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检测
TESTING
CNAS L2264

SAR TEST REPORT

Applicant	ZTE CORPORATION
FCC ID	SRQ-ZTU31
Product	LTE/WCDMA/GSM (GPRS) Multi-Mode Digital Mobile Phone
Brand	ZTE
Model	ZTU31/ZTE Blade V770/Blade V770
Report No.	RXC1611-0258SAR01R1
Issue Date	January 19, 2017

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **IEEE 1528- 2013, ANSI/ IEEE C95.1-1992.** The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Performed by: Jiangpeng Lan *Approved by: Kai Xu*

TA Technology (Shanghai) Co., Ltd.

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1 Test Laboratory

1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above. This report must not be used by the client to claim product certification, approval, or endorsement by CNAS or any government agencies.

1.2 Test facility

CNAS (accreditation number: L2264)

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

FCC (recognition number is 428261)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

IC (recognition number is 8510A)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

VCCI (recognition number is C-4595, T-2154, R-4113, G-766)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

1.3 Testing Location

Company: TA Technology (Shanghai) Co., Ltd.

Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China

City: Shanghai

Post code: 201201

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1.4 Laboratory Environment

Temperature	Min. = 18°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 Ω
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

2 Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for the EUT are as follows:

Table 2.1: Highest Reported SAR (Main-antenna and Wi-Fi antenna)

Mode	Highest Reported SAR (W/kg)			
	1g SAR Head	1g SAR Body-worn (Separation 10mm)	1g SAR Hotspot (Separation 10mm)	Product Specific 10-g SAR (Separation 0mm)
GSM 850	0.317	0.415	0.420	NA
GSM 1900	0.106	0.176	0.446	NA
WCDMA Band V	0.288	0.419	0.419	NA
LTE FDD 5	0.392	0.504	0.504	NA
LTE FDD 26	0.392	0.444	0.444	NA
LTE TDD 41	0.284	0.379	0.379	NA
Wi-Fi (2.4G)	0.308	0.094	0.094	NA
Date of Testing:	November 18, 2016 ~ December 17, 2016			
Note: The device is in compliance with SAR for Uncontrolled Environment /General Population exposure limits (1.6 W/kg and 4.0 W/kg) specified in ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013.				

Table 2.2: Highest Simultaneous Transmission SAR

Exposure Configuration	1g SAR Head	1g SAR Body-worn (Separation 10mm)	1g SAR Hotspot (Separation 10mm)
Highest Simultaneous Transmission SAR (W/kg)	0.672	0.589	0.589
Note: 1. The detail for simultaneous transmission consideration is described in chapter 10.3.			

3 Description of Equipment under Test

Client Information

Applicant	ZTE CORPORATION
Applicant address	ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District Shenzhen, Guangdong, 518057, P.R. China
Manufacturer	ZTE CORPORATION
Manufacturer address	ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District Shenzhen, Guangdong, 518057, P.R. China

Accessory Equipment Details

Name	Model	Manufacturer	Note
Battery	Li3925T44P8h786035	SCUD (Fujian) Electronics Co., Ltd	/
Adapter	WPS-056	MITSUMI	/

General Technologies

EUT Stage	Identical Prototype
Model:	ZTU31/ZTE Blade V770/Blade V770
IMEI:	863682030001706
Hardware Version:	uu9A
Software Version:	KDDI_JP_BV770_V1.0
Antenna Type:	Internal Antenna
Device Class:	B
Wi-Fi Hotspot	Wi-Fi 2.4G
Power Class:	GSM 850:4 GSM 1900:1 UMTS Band V:3 LTE FDD 5/26:3 LTE TDD 41:3
Power Level	GSM 850:level 5 GSM 1900:level 0 UMTS Band V:all up bits LTE FDD 5/26:max power LTE TDD 41:max power

Wireless Technology and Frequency Range

Wireless Technology		Modulation	Operating mode	Tx (MHz)
GSM	850	Voice(GMSK) GPRS(GMSK) EGPRS(GMSK,8PSK)	☐Multi-slot Class:8-1UP ☐Multi-slot Class:10-2UP ☒Multi-slot Class:12-4UP ☐Multi-slot Class:33-4UP	824 ~ 849
	1900			1850 ~ 1910
	Does this device support DTM (Dual Transfer Mode)? ☐Yes ☒No			
UMTS	Band V	QPSK	HSDPA UE Category:24 HSUPA UE Category:6	1850 ~ 1910
LTE	FDD 5	QPSK, 16QAM	Rel.8 /Category 6	1850 ~ 1910
	FDD 26			814 ~ 849
	TDD 41			2552.5 ~ 2655
	Does this device support Carrier Aggregation (CA) ☐Yes downlink only☒No			
	Does this device support SV-LTE (1xRTT-LTE)? ☐Yes ☒No			
BT	2.4G	Version 4.0 BLE/BT		2400 ~2480
Wi-Fi	2.4G	DSSS, OFDM	802.11b/g/n (HT20)	2402 ~2472
	Does this device support MIMO ☐Yes ☒No			

4 Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1093, IEEE 1528- 2013, ANSI/IEEE C95.1-1992, the following FCC Published RF exposure KDB procedures:

248227 D01 802.11 Wi-Fi SAR v02r02
447498 D01 General RF Exposure Guidance v06
648474 D04 Handset SAR v01r03
865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
865664 D02 RF Exposure Reporting v01r02
941225 D01 3G SAR Procedures v03r01
941225 D05 SAR for LTE Devices v02r05
941225 D06 Hotspot Mode v02r01

5 Operational Conditions during Test

5.1 Test Positions

5.1.1 Against Phantom Head

Measurements were made in “cheek” and “tilt” positions on both the left hand and right hand sides of the phantom.

The positions used in the measurements were according to IEEE 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".

5.1.2 Body Worn Configuration

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations.

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration. Per FCC KDB Publication 648474 D04, Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB Publication 447498 D01 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented. Transmitters that are designed to operate in front of a person’s face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

5.2 Measurement Variability

Per FCC KDB Publication 865664 D01, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR Measurement Variability was assessed using the following procedures for each frequency band:
1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
2) A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

5.3 Test Configuration

5.3.1 GSM Test Configuration

According to specification 3GPP TS 51.010, the maximum power of the GSM can do the power reduction for the multi-slot. The allowed power reduction in the multi-slot configuration is as following:

Output power of reductions:

Table 5.1: The allowed power reduction in the multi-slot configuration

Number of timeslots in uplink assignment	Permissible nominal reduction of maximum output power,(dB)
1	0
2	0 to 3,0
3	1,8 to 4,8
4	3,0 to 6,0

5.3.2 3G Test Configuration

3G SAR Test Reduction Procedure

In the following procedures, the mode tested for SAR is referred to as the primary mode. The equivalent modes considered for SAR test reduction are denoted as secondary modes. Both primary and secondary modes must be in the same frequency band. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.3 This is referred to as the 3G SAR test reduction procedure in the following SAR test guidance, where the primary mode is identified in the applicable wireless mode test procedures and the secondary mode is wireless mode being considered for SAR test reduction by that procedure. When the 3G SAR test reduction procedure is not satisfied, it is identified as “otherwise” in the applicable procedures; SAR measurement is required for the secondary mode.

5.3.2.1 WCDMA Test Configuration

Output power Verification

Maximum output power is verified on the high, middle and low channels according to procedures described in section 5.2 of 3GPP TS 34.121, using the appropriate RMC or AMR with TPC (transmit power control) set to all “1’s” for WCDMA/HSDPA or by applying the required inner loop power control procedures to maintain maximum output power while HSUPA is active. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HSDPA, HSPA) are requied in the SAR report. All configurations that are not supported by the handset or cannot be measured due to technical or equipment limitations must be clearly identified.

Head SAR

SAR for next to the ear head exposure is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”. The 3G SAR test reduction procedure is applied to AMR configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for 12.2 kbps AMR in 3.4 kbps SRB (signaling radio bearer) using the highest reported SAR configuration in 12.2 kbps RMC for head exposure.

Body-Worn Accessory SAR

SAR for body-worn accessory configurations is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”. The 3G SAR test reduction procedure is applied to other spreading codes and multiple DPDCHn configurations supported by the handset with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured using an applicable RMC configuration with the corresponding spreaing code or DPDCHn, for the highest reported body-worn accessory exposure SAR configuration in 12.2 kbps RMC. When more than 2 DPDCHn are supported by the handset, it may be necessary to configure additional DPDCHn using FTM (Factory Test Mode) or other chipset based test approaches with parameters similar to those used in 384 kbps and 768 kbps RMC.

Handsets with Release 5 HSDPA

The 3G SAR test reduction procedure is applied to HSDPA body-worn accessory configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for HSDPA using the HSDPA body SAR procedures in the "Release 5 HSDPA Data Devices" section of this document, for the highest reported SAR body-worn accessory exposure configuration in 12.2 kbps RMC. Handsets with both HSDPA and HSUPA are tested according to Release 6 HSPA test procedures.

HSDPA should be configured according to the UE category of a test device.The number of HSDSCH/ HS-PDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission conditions, 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 DPDCH gain factors(βc, βd), and HS-DPCCH power offset parameters (ΔACK, ΔNACK, ΔCQI) 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 5.2: Subtests for UMTS Release 5 HSDPA

Sub-set	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (note 1, note 2)	CM(dB) (note 3)	MPR(dB)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (note 4)	15/15 (note 4)	64	12/15 (note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI}= 8⇔A_{hs} = β_{hs}/β_c=30/15 ⇔ β_{hs}=30/15*β_c

Note2: CM=1 for β_c/β_d =12/15, β_{hs}/β_c=24/15.

Note3: For subtest 2 the $\beta_c\beta_d$ ratio of 12/15 for the TFC during the measurement period(TF1,TF0) is achieved by setting the signaled gain factors for the reference TFC (TFC1,TF1) to β_c=11/15 and β_d=15/15.

HSUPA Test Configuration

The 3G SAR test reduction procedure is applied to HSPA (HSUPA/HSDPA with RMC) body-worn accessory configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for HSPA using the HSPA body SAR procedures in the "Release 6 HSPA Data Devices" section of this document, for the highest reported body-worn accessory exposure SAR configuration in 12.2 kbps RMC. When VOIP is applicable for next to the ear head exposure in HSPA, the 3G SAR test reduction procedure is applied to HSPA with 12.2 kbps RMC as the primary mode; otherwise, the same HSPA configuration used for body-worn accessory measurements is tested for next to the ear head exposure.

