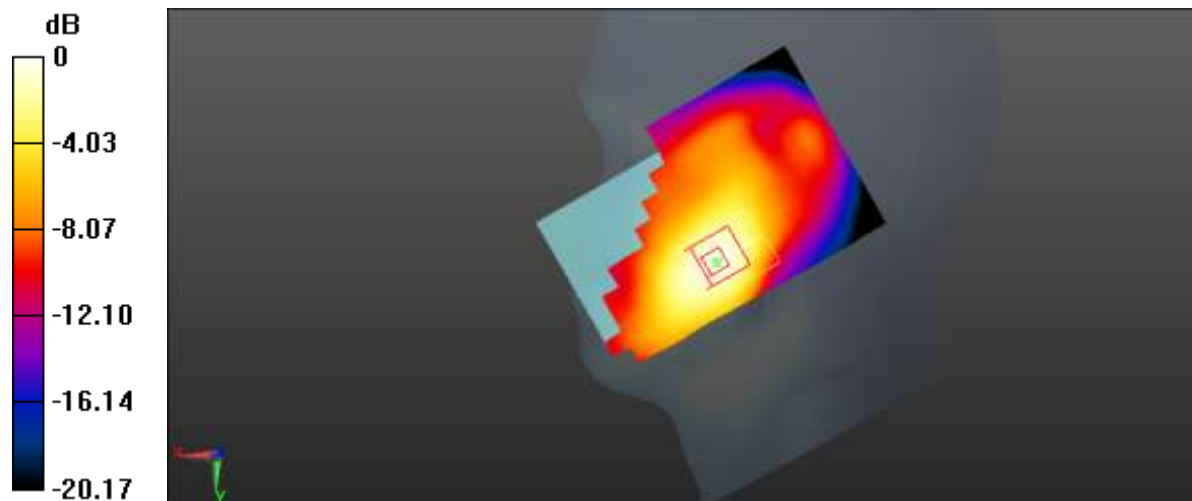
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.769 V/m; Power Drift = 0.13 dB

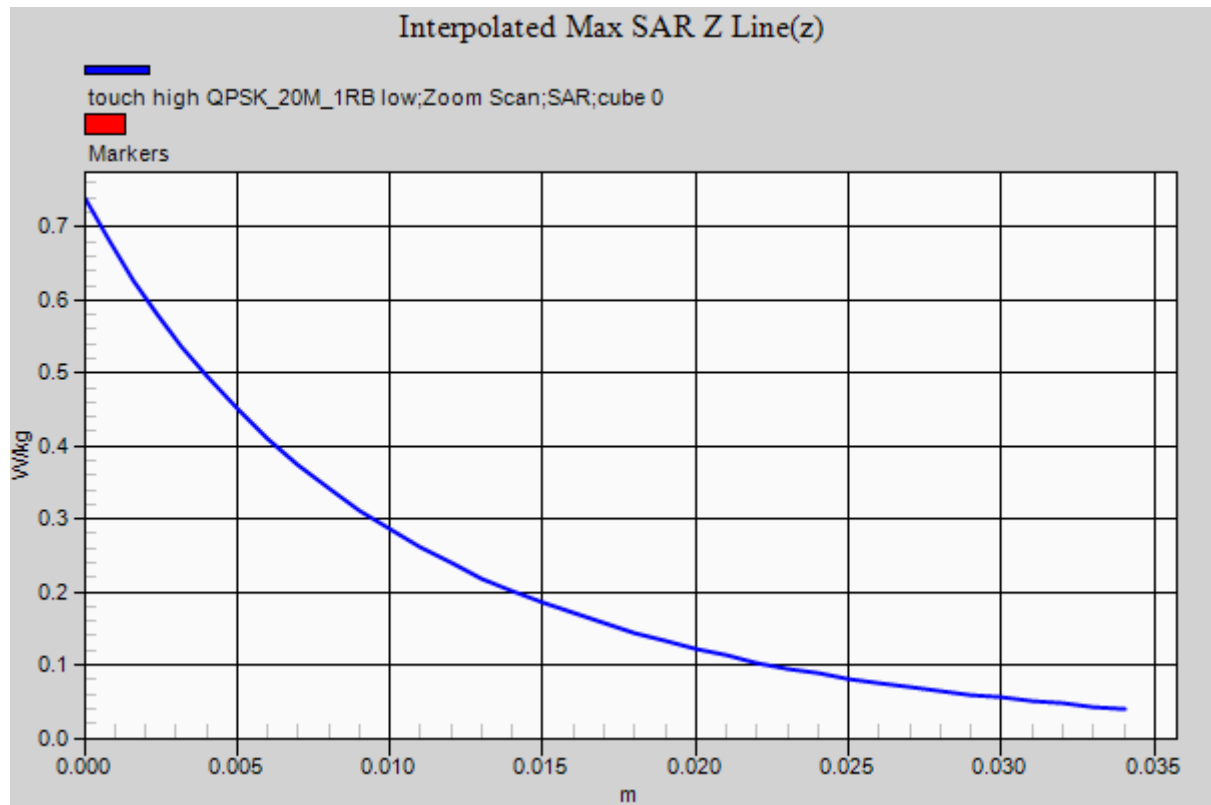
Peak SAR (extrapolated) = 0.739 W/kg

SAR(1 g) = 0.456 W/kg; SAR(10 g) = 0.273 W/kg

Maximum value of SAR (measured) = 0.500 W/kg



0 dB = 0.500 W/kg = -3.01 dBW/kg



LTE BAND 2 front high QPSK_20M_1RB_low with earphone

Date/Time: 07/05/2015 16:54:02

Communication System: UID 0, FDD-LTE(QPSK_20M_1RB) (0); Communication System

Band: BAND 2; Frequency: 1900 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.495$ S/m; $\epsilon_r = 52.357$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.85, 4.85, 4.85); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: ELI v4.0; Type: ELI4; Serial: TP:1086
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Configuration/front high QPSK_20M_1RB_low with earphone/Area Scan

(61x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.05 W/kg

Configuration/front high QPSK_20M_1RB_low with earphone/Zoom Scan

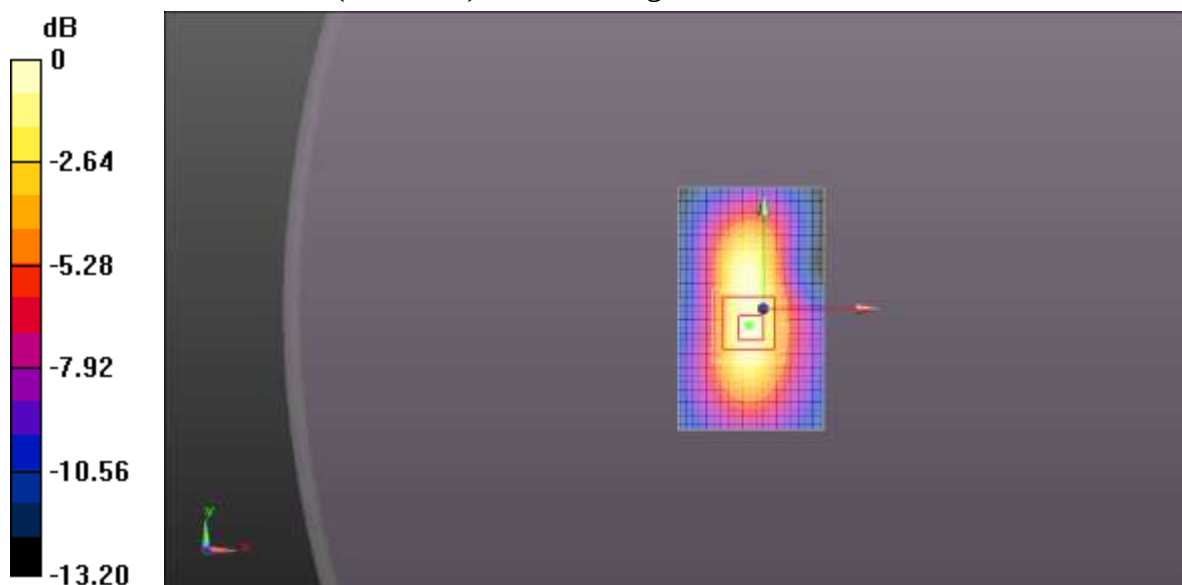
(7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 24.010 V/m; Power Drift = -0.09 dB

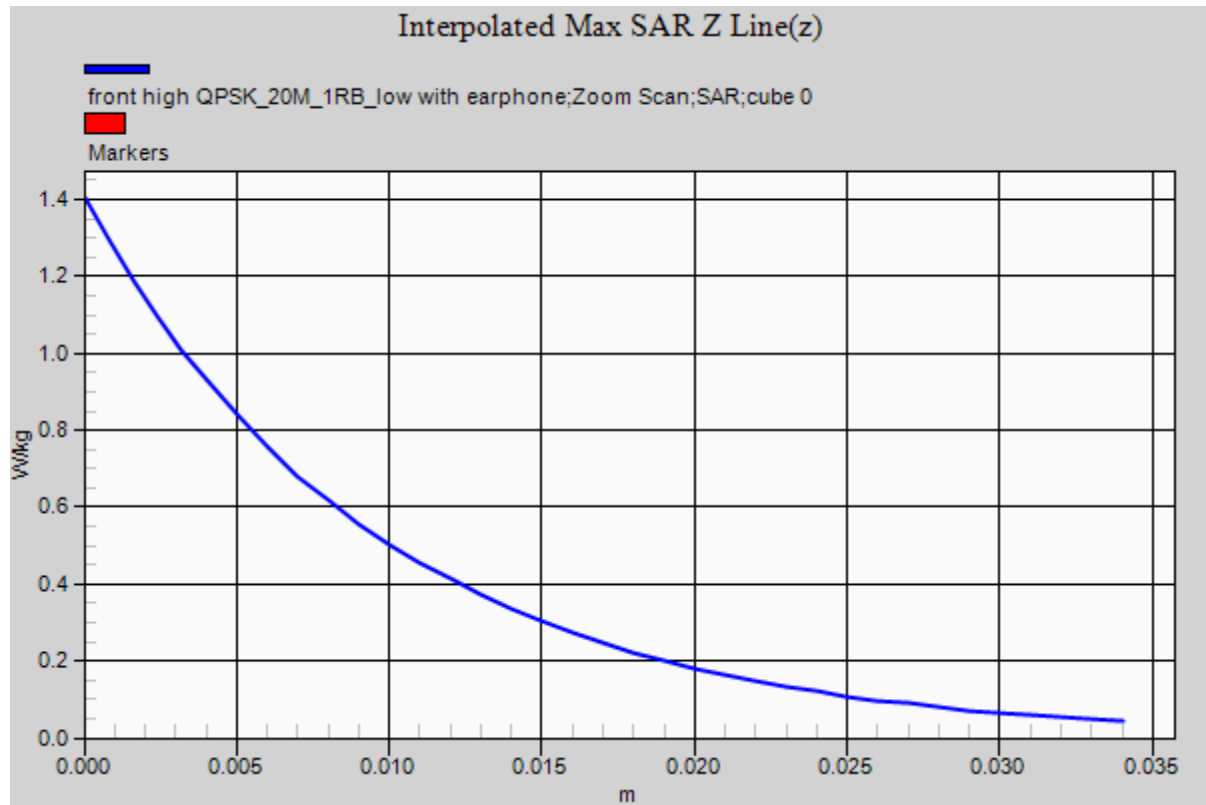
Peak SAR (extrapolated) = 1.41 W/kg

SAR(1 g) = 0.827 W/kg; SAR(10 g) = 0.453 W/kg

Maximum value of SAR (measured) = 0.931 W/kg



0 dB = 1.05 W/kg = 0.22 dBW/kg



LTE BAND 4 right touch mid QPSK_20M_1RB_low

Date/Time: 08/05/2015 11:37:38

Communication System: UID 0, FDD-LTE(QPSK_20M_1RB) (0); Communication System Band: BAND 4; Frequency: 1732.5 MHz; Communication System PAR: 0 dB

Medium parameters used (interpolated): $f = 1732.5$ MHz; $\sigma = 1.374$ S/m; $\epsilon_r = 39.262$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.98, 7.98, 7.98); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM2; Type: SAM; Serial: TP-1575
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

right/touch mid/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.283 W/kg

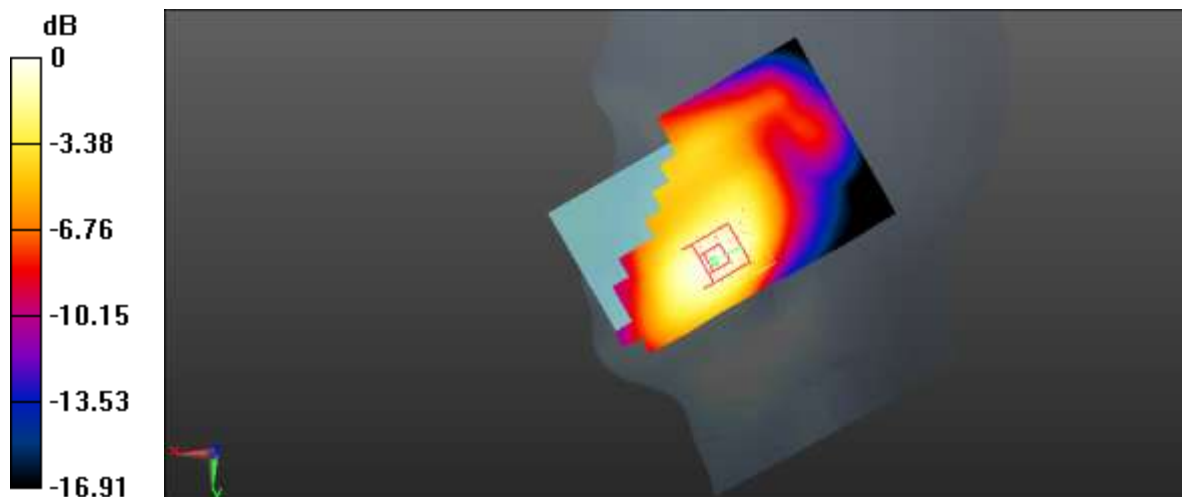
right/touch mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.428 V/m; Power Drift = 0.07 dB

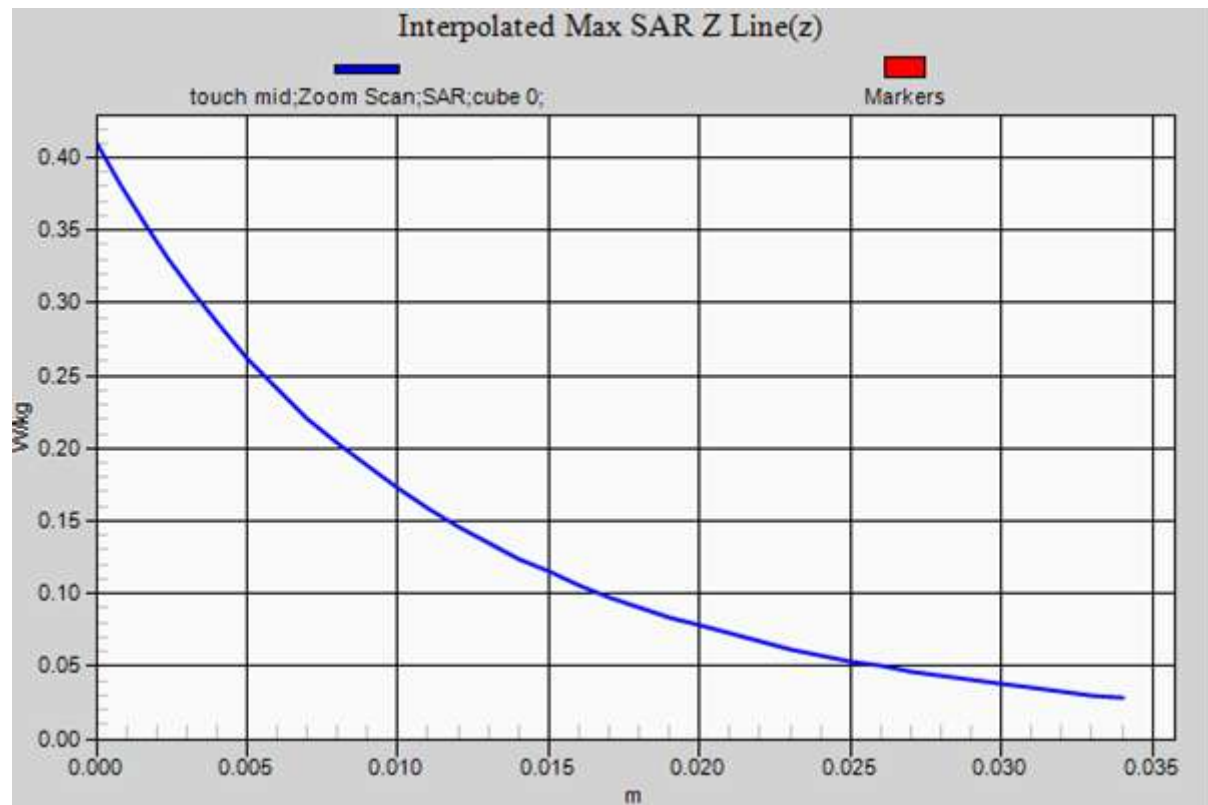
Peak SAR (extrapolated) = 0.409 W/kg

SAR(1 g) = 0.268 W/kg; SAR(10 g) = 0.169 W/kg

Maximum value of SAR (measured) = 0.287 W/kg



0 dB = 0.287 W/kg = -5.42 dBW/kg



LTE BAND 4 towards ground mid QPSK_20M_1RB_mid with earphone

Date/Time: 11/05/2015 20:08:55

Communication System: UID 0, FDD-LTE(QPSK_20M_1RB) (0); Communication System

Band: BAND 4; Frequency: 1732.5 MHz; Communication System PAR: 0 dB

Medium parameters used (interpolated): $f = 1732.5$ MHz; $\sigma = 1.496$ S/m; $\epsilon_r = 51.908$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(5.01, 5.01, 5.01); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

body/towards ground mid QPSK_20M_1RB_mid with earphone/Area Scan

(101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.716 W/kg

body/towards ground mid QPSK_20M_1RB_mid with earphone/Zoom Scan

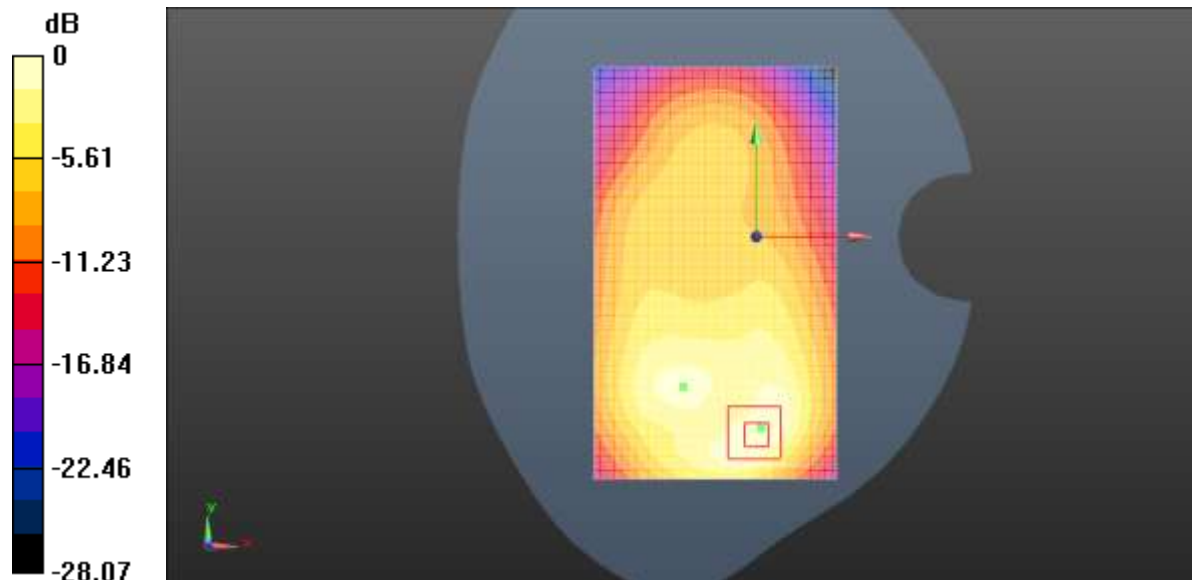
(7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.263 V/m; Power Drift = -0.09 dB

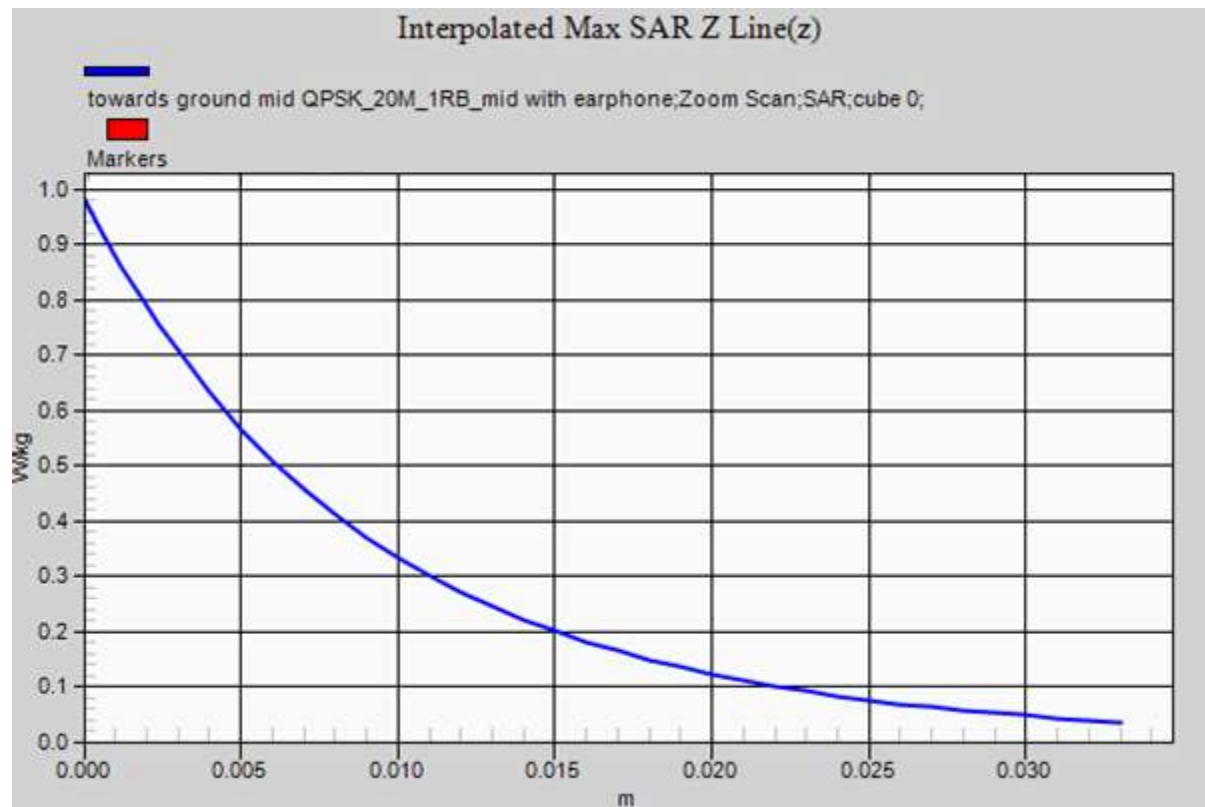
Peak SAR (extrapolated) = 0.981 W/kg

SAR(1 g) = 0.563 W/kg; SAR(10 g) = 0.317 W/kg

Maximum value of SAR (measured) = 0.703 W/kg



0 dB = 0.716 W/kg = -1.45 dBW/kg



LTE BAND 7 right touch low

Date/Time: 18/05/2015 15:02:58

Communication System: UID 0, FDD-LTE(QPSK_20M_1RB) (0); Communication System

Band: BAND 7; Frequency: 2510 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2510$ MHz; $\sigma = 1.814$ S/m; $\epsilon_r = 39.28$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.01, 7.01, 7.01); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

right/touch low/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

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

right/touch low/Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.097 V/m; Power Drift = -0.15 dB

Peak SAR (extrapolated) = 0.164 W/kg

SAR(1 g) = 0.084 W/kg; SAR(10 g) = 0.045 W/kg

Maximum value of SAR (measured) = 0.0901 W/kg

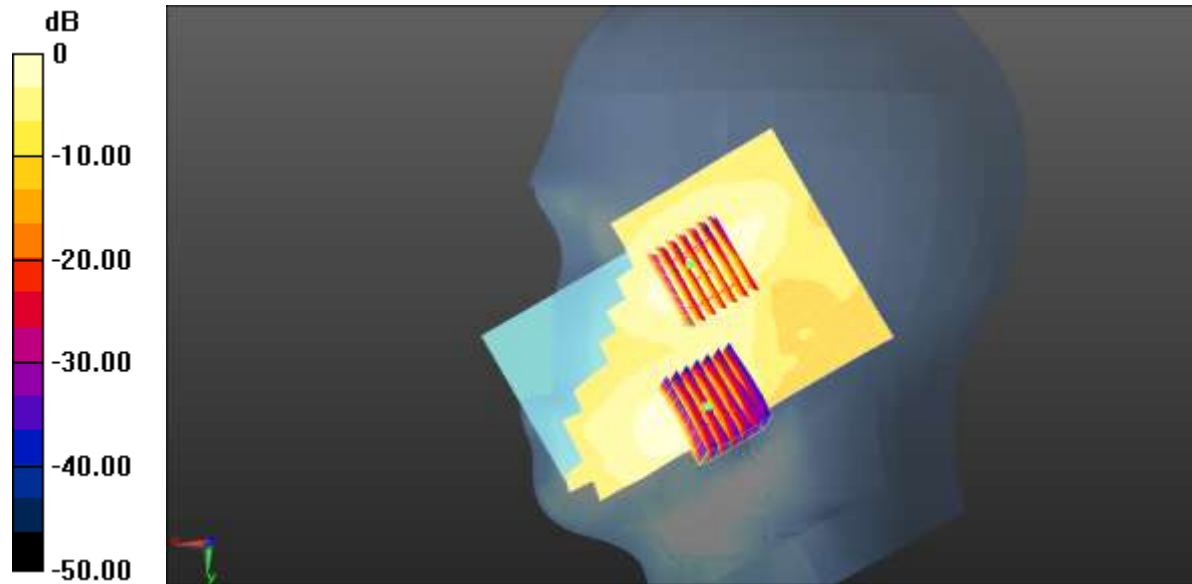
right/touch low/Zoom Scan (8x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.097 V/m; Power Drift = -0.15 dB

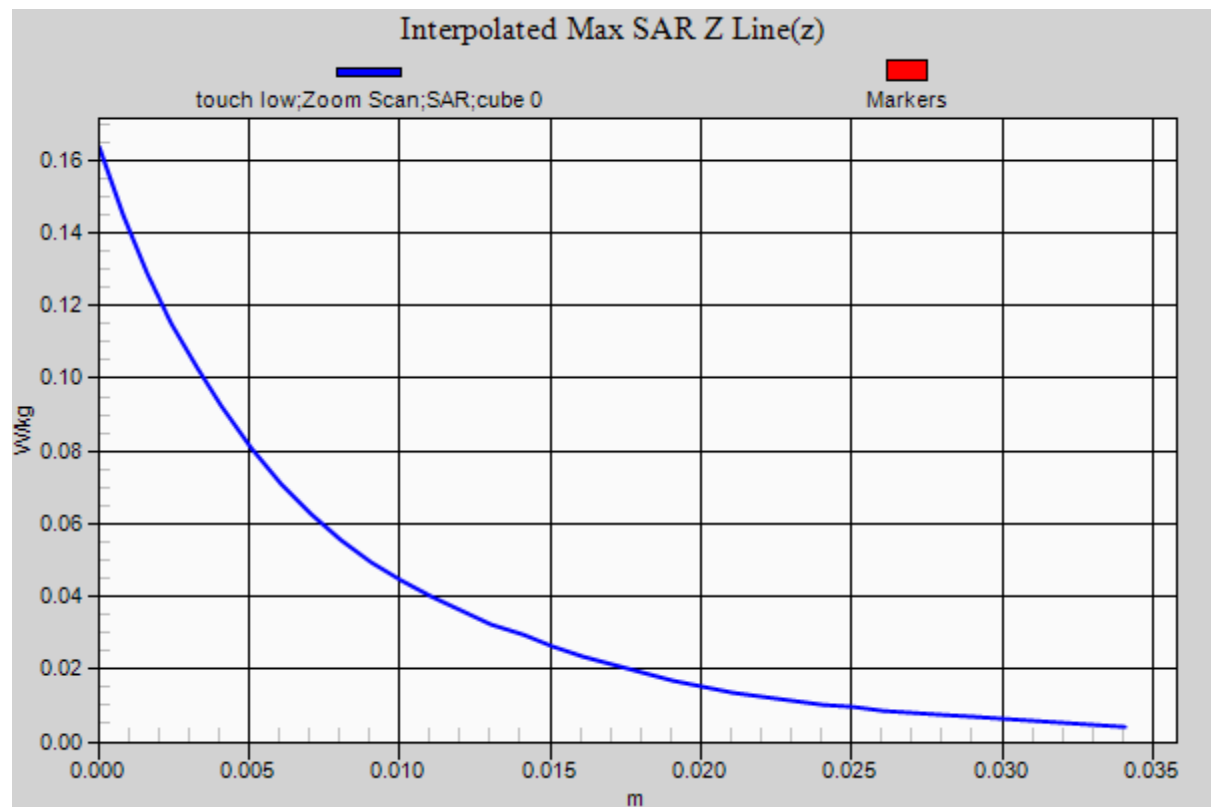
Peak SAR (extrapolated) = 0.138 W/kg

SAR(1 g) = 0.075 W/kg; SAR(10 g) = 0.041 W/kg

Maximum value of SAR (measured) = 0.0838 W/kg



0 dB = 0.110 W/kg = -9.58 dBW/kg



LTE BAND 7 towards ground low QPSK_20M_1RB_high

Date/Time: 08/05/2015 22:34:05

Communication System: UID 0, FDD-LTE(QPSK_20M_1RB) (0); Communication System

Band: BAND 7; Frequency: 2510 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2510$ MHz; $\sigma = 2.095$ S/m; $\epsilon_r = 51.424$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(6.99, 6.99, 6.99); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

body3/towards ground low QPSK_20M_1RB_high/Area Scan (101x171x1):

Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.831 W/kg

body3/towards ground low QPSK_20M_1RB_high/Zoom Scan (7x7x7)/Cube

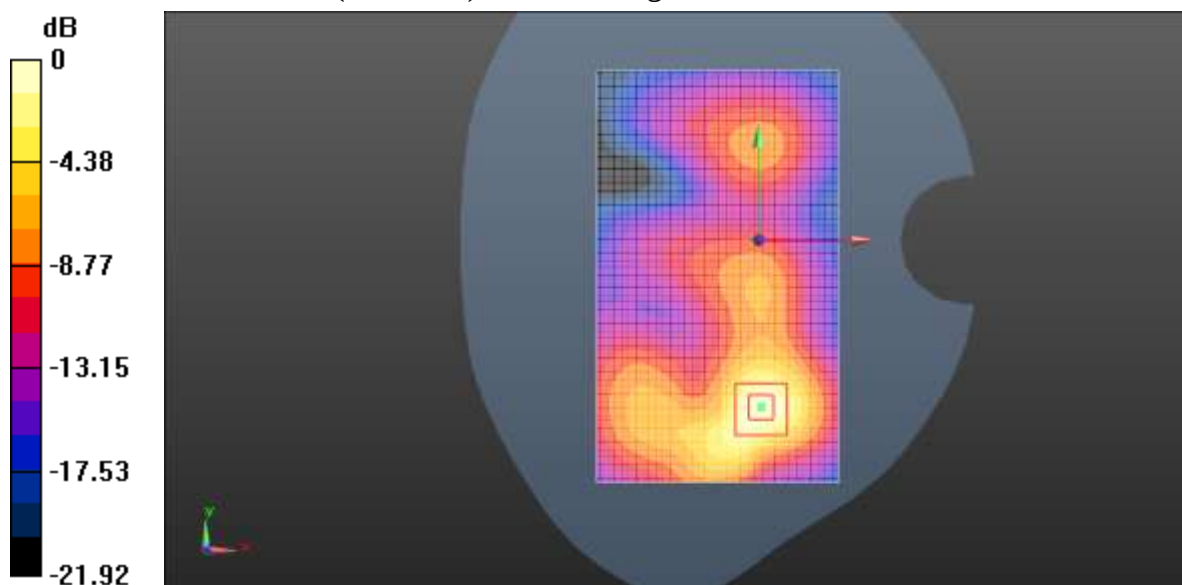
0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 6.062 V/m; Power Drift = -0.08 dB