Due to inner loop power control requirements in HSPA, a communication test set is required for output power and SAR tests. The 12.2 kbps RMC, FRC H-set 1 and E-DCH configurations for HSPA are configured according to the β values indicated in Table 2 and other applicable procedures described in the 'WCDMA Handset' and 'Release 5 HSDPA Data Devices' sections of this document

Table 5.3：Sub-Test 5 Setup for Release 6 HSUPA

Sub-set	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (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	β_{ed1}:47/15 β_{ed2}: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}, ΔNACK and Δ_{CQI} = 8 ⇔ A_{hs} = β_{hs}/β_c = 30/15 ⇔ β_{hs}= 30/15 *β_c.

Note 2: CM = 1 for βc/βd =12/15, β_{hs}/β_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 βc/βd 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 βc = 10/15 and βd = 15/15.

Note 4: For subtest 5 the βc/βd 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 βc = 14/15 and βd = 15/15.

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

Note 6: βed can not be set directly; it is set by Absolute Grant Value.

Table 5.4: HSUPA UE category

UE E-DCH Category	Maximum E-DCH Codes Transmitted	Number of HARQ Processes	E-DCH TTI (ms)	Minimum Spreading Factor	Maximum E-DCH Transport Block Bits	Max Rate (Mbps)
1	1	4	10	4	7110	0.7296
2	2	8	2	4	2798	1.4592
	2	4	10	4	14484	
3	2	4	10	4	14484	1.4592
4	2	8	2	2	5772	2.9185
	2	4	10	2	20000	2.00
5	2	4	10	2	20000	2.00
6 (No DPDCH)	4	8	2	2 SF2 & 2 SF4	11484	5.76
	4	4	10		20000	2.00
7 (No DPDCH)	4	8	2	2 SF2 & 2 SF4	22996	?
	4	4	10		20000	?

NOTE: When 4 codes are transmitted in parallel, two codes shall be transmitted with SF2 and two with SF4.
UE Categories 1 to 6 supports QPSK only. UE Category 7 supports QPSK and 16QAM. (TS25.306-7.3.0)

HSPA, HSPA+ and DC-HSDPA Test Configuration

Measurement is required for HSPA, HSPA+ or DC-HSDPA, a KDB inquiry is required to confirm that the wireless mode configurations in the test setup have remained stable throughout the SAR measurements.35 Without prior KDB confirmation to determine the SAR results are acceptable, a PBA is required for TCB approval.

SAR test exclusion for HSPA, HSPA+ and DC-HSDPA is determined according to the following:

1) The HSPA procedures are applied to configure 3GPP Rel. 6 HSPA devices in the required sub-test mode(s) to determine SAR test exclusion.

2) SAR is required for Rel. 7 HSPA+ when SAR is required for Rel. 6 HSPA; otherwise, the 3G SAR test reduction procedure is applied to (uplink) HSPA+ with 12.2 kbps RMC as the primary mode.36 Power is measured for HSPA+ that supports uplink 16 QAM according to configurations in Table C.11.1.4 of 3GPP TS 34.121-1 to determine SAR test reduction.

3) 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.

4) Regardless of whether a PBA is required, the following information must be verified and included in the SAR report for devices supporting HSPA, HSPA+ or DC-HSDPA: a) The output power measurement results and applicable release version(s) of 3GPP TS 34.121.

i) Power measurement difficulties due to test equipment setup or availability must be resolved between the grantee and its test lab.

b) The power measurement results are in agreement with the individual device implementation and specifications. When Enhanced MPR (E-MPR) applies, the normal MPR targets may be modified according to the Cubic Metric (CM) measured by the device, which must be taken into consideration.
c) The UE category, operating parameters, such as the β and Δ values used to configure the device for testing, power setback procedures described in 3GGPP TS 34.121 for the power measurements, and HSPA/HSPA+ channel conditions (active and stable) for the entire duration of the measurement according to the required E-TFCI and AG index values.

5) When SAR measurement is required, the test configurations, procedures and power measurement results must be clearly described to confirm that the required test parameters are used, including E-TFCI and AG index stability and output power conditions.

Table 5.5: HS-DSCH UE category

Table 5.1a: FDD HS-DSCH physical layer categories

<table>
<tr><th>HS-DSCH category</th><th>Maximum number of HS-DSCH codes received</th><th>Minimum inter-TTI interval</th><th>Maximum number of bits of an HS-DSCH transport block received within an HS-DSCH TTI NOTE 1</th><th>Total number of soft channel bits</th><th>Supported modulations without MIMO operation or dual cell operation</th><th>Supported modulations with MIMO operation and without dual cell operation</th><th>Supported modulations with dual cell operation</th></tr>
<tr><td>Category 1</td><td>5</td><td>3</td><td>7298</td><td>19200</td><td rowspan="10">QPSK, 16QAM</td><td rowspan="14">Not applicable (MIMO not supported)</td><td rowspan="22">Not applicable (dual cell operation not supported)</td></tr>
<tr><td>Category 2</td><td>5</td><td>3</td><td>7298</td><td>28800</td></tr>
<tr><td>Category 3</td><td>5</td><td>2</td><td>7298</td><td>28800</td></tr>
<tr><td>Category 4</td><td>5</td><td>2</td><td>7298</td><td>38400</td></tr>
<tr><td>Category 5</td><td>5</td><td>1</td><td>7298</td><td>57600</td></tr>
<tr><td>Category 6</td><td>5</td><td>1</td><td>7298</td><td>67200</td></tr>
<tr><td>Category 7</td><td>10</td><td>1</td><td>14411</td><td>115200</td></tr>
<tr><td>Category 8</td><td>10</td><td>1</td><td>14411</td><td>134400</td></tr>
<tr><td>Category 9</td><td>15</td><td>1</td><td>20251</td><td>172800</td></tr>
<tr><td>Category 10</td><td>15</td><td>1</td><td>27952</td><td>172800</td></tr>
<tr><td>Category 11</td><td>5</td><td>2</td><td>3630</td><td>14400</td><td rowspan="2">QPSK</td></tr>
<tr><td>Category 12</td><td>5</td><td>1</td><td>3630</td><td>28800</td></tr>
<tr><td>Category 13</td><td>15</td><td>1</td><td>35280</td><td>259200</td><td rowspan="2">QPSK, 16QAM, 64QAM</td></tr>
<tr><td>Category 14</td><td>15</td><td>1</td><td>42192</td><td>259200</td></tr>
<tr><td>Category 15</td><td>15</td><td>1</td><td>23370</td><td>345600</td><td rowspan="2" colspan="2">QPSK, 16QAM</td></tr>
<tr><td>Category 16</td><td>15</td><td>1</td><td>27952</td><td>345600</td></tr>
<tr><td rowspan="2">Category 17 NOTE 2</td><td rowspan="2">15</td><td rowspan="2">1</td><td>35280</td><td>259200</td><td>QPSK, 16QAM, 64QAM</td><td>–</td></tr>
<tr><td>23370</td><td>345600</td><td>–</td><td>QPSK, 16QAM</td></tr>
<tr><td rowspan="2">Category 18 NOTE 3</td><td rowspan="2">15</td><td rowspan="2">1</td><td>42192</td><td>259200</td><td>QPSK, 16QAM, 64QAM</td><td>–</td></tr>
<tr><td>27952</td><td>345600</td><td>–</td><td>QPSK, 16QAM</td></tr>
<tr><td>Category 19</td><td>15</td><td>1</td><td>35280</td><td>518400</td><td rowspan="2" colspan="2">QPSK, 16QAM, 64QAM</td></tr>
<tr><td>Category 20</td><td>15</td><td>1</td><td>42192</td><td>518400</td></tr>
<tr><td>Category 21</td><td>15</td><td>1</td><td>23370</td><td>345600</td><td rowspan="4">-</td><td rowspan="4">-</td><td rowspan="2">QPSK, 16QAM</td></tr>
<tr><td>Category 22</td><td>15</td><td>1</td><td>27952</td><td>345600</td></tr>
<tr><td>Category 23</td><td>15</td><td>1</td><td>35280</td><td>518400</td><td rowspan="2">QPSK, 16QAM, 64QAM</td></tr>
<tr><td>Category 24</td><td>15</td><td>1</td><td>42192</td><td>518400</td></tr>
</table>

5.3.3 LTE Test Configuration

LTE modes were tested according to FCC KDB 941225 D05 publication. Please see notes after the tabulated SAR data for required test configurations. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. The R&S CMW500 was used for LTE output power measurements and SAR testing. Max power control was used so the UE transmits with maximum output power during SAR testing. SAR must be measured with the maximum TTI (transmit time interval) supported by the device in each LTE configuration.

A) Spectrum Plots for RB Configurations

A properly configured base station simulator was used for SAR tests and power measurements. Therefore, spectrum plots for RB configurations were not required to be included in this report.

B) MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.

C) A-MPR

A-MPR (Additional MPR) has been disabled for all SAR tests by setting NS=01 on the base station simulator.

D) Largest channel bandwidth standalone SAR test requirements

1) QPSK with 1 RB allocation

Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel. When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

2) QPSK with 50% RB allocation

The procedures required for 1 RB allocation in 1) are applied to measure the SAR for QPSK with 50% RB allocation.

3) QPSK with 100% RB allocation

For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation in 1) and 2) are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.

4) Higher order modulations

For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in above sections 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 > ½ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

E) Other channel bandwidth standalone SAR test requirements

For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section A) to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > ½ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the *reported* SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.

5.3.4 TDD LTE specification

For Time-Division Duplex (TDD) systems, SAR must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP LTE TDD configurations.

TDD LTE Band supports 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations and Table 4.2-1 for Special subframe configurations.

Figure 4.2-1: Frame structure type 2

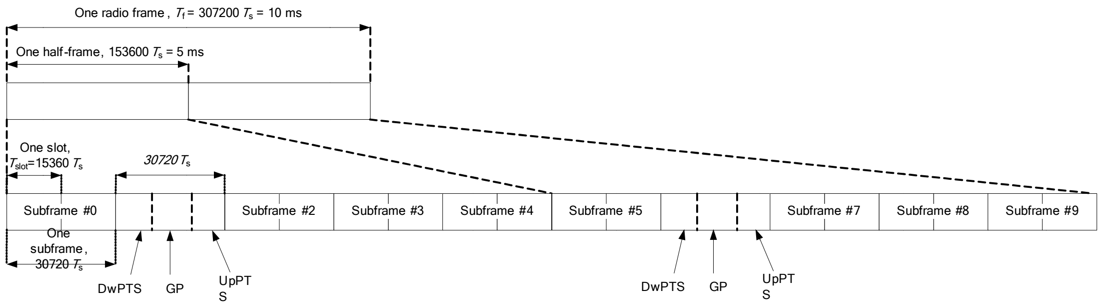


Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS)

<table>
<tr><th rowspan="3">Special subframe configuration</th><th colspan="3">Normal cyclic prefix in downlink</th><th colspan="3">Extended cyclic prefix in downlink</th></tr>
<tr><th rowspan="2">DwPTS</th><th colspan="2">UpPTS</th><th rowspan="2">DwPTS</th><th colspan="2">UpPTS</th></tr>
<tr><th>Normal cyclic prefix in uplink</th><th>Extended cyclic prefix in uplink</th><th>Normal cyclic prefix in uplink</th><th>Extended cyclic prefix in uplink</th></tr>
<tr><td>0</td><td>$6592 \cdot T_s$</td><td rowspan="5">$2192 \cdot T_s$</td><td rowspan="5">$2560 \cdot T_s$</td><td>$7680 \cdot T_s$</td><td rowspan="4">$2192 \cdot T_s$</td><td rowspan="4">$2560 \cdot T_s$</td></tr>
<tr><td>1</td><td>$19760 \cdot T_s$</td><td>$20480 \cdot T_s$</td></tr>
<tr><td>2</td><td>$21952 \cdot T_s$</td><td>$23040 \cdot T_s$</td></tr>
<tr><td>3</td><td>$24144 \cdot T_s$</td><td>$25600 \cdot T_s$</td></tr>
<tr><td>4</td><td>$26336 \cdot T_s$</td><td>$7680 \cdot T_s$</td><td rowspan="4">$4384 \cdot T_s$</td><td rowspan="4">$5120 \cdot T_s$</td></tr>
<tr><td>5</td><td>$6592 \cdot T_s$</td><td rowspan="5">$4384 \cdot T_s$</td><td rowspan="5">$5120 \cdot T_s$</td><td>$20480 \cdot T_s$</td></tr>
<tr><td>6</td><td>$19760 \cdot T_s$</td><td>$23040 \cdot T_s$</td></tr>
<tr><td>7</td><td>$21952 \cdot T_s$</td><td>$12800 \cdot T_s$</td></tr>
<tr><td>8</td><td>$24144 \cdot T_s$</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>9</td><td>$13168 \cdot T_s$</td><td>-</td><td>-</td><td>-</td></tr>
</table>

Table 4.2-2: Uplink-downlink configurations

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

According to Figure 4.2-1, one radio frame is configured by 10 subframes, which consist of Uplink-subframe, Downlink-subframe and Special subframe. For TDD-LTE, the Duty Cycle should be calculated on Uplink-subframes and Special subframes, due to Special subframe containing both Uplink transmissions. So for one radio frame, Duty Cycle can be calculated with formula as below. The count of Uplink subframes are according to Table 4.2-2:

Duty cycle =(30720Ts*Ups+Uplink Component*Specials)/(307200Ts)

About the uplink component of Special subframes, we can figure out by Table 4.2-1:

Uplink Component=UpPTS

In conclusion, for the TDD LTE Band, Duty Cycle can be calculated with formula as below .all these sets are ok when we test, or we can set as below.

Duty cycle =[(30720Ts*Ups)+ UpPTS *Specials]/(307200Ts)

And we can get different Duty cycles under different configurations:

Uplink-downlink configuration	Subframe number			Configuration of special subframe							
				Normal cyclic prefix in downlink				Extended cyclic prefix in downlink			
				Normal cyclic prefix in uplink		Extended cyclic prefix in uplink		Normal cyclic prefix in uplink		Extended cyclic prefix in uplink	
	D	S	U	configuration 0~4	configuration 5~9	configuration 0~4	configuration 5~9	configuration 0~3	configuration 4~7	configuration 0~3	configuration 4~7
0	2	2	6	61.43%	62.85%	61.67%	63.33%	61.43%	62.85%	61.67%	63.33%
1	4	2	4	41.43%	42.85%	41.67%	43.33%	41.43%	42.85%	41.67%	43.33%
2	6	2	2	21.43%	22.85%	21.67%	23.33%	21.43%	22.85%	21.67%	23.33%
3	6	1	3	30.71%	31.43%	30.83%	31.67%	30.71%	31.43%	30.83%	31.67%
4	7	1	2	20.71%	21.43%	20.83%	21.67%	20.71%	21.43%	20.83%	21.67%
5	8	1	1	10.71%	11.43%	10.83%	11.67%	10.71%	11.43%	10.83%	11.67%
6	3	2	5	51.43%	52.85%	51.67%	53.33%	51.43%	52.85%	51.67%	53.33%

SAR test Plan: For TDD LTE, SAR should be tested with the highest transmission duty factor (63.33%) using Uplink-downlink configuration 0 and Special subframe configuration 7 for Frame structure type

5.3.5 Wi-Fi Test Configuration

SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements. For 2.4 GHz DSSS, either the initial test position or DSSS procedure is applied to reduce the number of SAR tests; these are mutually exclusive. For OFDM, an initial test position is only applicable to next to the ear, UMPC mini-tablet and hotspot mode configurations, which is tested using the initial test configuration to facilitate test reduction. For other exposure conditions with a fixed test position, SAR test reduction is determined using only the initial test configuration.

The multiple test positions require SAR measurements in head, hotspot mode or UMPC mini-tablet configurations may be reduced according to the highest reported SAR determined using the *initial test position(s)* by applying the DSSS or OFDM SAR measurement procedures in the required wireless mode test configuration(s). The *initial test position(s)* is measured using the highest measured maximum output power channel in the required wireless mode test configuration(s). When the *reported* SAR for the *initial test position* is:

- ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and wireless mode combination within the frequency band or aggregated band. DSSS and OFDM configurations are considered separately according to the required SAR procedures.
- 0.4 W/kg, SAR is repeated using the same wireless mode test configuration tested in the *initial test position* to measure the subsequent next closet/smallest test separation distance and maximum coupling test position, on the highest maximum output power channel, until the *reported* SAR is ≤ 0.8 W/kg or all required test positions are tested.
  - ✧ For subsequent test positions with equivalent test separation distance or when exposure is dominated by coupling conditions, the position for maximum coupling condition should be tested.
  - ✧ When it is unclear, all equivalent conditions must be tested.
- For all positions/configurations tested using the *initial test position* and subsequent test positions, when the *reported* SAR is > 0.8 W/kg, measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the *reported* SAR is ≤ 1.2 W/kg or all required test channels are considered.
  - ✧ The additional power measurements required for this step should be limited to those necessary for identifying subsequent highest output power channels to apply the test reduction.

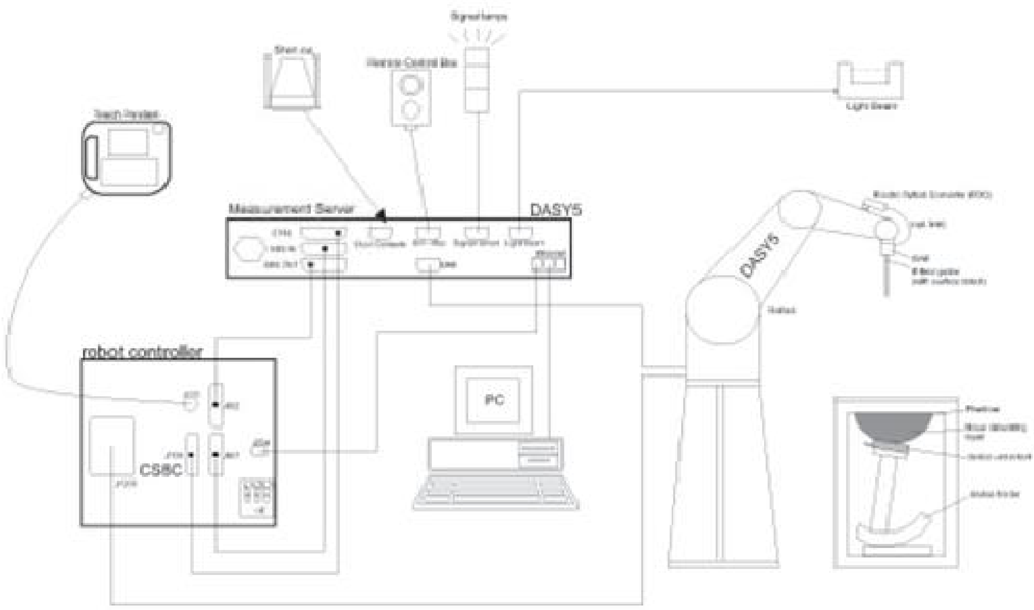
To determine the initial test position, Area Scans were performed to determine the position with the Maximum Value of SAR (measured). The position that produced the highest Maximum Value of SAR is considered the worst case position; thus used as the initial test position.

A Wi-Fi device must be configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools for SAR measurement. This RF signal utilized in SAR measurement has almost 100% duty cycle and its crest factor is 1.

6 SAR Measurements System Configuration

6.1 SAR Measurement Set-up

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



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- 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 or Win7 and the DASY software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

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.

ES3DV3 Probe Specification

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available
Frequency	10 MHz to 4 GHz Linearity: ± 0.2 dB (30 MHz to 4 GHz)
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in tissue material (rotation normal to probe axis)
Dynamic Range	5 μW/g to > 100 mW/g Linearity: ± 0.2dB
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm
Application	General dosimetry up to 4 GHz Dosimetry in strong gradient fields Compliance tests of mobile phones

E-field Probe Calibration

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

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

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

SAR=CΔT/Δt

Where: Δt = Exposure time (30 seconds),

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

ΔT = Temperature increase due to RF exposure.

Or

SAR=IEI^{2}σ/ρ

Where: σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m^3).

6.3 SAR Measurement Procedure

Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

Area Scan

The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of zoom scans has to be increased accordingly.
Area scan parameters extracted from FCC KDB 865664 D01 SAR measurement 100 MHz to 6 GHz.

	≤3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: ΔxArea, ΔyArea	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

Zoom Scan

Zoom scans are used assess the peak spatial SAR values within a cubic averaging volume containing 1 gram and 10 gram of simulated tissue. The zoom scan measures points (refer to table below) within a cube shoes base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the zoom scan evaluates the averaged SAR for 1 gram and 10 gram and displays these values next to the job's label.

Zoom scan parameters extracted from FCC KDB 865664 D01 SAR measurement 100 MHz to 6 GHz.