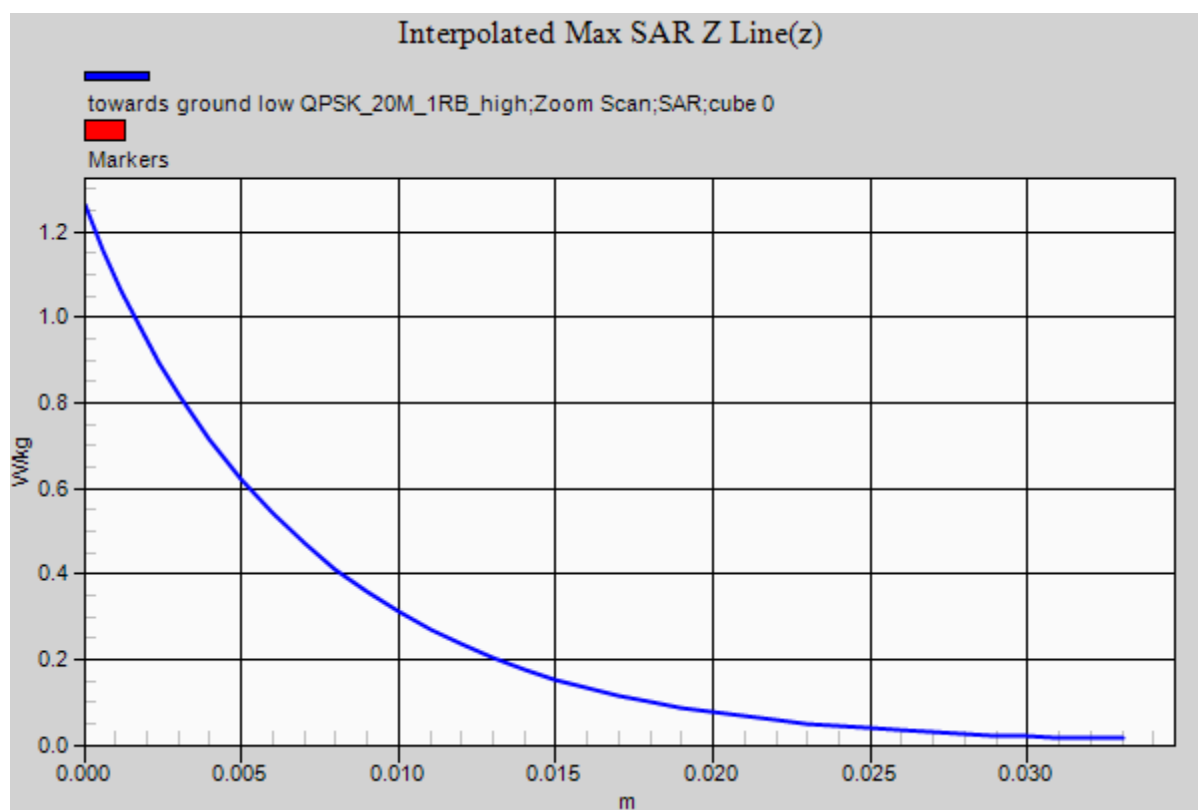
Peak SAR (extrapolated) = 1.26 W/kg

SAR(1 g) = 0.630 W/kg; SAR(10 g) = 0.294 W/kg

Maximum value of SAR (measured) = 0.824 W/kg



0 dB = 0.831 W/kg = -0.81 dBW/kg



802.11b Data Rate: 1 Mbps left touch high

Date/Time: 28/04/2015 22:00:49

Communication System: UID 0, 802.11b/g/n 2.45GHz (0); Communication System Band: 2400-2483.5; Frequency: 2462 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2462$ MHz; $\sigma = 1.789$ S/m; $\epsilon_r = 37.883$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.24, 7.24, 7.24); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 14/07/2014
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

left/touch high/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.286 W/kg

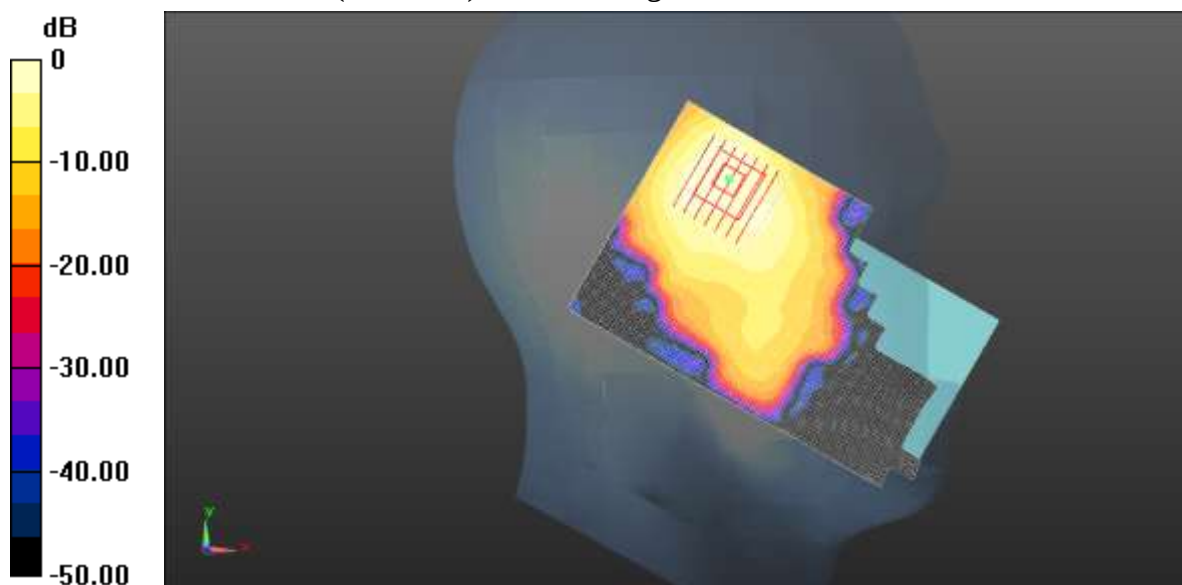
left/touch high/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.380 V/m; Power Drift = -0.09 dB

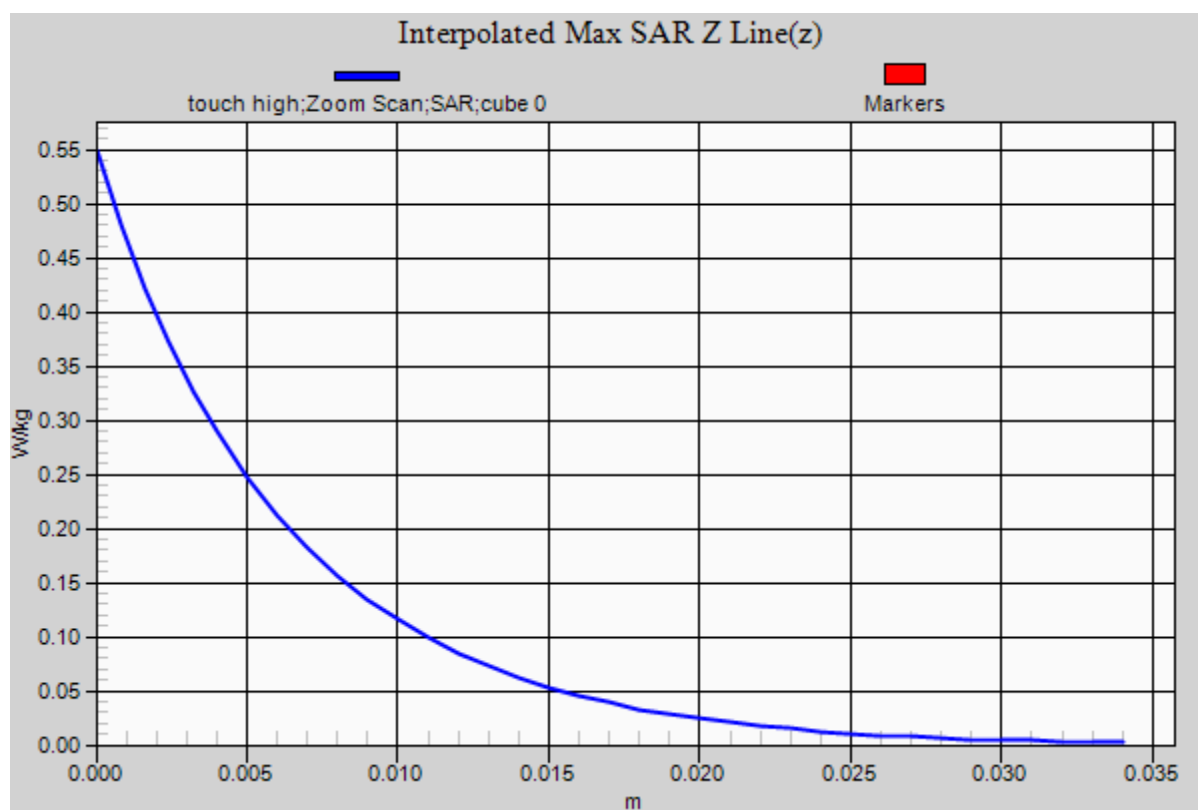
Peak SAR (extrapolated) = 0.549 W/kg

SAR(1 g) = 0.263 W/kg; SAR(10 g) = 0.129 W/kg

Maximum value of SAR (measured) = 0.297 W/kg



0 dB = 0.286 W/kg = -5.43 dBW/kg



802.11b Data Rate: 1 Mbps towards ground high

Date/Time: 08/05/2015 05:01:10

Communication System: UID 0, 802.11b/g/n 2.45GHz (0); Communication System Band: 2400-2483.5; Frequency: 2462 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2462$ MHz; $\sigma = 1.934$ S/m; $\epsilon_r = 51.886$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.46, 4.46, 4.46); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Configuration/towards ground high/Area Scan (101x171x1): Interpolated grid:

$dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.0722 W/kg

Configuration/towards ground high/Zoom Scan (7x7x7)/Cube 0: Measurement

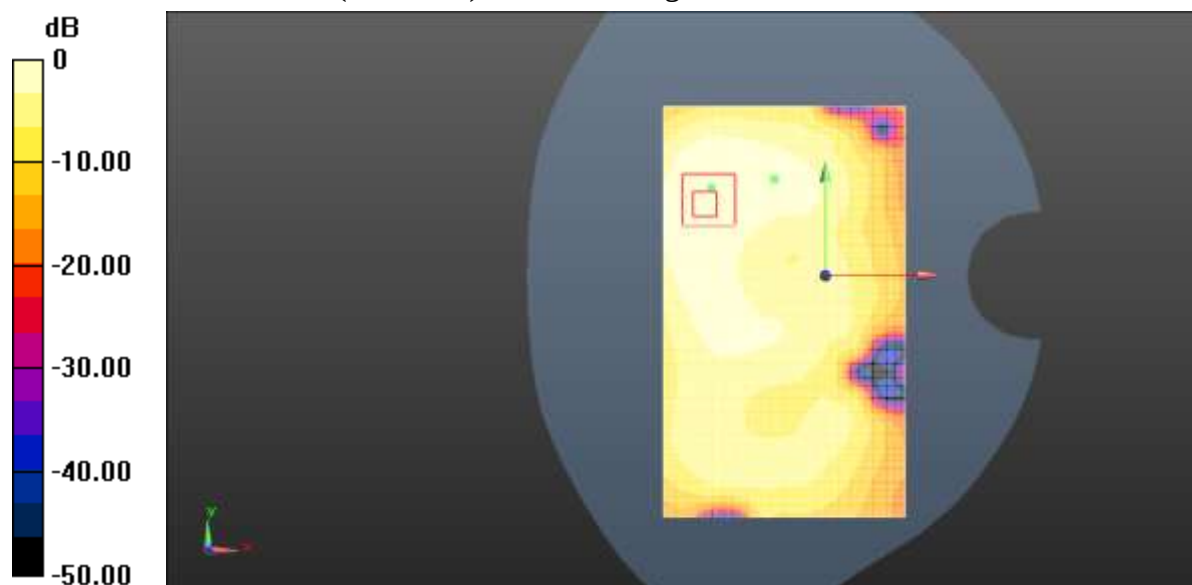
grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 3.089 V/m; Power Drift = -0.06 dB

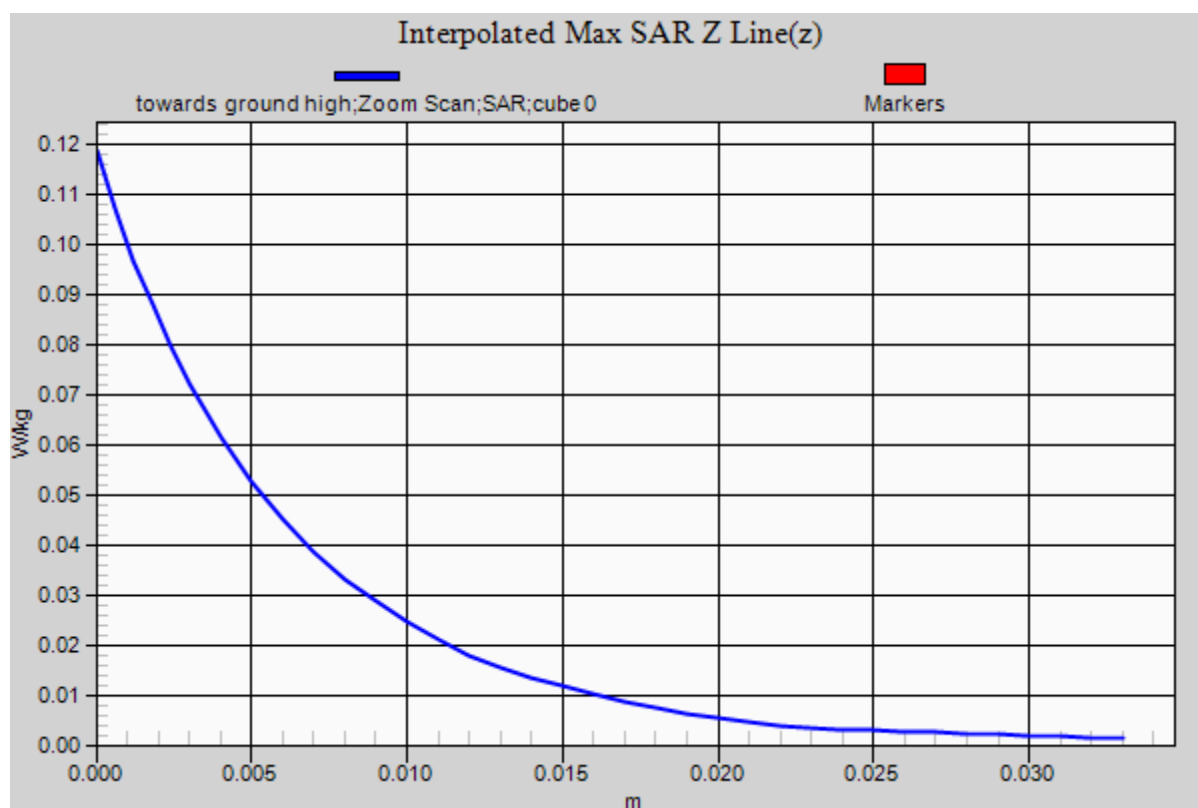
Peak SAR (extrapolated) = 0.119 W/kg

SAR(1 g) = 0.058 W/kg; SAR(10 g) = 0.032 W/kg

Maximum value of SAR (measured) = 0.0723 W/kg



0 dB = 0.0722 W/kg = -11.42 dBW/kg



Graph Result for double card version

GSM850 voice right touch low

Date/Time: 19/05/2015 18:13:23

Communication System: UID 0, GSM (0); Communication System Band: GSM850(824.0-849.0MHz); Frequency: 824.2 MHz; Communication System PAR: 9.191 dB

Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.868$ S/m; $\epsilon_r = 41.82$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(9.08, 9.08, 9.08); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM1; Type: SAM; Serial: TP1576
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

right/touch low/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.541 W/kg

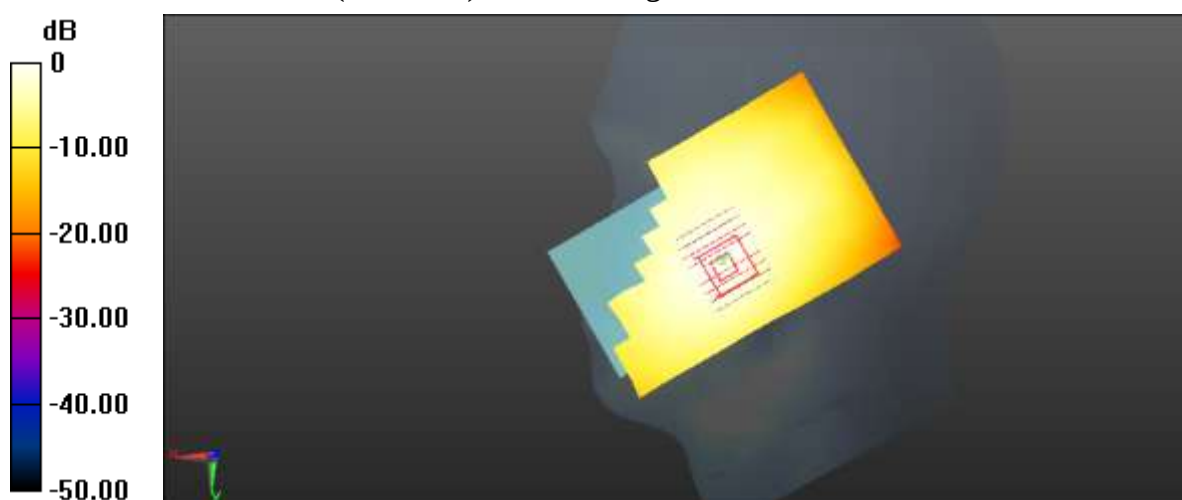
right/touch low/Zoom Scan (9x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.114 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 0.636 W/kg

SAR(1 g) = 0.475 W/kg; SAR(10 g) = 0.345 W/kg

Maximum value of SAR (measured) = 0.511 W/kg



0 dB = 0.541 W/kg = -2.67 dBW/kg



GSM850 DTM right touch low

Date/Time: 19/05/2015 14:53:17

Communication System: UID 0, GPRS/EGPRS(3UP) (0); Communication System Band: GSM850; Frequency: 824.2 MHz; Communication System PAR: 4.42 dB

Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.868$ S/m; $\epsilon_r = 41.82$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(9.08, 9.08, 9.08); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM1; Type: SAM; Serial: TP1576
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

right2/touch low 2card/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.517 W/kg

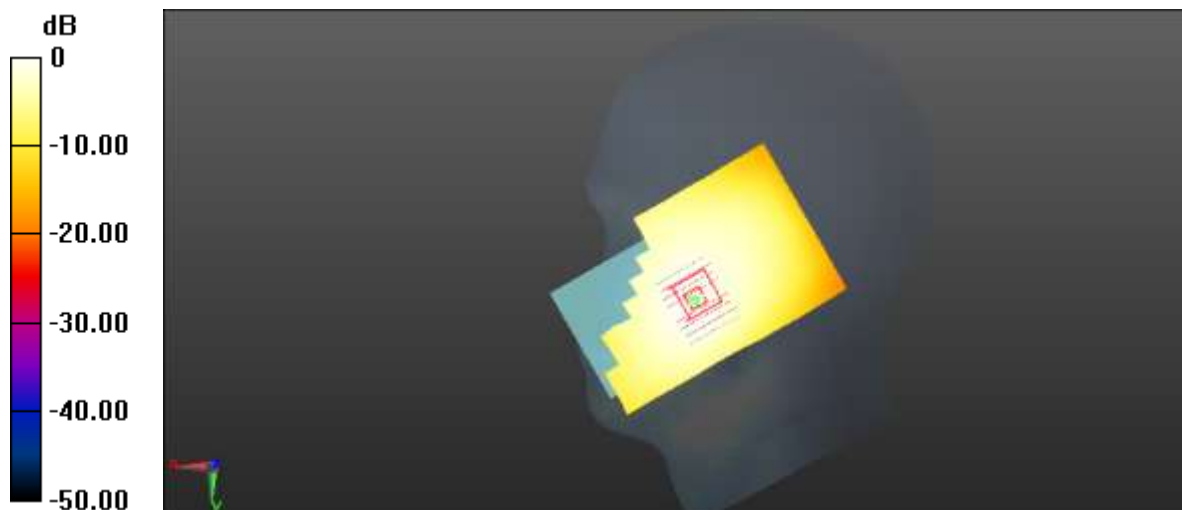
right2/touch low 2card/Zoom Scan (9x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.895 V/m; Power Drift = -0.03 dB

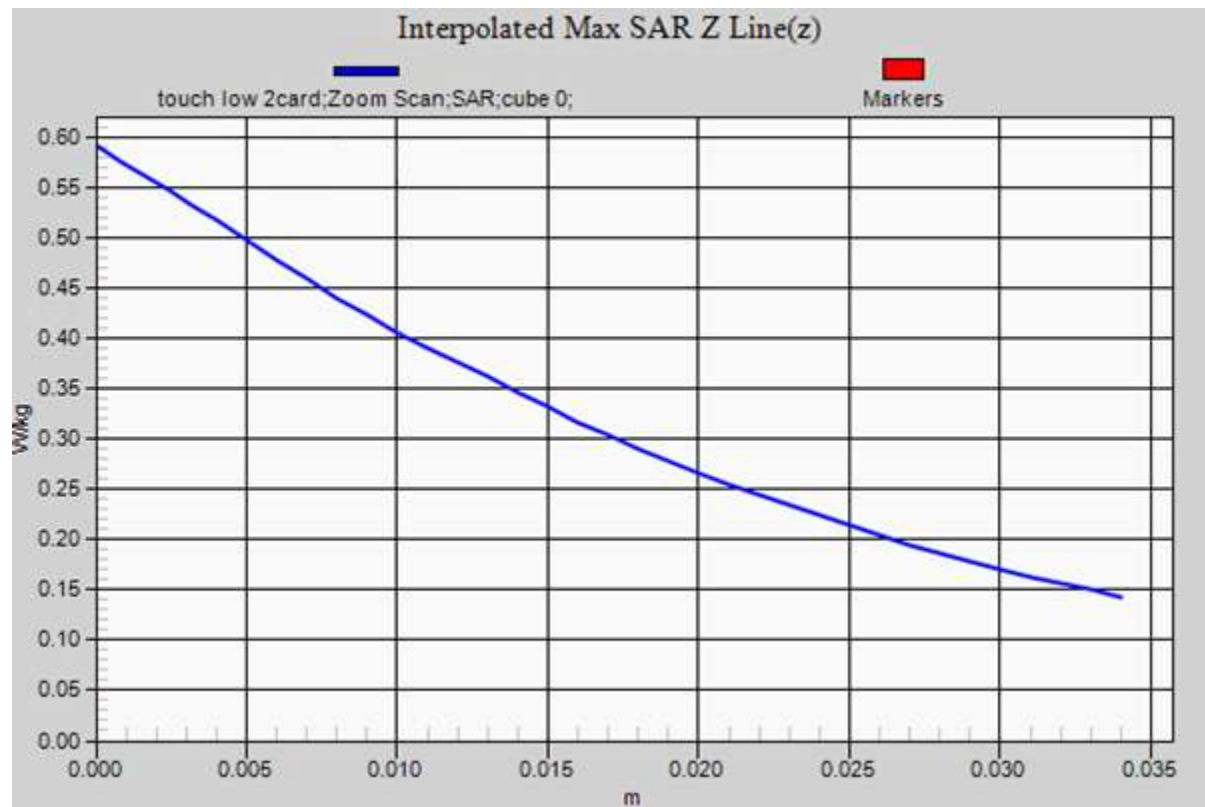
Peak SAR (extrapolated) = 0.592 W/kg

SAR(1 g) = 0.492 W/kg; SAR(10 g) = 0.383 W/kg

Maximum value of SAR (measured) = 0.519 W/kg



0 dB = 0.517 W/kg = -2.87 dBW/kg



GSM850 towards ground low card 2

Date/Time: 26/05/2015 11:26:29

Communication System: UID 0, GPRS/EGPRS(4UP) (0); Communication System Band: GSM850; Frequency: 824.2 MHz; Communication System PAR: 3.18 dB

Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.933$ S/m; $\epsilon_r = 54.311$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(6.37, 6.37, 6.37); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: ELI v4.0; Type: ELI4; Serial: TP:1086
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

body 10mm/towards ground low card 2/Area Scan (101x171x1): Interpolated

grid: dx=1.000 mm, dy=1.000 mm

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

body 10mm/towards ground low card 2/Zoom Scan (7x7x7)/Cube 0:

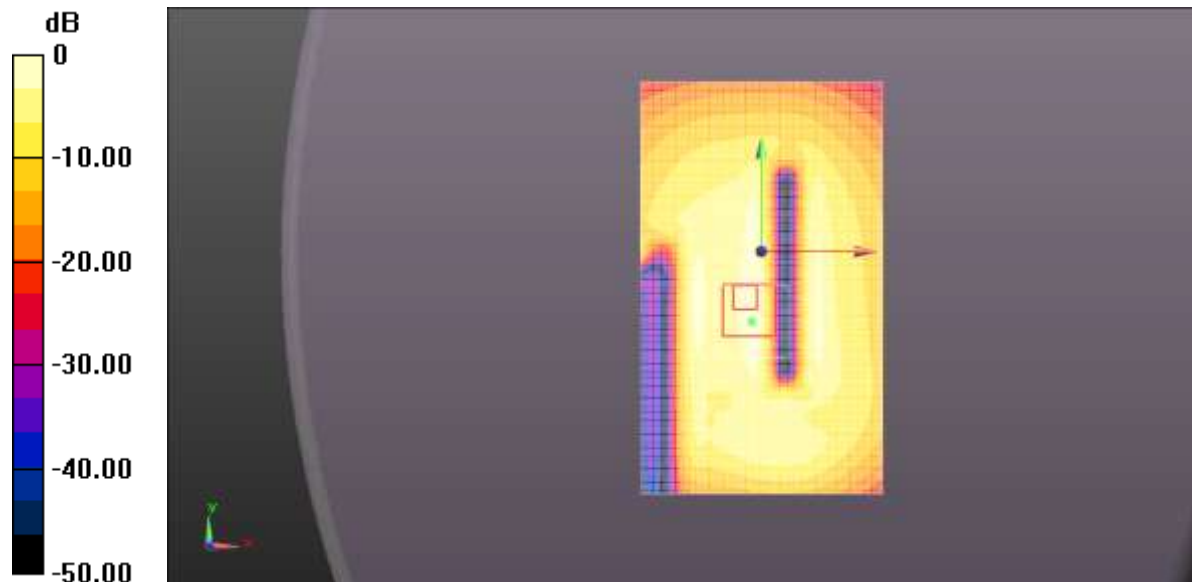
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 22.078 V/m; Power Drift = -0.09 dB

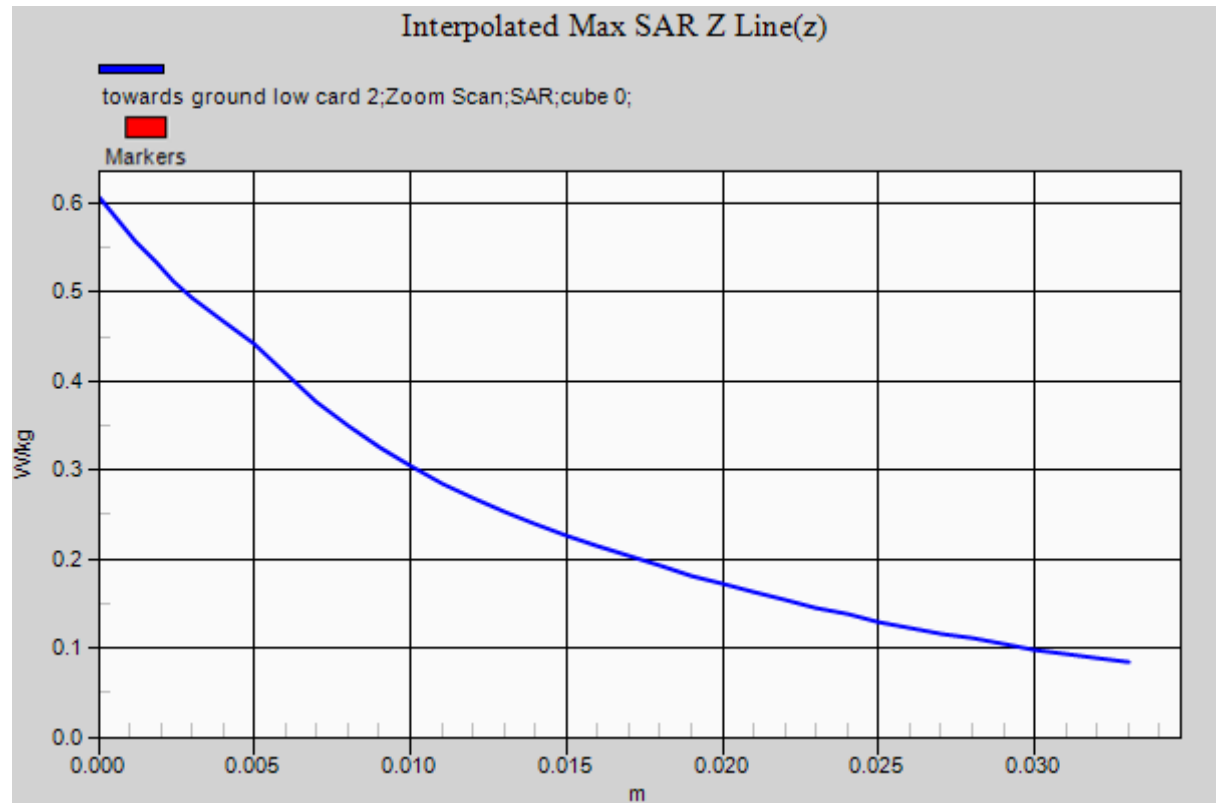
Peak SAR (extrapolated) = 0.607 W/kg

SAR(1 g) = 0.445 W/kg; SAR(10 g) = 0.308 W/kg

Maximum value of SAR (measured) = 0.480 W/kg



0 dB = 1.04 W/kg = 0.15 dBW/kg



GSM1900 voice right touch high card 2

Date/Time: 20/05/2015 10:38:38

Communication System: UID 0, GSM (0); Communication System Band: PCS1900(1850.0-1910.0MHz); Frequency: 1850.2 MHz; Communication System PAR: 9.191 dB

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.339$ S/m; $\epsilon_r = 39.255$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASYS (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.74, 7.74, 7.74); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

right/touch low 2card/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.212 W/kg

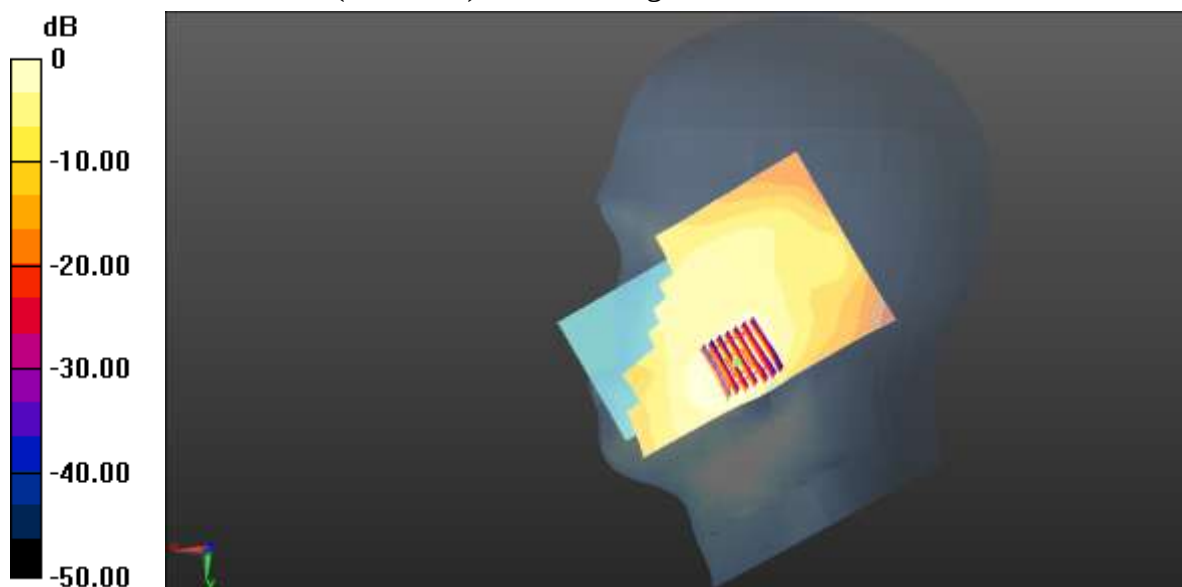
right/touch low 2card/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.517 V/m; Power Drift = -0.11 dB

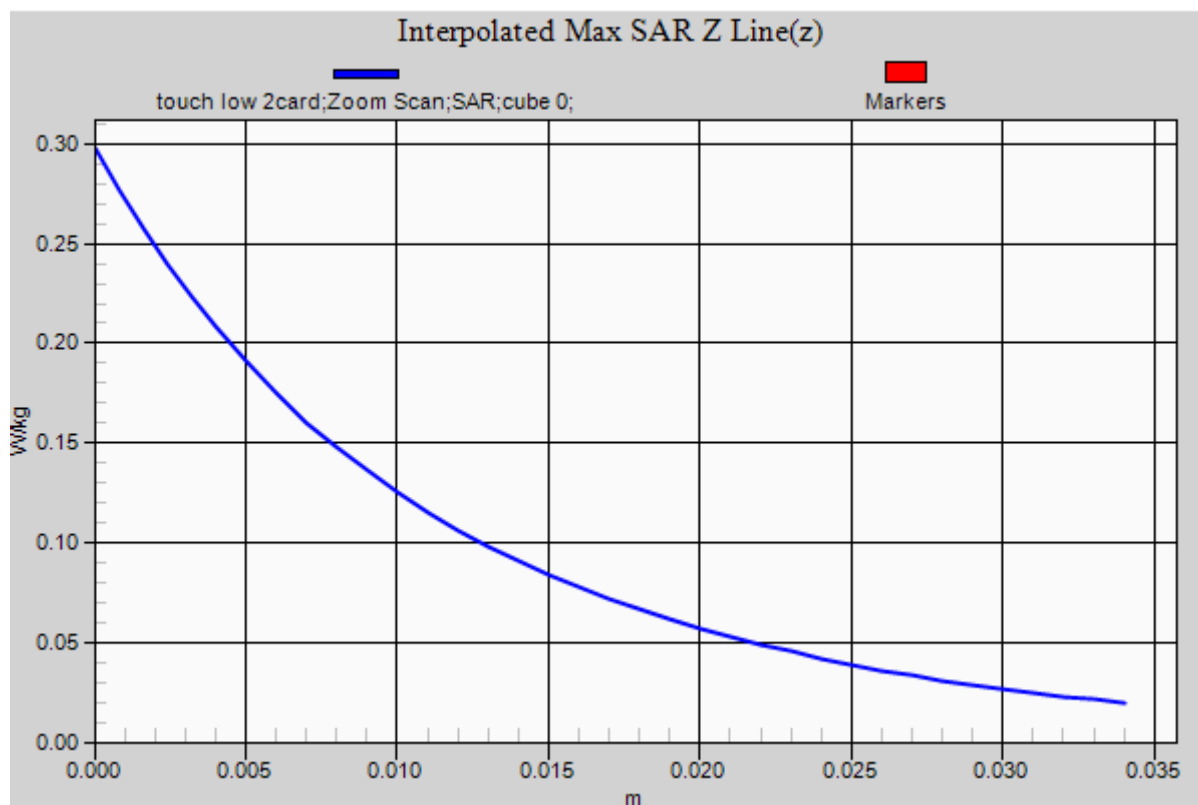
Peak SAR (extrapolated) = 0.298 W/kg

SAR(1 g) = 0.193 W/kg; SAR(10 g) = 0.120 W/kg

Maximum value of SAR (measured) = 0.207 W/kg



0 dB = 0.212 W/kg = -6.74 dBW/kg



GSM1900 DTM right touch high

Date/Time: 20/05/2015 12:09:36

Communication System: UID 0, GPRS/EGPRS(3UP) (0); Communication System Band: PCS1900; Frequency: 1909.8 MHz; Communication System PAR: 4.42 dB

Medium parameters used: $f = 1909.8$ MHz; $\sigma = 1.48$ S/m; $\epsilon_r = 39.6$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.74, 7.74, 7.74); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

right 2/touch high/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.358 W/kg

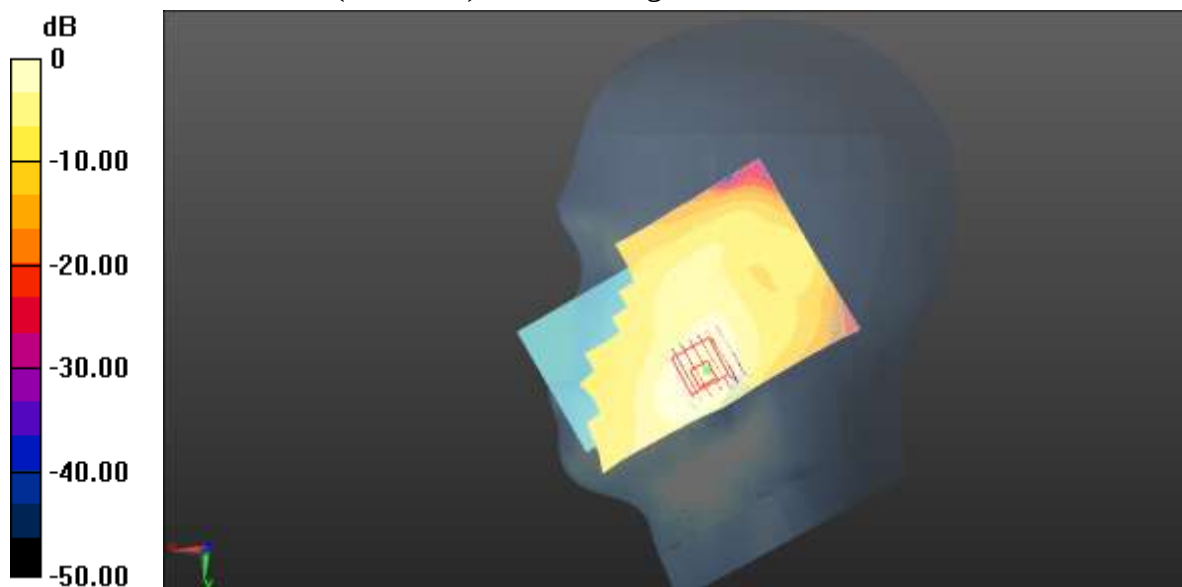
right 2/touch high/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.094 V/m; Power Drift = -0.19 dB

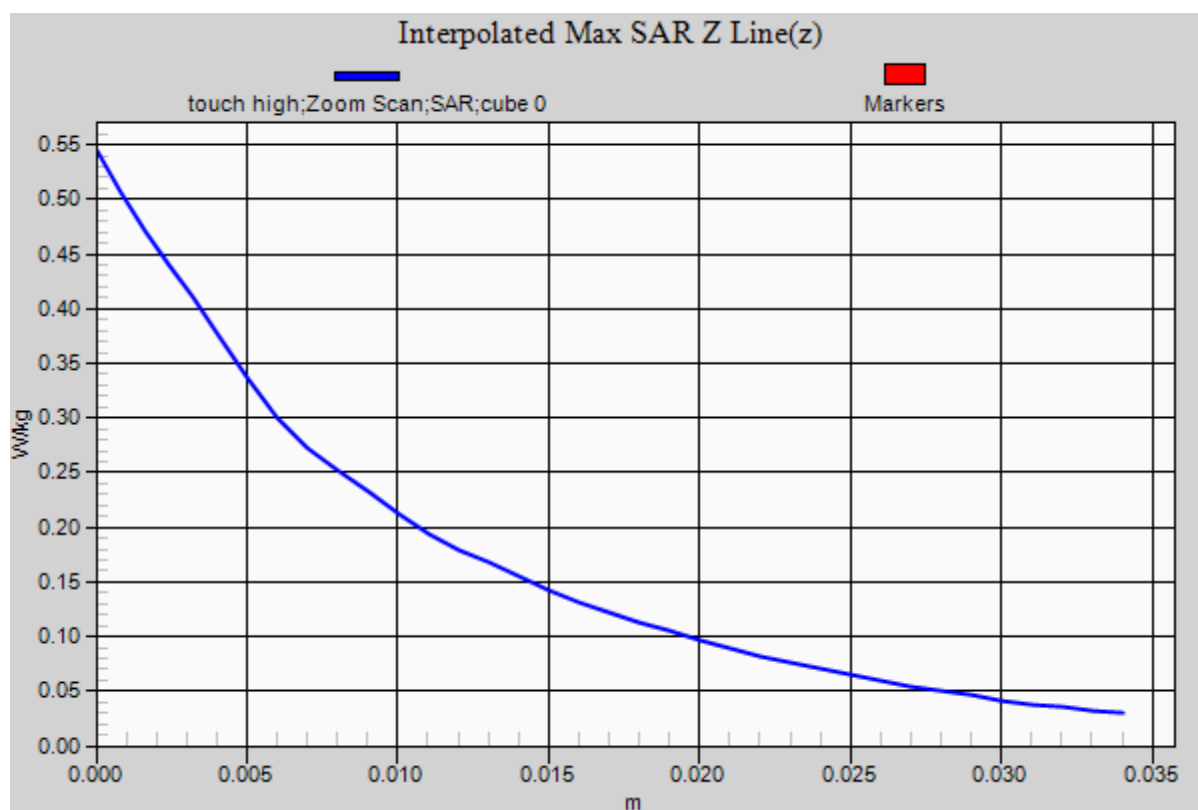
Peak SAR (extrapolated) = 0.544 W/kg

SAR(1 g) = 0.318 W/kg; SAR(10 g) = 0.193 W/kg

Maximum value of SAR (measured) = 0.371 W/kg



0 dB = 0.358 W/kg = -4.47 dBW/kg



GSM1900 front high

Date/Time: 23/05/2015 16:23:53

Communication System: UID 0, GPRS/EGPRS(4UP) (0); Communication System Band: PCS1900; Frequency: 1909.8 MHz; Communication System PAR: 3.18 dB

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.503$ S/m; $\epsilon_r = 52.325$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.85, 4.85, 4.85); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

body /front high/Area Scan (61x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.37 W/kg

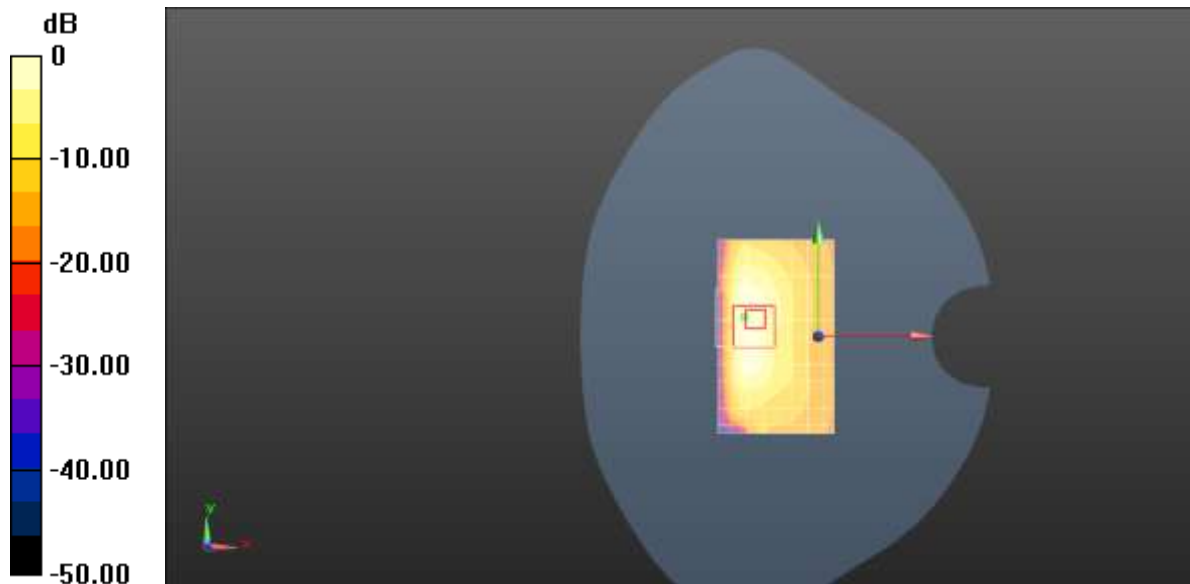
body /front high/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.914 V/m; Power Drift = -0.12dB

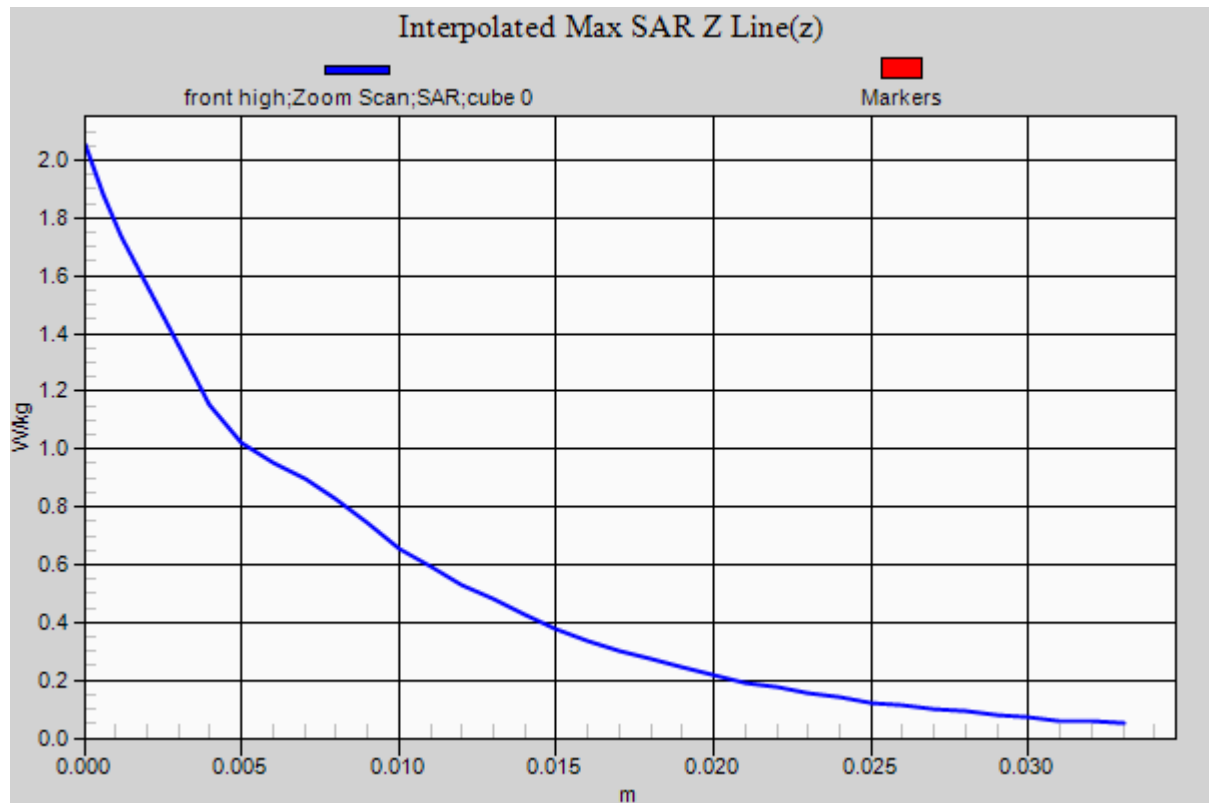
Peak SAR (extrapolated) = 2.05 W/kg

SAR(1 g) = 0.820 W/kg; SAR(10 g) = 0.363 W/kg

Maximum value of SAR (measured) = 0.891 W/kg



0 dB = 1.37 W/kg = 1.37 dBW/kg



WCDMA BAND II right touch high

Date/Time: 20/05/2015 09:52:16

Communication System: UID 0, WCDMA (0); Communication System Band: BAND 2;

Frequency: 1907.6 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 1908$ MHz; $\sigma = 1.391$ S/m; $\epsilon_r = 39.019$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.74, 7.74, 7.74); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

right/touch high/Area Scan (101x171x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.390 W/kg

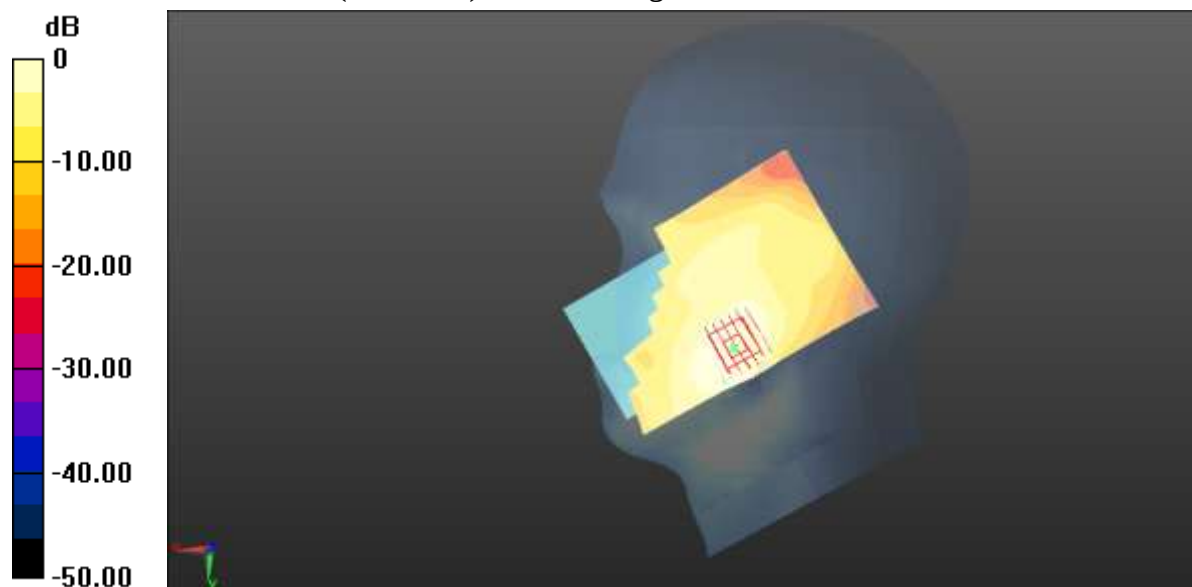
right/touch high/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 7.901 V/m; Power Drift = -0.09 dB

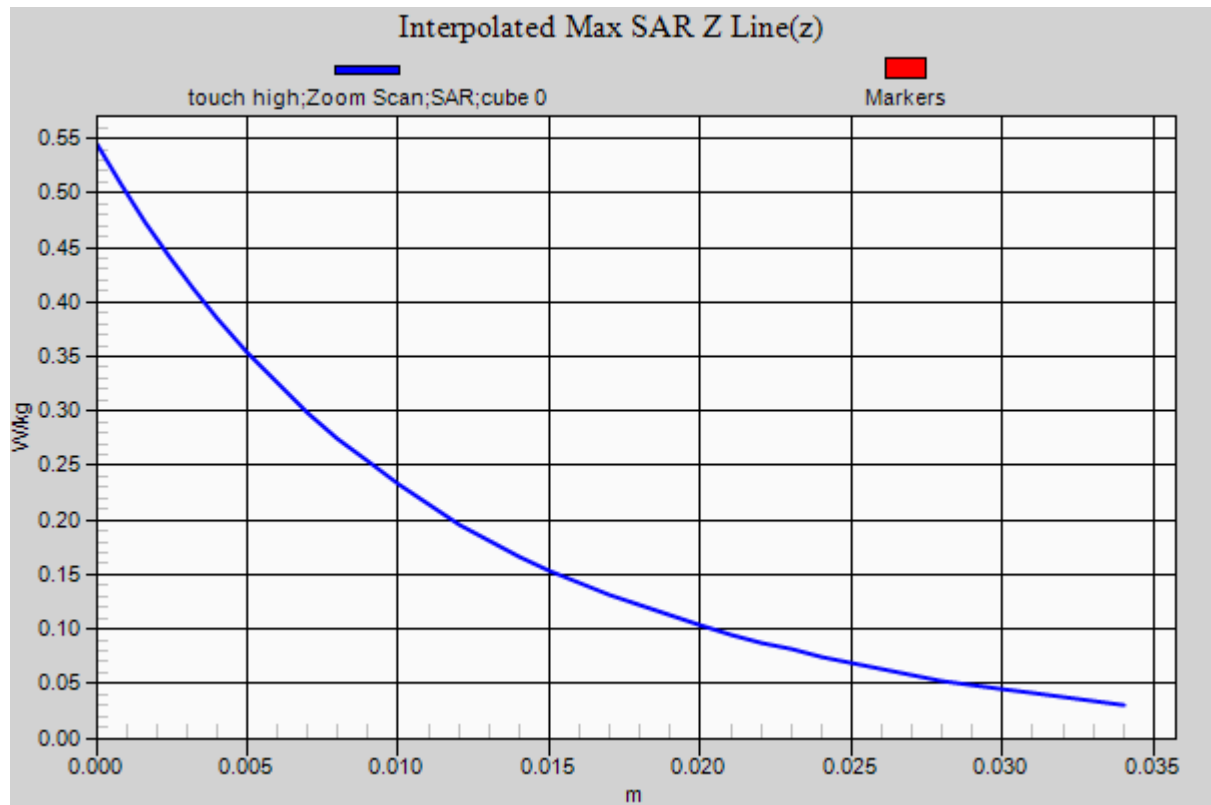
Peak SAR (extrapolated) = 0.544 W/kg

SAR(1 g) = 0.351 W/kg; SAR(10 g) = 0.214 W/kg

Maximum value of SAR (measured) = 0.388 W/kg



0 dB = 0.390 W/kg = -4.09 dBW/kg



WCDMA BAND II towards ground high

Date/Time: 23/05/2015 03:47:42

Communication System: UID 0, WCDMA (0); Communication System Band: BAND 2;

Frequency: 1907.6 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 1908$ MHz; $\sigma = 1.502$ S/m; $\epsilon_r = 52.332$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.85, 4.85, 4.85); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Configuration/towards ground high/Area Scan (101x171x1): Interpolated grid:

$dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.968 W/kg

Configuration/towards ground high/Zoom Scan (7x7x7)/Cube 0: Measurement

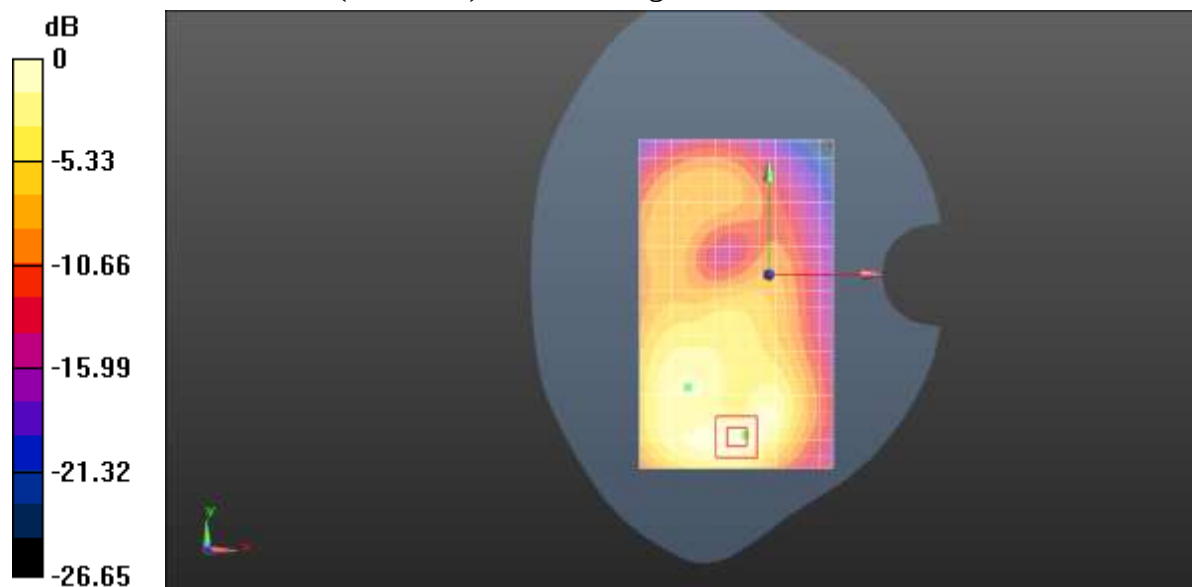
grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 7.700 V/m; Power Drift = -0.08 dB

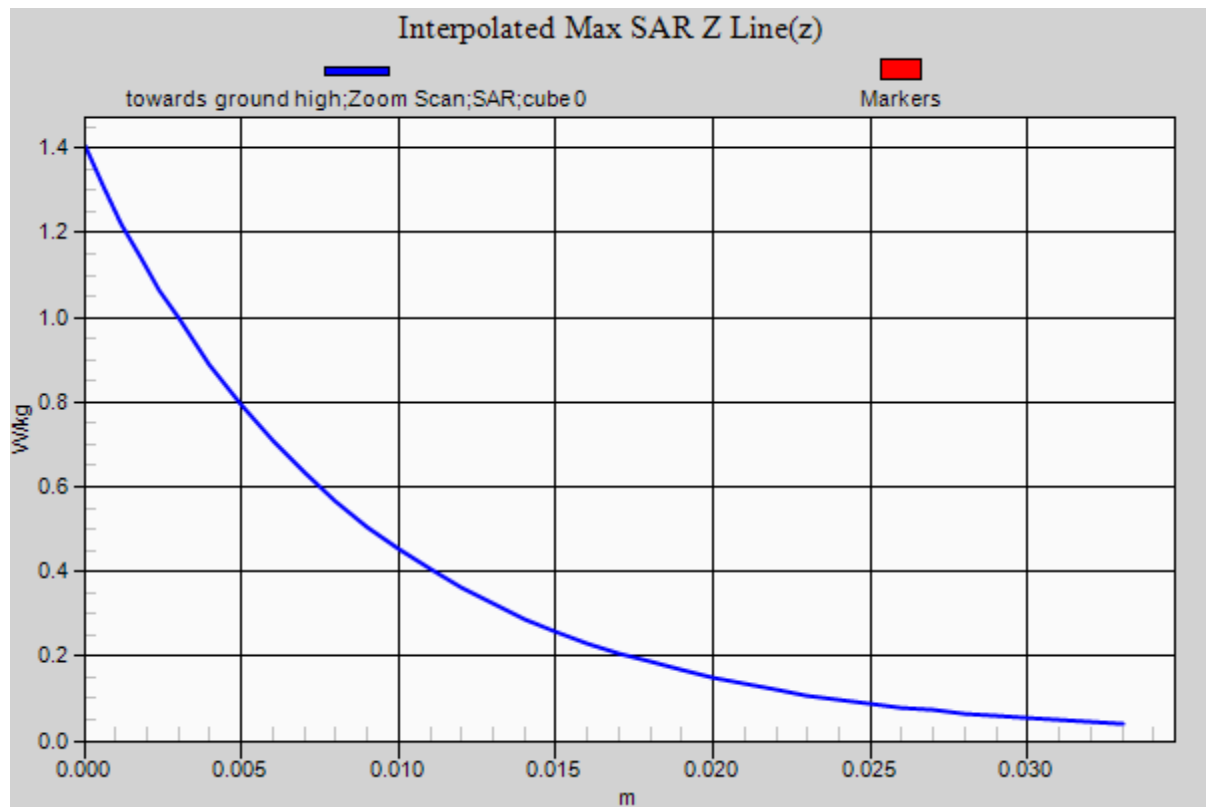
Peak SAR (extrapolated) = 1.41 W/kg

SAR(1 g) = 0.791 W/kg; SAR(10 g) = 0.428 W/kg

Maximum value of SAR (measured) = 0.984 W/kg



0 dB = 0.968 W/kg = -0.14 dBW/kg



WCDMA BAND V left touch high

Date/Time: 19/05/2015 15:43:02

Communication System: UID 0, WCDMA (0); Communication System Band: BAND 5;

Frequency: 846.6 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 847$ MHz; $\sigma = 0.892$ S/m; $\epsilon_r = 41.467$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(9.08, 9.08, 9.08); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM1; Type: SAM; Serial: TP1576
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

left /touch high/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.371 W/kg

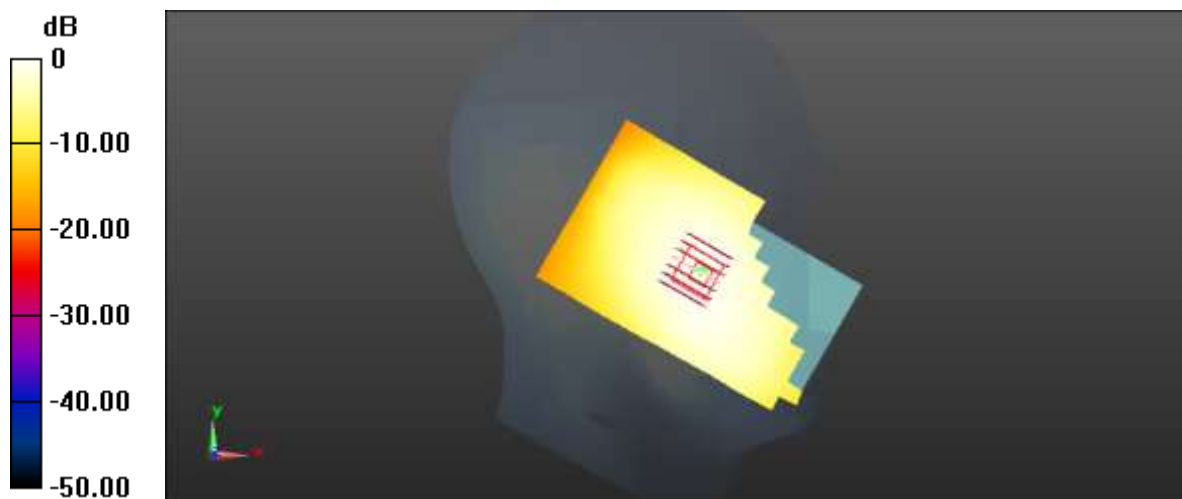
left /touch high/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.662 V/m; Power Drift = -0.06 dB