<table>
<tr><td colspan="3"></td><td>≤3GHz</td><td>> 3 GHz</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: $\triangle x_{zoom}$ $\triangle y_{zoom}$</td><td>≤2GHz: ≤8mm
2 – 3GHz: ≤5mm*</td><td>3 – 4GHz: ≤5mm*
4 – 6GHz: ≤4mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">Uniform grid: $\triangle z_{zoom}(n)$</td><td>≤5mm</td><td>3 – 4GHz: ≤4mm
4 – 5GHz: ≤3mm
5 – 6GHz: ≤2mm</td></tr>
<tr><td rowspan="2">Graded grid</td><td>$\triangle z_{zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤4mm</td><td>3 – 4GHz: ≤3mm
4 – 5GHz: ≤2.5mm
5 – 6GHz: ≤2mm</td></tr>
<tr><td>$\triangle z_{zoom}(n>1)$: between subsequent points</td><td colspan="2">≤1.5•$\triangle z_{zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">X, y, z</td><td>≥30mm</td><td>3 – 4GHz: ≥28mm
4 – 5GHz: ≥25mm
5 – 6GHz: ≥22mm</td></tr>
<tr><td colspan="5">Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
* When zoom scan is required and the <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4W/kg, ≤8mm, ≤7mm and ≤5mm zoom scan resolution may be applied, respectively, for 2GHz to 3GHz, 3GHz to 4GHz and 4GHz to 6GHz.</td></tr>
</table>

Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASY measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drifts more than 5%, the SAR will be retested.

7 Main Test Equipment

Name of Equipment	Manufacturer	Type/Model	Serial Number	Last Cal.	Cal. Due Date
Network analyzer	Agilent	E5071B	MY42404014	2016-05-21	2017-05-20
Dielectric Probe Kit	HP	85070E	US44020115	2016-05-21	2017-05-20
Power meter	Agilent	E4417A	GB41291714	2016-05-21	2017-05-20
Power sensor	Agilent	N8481H	MY50350004	2016-05-21	2017-05-20
Power sensor	Agilent	E9327A	US40441622	2016-05-21	2017-05-20
Dual directional coupler	Agilent	778D-012	50519	2016-05-21	2017-05-20
Dual directional coupler	Agilent	777D	50146	2016-05-21	2017-05-20
Amplifier	INDEXSAR	IXA-020	0401	2016-05-21	2017-05-20
Wideband radio communication tester	R&S	CMW 500	113645	2016-05-21	2017-05-20
E-field Probe	SPEAG	ES3DV3	3189	2016-07-27	2017-07-26
DAE	SPEAG	DAE4	1317	2016-08-02	2017-08-01
Validation Kit 835MHz	SPEAG	D835V2	4d020	2014-08-28	2017-08-27
Validation Kit 1900MHz	SPEAG	D1900V2	5d060	2014-09-01	2017-08-31
Validation Kit 2450MHz	SPEAG	D2450V2	786	2014-09-01	2017-08-31
Validation Kit 2600MHz	SPEAG	D2600V2	1025	2014-12-08	2017-12-07
Temperature Probe	Tianjin jinming	JM222	AA1009129	2016-05-21	2017-05-20
Hygrothermograph	Anymetr	NT-311	20150732	2016-05-21	2017-05-20

8 Tissue Dielectric Parameter Measurements & System Verification

8.1 Tissue Verification

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within ± 2°C of the temperature when the tissue parameters are characterized. The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 – 4 days of use; or earlier if the dielectric parameters can become out of tolerance.

Target values

Frequency (MHz)		Water (%)	Salt (%)	Sugar (%)	Glycol (%)	Preventol (%)	Cellulose (%)	ε_r	σ(s/m)
Head	835	41.45	1.45	56	0	0.1	1.0	41.5	0.90
	1900	55.242	0.306	0	44.452	0	0	40.0	1.40
	2450	62.7	0.5	0	36.8	0	0	39.2	1.80
	2600	55.242	0.306	0	44.452	0	0	39.0	1.96
Body	835	52.5	1.4	45	0	0.1	1.0	55.2	0.97
	1900	69.91	0.13	0	29.96	0	0	53.3	1.52
	2450	73.2	0.1	0	26.7	0	0	52.7	1.95
	2600	72.6	0.1	0	27.3	0	0	52.5	2.16

Measurements results

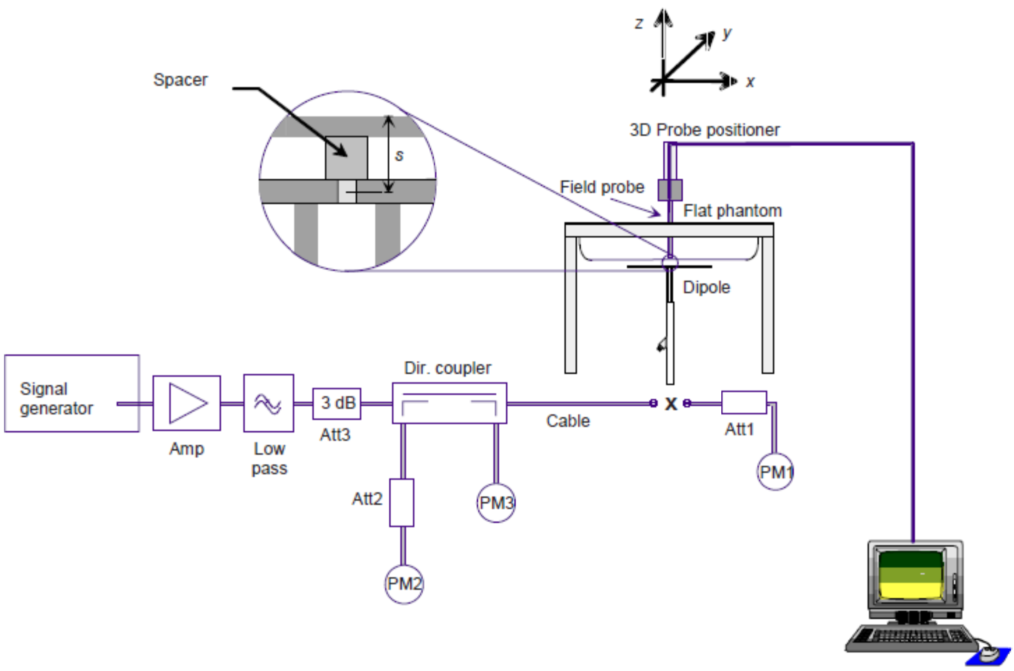
Frequency (MHz)		Test Date	Temp ℃	Measured Dielectric Parameters		Target Dielectric Parameters		Limit (Within ±5%)	
				ε_r	σ(s/m)	ε_r	σ(s/m)	Dev ε_r (%)	Dev σ (%)
835	Head	11/20/2016	21.5	41.40	0.88	41.5	0.90	-0.24	-2.22
		11/22/2016	21.5	41.30	0.87	41.5	0.90	-0.48	-3.33
		12/17/2016	21.5	41.91	0.92	41.5	0.90	0.99	2.22
	Body	11/23/2016	21.5	54.20	0.96	55.2	0.97	-1.81	-1.03
		11/26/2016	21.5	54.60	0.95	55.2	0.97	-1.09	-2.06
		12/16/2016	21.5	55.36	1.03	55.2	0.97	0.29	6.19
1900	Head	12/13/2016	21.5	39.01	1.38	40.0	1.40	-2.48	-1.43
	Body	12/15/2016	21.5	51.57	1.49	53.3	1.52	-3.25	-1.97
2450	Head	11/29/2016	21.5	40.55	1.82	39.2	1.80	3.44	1.11
	Body	12/2/2016	21.5	51.11	1.95	52.7	1.95	-3.02	0.00
2600	Head	12/1/2016	21.5	40.01	1.99	39.0	1.96	2.59	1.53
	Body	12/3/2016	21.5	50.68	2.13	52.5	2.16	-3.47	-1.39

Note: The depth of tissue-equivalent liquid in a phantom must be ≥ 15.0 cm for SAR measurements ≤ 3 GHz and ≥ 10.0 cm for measurements > 3 GHz.

8.2 System Performance Check

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulates were measured using the dielectric probe kit and the network analyzer. A system check measurement for every day was made following the determination of the dielectric parameters of the Tissue simulates, using the dipole validation kit. The dipole antenna was placed under the flat section of the twin SAM phantom.

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



Picture 1 System Performance Check setup

Picture 2 Setup Photo

Justification for Extended SAR Dipole Calibrations

Usage of SAR dipoles calibrated less than 3 years ago but more than 1 year ago were confirmed in maintaining return loss (< - 20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB 865664 D01:

Dipole		Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
Dipole D835V2 SN: 4d020	Head Liquid	8/28/2014	-30.1	/	48.6	/
		8/27/2015	-31.1	3.3%	49.7	1.1Ω
		8/26/2016	-32.2	-3.4%	49.8	0.1Ω
	Body Liquid	8/28/2014	-23.3	/	54.0	/
		8/27/2015	-23.9	2.6%	53.5	0.5Ω
		8/26/2016	-24.2	-1.2%	53.1	0.4Ω
Dipole D1900V2 SN: 5d060	Head Liquid	9/1/2014	-22.8	/	54.1	/
		8/31/2015	-23.7	3.8%	55.4	1.3Ω
		8/30/2016	-23.2	2.2%	56.7	1.3Ω
	Body Liquid	9/1/2014	-21.6	/	57.6	/
		8/31/2015	-20.8	3.8%	57.3	0.3Ω
		8/30/2016	-20.8	3.5%	57.0	0.3Ω
Dipole D2450V2 SN: 786	Head Liquid	9/1/2014	-23.6	/	57.1	/
		8/31/2015	-23.9	1.3%	57.4	0.3Ω
		8/30/2016	-23.3	2.6%	57.7	0.3Ω
	Body Liquid	9/1/2014	-23.7	/	56.0	/
		8/31/2015	-24.0	1.3%	55.8	0.2Ω
		8/30/2016	-24.4	-1.6%	55.1	0.7Ω
Dipole D2600V2 SN: 1025	Head Liquid	12/8/2014	-24.2	/	49.7	/
		12/7/2015	-23.9	1.2%	50.4	0.7Ω
		12/6/2016	-23.4	2.1%	50.5	-0.1Ω
	Body Liquid	12/8/2014	-23.6	/	46.6	/
		12/7/2015	-24.0	1.7%	47.2	0.6Ω
		12/6/2016	-24.5	-2.0%	47.5	-0.3Ω

System Check results

Frequency (MHz)		Test Date	Temp ℃	250mW Measured SAR_{1g} (W/kg)	1W Normalized SAR_{1g} (W/kg)	1W Target SAR_{1g} (W/kg)	Δ % (Limit ±10%)	Plot No.
835	Head	11/20/2016	21.5	2.44	9.76	9.54	2.31%	1
		11/22/2016	21.5	2.46	9.84	9.54	3.14%	2
		12/17/2016	21.5	2.48	9.92	9.54	3.98%	3
	Body	11/23/2016	21.5	2.41	9.64	9.54	1.05%	4
		11/26/2016	21.5	2.42	9.68	9.54	1.47%	5
		12/16/2016	21.5	2.45	9.80	9.54	2.73%	6
1900	Head	12/13/2016	21.5	9.48	37.92	39.20	-3.27%	7
	Body	12/15/2016	21.5	9.93	39.72	40.00	-0.70%	8
2450	Head	11/29/2016	21.5	13.70	54.80	52.50	4.38%	9
	Body	12/2/2016	21.5	12.50	50.00	52.40	-4.58%	10
2600	Head	12/1/2016	21.5	13.90	55.60	56.90	-2.28%	11
	Body	12/3/2016	21.5	13.88	55.52	56.40	-1.56%	12
Note：Target Values used derive from the calibration certificate Data Storage and Evaluation.								