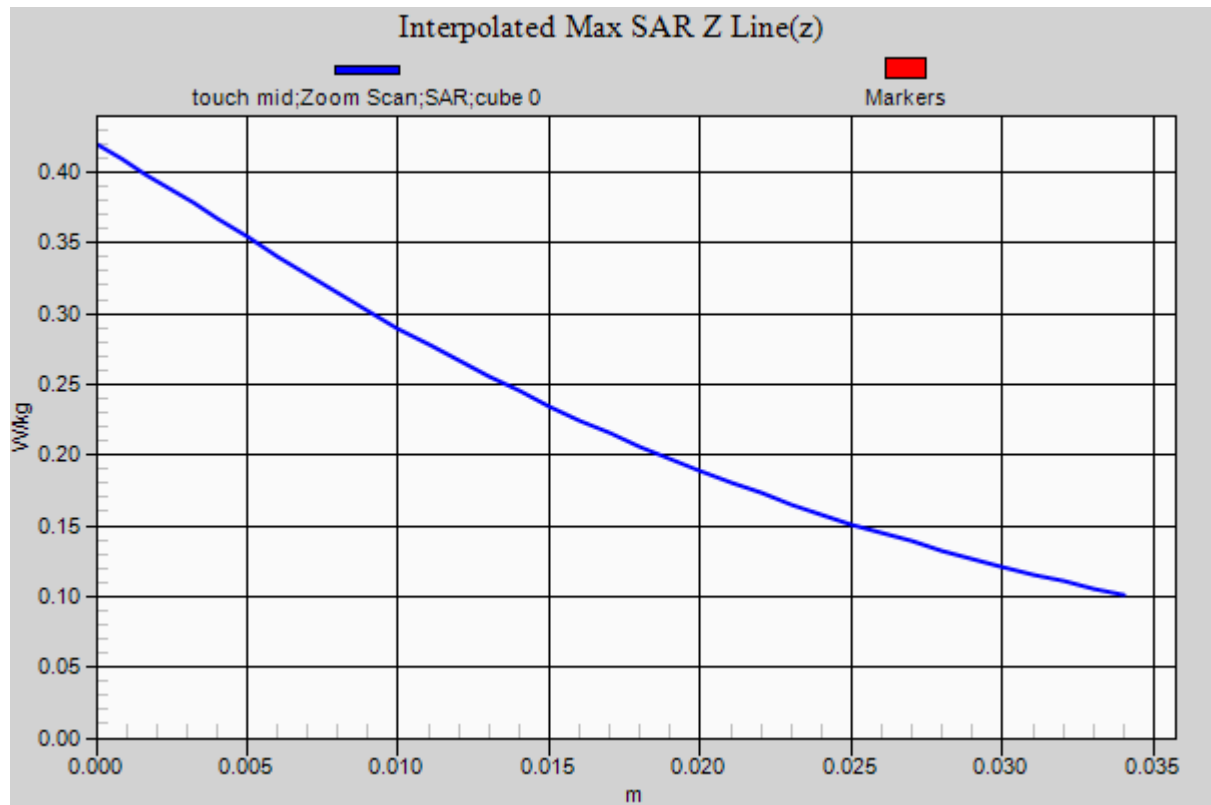
Peak SAR (extrapolated) = 0.419 W/kg

SAR(1 g) = 0.349 W/kg; SAR(10 g) = 0.271 W/kg

Maximum value of SAR (measured) = 0.367 W/kg



0 dB = 0.371 W/kg = -4.31 dBW/kg



WCDMA BAND V towards ground high

Date/Time: 26/05/2015 15:33:09

Communication System: UID 0, WCDMA (0); Communication System Band: BAND 5;

Frequency: 846.6 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 847$ MHz; $\sigma = 0.965$ S/m; $\epsilon_r = 54.169$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(6.37, 6.37, 6.37); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: ELI v4.0; Type: ELI4; Serial: TP:1086
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Configuration/towards ground high/Area Scan (101x171x1): Interpolated grid:

$dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.634 W/kg

Configuration/towards ground high/Zoom Scan (7x7x7)/Cube 0: Measurement

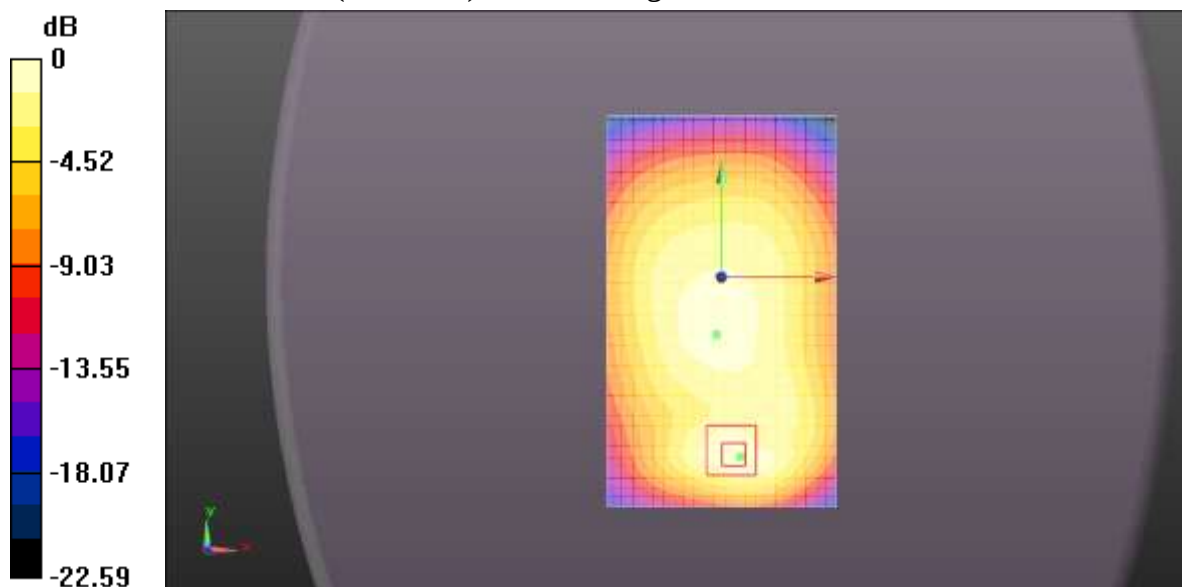
grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 23.908 V/m; Power Drift = -0.05 dB

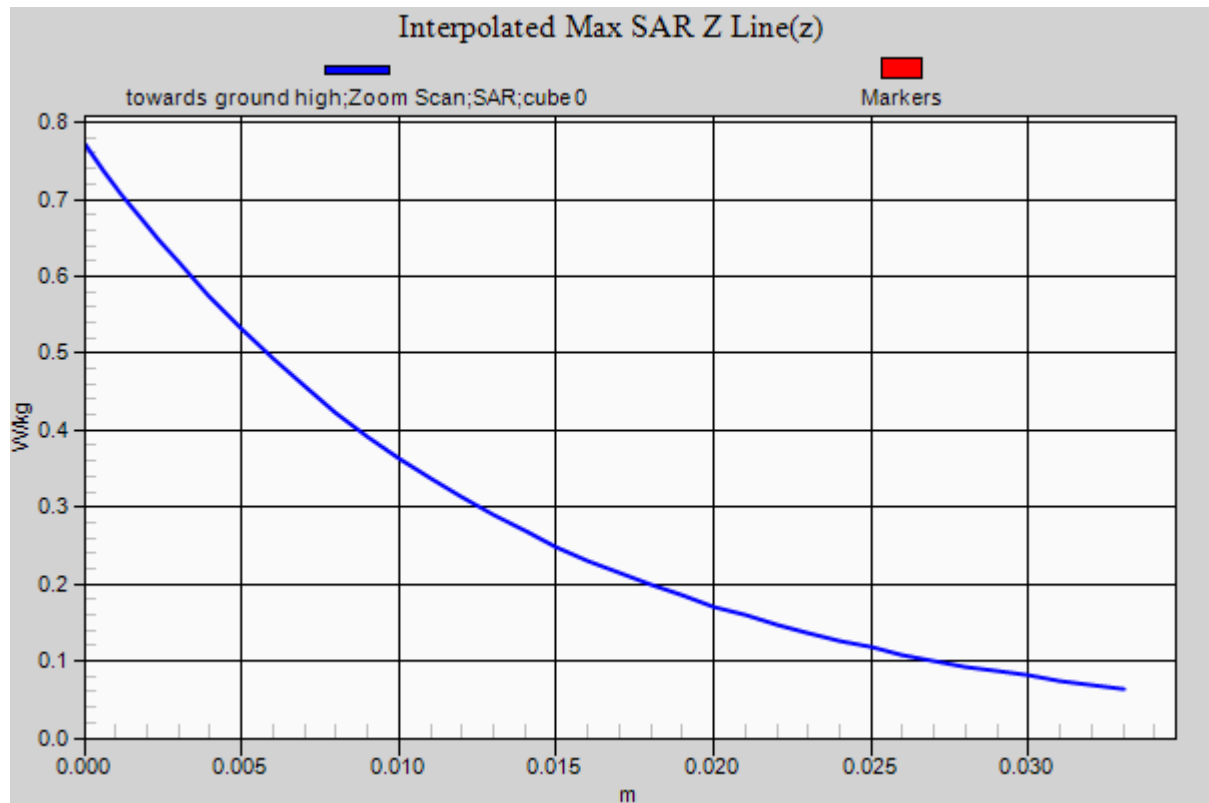
Peak SAR (extrapolated) = 0.771 W/kg

SAR(1 g) = 0.516 W/kg; SAR(10 g) = 0.319 W/kg

Maximum value of SAR (measured) = 0.613 W/kg



0 dB = 0.634 W/kg = -1.98 dBW/kg



LTE BAND 2 right touch high QPSK_20M_1RB_low

Date/Time: 20/05/2015 15:12:28

Communication System: UID 0, FDD-LTE(QPSK_20M_1RB) (0); Communication System

Band: BAND 2; Frequency: 1900 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.383$ S/m; $\epsilon_r = 39.048$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.74, 7.74, 7.74); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

right/touch high QPSK_20M_1RB_low/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.328 W/kg

right/touch high QPSK_20M_1RB_low/Zoom Scan (7x7x7)/Cube 0:

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

Reference Value = 6.492 V/m; Power Drift = 0.11 dB

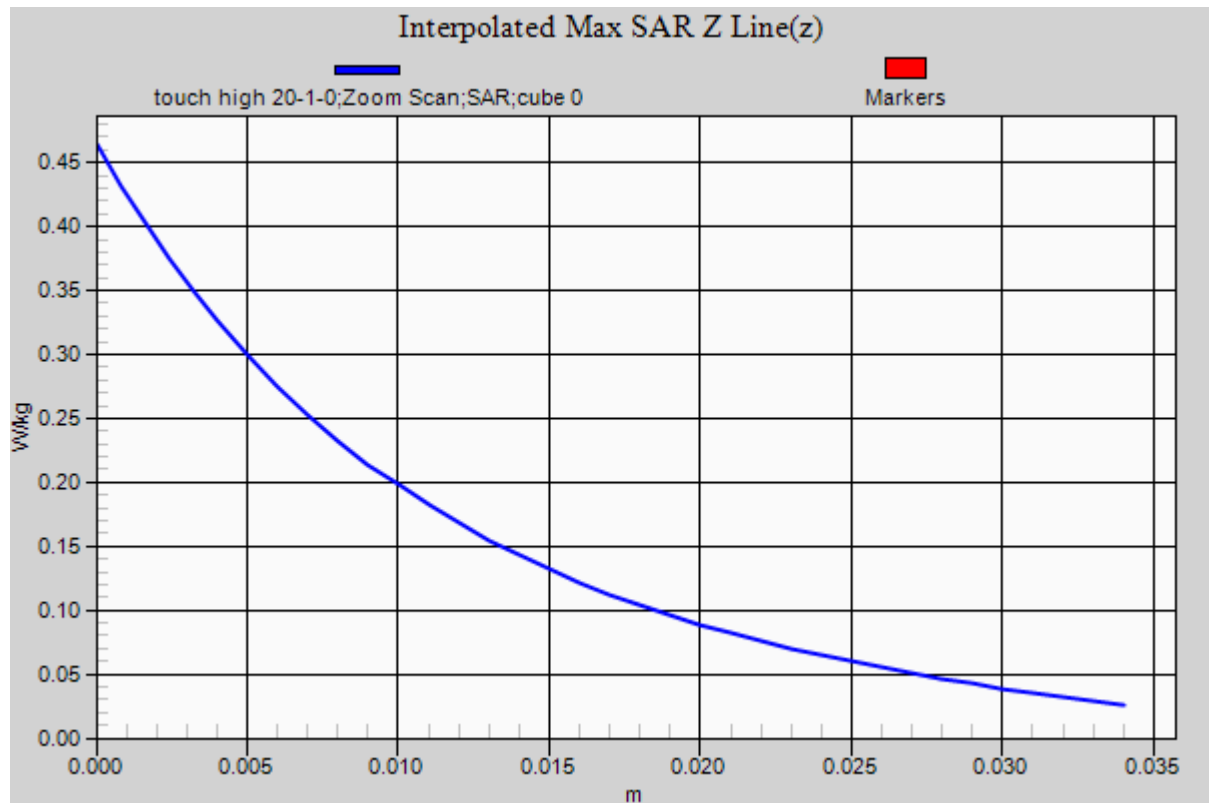
Peak SAR (extrapolated) = 0.464 W/kg

SAR(1 g) = 0.295 W/kg; SAR(10 g) = 0.181 W/kg

Maximum value of SAR (measured) = 0.328 W/kg



0 dB = 0.328 W/kg = -4.85 dBW/kg



LTE BAND 2 front high QPSK_20M_1RB low with earphone

Date/Time: 23/05/2015 16:54:02

Communication System: UID 0, FDD-LTE(QPSK_20M_1RB) (0); Communication System

Band: BAND 2; Frequency: 1900 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.495$ S/m; $\epsilon_r = 52.357$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.85, 4.85, 4.85); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: ELI v4.0; Type: ELI4; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Configuration/front high QPSK_20M_1RB_low with earphone/Area Scan

(61x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.05 W/kg

Configuration/front high QPSK_20M_1RB_low with earphone/Zoom Scan

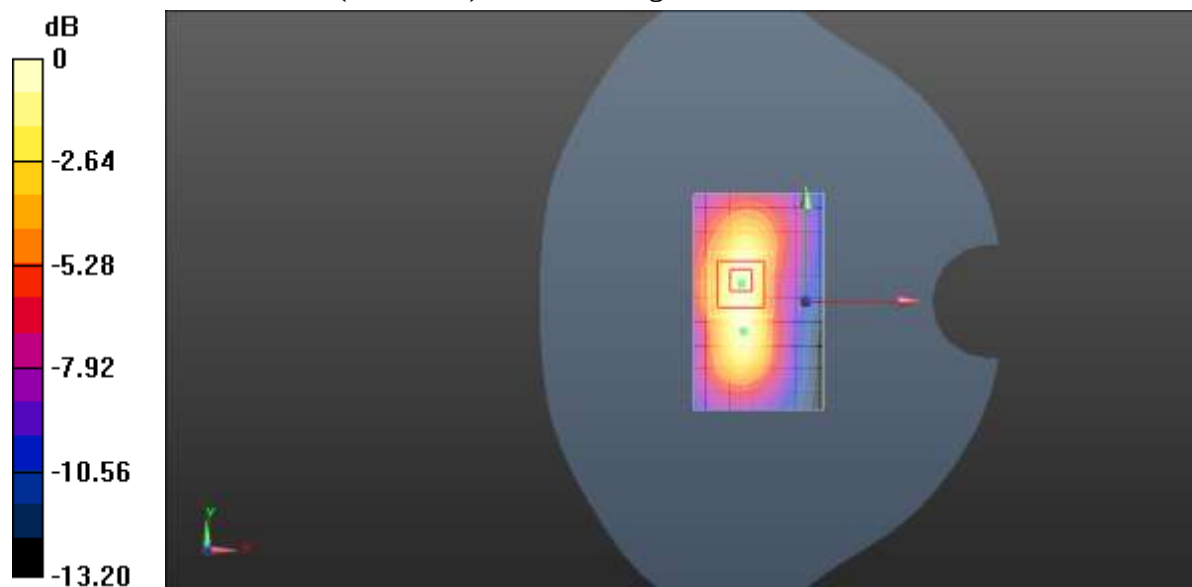
(7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 23.010 V/m; Power Drift = -0.05 dB

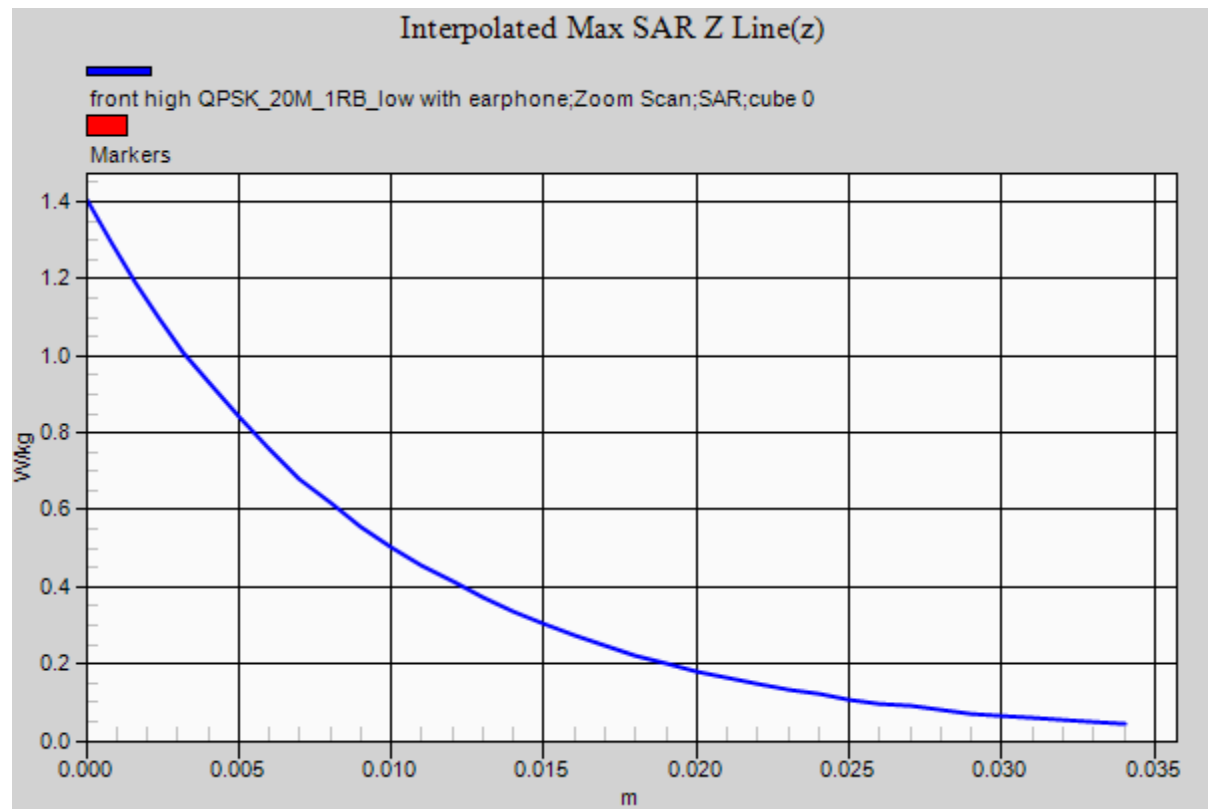
Peak SAR (extrapolated) = 1.41 W/kg

SAR(1 g) = 0.805 W/kg; SAR(10 g) = 0.443 W/kg

Maximum value of SAR (measured) = 0.931 W/kg



0 dB = 1.05 W/kg = 0.22 dBW/kg



LTE BAND 4 right touch mid QPSK_20M_1RB_low

Date/Time: 22/05/2015 20:47:59

Communication System: UID 0, FDD-LTE(QPSK_20M_1RB) (0); Communication System

Band: BAND 4; Frequency: 1732.5 MHz; Communication System PAR: 0 dB

Medium parameters used (interpolated): $f = 1732.5$ MHz; $\sigma = 1.374$ S/m; $\epsilon_r = 39.262$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.98, 7.98, 7.98); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM2; Type: SAM; Serial: TP-1575
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Configuration/touch mid/Area Scan (101x181x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.301 W/kg

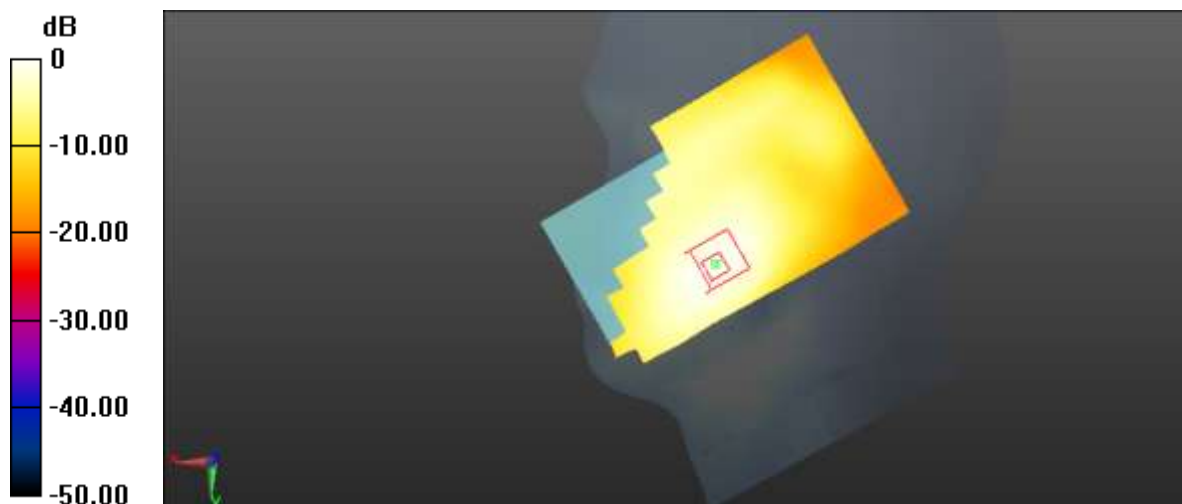
Configuration/touch mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 7.019 V/m; Power Drift = -0.02 dB

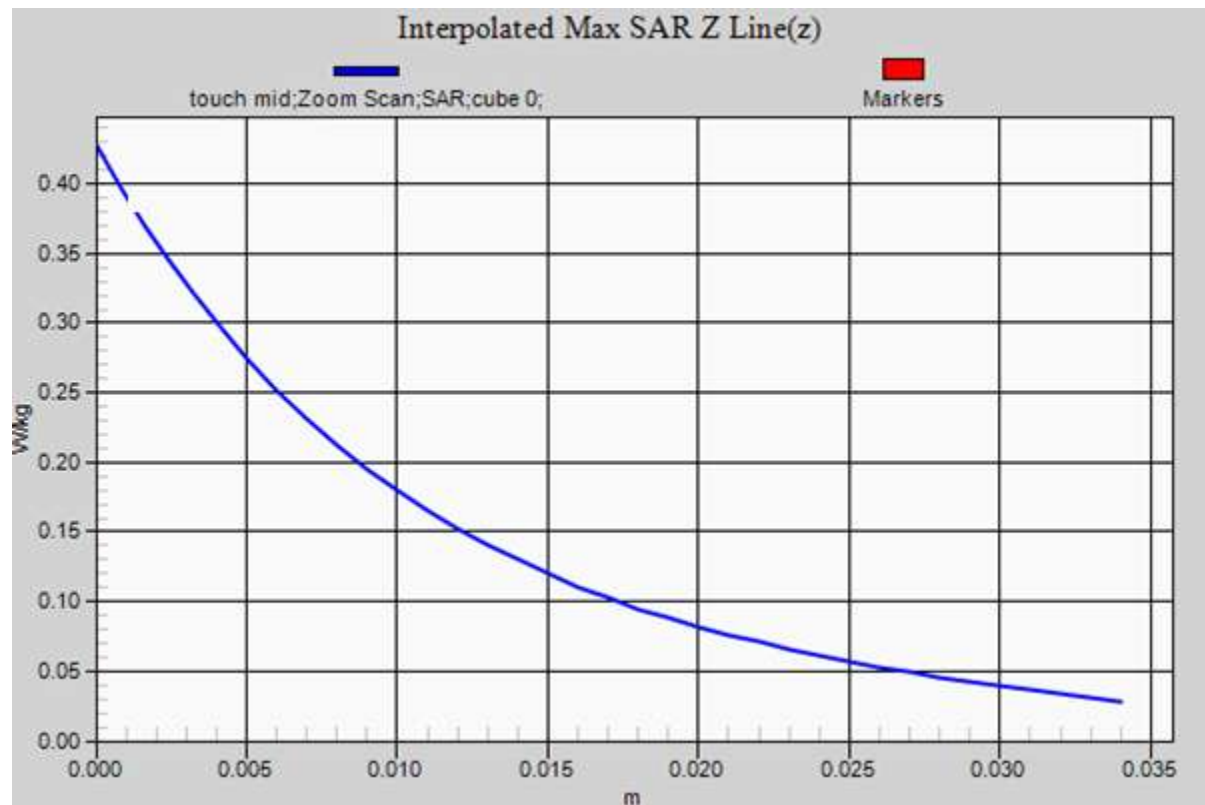
Peak SAR (extrapolated) = 0.427 W/kg

SAR(1 g) = 0.280 W/kg; SAR(10 g) = 0.176 W/kg

Maximum value of SAR (measured) = 0.299 W/kg



0 dB = 0.301 W/kg = -5.21 dBW/kg



LTE BAND 4 towards ground mid QPSK_20M_1RB mid

Date/Time: 25/05/2015 19:58:27

Communication System: UID 0, FDD-LTE(QPSK_20M_1RB) (0); Communication System

Band: BAND 4; Frequency: 1732.5 MHz; Communication System PAR: 0 dB

Medium parameters used (interpolated): $f = 1732.5$ MHz; $\sigma = 1.496$ S/m; $\epsilon_r = 51.908$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(5.01, 5.01, 5.01); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Configuration/towards ground mid QPSK_20M_1RB_mid with earphone/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.676 W/kg

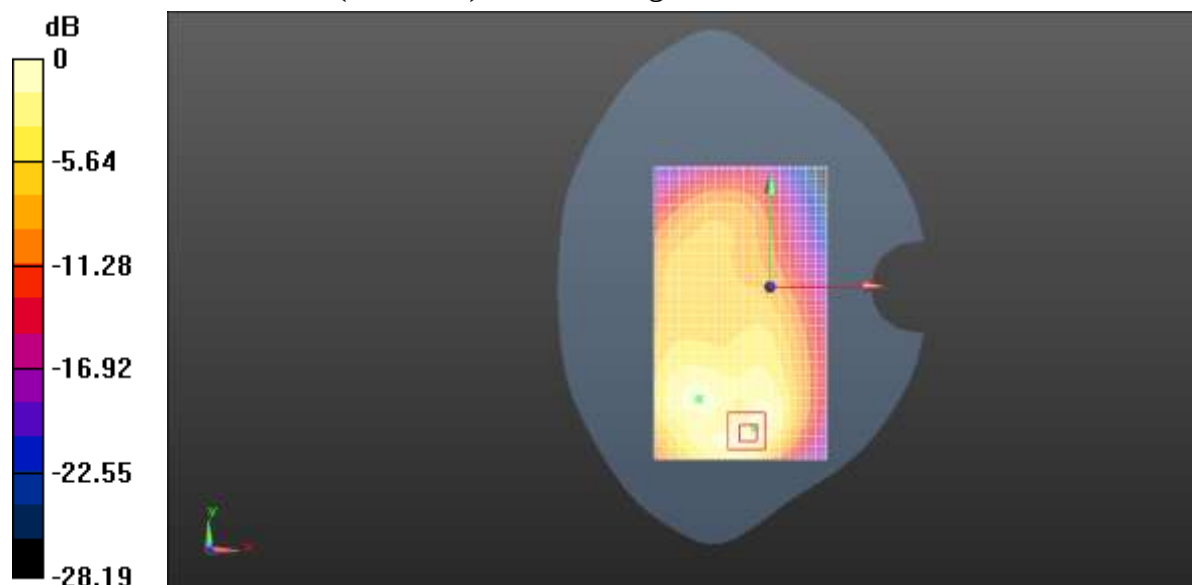
Configuration/towards ground mid QPSK_20M_1RB_mid with earphone/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.598 V/m; Power Drift = -0.06 dB

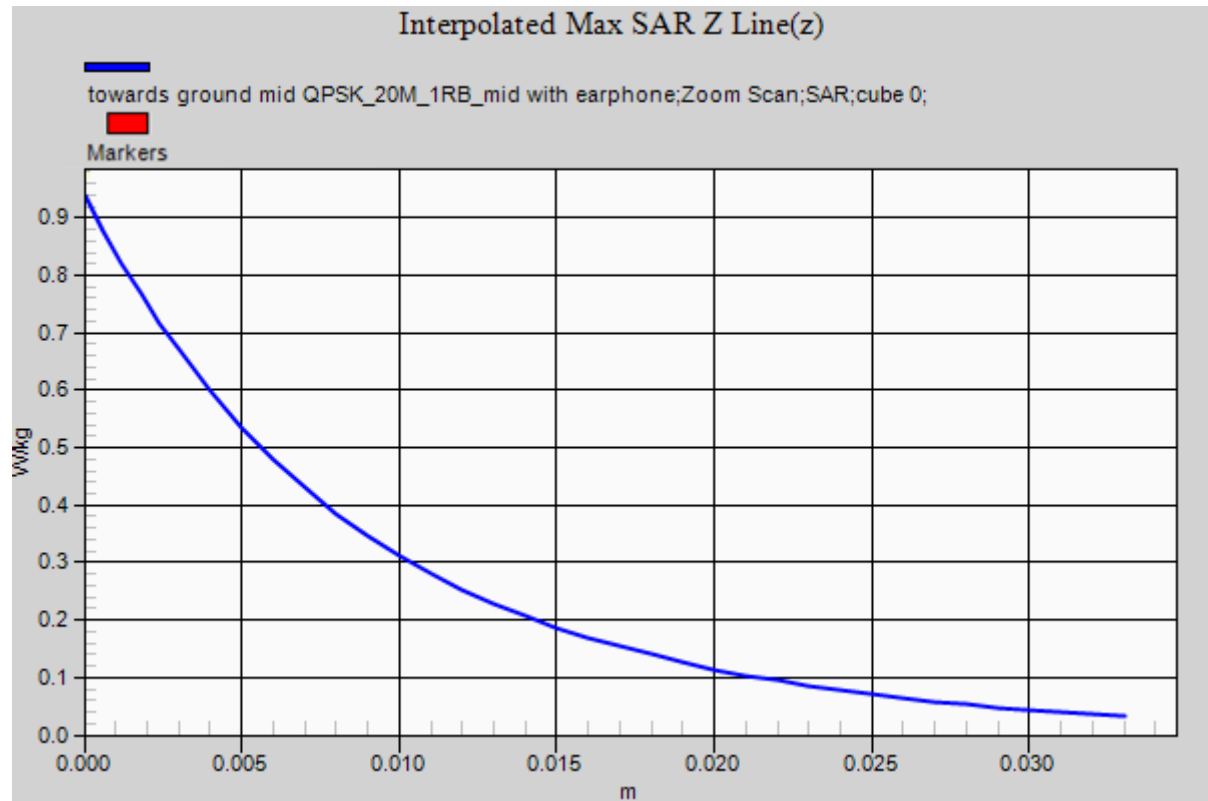
Peak SAR (extrapolated) = 0.940 W/kg

SAR(1 g) = 0.533 W/kg; SAR(10 g) = 0.295 W/kg

Maximum value of SAR (measured) = 0.672 W/kg



0 dB = 0.676 W/kg = -1.70 dBW/kg



LTE BAND 7 right touch low QPSK_20M_1RB_low

Date/Time: 24/05/2015 10:18:57

Communication System: UID 0, FDD-LTE(QPSK_20M_1RB) (0); Communication System

Band: BAND 7; Frequency: 2510 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2510$ MHz; $\sigma = 1.814$ S/m; $\epsilon_r = 39.28$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.64, 4.64, 4.64); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Configuration/touch low/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.156 W/kg

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

Reference Value = 2.760 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.253 W/kg