9 Normal and Maximum Output Power

KDB 447498 D01 at the maximum rated output power and within the tune-up tolerance range specified for the product, but not more than 2 dB lower than the maximum tune-up tolerance limit.

9.1 GSM Mode

GSM 850		Burst Average Power(dBm)			Division Factors (dB)	Frame-Average Power(dBm)			Burst Tune-up Limit (dBm)
Tx Channel		128	190	251		128	190	251	
Frequency(MHz)		824.2	836.6	848.8		824.2	836.6	848.8	
GSM(GMSK)		32.44	32.48	32.60	9.03	23.41	23.45	23.57	33.00
GPRS (GMSK)	1Txslot	32.21	32.15	32.43	9.03	23.18	23.12	23.40	33.00
	2Txslots	29.44	29.54	29.63	6.02	**23.42**	**23.52**	**23.61**	30.00
	3Txslots	27.40	27.26	27.34	4.26	23.14	23.00	23.08	28.00
	4Txslots	26.13	26.21	26.42	3.01	23.12	23.20	23.41	27.00
EGPRS (GMSK)	1Txslot	32.20	32.41	32.49	9.03	23.17	23.38	23.46	33.00
	2Txslots	29.41	29.52	29.54	6.02	23.39	23.50	23.52	30.00
	3Txslots	27.46	27.23	27.39	4.26	23.20	22.97	23.13	28.00
	4Txslots	26.31	26.36	26.45	3.01	23.30	23.35	23.44	27.00
EGPRS (8PSK)	1TxSlot	26.34	26.37	26.41	9.03	17.31	17.34	17.38	27.00
	2TxSlots	23.29	23.30	23.34	6.02	17.27	17.28	17.32	24.00
	3TxSlots	21.43	21.54	21.75	4.26	17.17	17.28	17.49	22.00
	4TxSlots	20.23	20.39	20.48	3.01	17.22	17.38	17.47	21.00
GSM 1900		Power(dBm)			Division Factors (dB)	Power(dBm)			Burst Tune-up Limit (dBm)
Tx Channel		512	661	810		512	661	810	
Frequency(MHz)		1850.2	1880	1909.8		1850.2	1880	1909.8	
GSM(GMSK)		27.87	28.30	28.87	9.03	18.84	19.27	19.84	29.00
GPRS (GMSK)	1Txslot	27.81	28.24	28.80	9.03	18.78	19.21	19.77	29.00
	2Txslots	26.84	26.85	27.51	6.02	**20.82**	**20.83**	**21.49**	28.00
	3Txslots	24.50	24.83	25.14	4.26	20.24	20.57	20.88	26.00
	4Txslots	23.55	23.54	24.17	3.01	20.54	20.53	21.16	25.00
EGPRS (GMSK)	1Txslot	27.57	28.20	28.78	9.03	18.54	19.17	19.75	29.00
	2Txslots	26.63	26.82	27.49	6.02	20.61	20.80	21.47	28.00
	3Txslots	24.45	24.87	25.15	4.26	20.19	20.61	20.89	26.00
	4Txslots	23.55	23.52	24.22	3.01	20.54	20.51	21.21	25.00
EGPRS	1Txslot	24.28	24.42	24.89	9.03	15.25	15.39	15.86	25.00
	2Txslots	21.32	21.45	21.81	6.02	15.30	15.43	15.79	22.00

(8PSK)	3Txslots	19.28	19.34	19.83	4.26	15.02	15.08	15.57	20.00
	4Txslots	18.18	18.46	18.76	3.01	15.17	15.45	15.75	19.00

Notes: The worst-case configuration and mode for SAR testing is determined to be as follows:

1. Standalone: GSM 850 GMSK (GPRS) mode with 2 time slots for Max power, GSM 1900 GMSK (GPRS) mode with 2 time slots for Max power, based on the output power measurements above.
2. SAR is not required for EGPRS (8PSK) mode because its output power is less than that of GPRS Mode.

9.2 WCDMA Mode

The following tests were completed according to the test requirements outlined in the 3GPP TS34.121 specification.

WCDMA Band V		Conducted Power (dBm)			
Tx Channel		4132	4183	4233	Tune-up Limit (dBm)
Frequency(MHz)		826.4	836.6	846.6	
RMC	12.2kbps	22.36	22.44	22.42	23.00
	64kbps	22.29	22.30	22.36	23.00
	144kbps	22.28	22.29	22.26	23.00
	384kbps	22.27	22.28	22.25	23.00
HSDPA	Sub 1	22.26	22.27	22.26	23.00
	Sub 2	22.20	22.28	22.25	23.00
	Sub 3	21.69	21.88	21.83	22.00
	Sub 4	21.70	21.87	21.85	22.00
HSUPA	Sub 1	22.19	22.36	22.34	23.00
	Sub 2	21.44	21.52	21.50	22.00
	Sub 3	21.26	21.34	21.32	22.00
	Sub 4	20.45	20.53	20.51	21.00
	Sub 5	22.24	22.32	22.30	23.00
DC-HSDPA	Sub 1	22.23	22.31	22.29	23.00
	Sub 2	22.32	22.29	22.28	23.00
	Sub 3	21.81	21.78	21.77	22.00
	Sub 4	21.80	21.77	21.76	22.00

Note: 1.Per KDB 941225 D01, SAR for Head / Hotspot / Body-worn exposure is measured using a 12.2 kbps AMR with TPC bits configured to all “1’s”.

2. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

9.3 LTE Mode

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (N_{RB})						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

LTE FDD Band 5				Conducted Power(dBm)			Tune-up Limit (dBm)
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			
				20407/824.7	20525/836.5	20643/848.3	
1.4MHz	QPSK	1	0	23.21	23.09	23.38	24.00
		1	2	23.27	23.14	23.32	24.00
		1	5	23.25	23.25	23.40	24.00
		3	0	23.14	23.19	23.21	24.00
		3	2	23.05	23.21	23.19	24.00
		3	3	23.13	23.21	23.12	24.00
		6	0	22.16	22.29	22.29	23.00
	16QAM	1	0	21.76	22.51	22.85	23.00
		1	2	21.87	22.53	22.70	23.00
		1	5	21.67	22.30	22.48	23.00
		3	0	22.27	22.29	22.32	23.00
		3	2	22.25	22.17	22.28	23.00
		3	3	22.27	22.18	22.09	23.00
		6	0	21.19	21.32	21.24	22.50
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit (dBm)
				20415/825.5	20525/836.5	20635/847.5	
3MHz	QPSK	1	0	23.23	23.13	23.41	24.00
		1	7	23.30	23.19	23.36	24.00
		1	14	23.28	23.30	23.44	24.00
		8	0	22.24	22.31	22.34	23.00
		8	4	22.17	22.31	22.31	23.00
		8	7	22.23	22.32	22.22	23.00
		15	0	22.19	22.33	22.32	23.00
	16QAM	1	0	21.79	22.53	22.88	23.00
		1	7	21.90	22.58	22.74	23.00

		1	14	21.69	22.34	22.51	23.00
		8	0	21.38	21.42	21.44	22.00
		8	4	21.36	21.30	21.40	22.00
		8	7	21.37	21.30	21.22	22.00
		15	0	21.22	21.36	21.27	22.00
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit (dBm)
				20425/826.5	20525/836.5	20625/846.5	
5MHz	QPSK	1	0	23.20	23.11	23.37	24.00
		1	13	23.28	23.15	23.33	24.00
		1	24	23.25	23.25	23.40	24.00
		12	0	22.21	22.26	22.30	23.00
		12	6	22.15	22.27	22.26	23.00
		12	13	22.21	22.30	22.18	23.00
		25	0	22.17	22.32	22.30	23.00
	16QAM	1	0	21.76	22.49	22.85	23.00
		1	13	21.87	22.56	22.71	23.00
		1	24	21.66	22.32	22.47	23.00
		12	0	21.36	21.38	21.41	22.00
		12	6	21.33	21.25	21.36	22.00
		12	13	21.34	21.25	21.18	22.00
		25	0	21.20	21.32	21.22	22.00
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit (dBm)
				20450/829	20525/836.5	20600/844	
10MHz	QPSK	1	0	23.18	23.04	23.35	24.00
		1	25	23.28	23.15	23.32	24.00
		1	49	23.22	23.23	23.36	24.00
		25	0	22.19	22.22	22.27	23.00
		25	13	22.13	22.23	22.23	23.00
		25	25	22.17	22.26	22.15	23.00
		50	0	22.20	22.25	22.25	23.00
	16QAM	1	0	22.21	22.46	22.80	23.00
		1	25	22.34	22.55	22.68	23.00
		1	49	22.14	22.27	22.45	23.00
		25	0	21.33	21.37	21.39	22.00
		25	13	21.29	21.22	21.32	22.00
		25	25	21.32	21.21	21.15	22.00
		50	0	21.18	21.28	21.19	22.00

LTE FDD Band 26				Conducted Power(dBm)			Tune-up Limit (dBm)
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			
				26697/814.7	26865/831.5	27033/848.3	
1.4MHz	QPSK	1	0	23.69	23.79	23.51	24.00
		1	2	23.45	23.59	23.89	24.00
		1	5	23.41	23.44	23.45	24.00
		3	0	23.44	23.46	23.43	24.00
		3	2	23.43	23.47	23.53	24.00
		3	3	23.56	23.44	23.50	24.00
		6	0	22.49	22.43	22.51	23.50
	16QAM	1	0	23.19	22.84	23.19	23.50
		1	2	23.26	22.75	22.89	23.50
		1	5	22.95	22.73	23.16	23.50
		3	0	22.36	22.35	22.30	23.50
		3	2	22.41	22.42	22.40	23.50
		3	3	22.40	22.41	22.25	23.50
		6	0	21.47	21.47	21.57	22.50
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit (dBm)
				26705/815.5	26865/831.5	27025/847.5	
3MHz	QPSK	1	0	23.71	23.83	23.54	24.00
		1	7	23.48	23.64	**23.93**	24.00
		1	14	23.44	23.49	23.49	24.00
		8	0	22.54	22.58	22.56	23.50
		8	4	22.55	22.57	22.65	23.50
		8	7	22.66	22.55	22.60	23.50
		15	0	22.52	22.47	22.54	23.50
	16QAM	1	0	23.22	22.86	23.22	23.50
		1	7	23.29	22.80	22.93	23.50
		1	14	22.97	22.77	23.19	23.50
		8	0	21.47	21.48	21.42	22.50
		8	4	21.52	21.55	21.52	22.50
		8	7	21.50	21.53	21.38	22.50
		15	0	21.50	21.51	21.60	22.50
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit (dBm)
				26715/816.5	26865/831.5	27015/846.5	
5MHz	QPSK	1	0	23.68	23.81	23.50	24.00
		1	13	23.46	23.60	23.90	24.00
		1	24	23.41	23.44	23.45	24.00
		12	0	22.51	22.53	22.52	23.50
		12	6	22.53	22.53	22.60	23.50

Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit (dBm)
		12	13	22.64	22.53	22.56	23.50
		25	0	22.50	22.46	22.52	23.50
	16QAM	1	0	23.19	22.82	23.19	23.50
		1	13	23.26	22.78	22.90	23.50
		1	24	22.94	22.75	23.15	23.50
		12	0	21.45	21.44	21.39	22.50
		12	6	21.49	21.50	21.48	22.50
		12	13	21.47	21.48	21.34	22.50
		25	0	21.48	21.47	21.55	22.50
Bandwidth	Modulation	RB size	RB offset	26750/820	26865/831.5	26990/844	Tune-up Limit (dBm)
10MHz	QPSK	1	0	23.69	23.78	23.51	24.00
		1	25	23.47	23.64	23.91	24.00
		1	49	23.40	23.43	23.44	24.00
		25	0	22.52	22.54	22.53	23.50
		25	13	22.53	22.53	22.60	23.50
		25	25	22.63	22.54	22.57	23.50
		50	0	22.56	22.44	22.51	23.50
	16QAM	1	0	23.16	22.83	23.19	23.50
		1	25	23.27	22.79	22.91	23.50
		1	49	22.94	22.73	23.15	23.50
		25	0	21.45	21.47	21.40	22.50
		25	13	21.48	21.49	21.47	22.50
		25	25	21.48	21.49	21.35	22.50
		50	0	21.48	21.47	21.55	22.50
Bandwidth	Modulation	RB size	RB offset	26775/822.5	26865/831.5	26965/841.5	Tune-up Limit (dBm)
15MHz	QPSK	1	0	23.66	23.74	23.48	24.00
		1	38	23.46	23.60	23.89	24.00
		1	74	23.38	23.42	23.41	24.00
		36	0	22.49	22.49	22.49	23.50
		36	18	22.51	22.46	22.57	23.50
		36	39	22.60	22.48	22.53	23.50
		75	0	22.53	22.39	22.47	23.50
	16QAM	1	0	23.14	22.79	23.14	23.50
		1	38	23.23	22.77	22.87	23.50
		1	74	22.92	22.70	23.13	23.50
		36	0	21.42	21.43	21.37	22.50
		36	18	21.45	21.47	21.44	22.50
		36	39	21.45	21.44	21.31	22.50
		75	0	21.46	21.43	21.52	22.50

LTE TDD Band 41				Conducted Power(dBm)			Tune-up Limit (dBm)
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			
				40240/2555	40728/2603.8	41215/2652.5	
5MHz	QPSK	1	0	22.05	22.63	22.03	24.00
		1	13	23.43	23.48	22.54	24.00
		1	24	23.42	22.65	22.11	24.00
		12	0	22.28	22.80	22.03	23.00
		12	6	22.49	22.64	22.31	23.00
		12	13	22.73	22.60	22.76	23.00
		25	0	22.30	22.75	22.21	23.00
	16QAM	1	0	21.39	21.78	21.39	23.00
		1	13	22.41	22.21	21.95	23.00
		1	24	22.21	21.89	21.40	23.00
		12	0	21.42	21.64	21.38	22.00
		12	6	21.84	21.73	21.77	22.00
		12	13	21.76	21.64	21.65	22.00
		25	0	21.60	21.68	21.54	22.00
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit (dBm)
				40265/2557.5	40728/2603.8	41185/2650	
10MHz	QPSK	1	0	22.07	22.64	22.06	24.00
		1	25	23.46	**23.53**	22.58	24.00
		1	49	23.44	22.69	22.14	24.00
		25	0	22.31	22.85	22.07	23.00
		25	13	22.52	22.69	22.35	23.00
		25	25	22.75	22.64	22.81	23.00
		50	0	22.38	22.77	22.25	23.00
	16QAM	1	0	21.41	21.81	21.41	23.00
		1	25	22.44	22.25	21.98	23.00
		1	49	22.24	21.91	21.43	23.00
		25	0	21.45	21.69	21.42	22.00
		25	13	21.86	21.77	21.80	22.00
		25	25	21.79	21.69	21.69	22.00
		50	0	21.63	21.73	21.58	22.00
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit (dBm)
				40290/2560	40728/2603.8	41165/2647.5	
15MHz	QPSK	1	0	22.06	22.60	22.04	24.00
		1	38	23.44	23.52	22.55	24.00
		1	74	23.41	22.64	22.10	24.00
		36	0	22.29	22.81	22.04	23.00
		36	18	22.49	22.64	22.31	23.00

		36	39	22.72	22.61	22.77	23.00
		75	0	22.36	22.73	22.20	23.00
	16QAM	1	0	21.36	21.79	21.39	23.00
		1	38	22.42	22.22	21.96	23.00
		1	74	22.21	21.87	21.40	23.00
		36	0	21.42	21.67	21.39	22.00
		36	18	21.83	21.72	21.76	22.00
		36	39	21.77	21.65	21.66	22.00
		75	0	21.60	21.68	21.54	22.00
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit (dBm)
				40315/2562.5	40728/2603.8	41140/2645	
20MHz	QPSK	1	0	22.03	22.56	22.01	24.00
		1	50	23.43	23.48	22.53	24.00
		1	99	23.39	22.63	22.07	24.00
		50	0	22.26	22.76	22.00	23.00
		50	25	22.47	22.60	22.28	23.00
		50	50	22.69	22.56	22.73	23.00
		100	0	22.33	22.68	22.16	23.00
	16QAM	1	0	21.34	21.75	21.34	23.00
		1	50	22.38	22.20	21.92	23.00
		1	99	22.19	21.84	21.38	23.00
		50	0	21.39	21.63	21.36	22.00
		50	25	21.80	21.70	21.73	22.00
		50	50	21.74	21.60	21.62	22.00
		100	0	21.58	21.64	21.51	22.00

9.4 WLAN Mode

Wi-Fi 2.4G	**Channel**	**Frequency (MHz)**	**Average Conducted Power (dBm) for Data Rates (bps)**								**Tune-up Limit (dBm)**
Mode			1M	2M	5.5M	11M	/	/	/	/	
802.11b	1	2412	13.58	13.53	13.40	13.08	/	/	/	/	14.00
	6	2437	12.87	12.80	12.58	12.33	/	/	/	/	14.00
	11	2462	13.10	13.03	12.84	12.55	/	/	/	/	14.00
Mode	Channel	Frequency (MHz)	6M	9M	12M	18M	24M	36M	48M	54M	Tune-up
802.11g	1	2412	13.08	12.86	12.55	12.35	11.87	11.39	10.96	10.70	13.50
	6	2437	12.79	12.34	12.13	11.99	11.65	11.06	10.67	10.38	13.50
	11	2462	12.97	12.64	12.43	12.20	11.84	11.27	10.89	10.58	13.50
Mode	Channel	Frequency (MHz)	6.5M	13M	19.5M	26M	39M	52M	58.5M	65M	Tune-up
802.11n (HT20)	1	2412	9.67	9.12	8.87	8.21	7.86	7.50	7.36	7.14	10.00
	6	2437	8.96	8.45	8.16	7.83	7.27	6.80	6.63	6.41	10.00
	11	2462	9.61	9.00	8.79	8.43	7.88	7.64	7.41	7.04	10.00

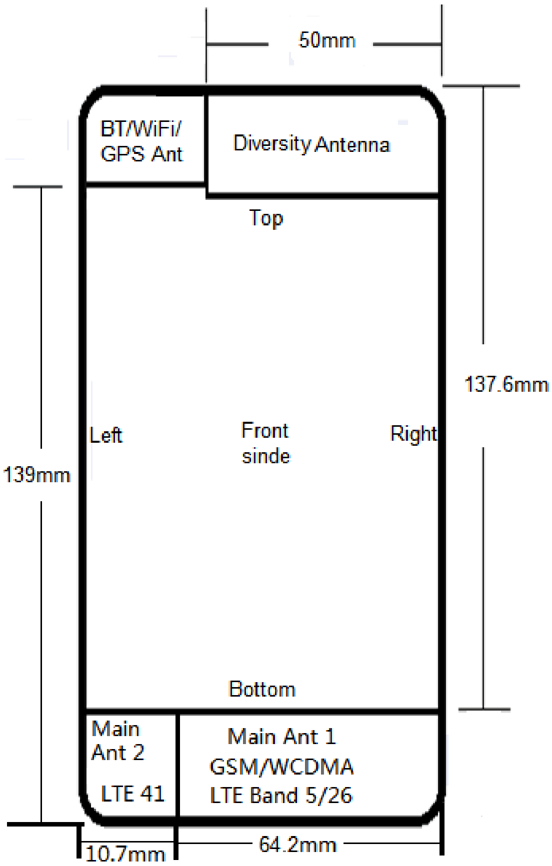
Note. 1. SAR is not required for OFDM when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
2. The Tx power is set to 14 for 802.11 b mode, set to 12.5 for 802.11g mode, is set to 10.5 for 802.11n HT20 mode by software.