SAR(1 g) = 0.139 W/kg; SAR(10 g) = 0.075 W/kg

Maximum value of SAR (measured) = 0.153 W/kg

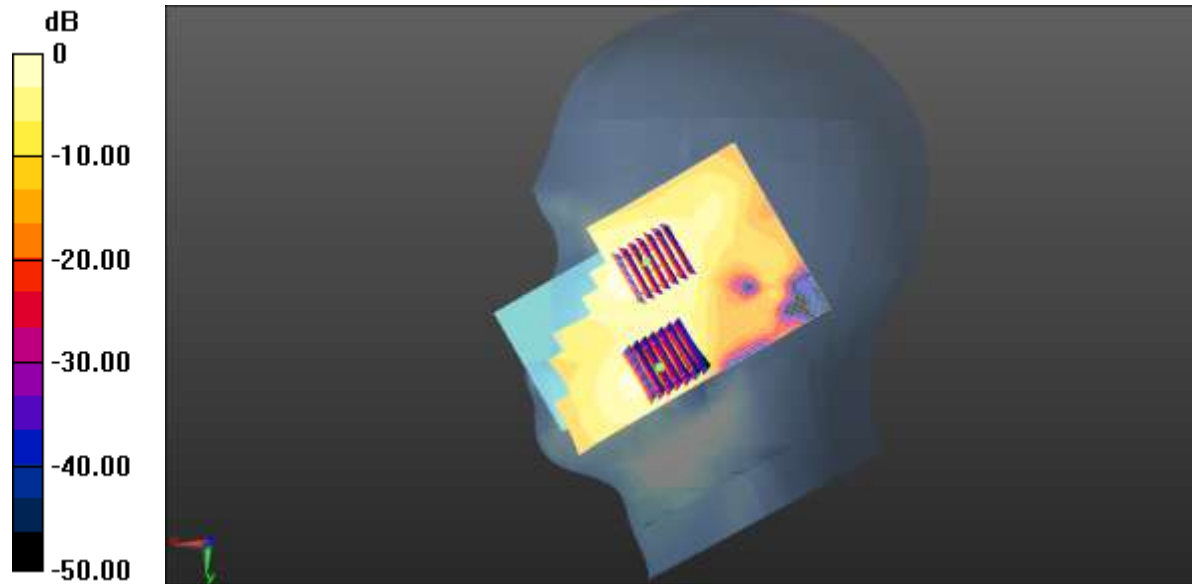
Configuration/touch low/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.760 V/m; Power Drift = 0.07 dB

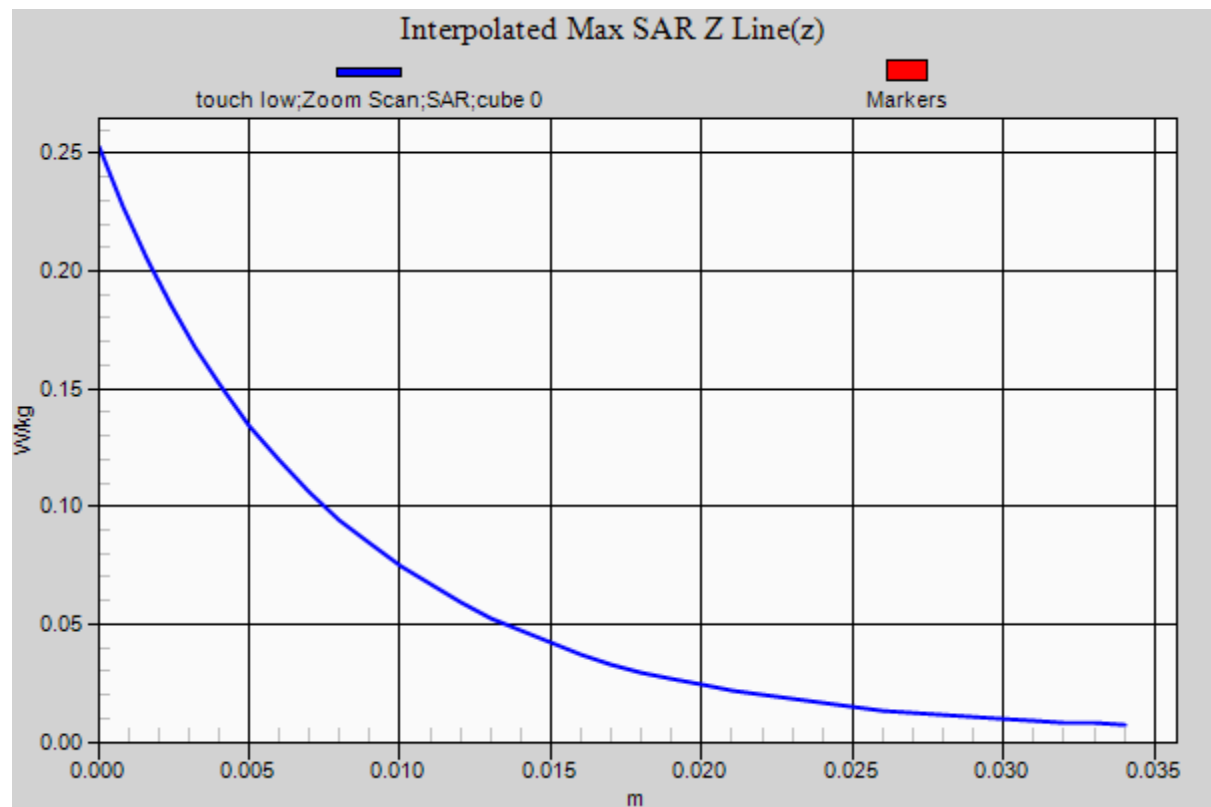
Peak SAR (extrapolated) = 0.224 W/kg

SAR(1 g) = 0.120 W/kg; SAR(10 g) = 0.064 W/kg

Maximum value of SAR (measured) = 0.133 W/kg



0 dB = 0.156 W/kg = -8.08 dBW/kg



LTE BAND 7 towards ground low QPSK_20M_1RB_high

Date/Time: 21/05/2015 20:08:51

Communication System: UID 0, FDD-LTE(QPSK_20M_1RB) (0); Communication System

Band: BAND 7; Frequency: 2510 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2510$ MHz; $\sigma = 2.095$ S/m; $\epsilon_r = 51.424$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.11, 7.11, 7.11); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: ELI v4.0; Type: ELI4; Serial: TP:1086
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Configuration/towards ground low QPSK_20M_1RB_high/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.553 W/kg

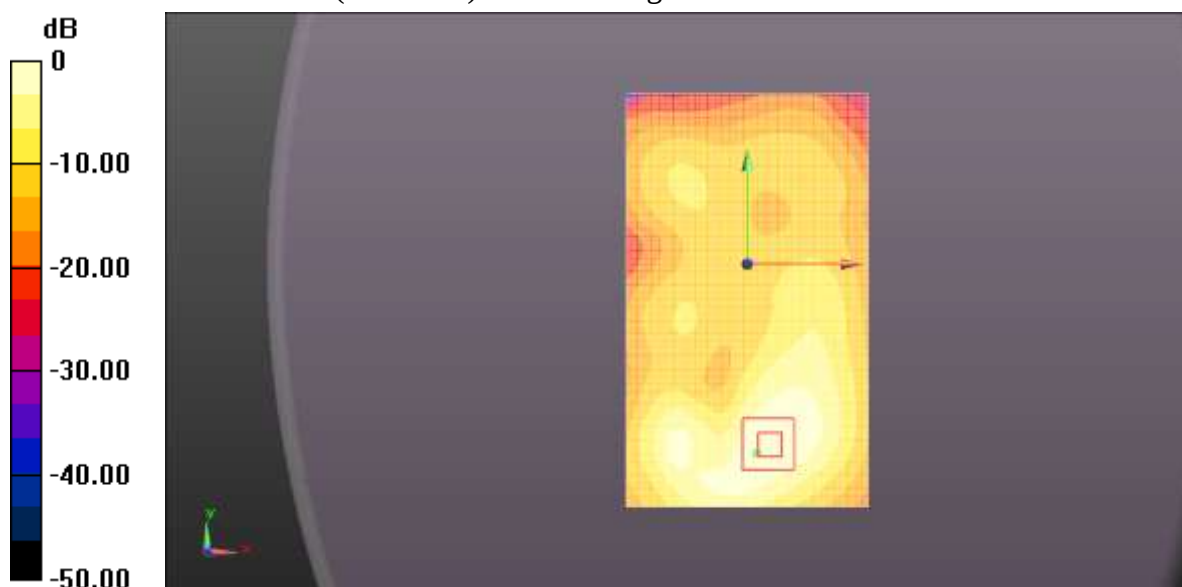
Configuration/towards ground low QPSK_20M_1RB_high/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.351 V/m; Power Drift = -0.09 dB

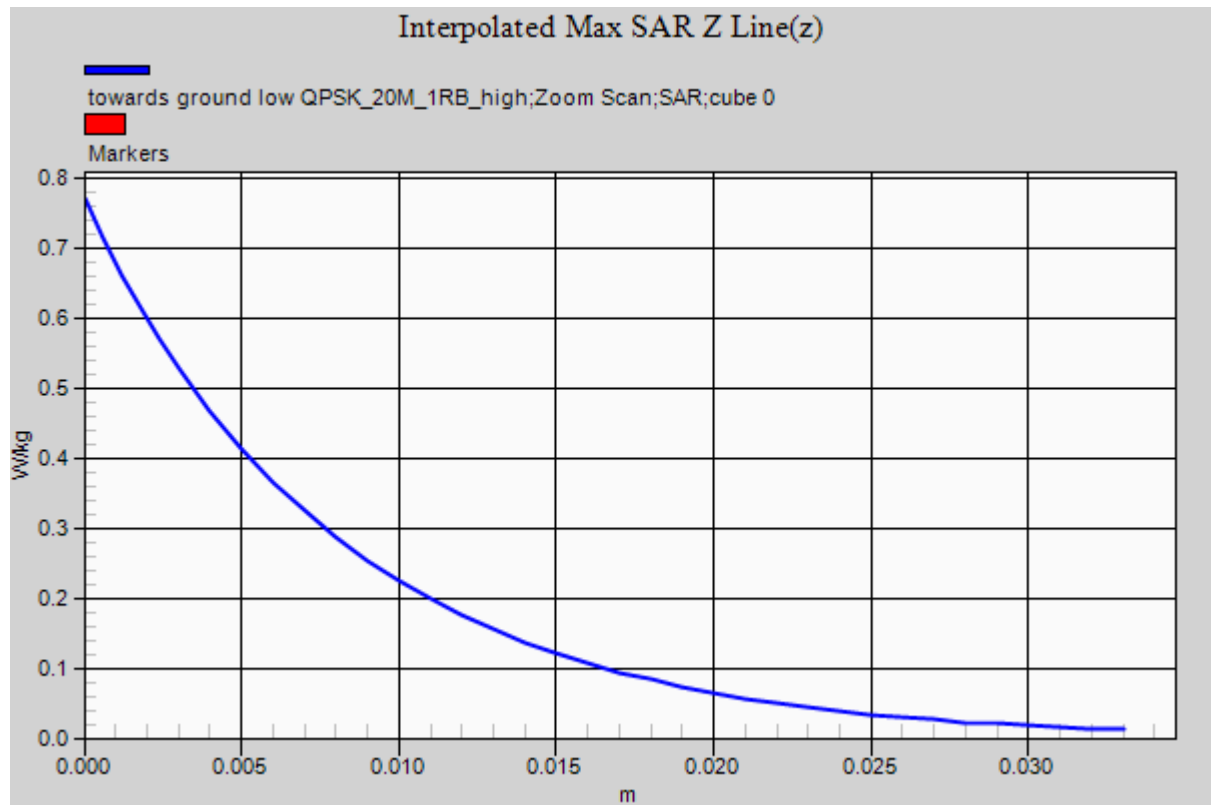
Peak SAR (extrapolated) = 0.770 W/kg

SAR(1 g) = 0.426 W/kg; SAR(10 g) = 0.229 W/kg

Maximum value of SAR (measured) = 0.528 W/kg



0 dB = 0.553 W/kg = -2.57 dBW/kg



Graph Result for single card version

GSM850 voice right touch low

Date/Time: 19/05/2015 17:16:49

Communication System: UID 0, GSM (0); Communication System Band: GSM850(824.0-849.0MHz); Frequency: 824.2 MHz; Communication System PAR: 9.191 dB

Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.868$ S/m; $\epsilon_r = 41.82$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(9.08, 9.08, 9.08); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM1; Type: SAM; Serial: TP1576
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

right/touch low/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.422 W/kg

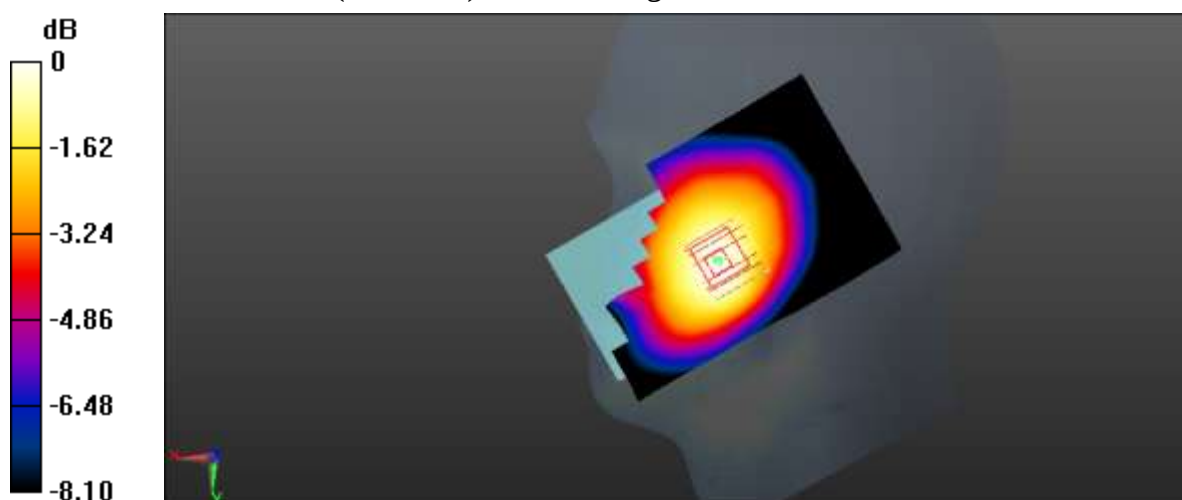
right/touch low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.302 V/m; Power Drift = -0.12 dB

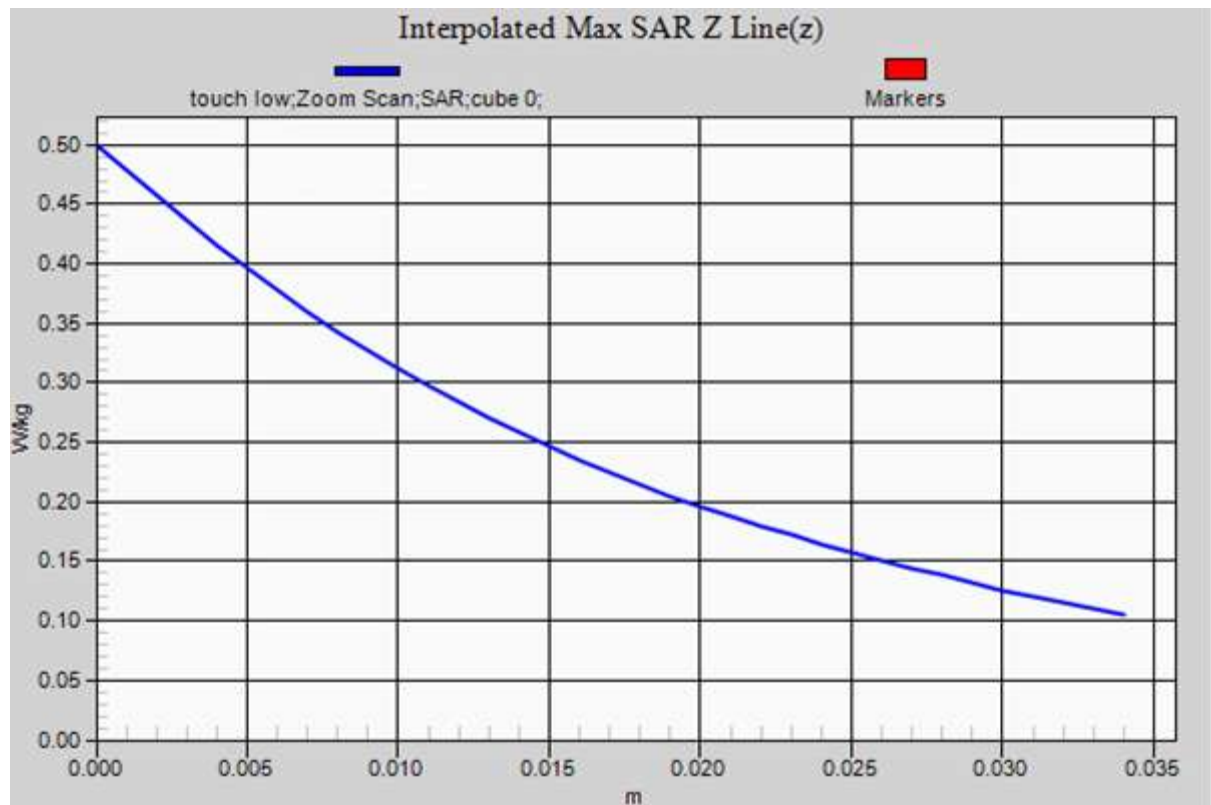
Peak SAR (extrapolated) = 0.499 W/kg

SAR(1 g) = 0.398 W/kg; SAR(10 g) = 0.305 W/kg

Maximum value of SAR (measured) = 0.422 W/kg



0 dB = 0.422 W/kg = -3.75 dBW/kg



GSM850 DTM right touch low

Date/Time:19/05/2015 15:38:34

Communication System: UID 0, GPRS/EGPRS(3UP) (0); Communication System Band: GSM850; Frequency: 824.2 MHz; Communication System PAR: 4.42 dB

Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.868$ S/m; $\epsilon_r = 41.82$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(9.08, 9.08, 9.08); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM1; Type: SAM; Serial: TP1576
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Configuration/touch low/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.597 W/kg

Configuration/touch low/Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.602 V/m; Power Drift = -0.18 dB

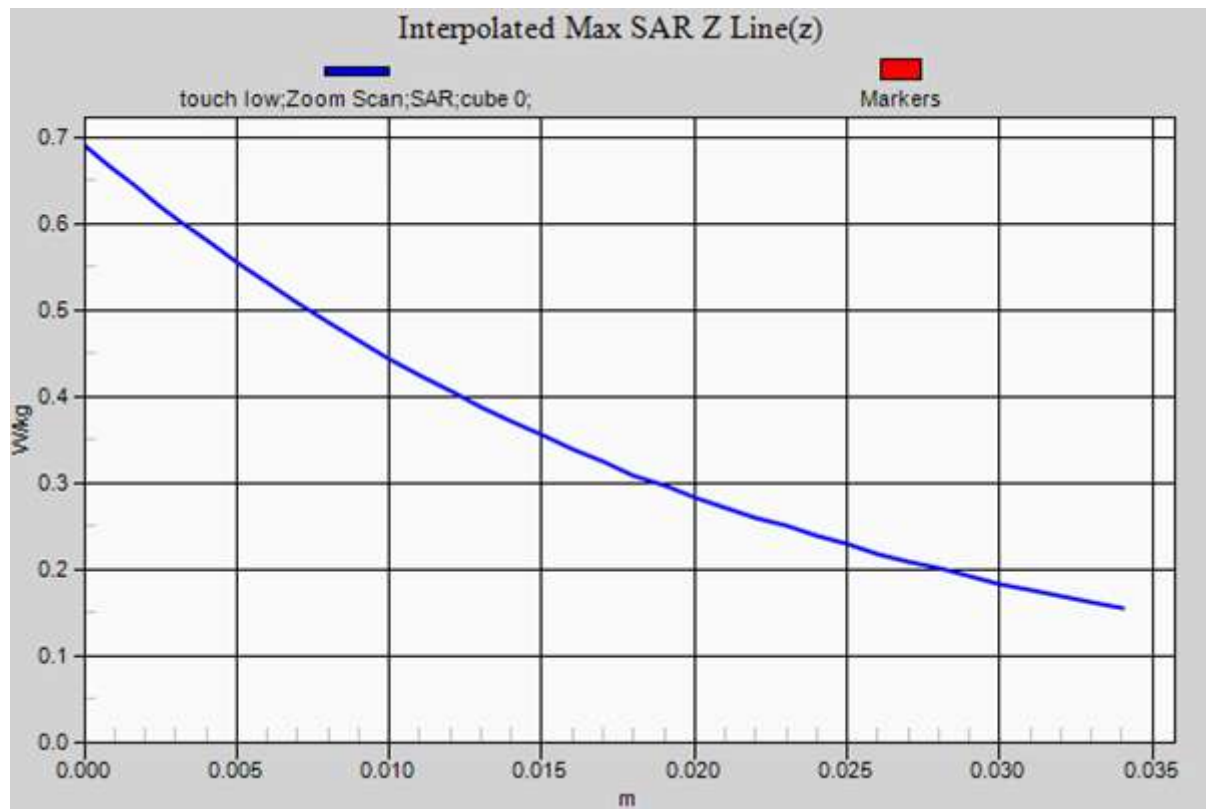
Peak SAR (extrapolated) = 0.689 W/kg

SAR(1 g) = 0.582 W/kg; SAR(10 g) = 0.461 W/kg

Maximum value of SAR (measured) = 0.613 W/kg



0 dB = 0.597 W/kg = -2.24 dBW/kg



GSM850 towards ground low

Date/Time: 26/05/2015 12:50:06

Communication System: UID 0, GPRS/EGPRS(4UP) (0); Communication System Band: GSM850; Frequency: 824.2 MHz; Communication System PAR: 3.18 dB

Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.933$ S/m; $\epsilon_r = 54.311$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(6.37, 6.37, 6.37); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: ELI v4.0; Type: ELI4; Serial: TP:1086
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

body /towards ground low/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.782 W/kg

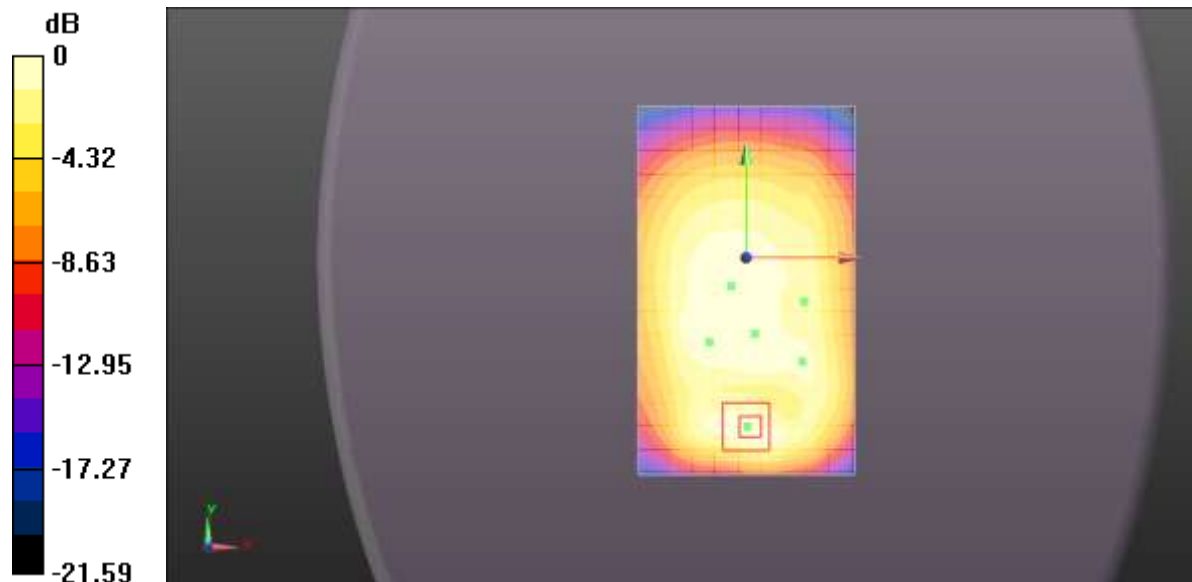
body /towards ground low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 29.279 V/m; Power Drift = 0.15 dB

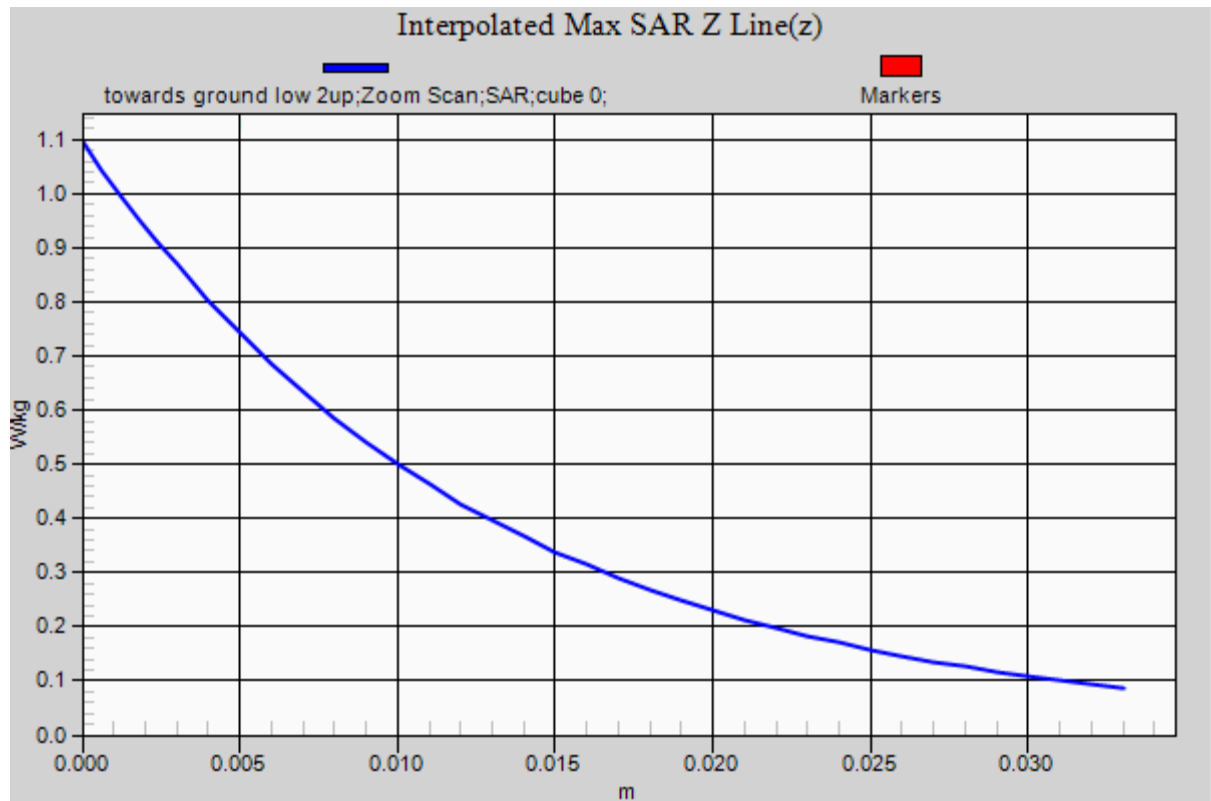
Peak SAR (extrapolated) = 1.09 W/kg

SAR(1 g) = 0.718 W/kg; SAR(10 g) = 0.429 W/kg

Maximum value of SAR (measured) = 0.869 W/kg



0 dB = 0.782 W/kg = -1.07 dBW/kg



GSM1900 voice right touch high

Date/Time: 20/05/2015 11:39:23

Communication System: UID 0, GSM (0); Communication System Band: PCS1900(1850.0-1910.0MHz); Frequency: 1909.8 MHz; Communication System PAR: 9.191 dB

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.393$ S/m; $\epsilon_r = 39.011$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.74, 7.74, 7.74); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

right/touch high/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.376 W/kg

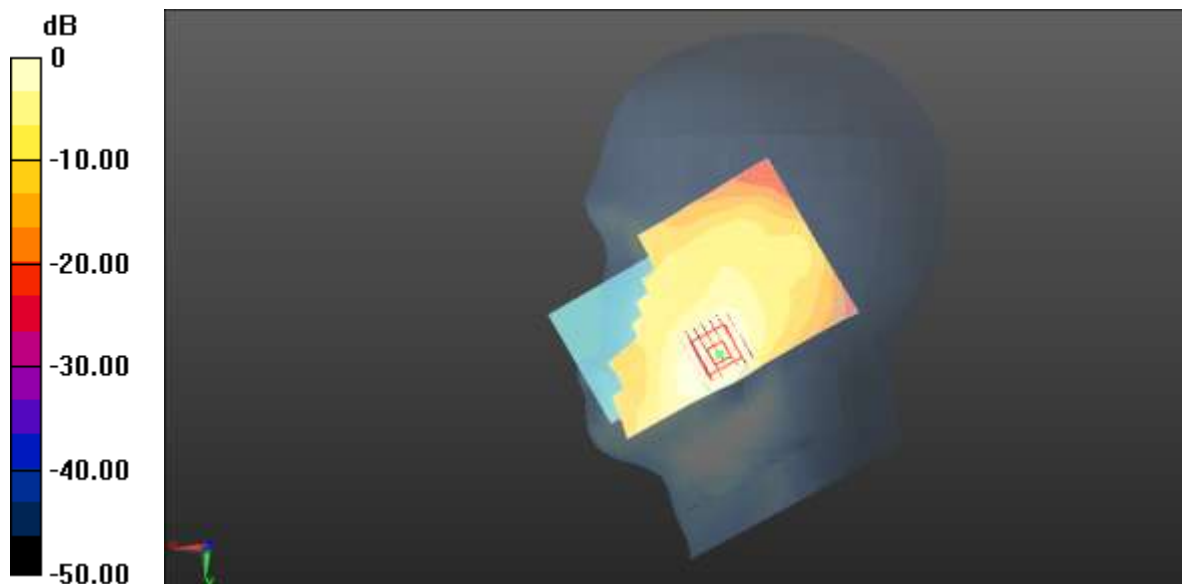
right/touch high/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.699 V/m; Power Drift = -0.19 dB

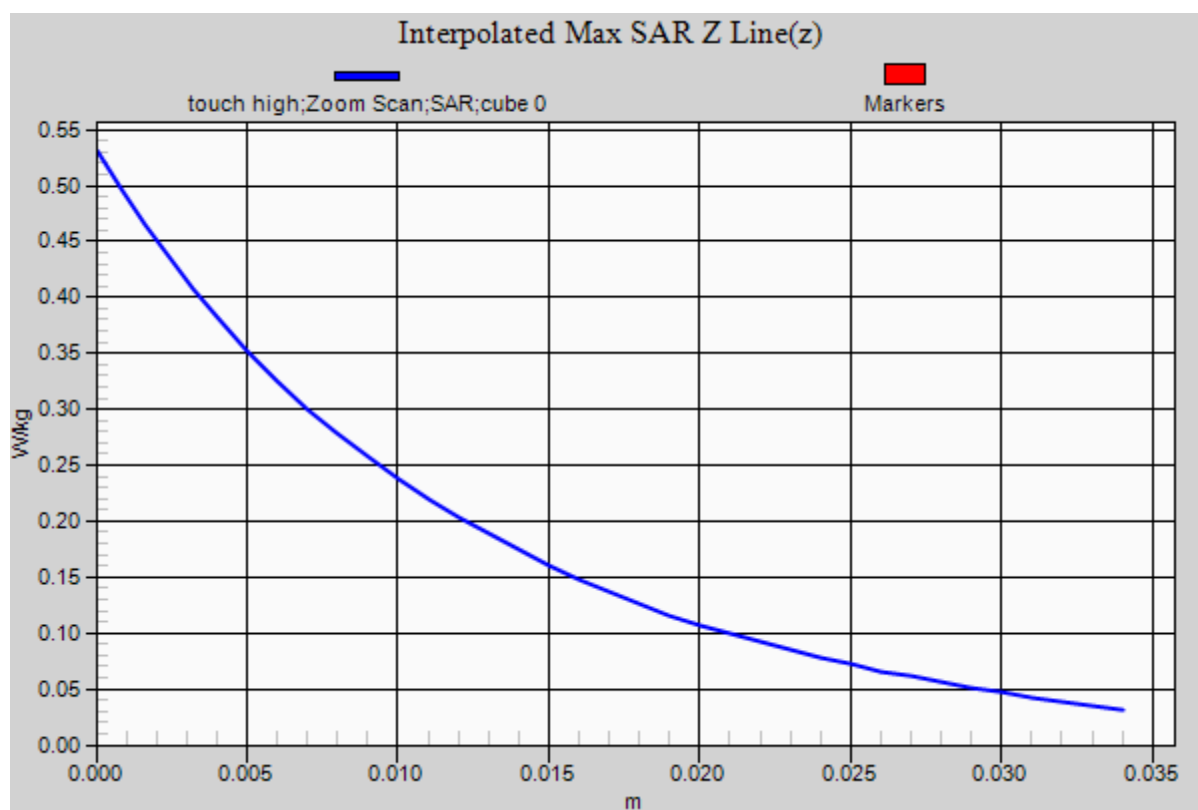
Peak SAR (extrapolated) = 0.531 W/kg

SAR(1 g) = 0.347 W/kg; SAR(10 g) = 0.211 W/kg

Maximum value of SAR (measured) = 0.384 W/kg



0 dB = 0.376 W/kg = -4.25 dBW/kg



GSM1900 DTM right touch high

Date/Time: 20/05/2015 17:20:55

Communication System: UID 0, GPRS/EGPRS(3UP) (0); Communication System Band: PCS1900; Frequency: 1909.8 MHz; Communication System PAR: 4.42 dB