9.5 Bluetooth Mode

BT	Average Conducted Power (dBm)			Tune-up Limit (dBm)
	Channel/Frequency(MHz)			
	Ch 0/2402 MHz	Ch 39/2441 MHz	Ch 78/2480 MHz	
GFSK	8.06	8.09	8.06	8.50
π/4DQPSK	8.02	7.89	7.83	8.50
8DPSK	8.13	8.00	8.03	8.50
BLE	Ch 0/2402 MHz	Ch 19/2440 MHz	Ch 39/2480 MHz	/
GFSK	-2.1	-1.8	-2.2	1.00

10 Measured and Reported (Scaled) SAR Results

10.1 EUT Antenna Locations



Overall (Length x Width): 148.3 mm x 75 mm Overall Diagonal: 157 mm/Display Diagonal: 132.5mm						
Distance of the Antenna to the EUT surface/edge						
Antenna	Back Side	Front side	Left Edge	Right Edge	Top Edge	Bottom Edge
Main-Antenna(ANT 1)	0	0	10.7	0	137.6	0
Main-Antenna(ANT 2)	0	0	0	64.2	137.6	0
BT/Wi-Fi Antenna	0	0	0	50	0	139
Hotspot mode, Positions for SAR tests						
Mode	Back Side	Front side	Left Edge	Right Edge	Top Edge	Bottom Edge
GSM 850/1900/ UMTS Band V/ LTE 5/26	Yes	Yes	Yes	Yes	N/A	Yes
LTE 41	Yes	Yes	Yes	N/A	N/A	Yes
2.4GHz WLAN	Yes	Yes	Yes	N/A	Yes	N/A
Note: 1. Per KDB 941225 D06, when the overall device length and width are ≥ 9cm*5cm, the test distance is 10mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.						

10.2 Standalone SAR test exclusion considerations

Per KDB 447498 D01, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] ·[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

Per KDB 447498 D01, when the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

Bluetooth	Distance (mm)	MAX Power (dBm)	Frequency (MHz)	Ratio	Evaluation
Head	5	8.50	2441	2.212	No
Body-worn	10	8.50	2441	1.106	No

10.3 Measured SAR Results

Table 1: GSM 850

Test Position	Cover Type	Channel/ Frequency (MHz)	Time slot	Duty Cycle	Tune-up limit (dBm)	Conducted Power (dBm)	Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Plot No.
Head SAR											
Left Cheek	standard	190/836.6	GSM	1:8.3	33.00	32.48	-0.120	0.222	1.13	0.250	/
Left Tilt	standard	190/836.6	GSM	1:8.3	33.00	32.48	0.070	0.155	1.13	0.175	/
Right Cheek	standard	190/836.6	GSM	1:8.3	33.00	32.48	0.030	0.281	1.13	0.317	13
Right Tilt	standard	190/836.6	GSM	1:8.3	33.00	32.48	0.120	0.178	1.13	0.201	/
Body-worn (Distance 10mm)											
Back Side	standard	190/836.6	GSM	1:8.3	33.00	32.48	0.000	0.368	1.13	0.415	14
Front Side	standard	190/836.6	GSM	1:8.3	33.00	32.48	0.040	0.295	1.13	0.333	/
Hotspot (Distance 10mm)											
Back Side	standard	190/836.6	2Txslots	1:4.15	30.00	29.54	0.060	0.378	1.11	0.420	15
Front Side	standard	190/836.6	2Txslots	1:4.15	30.00	29.54	0.000	0.281	1.11	0.312	/
Left Edge	standard	190/836.6	2Txslots	1:4.15	30.00	29.54	0.070	0.134	1.11	0.149	/
Right Edge	standard	190/836.6	2Txslots	1:4.15	30.00	29.54	0.060	0.231	1.11	0.257	/
Top Edge	N/A	N/A	N/A	1:4.15	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	standard	190/836.6	2Txslots	1:4.15	30.00	29.54	0.024	0.167	1.11	0.186	/

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

3. When multiple slots are used, SAR should be tested to account for the maximum source-based time-averaged output power.

4. Per FCC KDB Publication 648474 D04, SAR was evaluated without a headset connected to the device. Since the reported SAR was ≤ 1.2 W/kg, no additional SAR evaluations using a headset cable were required.

Table 2: GSM 1900

Test Position	Cover Type	Channel/ Frequency (MHz)	Time slot	Duty Cycle	Tune-up limit (dBm)	Conducted Power (dBm)	Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Plot No.
Head SAR											
Left Cheek	standard	661/1880	GSM	1:8.3	29.00	28.30	0.180	0.055	1.17	0.065	/
Left Tilt	standard	661/1880	GSM	1:8.3	29.00	28.30	0.160	0.028	1.17	0.033	/
Right Cheek	standard	661/1880	GSM	1:8.3	29.00	28.30	-0.033	0.090	1.17	0.106	16
Right Tilt	standard	661/1880	GSM	1:8.3	29.00	28.30	0.042	0.018	1.17	0.021	/
Body-worn (Distance 10mm)											
Back Side	standard	661/1880	GSM	1:8.3	29.00	28.30	-0.042	0.150	1.17	0.176	17
Front Side	standard	661/1880	GSM	1:8.3	29.00	28.30	0.080	0.143	1.17	0.168	/
Hotspot (Distance 10mm)											
Back Side	standard	661/1880	2xslots	1:4.15	28.00	26.85	0.060	0.179	1.30	0.233	/
Front Side	standard	661/1880	2xslots	1:4.15	28.00	26.85	0.020	0.306	1.30	0.399	/
Left Edge	standard	661/1880	2xslots	1:4.15	28.00	26.85	-0.190	0.098	1.30	0.127	/
Right Edge	standard	661/1880	2xslots	1:4.15	28.00	26.85	0.070	0.062	1.30	0.080	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	standard	661/1880	2Txslots	1:4.15	28.00	26.85	-0.140	0.342	1.30	0.446	18

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

3. When multiple slots are used, SAR should be tested to account for the maximum source-based time-averaged output power.

4. Per FCC KDB Publication 648474 D04, SAR was evaluated without a headset connected to the device. Since the reported SAR was ≤ 1.2 W/kg, no additional SAR evaluations using a headset cable were required.

Table 3: UMTS Band V

Test Position	Cover Type	Channel/ Frequency (MHz)	Channel Type	Duty Cycle	Tune-up limit (dBm)	Conducted Power (dBm)	Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Plot No.
Head SAR											
Left Cheek	standard	4183/836.6	RMC 12.2K	1:1	23.00	22.44	-0.030	0.253	1.14	0.288	19
Left Tilt	standard	4183/836.6	RMC 12.2K	1:1	23.00	22.44	-0.070	0.190	1.14	0.216	/
Right Cheek	standard	4183/836.6	RMC 12.2K	1:1	23.00	22.44	-0.170	0.229	1.14	0.261	/
Right Tilt	standard	4183/836.6	RMC 12.2K	1:1	23.00	22.44	-0.030	0.146	1.14	0.166	/
Hotspot (Distance 10mm)											
Back Side	standard	4183/836.6	RMC 12.2K	1:1	23.00	22.44	0.060	0.368	1.14	0.419	20
Front Side	standard	4183/836.6	RMC 12.2K	1:1	23.00	22.44	0.040	0.326	1.14	0.371	/
Left Edge	standard	4183/836.6	RMC 12.2K	1:1	23.00	22.44	-0.150	0.051	1.14	0.058	/
Right Edge	standard	4183/836.6	RMC 12.2K	1:1	23.00	22.44	-0.080	0.068	1.14	0.077	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	standard	4183/836.6	RMC 12.2K	1:1	23.00	22.44	0.180	0.194	1.14	0.221	/

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).
3. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode
4. Per FCC KDB Publication 648474 D04, SAR was evaluated without a headset connected to the device. Since the reported SAR was ≤ 1.2 W/kg, no additional SAR evaluations using a headset cable were required.

Table 4: LTE Band 5 (10MHz)

Test Position	Cover Type	RB size	RB offset	Channel/ Frequency (MHz)	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Plot No.
Head SAR (QPSK)											
Left Cheek	Standard	1	49	20600/844	24.00	23.36	0.120	0.290	1.16	0.336	/
Left Tilt	Standard	1	49	20600/844	24.00	23.36	-0.090	0.179	1.16	0.207	/
Right Cheek	Standard	1	49	20600/844	24.00	23.36	-0.025	0.338	1.16	0.392	21
Right Tilt	Standard	1	49	20600/844	24.00	23.36	0.031	0.222	1.16	0.257	/
Left Cheek	Standard	50%	0	20600/844	23.00	22.27	-0.010	0.237	1.18	0.280	/
Left Tilt	Standard	50%	0	20600/844	23.00	22.27	-0.070	0.147	1.18	0.174	/
Right Cheek	Standard	50%	0	20600/844	23.00	22.27	-0.100	0.281	1.18	0.332	/
Right Tilt	Standard	50%	0	20600/844	23.00	22.27	0.010	0.174	1.18	0.206	/
Hotspot (QPSK, Distance 10mm)											
Back Edge	Standard	1	49	20600/844	24.00	23.36	0.150	0.435	1.16	0.504	22
Front Edge	Standard	1	49	20600/844	24.00	23.36	-0.040	0.342	1.16	0.396	/
Left Edge	Standard	1	49	20600/844	24.00	23.36	0.010	0.042	1.16	0.049	/
Right Edge	Standard	1	49	20600/844	24.00	23.36	0.120	0.253	1.16	0.293	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	Standard	1	49	20600/844	24.00	23.36	0.024	0.252	1.16	0.292	/
Back Edge	Standard	50%	0	20600/844	23.00	22.27	-0.010	0.343	1.18	0.406	/
Front Edge	Standard	50%	0	20600/844	23.00	22.27	0.010	0.274	1.18	0.324	/
Left Edge	Standard	50%	0	20600/844	23.00	22.27	0.040	0.045	1.18	0.053	/
Right Edge	Standard	50%	0	20600/844	23.00	22.27	-0.040	0.194	1.18	0.230	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	Standard	50%	0	20600/844	23.00	22.27	0.022	0.193	1.18	0.228	/

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

3. For QPSK with 100% RB allocation, SAR is required when and the highest reported SAR for 1 RB and 50% RB allocation in are ≥ 0.8 W/kg.