Medium parameters used: $f = 1909.8$ MHz; $\sigma = 1.48$ S/m; $\epsilon_r = 39.6$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.74, 7.74, 7.74); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

right 2/touch high/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.587 W/kg

right 2/touch high/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.699 V/m; Power Drift = -0.19 dB

Peak SAR (extrapolated) = 0.829 W/kg

SAR(1 g) = 0.522 W/kg; SAR(10 g) = 0.316 W/kg

Maximum value of SAR (measured) = 0.569 W/kg

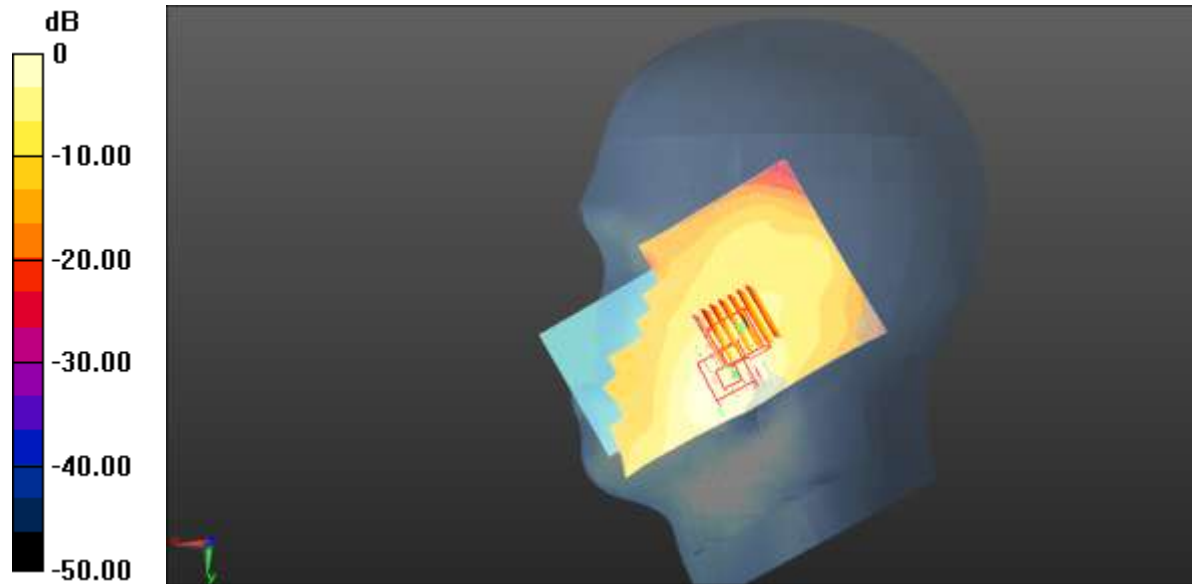
right 2/touch high/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.699 V/m; Power Drift = -0.19 dB

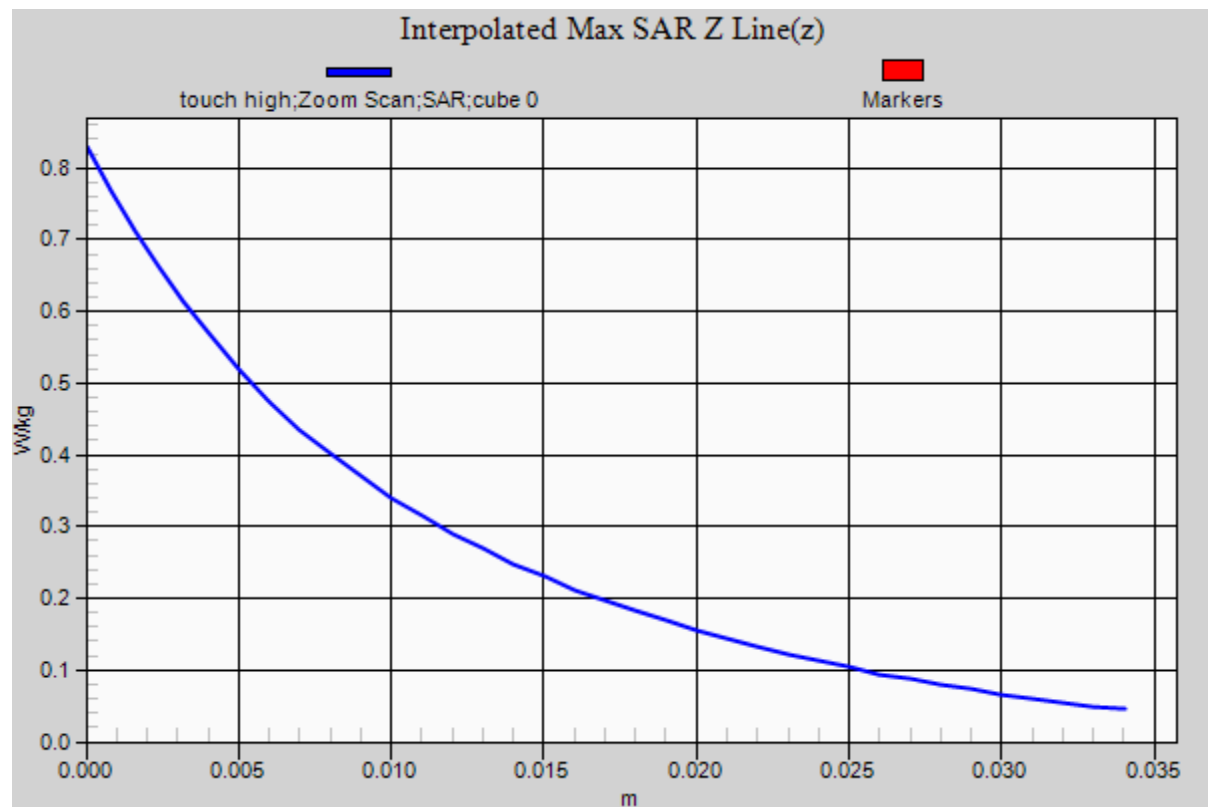
Peak SAR (extrapolated) = 0.730 W/kg

SAR(1 g) = 0.427 W/kg; SAR(10 g) = 0.220 W/kg

Maximum value of SAR (measured) = 0.540 W/kg



0 dB = 0.587 W/kg = -2.32 dBW/kg



GSM1900 front high

Date/Time: 23/05/2015 04:40:35

Communication System: UID 0, GPRS/EGPRS(4UP) (0); Communication System Band: PCS1900; Frequency: 1909.8 MHz; Communication System PAR: 3.18 dB

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.503$ S/m; $\epsilon_r = 52.325$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.85, 4.85, 4.85); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Configuration/front high/Area Scan (61x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.03 W/kg

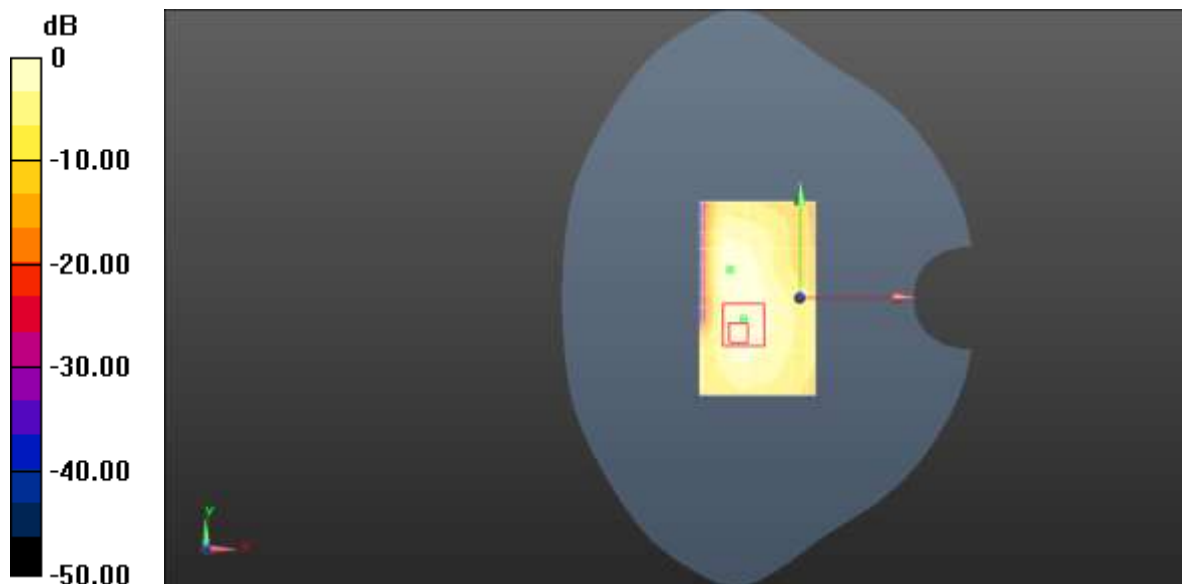
Configuration/front high/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 20.306 V/m; Power Drift = -0.02 dB

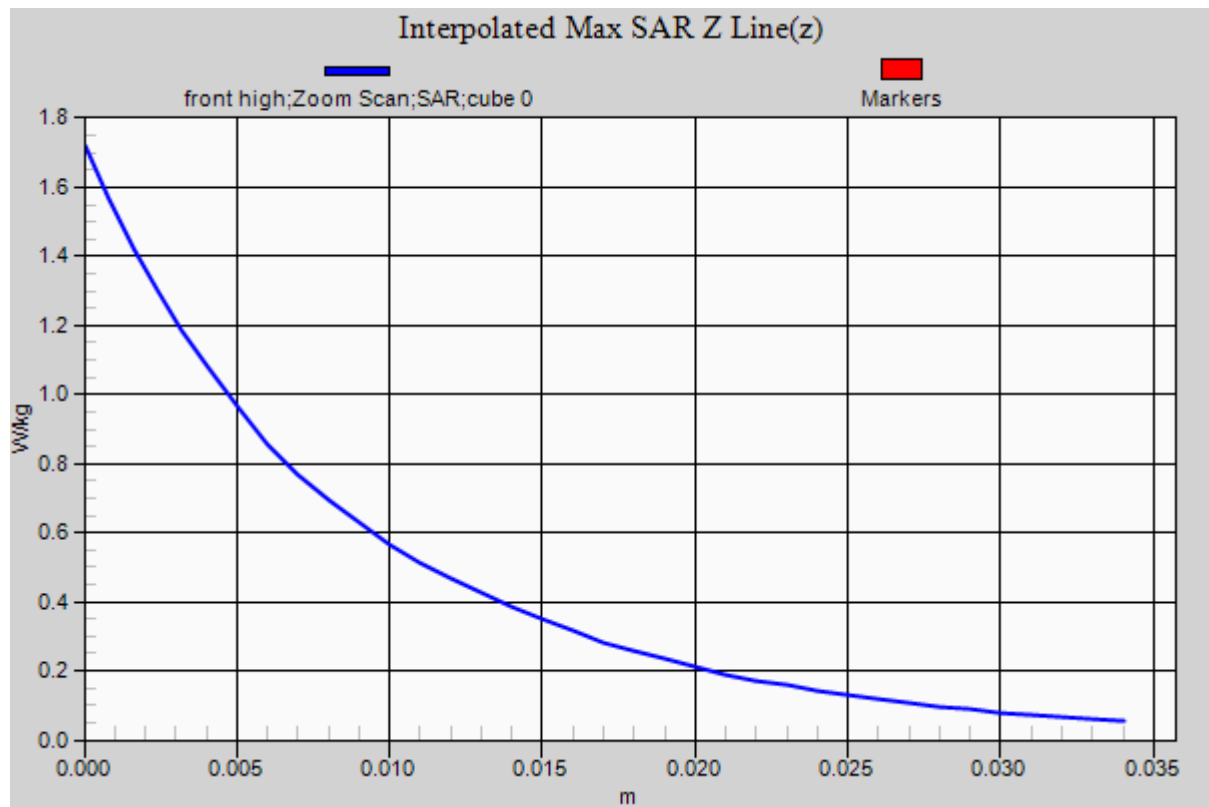
Peak SAR (extrapolated) = 1.72 W/kg

SAR(1 g) = 0.946 W/kg; SAR(10 g) = 0.510 W/kg

Maximum value of SAR (measured) = 1.10 W/kg



0 dB = 1.03 W/kg = 0.13 dBW/kg



WCDMA BAND II right touch high

Date/Time: 20/05/2015 13:25:10

Communication System: UID 0, WCDMA (0); Communication System Band: BAND 2;

Frequency: 1907.6 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 1908$ MHz; $\sigma = 1.391$ S/m; $\epsilon_r = 39.019$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.74, 7.74, 7.74); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

right/touch high/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.817 W/kg

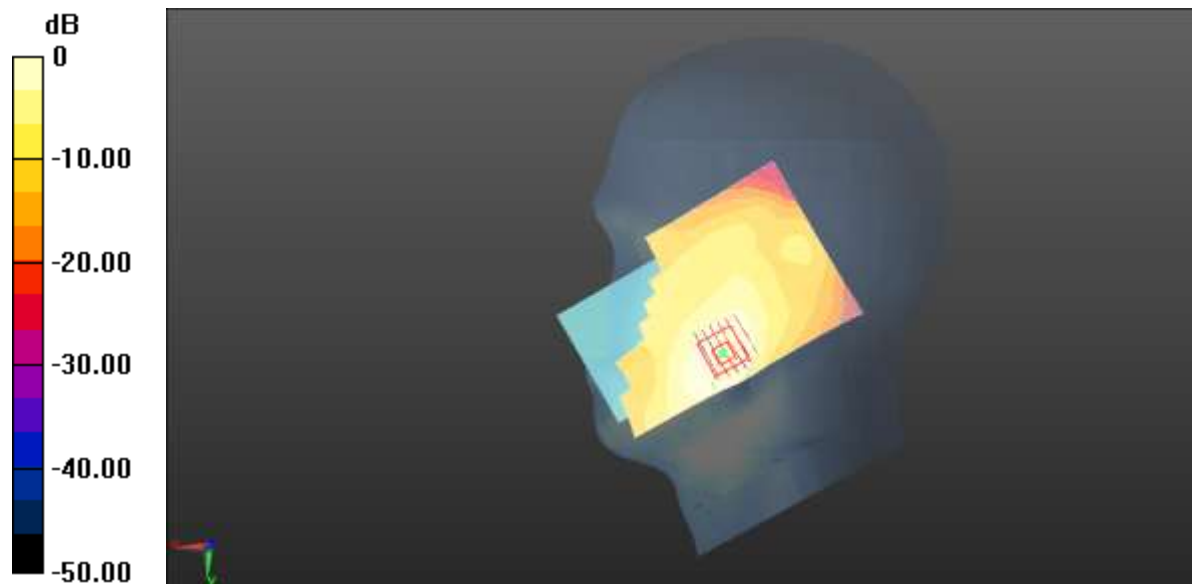
right/touch high/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.635 V/m; Power Drift = -0.01 dB

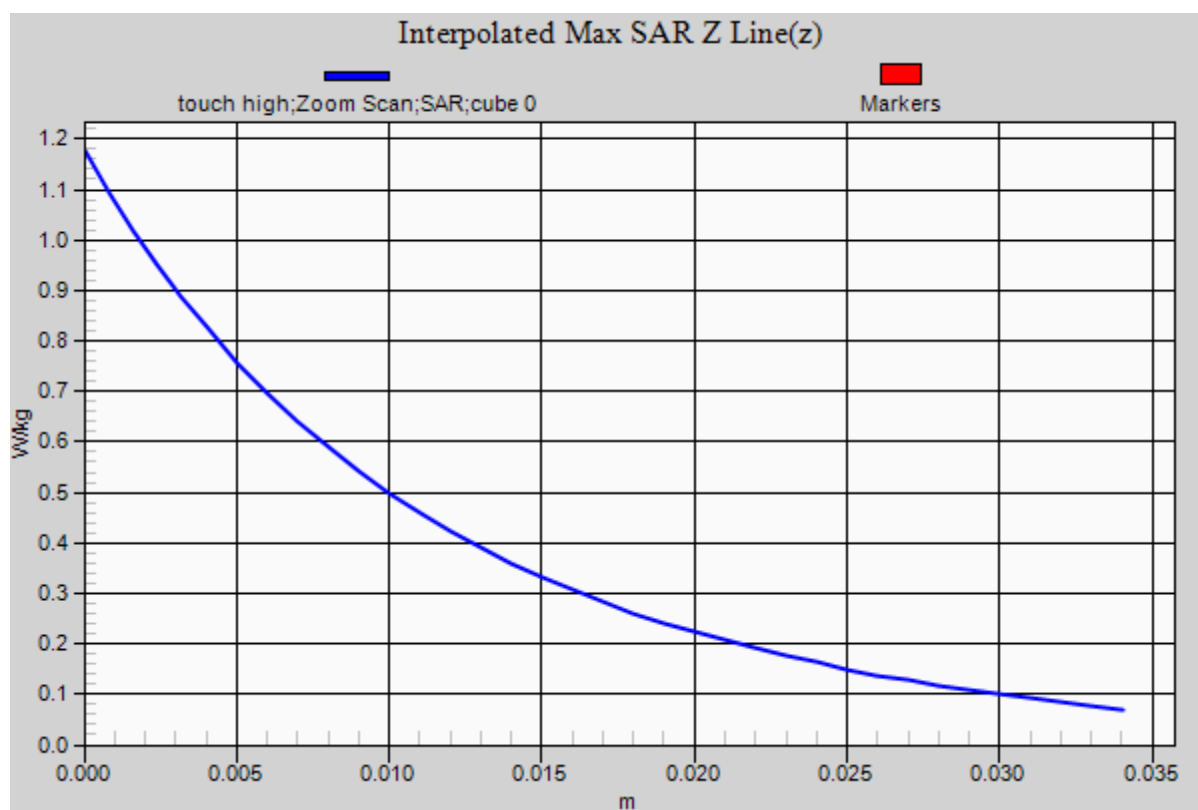
Peak SAR (extrapolated) = 1.18 W/kg

SAR(1 g) = 0.745 W/kg; SAR(10 g) = 0.458 W/kg

Maximum value of SAR (measured) = 0.829 W/kg



0 dB = 0.817 W/kg = -0.88 dBW/kg



WCDMA BAND II towards ground high

Date/Time: 23/05/2015 03:01:36

Communication System: UID 0, WCDMA (0); Communication System Band: BAND 2;

Frequency: 1907.6 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 1908$ MHz; $\sigma = 1.502$ S/m; $\epsilon_r = 52.332$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.85, 4.85, 4.85); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Configuration/towards ground high/Area Scan (101x171x1): Interpolated grid:

$dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.976 W/kg

Configuration/towards ground high/Zoom Scan (7x7x7)/Cube 0: Measurement

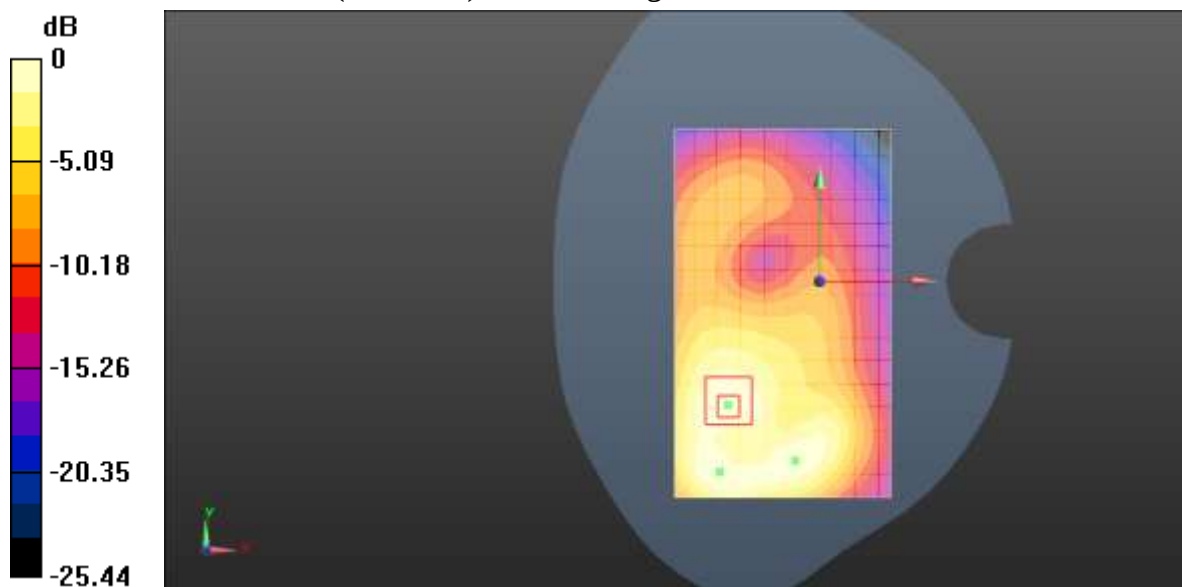
grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 7.779 V/m; Power Drift = -0.03 dB

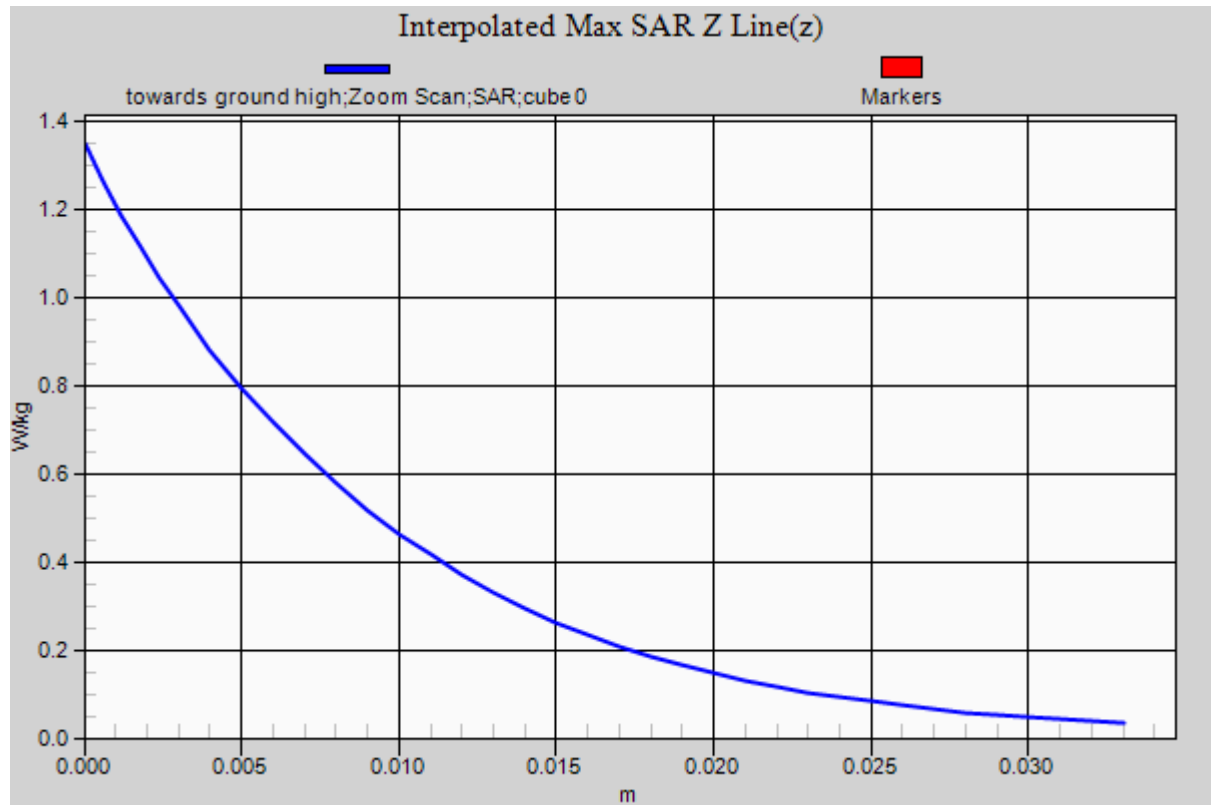
Peak SAR (extrapolated) = 1.35 W/kg

SAR(1 g) = 0.829 W/kg; SAR(10 g) = 0.483 W/kg

Maximum value of SAR (measured) = 0.988 W/kg



0 dB = 0.976 W/kg = -0.10 dBW/kg



WCDMA BAND V left touch high

Date/Time: 19/05/2015 16:23:13

Communication System: UID 0, WCDMA (0); Communication System Band: BAND 5;
Frequency: 846.6 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 847$ MHz; $\sigma = 0.892$ S/m; $\epsilon_r = 41.467$; $\rho = 1000$ kg/m³

Phantom section: Left Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(9.08, 9.08, 9.08); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM1; Type: SAM; Serial: TP1576
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

left/touch high/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.332 W/kg

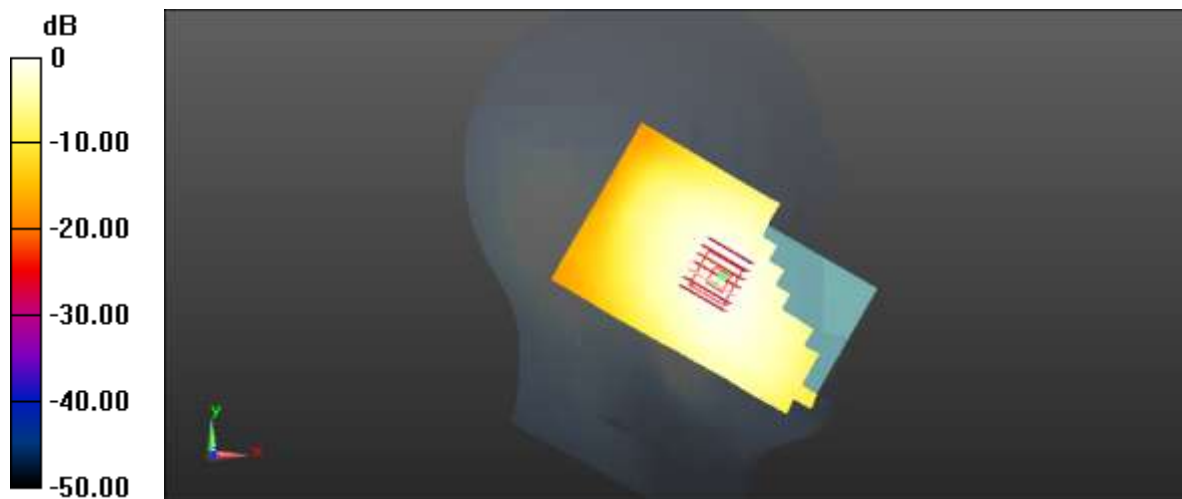
left/touch high/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.225 V/m; Power Drift = -0.09 dB

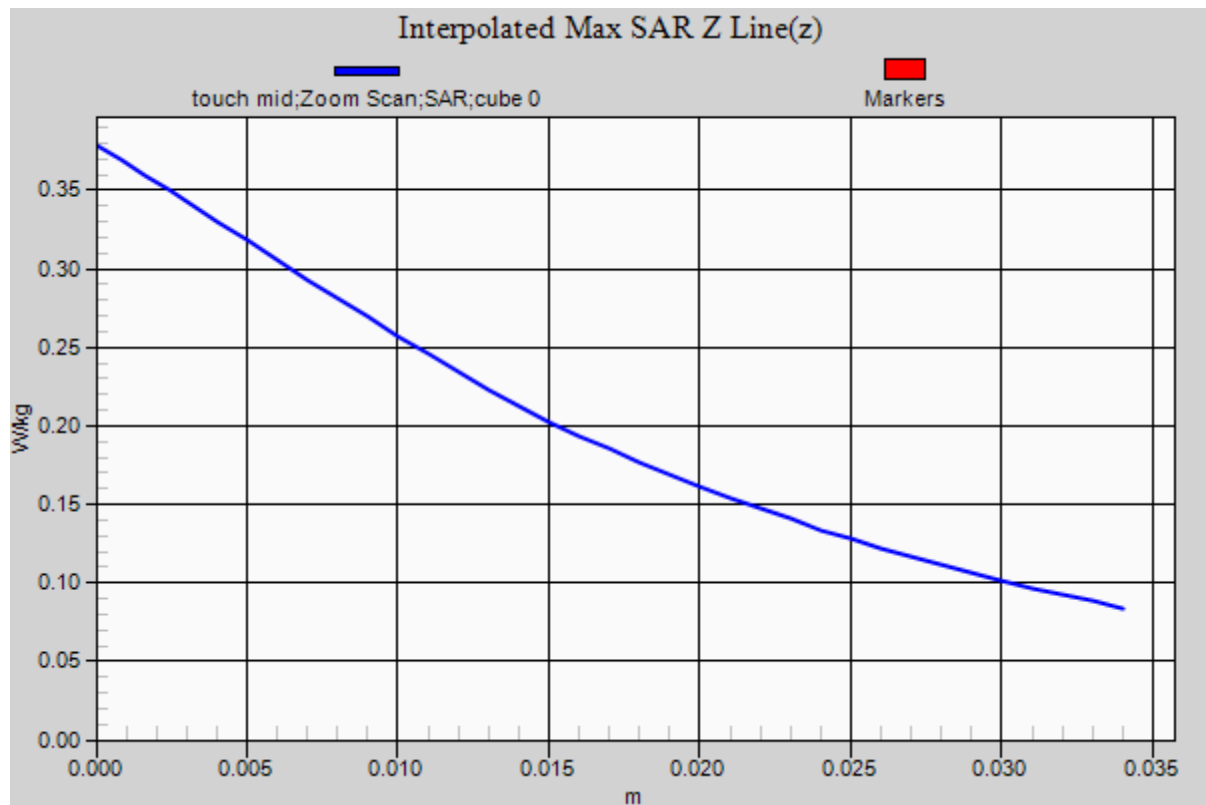
Peak SAR (extrapolated) = 0.378 W/kg

SAR(1 g) = 0.314 W/kg; SAR(10 g) = 0.240 W/kg

Maximum value of SAR (measured) = 0.331 W/kg



0 dB = 0.332 W/kg = -4.79 dBW/kg



WCDMA BAND V towards ground high

Date/Time: 26/05/2015 14:21:25

Communication System: UID 0, WCDMA (0); Communication System Band: BAND 5;

Frequency: 846.6 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 847$ MHz; $\sigma = 0.965$ S/m; $\epsilon_r = 54.169$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(6.37, 6.37, 6.37); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: ELI v4.0; Type: ELI4; Serial: TP:1086
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Configuration/towards ground high/Area Scan (101x171x1): Interpolated grid:

$dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 1.00 W/kg

Configuration/towards ground high/Zoom Scan (7x7x7)/Cube 0: Measurement

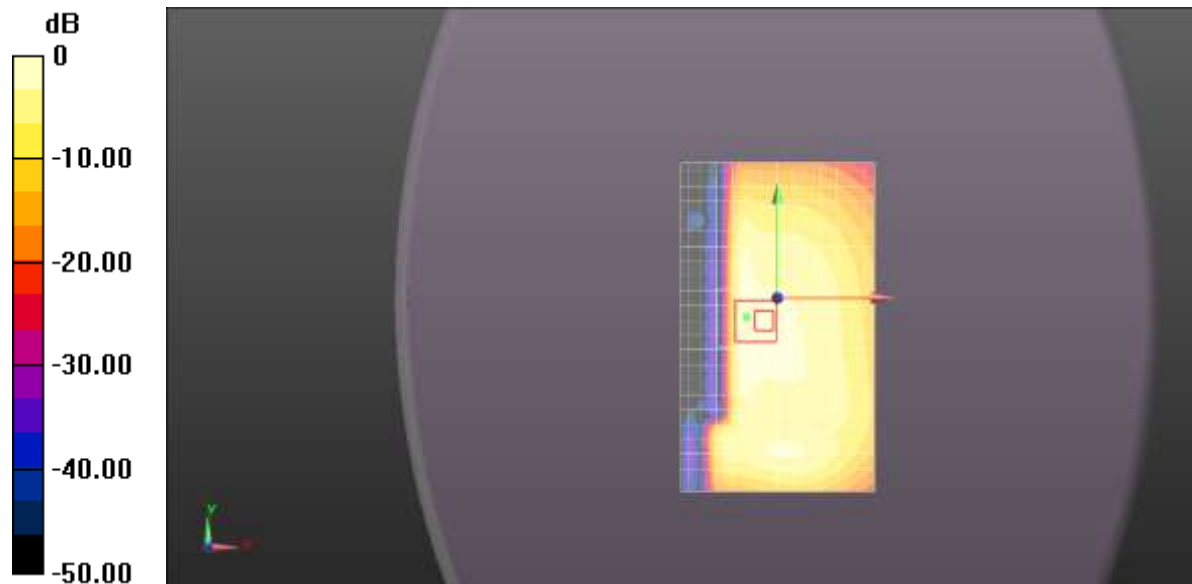
grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 23.208 V/m; Power Drift = -0.17 dB

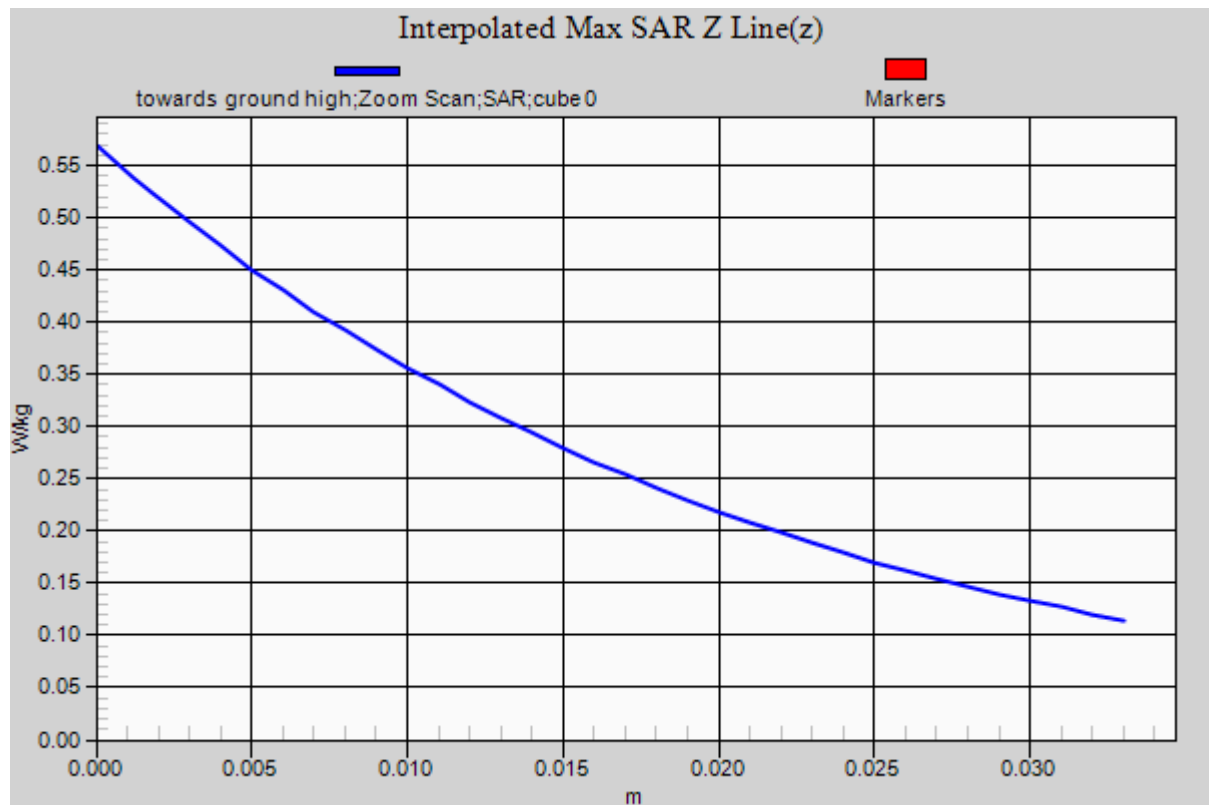
Peak SAR (extrapolated) = 0.569 W/kg

SAR(1 g) = 0.451 W/kg; SAR(10 g) = 0.337 W/kg

Maximum value of SAR (measured) = 0.495 W/kg



0 dB = 1.00 W/kg = 0.01 dBW/kg



LTE BAND 2 right touch high QPSK_20M_1RB low

Date/Time: 20/05/2015 15:50:52

Communication System: UID 0, FDD-LTE(QPSK_20M_1RB) (0); Communication System

Band: BAND 2; Frequency: 1900 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.383$ S/m; $\epsilon_r = 39.048$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.74, 7.74, 7.74); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

right/touch high QPSK_20M_1RB low /Area Scan (101x171x1): Interpolated

grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.553 W/kg

right/touch high QPSK_20M_1RB low /Zoom Scan (7x7x7)/Cube 0:

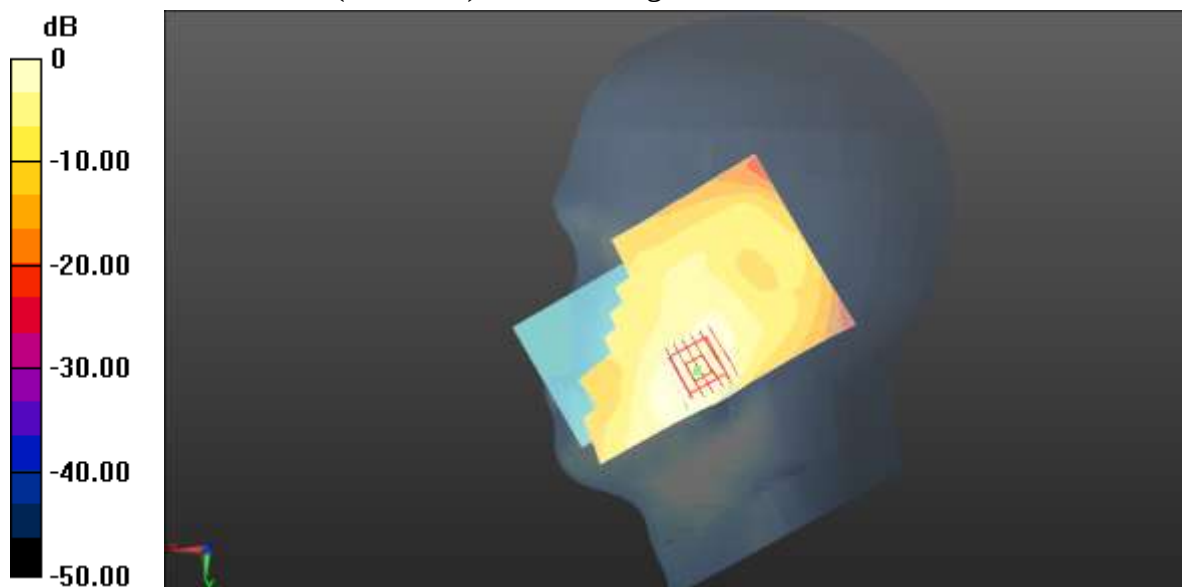
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.264 V/m; Power Drift = -0.06 dB

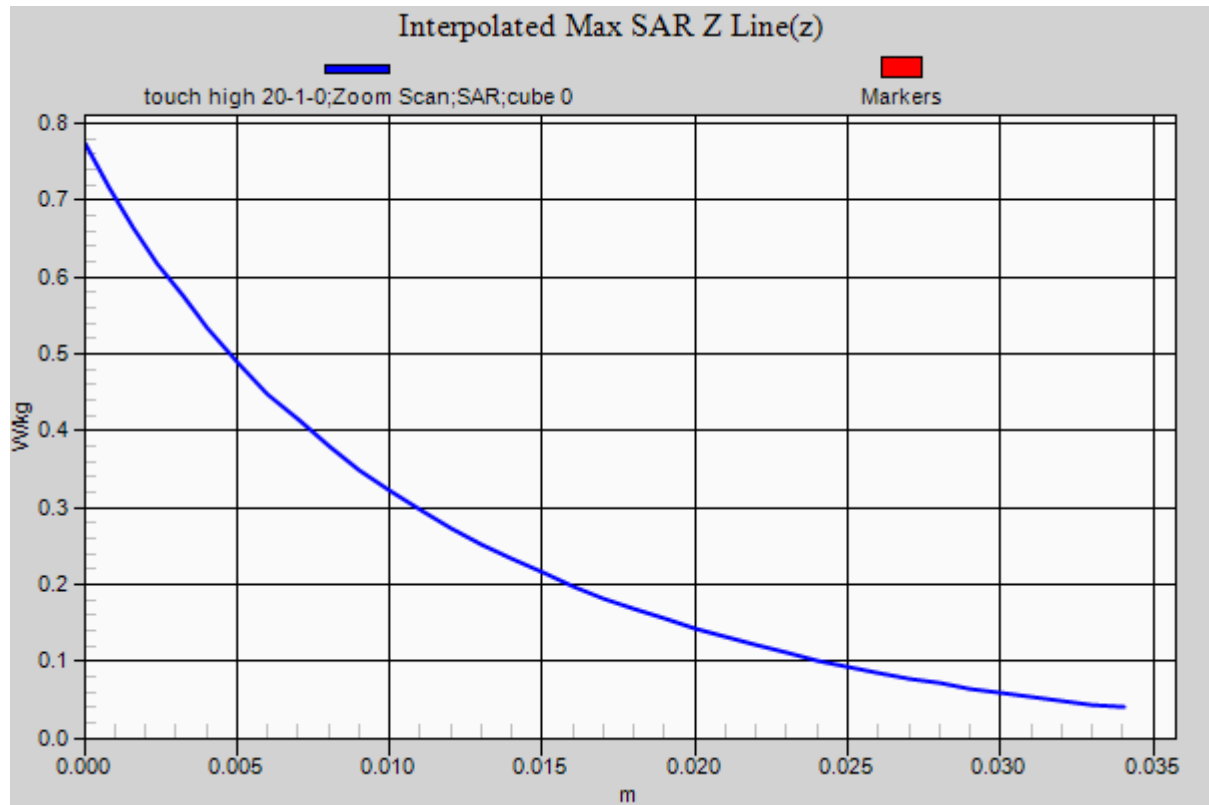
Peak SAR (extrapolated) = 0.773 W/kg

SAR(1 g) = 0.491 W/kg; SAR(10 g) = 0.300 W/kg

Maximum value of SAR (measured) = 0.539 W/kg



0 dB = 0.553 W/kg = -2.57 dBW/kg



LTE BAND 2 front high QPSK_20M_1RB low with earphone

Date/Time: 26/05/2015 21:32:42

Communication System: UID 0, FDD-LTE(QPSK_20M_1RB) (0); Communication System

Band: BAND 2; Frequency: 1900 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.495$ S/m; $\epsilon_r = 52.357$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.85, 4.85, 4.85); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Configuration/front high QPSK_20M_1RB low with earphone/Area Scan

(61x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.796 W/kg

Configuration/front high QPSK_20M_1RB low with earphone/Zoom Scan

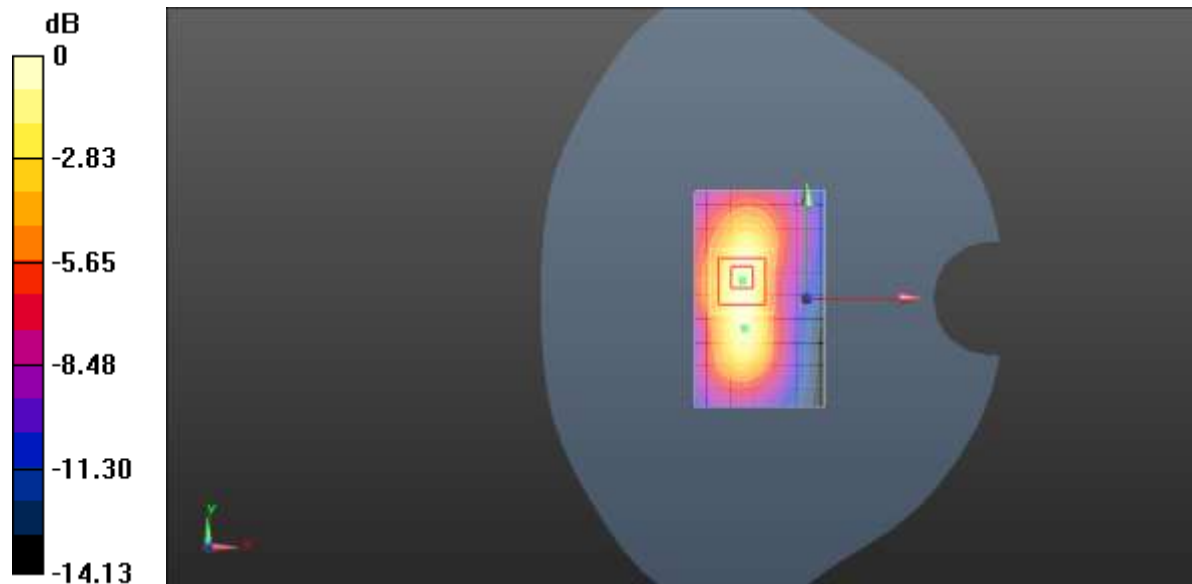
(7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 14.146 V/m; Power Drift = 0.07 dB

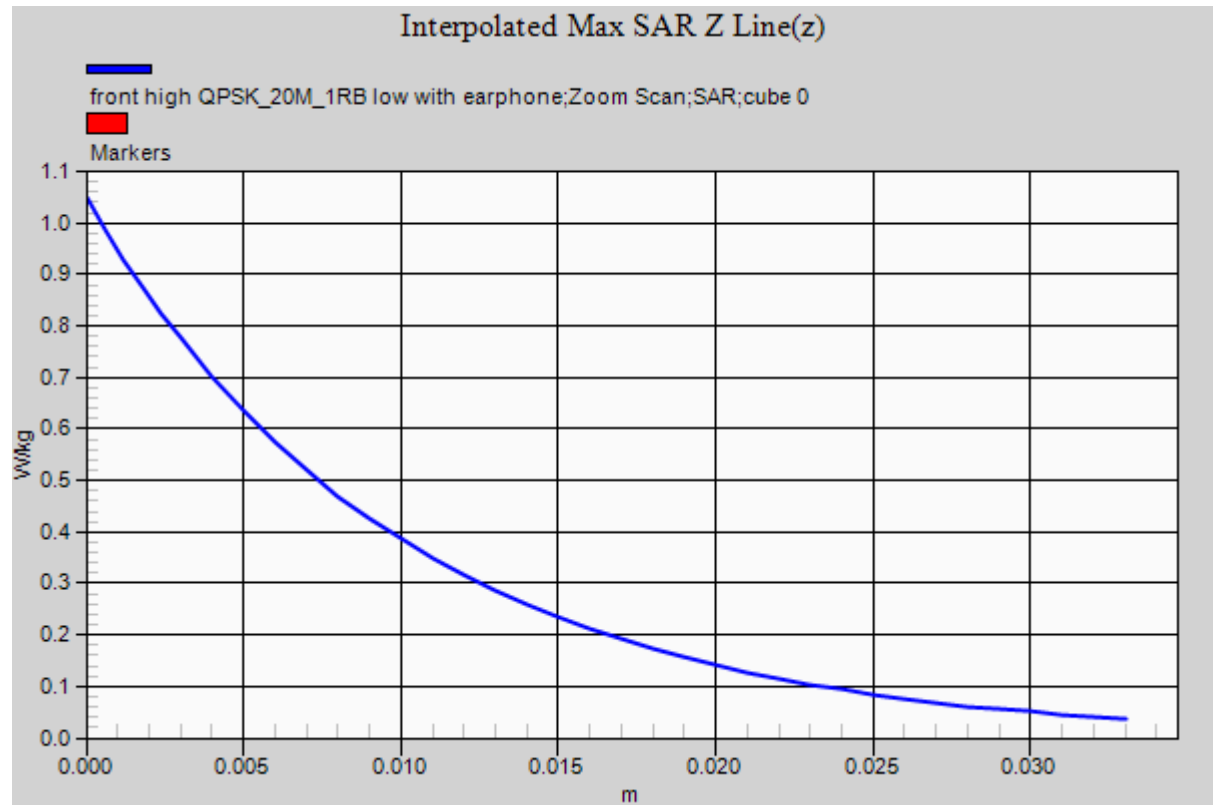
Peak SAR (extrapolated) = 1.05 W/kg

SAR(1 g) = 0.623 W/kg; SAR(10 g) = 0.342 W/kg

Maximum value of SAR (measured) = 0.773 W/kg



0 dB = 0.796 W/kg = -0.99 dBW/kg



LTE BAND 4 right touch mid QPSK_20M_1RB_low

Date/Time: 22/05/2015 21:29:24

Communication System: UID 0, FDD-LTE(QPSK_20M_1RB) (0); Communication System

Band: BAND 4; Frequency: 1732.5 MHz; Communication System PAR: 0 dB

Medium parameters used (interpolated): $f = 1732.5$ MHz; $\sigma = 1.374$ S/m; $\epsilon_r = 39.262$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.98, 7.98, 7.98); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: SAM2; Type: SAM; Serial: TP-1575
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Configuration/touch mid/Area Scan (101x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.322 W/kg

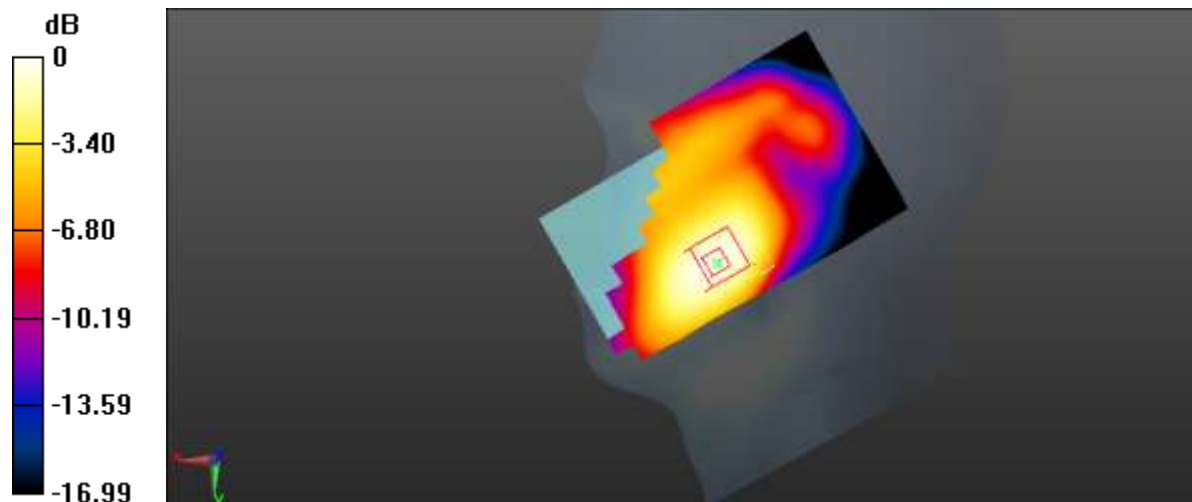
Configuration/touch mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.958 V/m; Power Drift = -0.19 dB

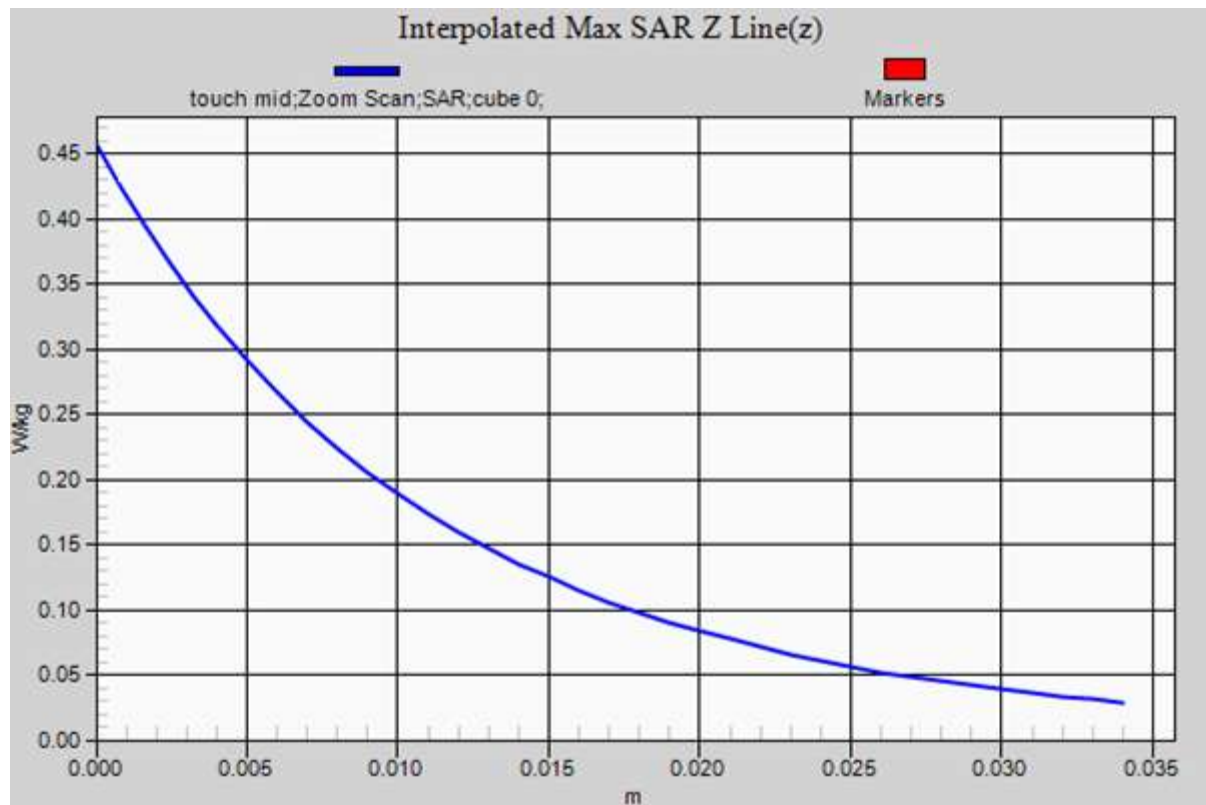
Peak SAR (extrapolated) = 0.456 W/kg

SAR(1 g) = 0.295 W/kg; SAR(10 g) = 0.184 W/kg

Maximum value of SAR (measured) = 0.320 W/kg



0 dB = 0.320 W/kg = -4.95 dBW/kg



LTE BAND 4 towards ground mid QPSK_20M_1RB mid with earphone

Date/Time: 25/05/2015 20:53:29

Communication System: UID 0, FDD-LTE(QPSK_20M_1RB) (0); Communication System

Band: BAND 4; Frequency: 1732.5 MHz; Communication System PAR: 0 dB

Medium parameters used (interpolated): $f = 1732.5$ MHz; $\sigma = 1.496$ S/m; $\epsilon_r = 51.908$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(5.01, 5.01, 5.01); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Configuration/towards ground mid QPSK_20M_1RB_mid with earphone/Area Scan (101x171x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm
Maximum value of SAR (interpolated) = 0.637 W/kg

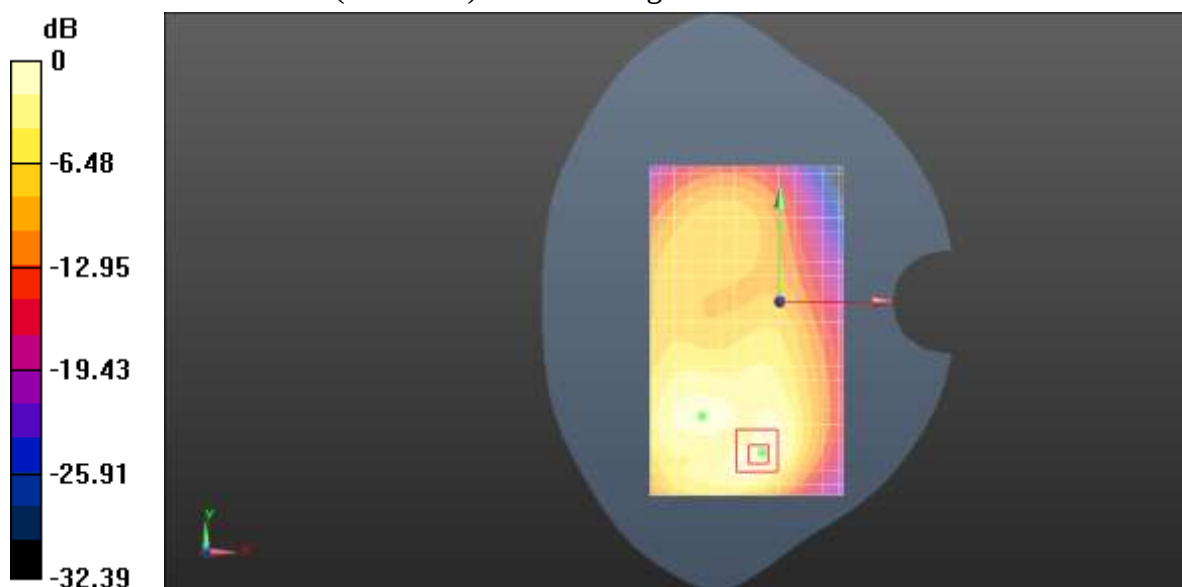
Configuration/towards ground mid QPSK_20M_1RB_mid with earphone/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 7.961 V/m; Power Drift = -0.05 dB

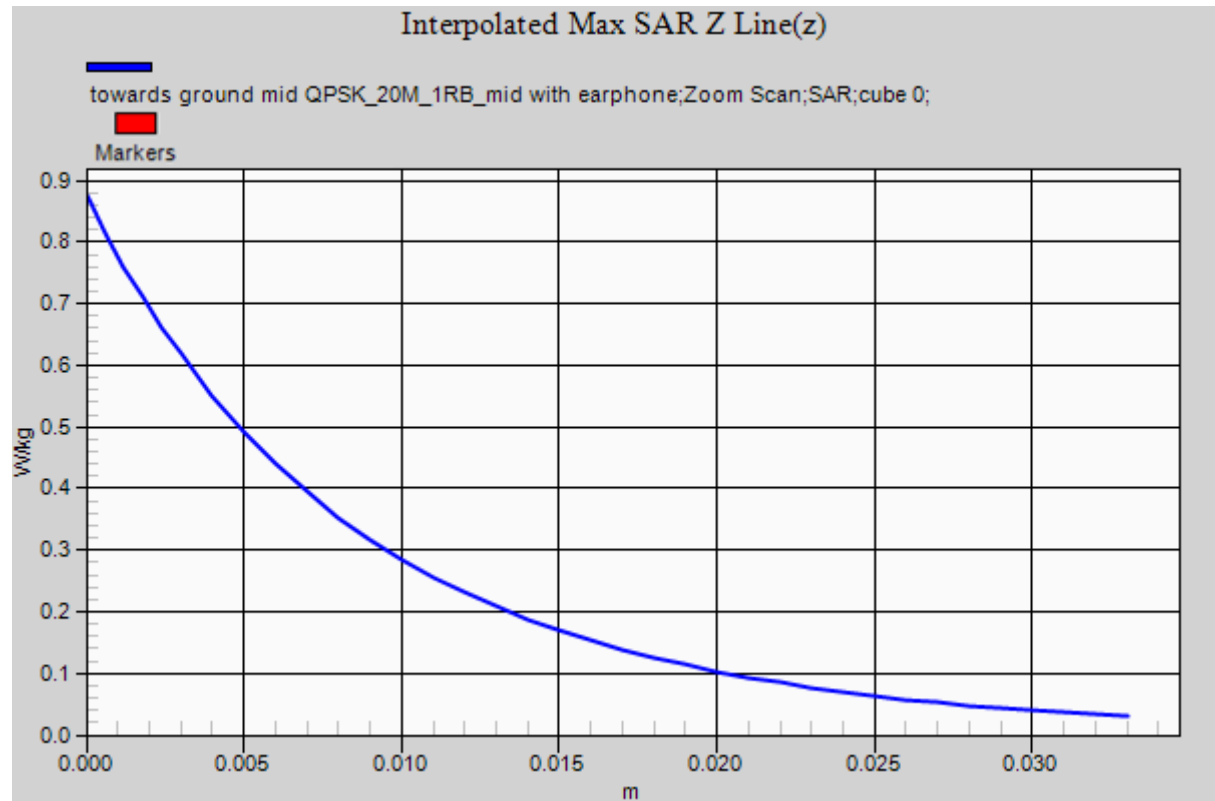
Peak SAR (extrapolated) = 0.876 W/kg

SAR(1 g) = 0.489 W/kg; SAR(10 g) = 0.271 W/kg

Maximum value of SAR (measured) = 0.617 W/kg



0 dB = 0.637 W/kg = -1.96 dBW/kg



LTE BAND 7 right touch low QPSK_20M_1RB_low

Date/Time: 24/05/2015 09:12:41

Communication System: UID 0, FDD-LTE(QPSK_20M_1RB) (0); Communication System

Band: BAND 7; Frequency: 2510 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2510$ MHz; $\sigma = 1.814$ S/m; $\epsilon_r = 39.28$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE1528-2013)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.64, 4.64, 4.64); Calibrated: 29/09/2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 15/09/2014
- Phantom: SAM 1; Type: SAM; Serial: TP:1702
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Configuration/touch low/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.168 W/kg

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

Reference Value = 3.647 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.291 W/kg

SAR(1 g) = 0.155 W/kg; SAR(10 g) = 0.081 W/kg

Maximum value of SAR (measured) = 0.174 W/kg

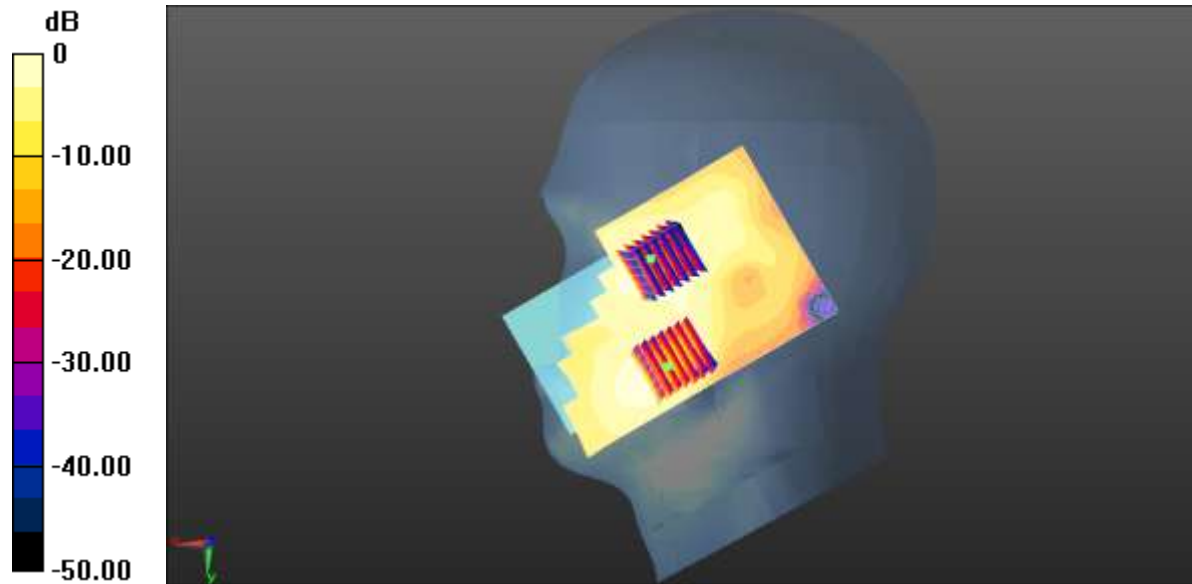
Configuration/touch low/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.647 V/m; Power Drift = 0.09 dB

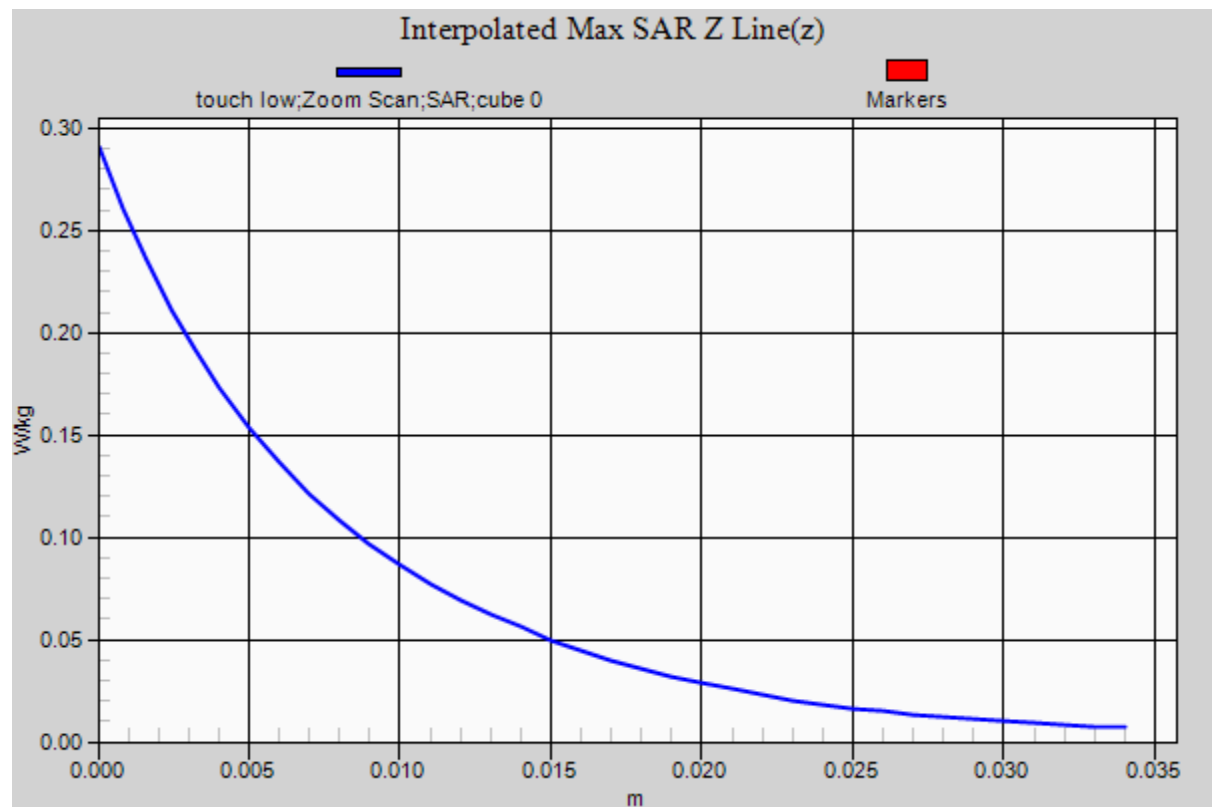
Peak SAR (extrapolated) = 0.253 W/kg

SAR(1 g) = 0.140 W/kg; SAR(10 g) = 0.076 W/kg

Maximum value of SAR (measured) = 0.152 W/kg



0 dB = 0.168 W/kg = -7.76 dBW/kg



LTE BAND 7 towards ground low QPSK_20M_1RB high

Date/Time: 21/05/2015 22:47:20

Communication System: UID 0, FDD-LTE(QPSK_20M_1RB) (0); Communication System

Band: BAND 7; Frequency: 2510 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2510$ MHz; $\sigma = 2.095$ S/m; $\epsilon_r = 51.424$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE1528-2013)

DASY5 Configuration:

- Probe: EX3DV4 - SN3717; ConvF(7.11, 7.11, 7.11); Calibrated: 02/09/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1327; Calibrated: 21/04/2015
- Phantom: ELI v4.0; Type: ELI4; Serial: TP:1086
- Measurement SW: DASYS2, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Configuration/towards ground low QPSK_20M_1RB_high/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.743 W/kg

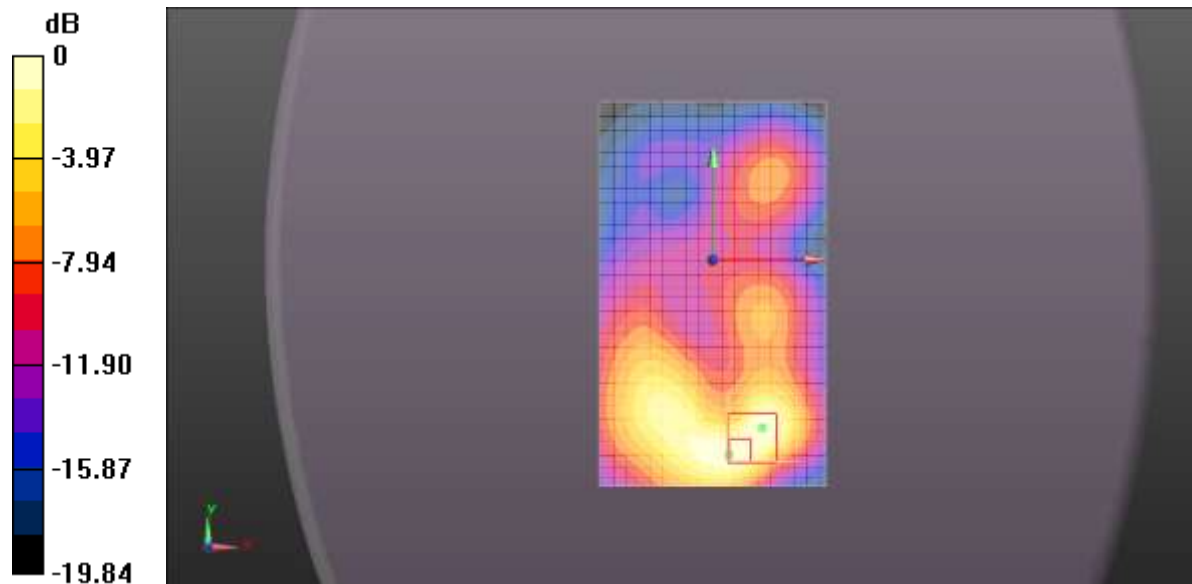
Configuration/towards ground low QPSK_20M_1RB_high/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.896 V/m; Power Drift = -0.05 dB

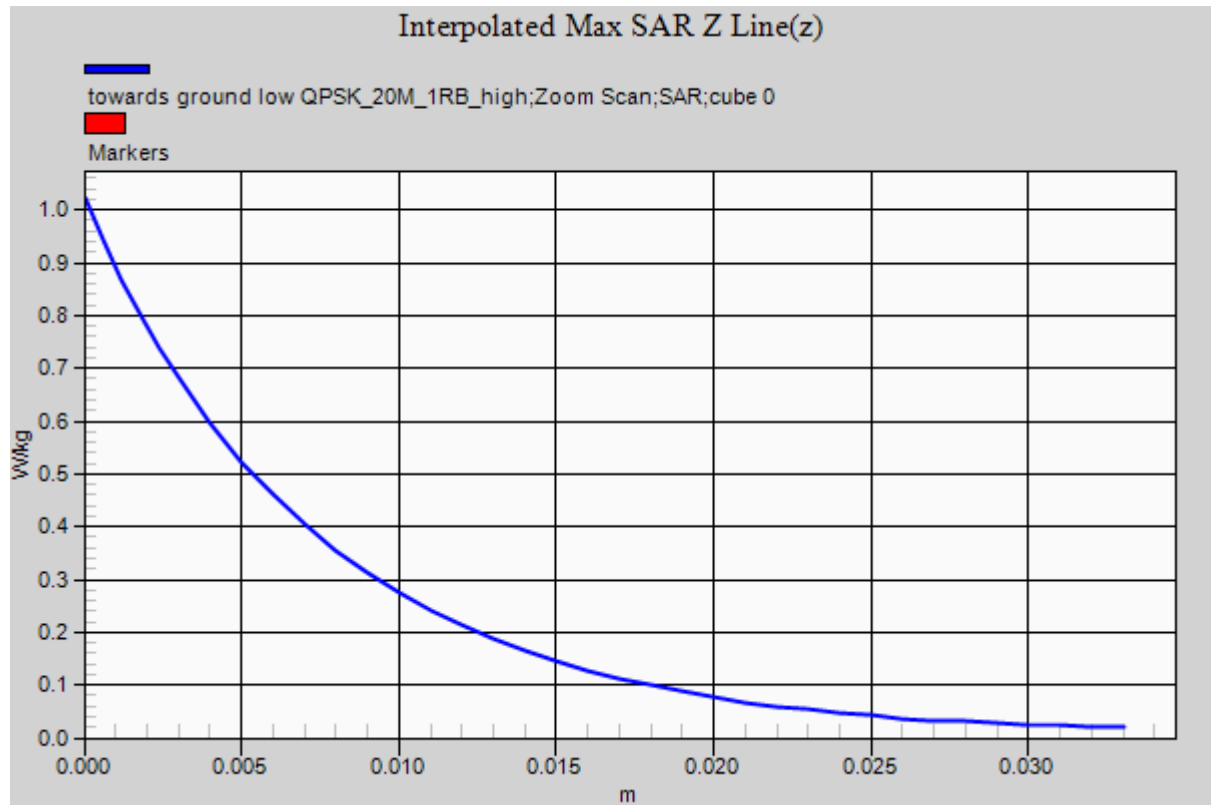
Peak SAR (extrapolated) = 1.02 W/kg

SAR(1 g) = 0.508 W/kg; SAR(10 g) = 0.251 W/kg

Maximum value of SAR (measured) = 0.666 W/kg



0 dB = 0.743 W/kg = -1.29 dBW/kg



ANNEX B: Calibration Certificate

Annex B.1 Probe Calibration Certificate



In Collaboration with
s p e a g
CALIBRATION LABORATORY

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CALIBRATION
No. L0570

Client **Tejet**
Certificate No: **Z14-97105**

CALIBRATION CERTIFICATE

Object: **ES3DV3 - SN:3241**

Calibration Procedure(s): **TMC-OS-E-02-195**
Calibration Procedures for Dosimetric E-field Probes

Calibration date: **September 29, 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(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter	NRP2	101919	01-Jul-14 (CTTL, No.J14X02146)	Jun-15
Power sensor	NRP-Z91	101547	01-Jul-14 (CTTL, No.J14X02146)	Jun-15
Power sensor	NRP-Z91	101548	01-Jul-14 (CTTL, No.J14X02146)	Jun-15
Reference10dBAttenuator		BT0520	12-Dec-12(TMC,No.JZ12-867)	Dec-14
Reference20dBAttenuator		BT0267	12-Dec-12(TMC,No.JZ12-866)	Dec-14
Reference Probe EX3DV4		SN 3617	28-Aug-14(SPEAG,No.EX3-3617_Aug14)	Aug-15
DAE4		SN 1331	23-Jan-14 (SPEAG, DAE4-1331_Jan14)	Jan -15
Secondary Standards		ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
SignalGeneratorMG3700A		6201052605	01-Jul-14 (CTTL, No.J14X02145)	Jun-15
Network Analyzer E5071C		MY46110673	15-Feb-14 (TMC, No.JZ14-781)	Feb-15

Calibrated by: **Yu Zongying**

Reviewed by: **Qi Dianyuan**

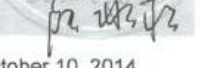
Approved by: **Lu Bingsong**

Name: **Yu Zongying**

Function: **SAR Test Engineer**

Signature: 

Signature: 

Signature: 

Issued: October 10, 2014

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



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Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A,B,C,D	modulation dependent linearization parameters
Polarization Φ	Φ rotation around probe axis
Polarization θ	θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i $\theta=0$ 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:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3GHz)", February 2005

Methods Applied and Interpretation of Parameters:

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



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Probe ES3DV3

SN: 3241

Calibrated: September 29, 2014

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)



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DASY – Parameters of Probe: ES3DV3 - SN: 3241

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	1.12	0.83	1.00	±10.8%
DCP(mV) ^B	105.8	106.3	106.4	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB $\sqrt{\mu\text{V}}$	C	D dB	VR mV	Unc ^E (k=2)
0	CW	X	0.0	0.0	1.0	0.00	294.1	±2.3%
		Y	0.0	0.0	1.0		250.2	
		Z	0.0	0.0	1.0		276.2	

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

^A The uncertainties of Norm X, Y, Z do not affect the E²-field uncertainty inside TSL (see Page 5 and Page 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.



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DASY – Parameters of Probe: ES3DV3 - SN: 3241

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz] ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unct. (k=2)
750	41.9	0.89	6.90	6.90	6.90	0.59	1.23	± 12%
835	41.5	0.90	6.41	6.41	6.41	0.43	1.46	± 12%
900	41.5	0.97	6.35	6.35	6.35	0.46	1.44	± 12%
1750	40.1	1.37	5.48	5.48	5.48	0.47	1.50	± 12%
1900	40.0	1.40	5.12	5.12	5.12	0.73	1.24	± 12%
2000	40.0	1.40	5.10	5.10	5.10	0.52	1.48	± 12%
2450	39.2	1.80	4.64	4.64	4.64	0.89	1.13	± 12%

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

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

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



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DASY – Parameters of Probe: ES3DV3 - SN: 3241

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz] ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unct. (k=2)
750	55.2	0.97	6.44	6.44	6.44	0.38	1.64	± 12%
835	55.2	0.99	6.37	6.37	6.37	0.48	1.48	± 12%
900	55.0	1.05	6.24	6.24	6.24	0.40	1.62	± 12%
1750	53.4	1.49	5.01	5.01	5.01	0.52	1.53	± 12%
1900	53.3	1.52	4.85	4.85	4.85	0.48	1.64	± 12%
2000	53.3	1.52	4.92	4.92	4.92	0.52	1.58	± 12%
2450	52.7	1.95	4.46	4.46	4.46	0.86	1.18	± 12%

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

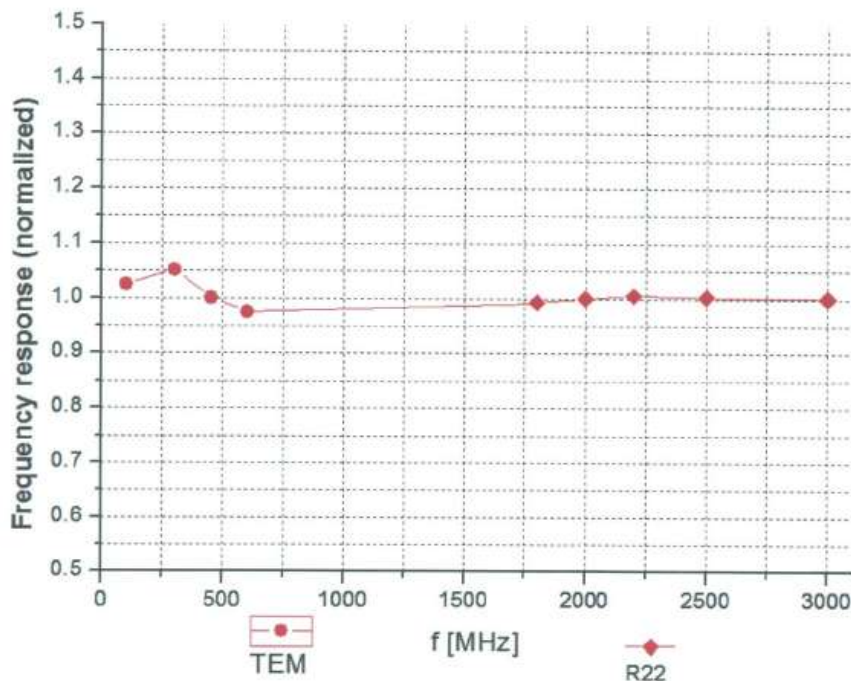
^F At frequency below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty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

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



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



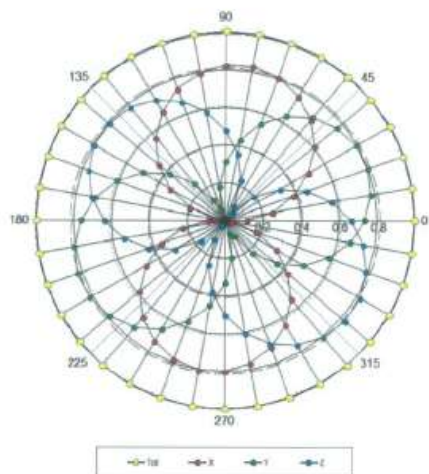
Uncertainty of Frequency Response of E-field: $\pm 7.5\%$ (k=2)



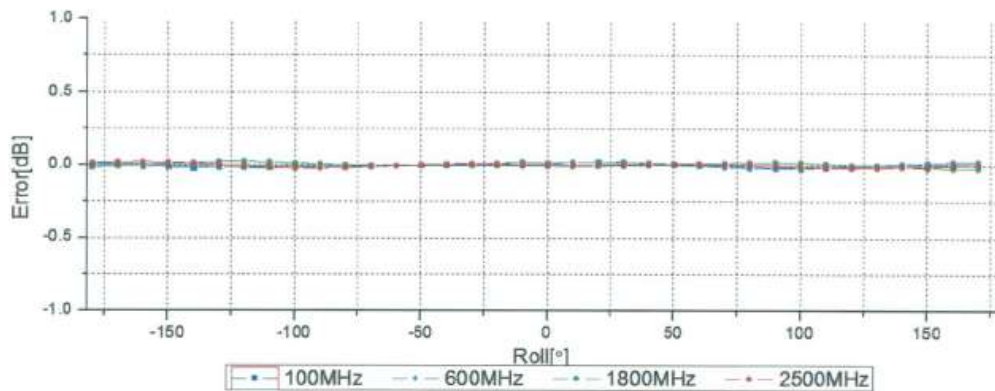
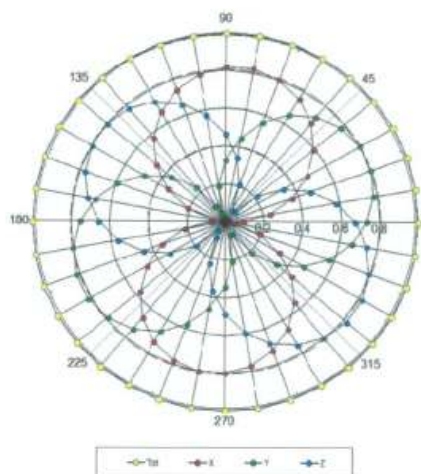
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Receiving Pattern (Φ), $\theta=0^\circ$

f=600 MHz, TEM



f=1800 MHz, R22

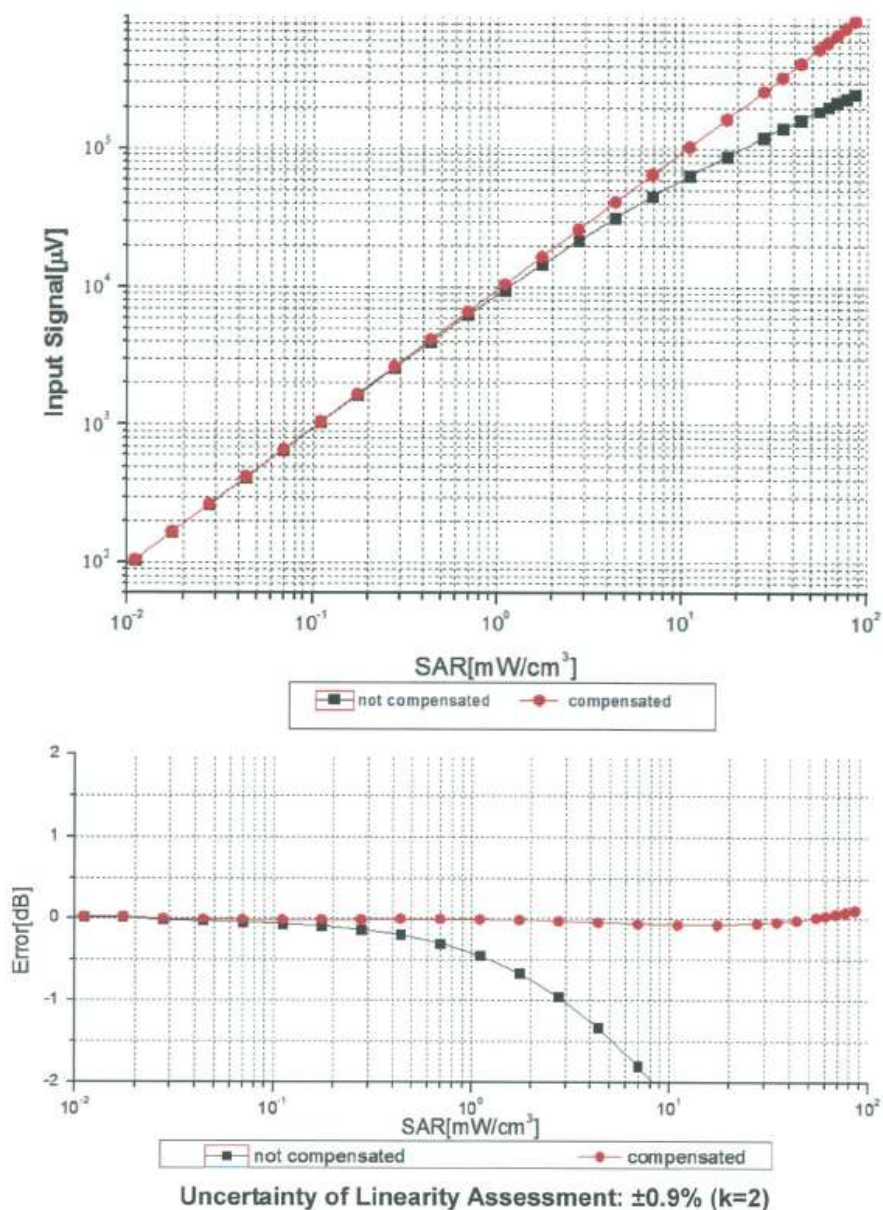


Uncertainty of Axial Isotropy Assessment: $\pm 0.9\%$ ($k=2$)



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



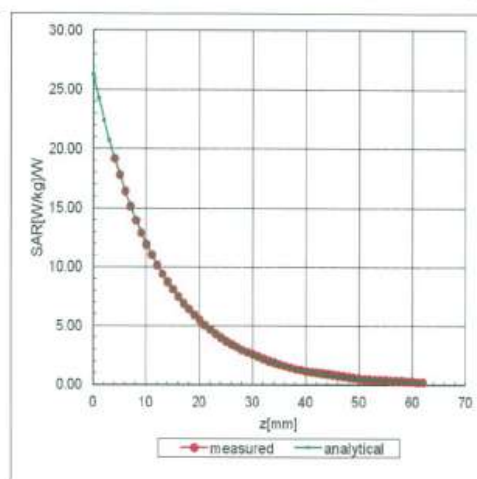
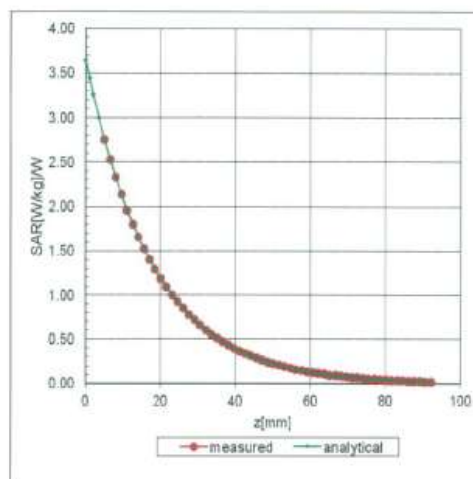


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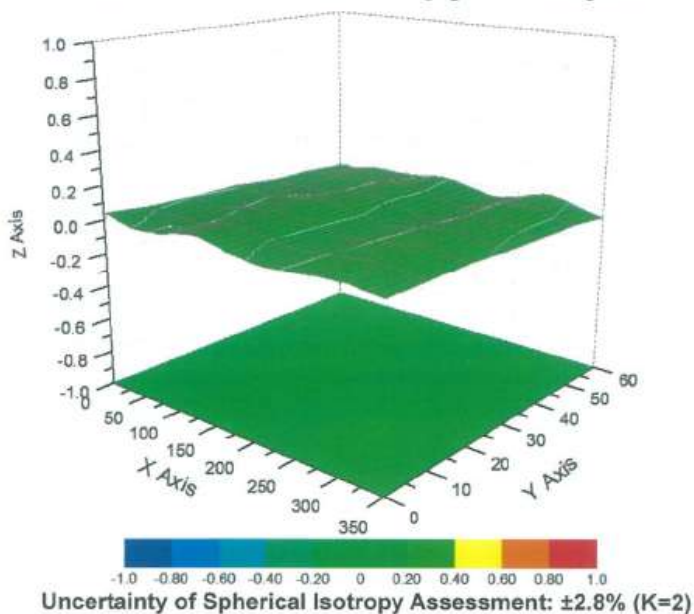
Conversion Factor Assessment

f=900 MHz, WGLS R9(H_convF)

f=1750 MHz, WGLS R22(H_convF)



Deviation from Isotropy in Liquid



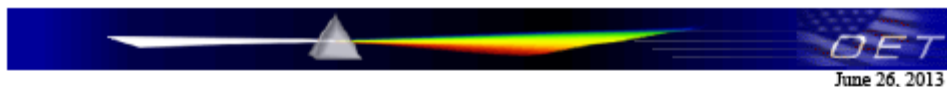


Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
 Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
 E-mail: ctl@chinatl.com [Http://www.chinatl.cn](http://www.chinatl.cn)

DASY - Parameters of Probe: ES3DV3 - SN: 3241

Other Probe Parameters

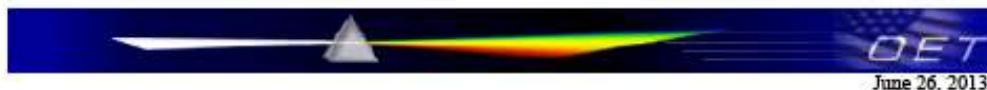
Sensor Arrangement	Triangular
Connector Angle (°)	150.2
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	10mm
Tip Diameter	4mm
Probe Tip to Sensor X Calibration Point	2mm
Probe Tip to Sensor Y Calibration Point	2mm
Probe Tip to Sensor Z Calibration Point	2mm
Recommended Measurement Distance from Surface	3mm



Acceptable Conditions for SAR Measurements Using Probes and Dipoles Calibrated under the SPEAG-TMC Dual-Logo Calibration Program to Support FCC Equipment Certification

The acceptable conditions for SAR measurements using probes, dipoles and DAEs calibrated by TMC (*Telecommunication Metrology Center of MITT in Beijing, China*), under the Dual-Logo Calibration Certificate program and quality assurance (QA) protocols established between SPEAG (*Schmid & Partner Engineering AG, Switzerland*) and TMC, to support FCC (*U.S. Federal Communications Commission*) equipment certification are defined and described in the following.

- 1) The agreement established between SPEAG and TMC is only applicable to calibration services performed by TMC where its clients (companies and divisions of such companies) are headquartered in the Greater China Region, including Taiwan and Hong Kong. This agreement is subject to renewal at the end of each calendar year between SPEAG and TMC. TMC shall inform the FCC of any changes or early termination to the agreement.
- 2) Only a subset of the calibration services specified in the SPEAG-TMC agreement, while it remains valid, are applicable to SAR measurements performed using such equipment for supporting FCC equipment certification. These are identified in the following.
 - a) Calibration of dosimetric (SAR) probes EX3DVx, ET3DVx and ES3DVx.
 - i) Free-space E-field and H-field probes, including those used for HAC (hearing aid compatibility) evaluation, temperature probes, other probes or equipment not identified in this document, when calibrated by TMC, are excluded and cannot be used for measurements to support FCC equipment certification.
 - ii) Signal specific and bundled probe calibrations based on PMR (probe modulation response) characteristics are handled according to the requirements of KDB 865664; that is, "Until standardized procedures are available to make such determination, the applicability of a signal specific probe calibration for testing specific wireless modes and technologies is determined on a case-by-case basis through KDB inquiries, including SAR system verification requirements."
 - b) Calibration of SAR system validation dipoles, excluding HAC dipoles.
 - c) Calibration of data acquisition electronics DAE3Vx, DAE4Vx and DAEasyVx.
 - d) For FCC equipment certification purposes, the frequency range of SAR probe and dipole calibrations is limited to 700 MHz - 6 GHz and provided it is supported by the equipment identified in the TMC QA protocol (a separate attachment to this document).
 - e) The identical system and equipment setup, measurement configurations, hardware, evaluation algorithms, calibration and QA protocols, including the format of calibration certificates and reports used by SPEAG shall be applied by TMC.
 - f) The calibrated items are only applicable to SPEAG DASY 4 and DASY 5 or higher version systems.



June 26, 2013

- 3) The SPEAG-TMC agreement includes specific protocols identified in the following to ensure the quality of calibration services provided by TMC under this SPEAG-TMC Dual-Logo calibration agreement are equivalent to the calibration services provided by SPEAG. TMC shall, upon request, provide copies of documentation to the FCC to substantiate program implementation.
 - a) The Inter-laboratory Calibration Evaluation (ILCE) stated in the TMC QA protocol shall be performed between SPEAG and TMC at least once every 12 months. The ILCE acceptance criteria defined in the TMC QA protocol shall be satisfied for the TMC, SPEAG and FCC agreements to remain valid.
 - b) Check of Calibration Certificate (CCC) shall be performed by SPEAG for all calibrations performed by TMC. Written confirmation from SPEAG is required for TMC to issue calibration certificates under the SPEAG-TMC Dual-Logo calibration program. Quarterly reports for all calibrations performed by TMC under the program are also issued by SPEAG.
 - c) The calibration equipment and measurement system used by TMC shall be verified before each calibration service according to the specific reference SAR probes, dipoles, and DAE calibrated by SPEAG. The results shall be reproducible and within the defined acceptance criteria specified in the TMC QA protocol before each actual calibration can commence. TMC shall maintain records of the measurement and calibration system verification results for all calibrations.
 - d) Quality Check of Calibration (QCC) certificates shall be performed by SPEAG at least once every 12 months. SPEAG shall visit TMC facilities to verify the laboratory, equipment, applied procedures and plausibility of randomly selected certificates.
- 4) A copy of this document, to be updated annually, shall be provided to TMC clients that accept calibration services according to the SPEAG-TMC Dual-Logo calibration program, which should be presented to a TCB (*Telecommunication Certification Body*), to facilitate FCC equipment approval.
- 5) TMC shall address any questions raised by its clients or TCBs relating to the SPEAG-TMC Dual-Logo calibration program and inform the FCC and SPEAG of any critical issues.

Change Note: Revised on June 26 to clarify the applicability of PMR and Bundled probe calibrations according to the requirements of KDB 865664.