Table 5: LTE Band 26 (15MHz)

Test Position	Cover Type	RB size	RB offset	Channel/ Frequency (MHz)	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Plot No.
Head SAR (QPSK)											
Left Cheek	Standard	1	38	26965/841.5	24.00	23.89	-0.043	0.301	1.03	0.309	/
Left Tilt	Standard	1	38	26965/841.5	24.00	23.89	0.020	0.193	1.03	0.198	/
Right Cheek	Standard	1	38	26965/841.5	24.00	23.89	0.048	0.382	1.03	0.392	23
Right Tilt	Standard	1	38	26965/841.5	24.00	23.89	0.100	0.229	1.03	0.235	/
Left Cheek	Standard	50%	39	26775/822.5	23.00	22.60	0.130	0.214	1.10	0.235	/
Left Tilt	Standard	50%	39	26775/822.5	23.00	22.60	0.000	0.135	1.10	0.148	/
Right Cheek	Standard	50%	39	26775/822.5	23.00	22.60	-0.190	0.257	1.10	0.282	/
Right Tilt	Standard	50%	39	26775/822.5	23.00	22.60	0.040	0.159	1.10	0.174	/
Hotspot (QPSK, Distance 10mm)											
Back Edge	Standard	1	38	26965/841.5	24.00	23.89	-0.060	0.430	1.03	0.441	24
Front Edge	Standard	1	38	26965/841.5	24.00	23.89	0.070	0.393	1.03	0.403	/
Left Edge	Standard	1	38	26965/841.5	24.00	23.89	0.030	0.119	1.03	0.122	/
Right Edge	Standard	1	38	26965/841.5	24.00	23.89	0.024	0.235	1.03	0.241	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	Standard	1	38	26965/841.5	24.00	23.89	0.037	0.273	1.03	0.280	/
Back Edge	Standard	50%	39	26775/822.5	23.50	22.60	-0.010	0.361	1.23	0.444	/
Front Edge	Standard	50%	39	26775/822.5	23.50	22.60	0.040	0.286	1.23	0.352	/
Left Edge	Standard	50%	39	26775/822.5	23.50	22.60	-0.095	0.096	1.23	0.118	/
Right Edge	Standard	50%	39	26775/822.5	23.50	22.60	0.100	0.163	1.23	0.201	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	Standard	50%	39	26775/822.5	23.50	22.60	0.022	0.178	1.23	0.219	/

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

3. For QPSK with 100% RB allocation, SAR is required when and the highest reported SAR for 1 RB and 50% RB allocation in are ≥ 0.8 W/kg.

Table 6: LTE Band 41 (20MHz)

Test Position	Cover Type	RB size	RB offset	Channel/ Frequency (MHz)	Maximum Allowed Power(dBm)	Conducted Power (dBm)	Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Plot No.
Head SAR (QPSK)											
Left Cheek	Standard	1	50	40728/2603.8	24.00	23.48	0.142	0.252	1.13	0.284	25
Left Tilt	Standard	1	50	40728/2603.8	24.00	23.48	0.030	0.055	1.13	0.062	/
Right Cheek	Standard	1	50	40728/2603.8	24.00	23.48	0.080	0.196	1.13	0.221	/
Right Tilt	Standard	1	50	40728/2603.8	24.00	23.48	0.130	0.119	1.13	0.134	/
Left Cheek	Standard	50%	0	40728/2603.8	23.00	22.76	0.117	0.165	1.06	0.174	/
Left Tilt	Standard	50%	0	40728/2603.8	23.00	22.76	0.069	0.050	1.06	0.053	/
Right Cheek	Standard	50%	0	40728/2603.8	23.00	22.76	0.108	0.154	1.06	0.163	/
Right Tilt	Standard	50%	0	40728/2603.8	23.00	22.76	0.160	0.097	1.06	0.103	/
Hotspot (QPSK, Distance 10mm)											
Back Edge	Standard	1	50	40728/2603.8	24.00	23.48	-0.033	0.336	1.13	0.379	26
Front Edge	Standard	1	50	40728/2603.8	24.00	23.48	0.052	0.326	1.13	0.367	/
Left Edge	Standard	1	50	40728/2603.8	24.00	23.48	-0.026	0.275	1.13	0.310	/
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	Standard	1	50	40728/2603.8	24.00	23.48	0.170	0.285	1.13	0.321	/
Back Edge	Standard	50%	0	40728/2603.8	23.00	22.76	0.052	0.266	1.06	0.281	/
Front Edge	Standard	50%	0	40728/2603.8	23.00	22.76	0.042	0.253	1.06	0.267	/
Left Edge	Standard	50%	0	40728/2603.8	23.00	22.76	-0.130	0.225	1.06	0.238	/
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	Standard	50%	0	40728/2603.8	23.00	22.76	0.050	0.232	1.06	0.245	/

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

3. For QPSK with 100% RB allocation, SAR is required when and the highest reported SAR for 1 RB and 50% RB allocation in are ≥ 0.8 W/kg. SAR is no required.

Table 7: Wi-Fi (2.4G)

Test Position	Cover Type	Channel/ Frequency (MHz)	Mode 802.11b	Duty Cycle	Area Scan Max.SAR (W/Kg)	Tune-up limit (dBm)	Conducted Power (dBm)	Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Plot No.
Head SAR (Full Power)												
Left Cheek	Standard	1/2412	802.11b	1:1	0.093	14.00	13.58	0.130	0.096	1.10	0.105	/
Left Tilt	Standard	1/2412	802.11b	1:1	0.087	14.00	13.58	0.032	0.092	1.10	0.102	/
Right Cheek	Standard	1/2412	802.11b	1:1	0.372	14.00	13.58	-0.150	0.280	1.10	0.308	27
Right Tilt	Standard	1/2412	802.11b	1:1	0.201	14.00	13.58	0.090	0.191	1.10	0.210	/
Hotspot (Distance 10mm)												
Back Edge	Standard	1/2412	802.11b	1:1	0.116	14.00	13.58	0.027	0.085	1.10	0.094	28
Front Edge	Standard	1/2412	802.11b	1:1	0.050	14.00	13.58	0.036	0.047	1.10	0.051	/
Left Edge	Standard	1/2412	802.11b	1:1	0.054	14.00	13.58	0.026	0.039	1.10	0.043	/
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	Standard	1/2412	802.11b	1:1	0.043	14.00	13.58	0.071	0.024	1.10	0.026	/

Note: 1. The value with blue color is the maximum SAR Value of each test band.

2. According to 648474 D04 Handset SAR v01r03, For Phablet, Since hotspot mode 1-g *reported* SAR < 1.2 W/kg, 10-g extremity SAR is no required.

Table 8: BT

Band	Configuration	Frequency (MHz)	Maximum Power (dBm)	Separation Distance (mm)	Estimated SAR （W/kg)
Bluetooth	Body-worn	2441	8.50	10	0.147

For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01 based on the formula below.(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[√f(GHz)/x] W/kgfor test separation distances ≤ 50 mm; where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR.

10.4 Simultaneous Transmission Analysis

Simultaneous Transmission Configurations	Head	Body-worn	Hotspot
GSM(Voice) + Bluetooth(data)	N/A	Yes	N/A
GPRS/EDGE(Data) + Bluetooth(data)	N/A	Yes	N/A
WCDMA(Voice) + Bluetooth(data)	N/A	Yes	N/A
WCDMA(Data) + Bluetooth(data)	N/A	Yes	N/A
LTE(Data) + Bluetooth(data)	N/A	Yes	N/A
GSM(Voice) + Wi-Fi-2.4GHz(data)	Yes	Yes	N/A
GPRS/EDGE(Data) + Wi-Fi-2.4GHz(data)	N/A	Yes	Yes
WCDMA(Voice) + Wi-Fi-2.4GHz(data)	Yes	Yes	N/A
WCDMA(Data) + Wi-Fi-2.4GHz(data)	N/A	Yes	Yes
LTE(Data) + Wi-Fi-2.4GHz(data)	N/A	Yes	Yes
Wi-Fi-2.4GHz(data) + Bluetooth(data)	N/A	Yes	Yes

General Note:

1. The Scaled SAR summation is calculated based on the same configuration and test position.
2. Per KDB 447498 D01, simultaneous transmission SAR is compliant if,
   i) Scalar SAR summation < 1.6W/kg, simultaneously transmission SAR measurement is not necessary.
   ii) SPLSR = (SAR1 + SAR2)^1.5 / (min. separation distance, mm), and the peak separation distance is determined from the square root of [(x1-x2)2 + (y1-y2)2 + (z1-z2)2], where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
   iii) If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary.

The maximum SAR_{1g} Value for Main- Antenna

Test Position \ SAR_{1g}(W/kg)		GSM 850	GSM 1900	WCDMA Band V	LTE FDD 5	LTE FDD 26	LTE TDD 41	MAX. SAR_{1g}
Head	Left Cheek	0.250	0.065	0.288	0.336	0.309	0.284	**0.336**
	Left Tilt	0.175	0.033	0.216	0.207	0.198	0.062	**0.216**
	Right Cheek	0.317	0.106	0.261	0.392	0.392	0.221	**0.392**
	Right Tilt	0.201	0.021	0.166	0.257	0.235	0.134	**0.257**
Body worn	Back Side	0.415	0.176	0.419	0.504	0.444	0.379	**0.504**
	Front Side	0.333	0.168	0.371	0.396	0.403	0.367	**0.403**
Hotspot	Back Side	0.420	0.233	0.419	0.504	0.444	0.379	**0.504**
	Front Side	0.312	0.399	0.371	0.396	0.403	0.367	**0.403**
	Left Edge	0.149	0.127	0.058	0.049	0.122	0.310	**0.310**
	Right Edge	0.257	0.080	0.077	0.293	0.241	N/A	**0.293**
	Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**
	Bottom Edge	0.186	0.446	0.221	0.292	0.280	0.321	**0.446**

About BT and Main- Antenna

Test Position \ SAR_{1g}(W/kg)		Main-antenna	BT	MAX. $\Sigma SAR_{1g/10g}$
Body worn 1g	Back Side	**0.504**	0.147	0.651
	Front Side	**0.403**	0.147	0.550

Note: 1.The value with blue color is the maximum $\Sigma SAR_{1g/10g}$ Value.

2. MAX. $\Sigma SAR_{1g/10g}$ =Unlicensed SAR_{MAX} +Licensed SAR_{MAX}

MAX. ΣSAR_{1g} = 0.651 W/kg <1.6 W/kg. So the Simultaneous transimition SAR with volum scan are not required for BT and Main-Antenna.

About Wi-Fi and Main- Antenna

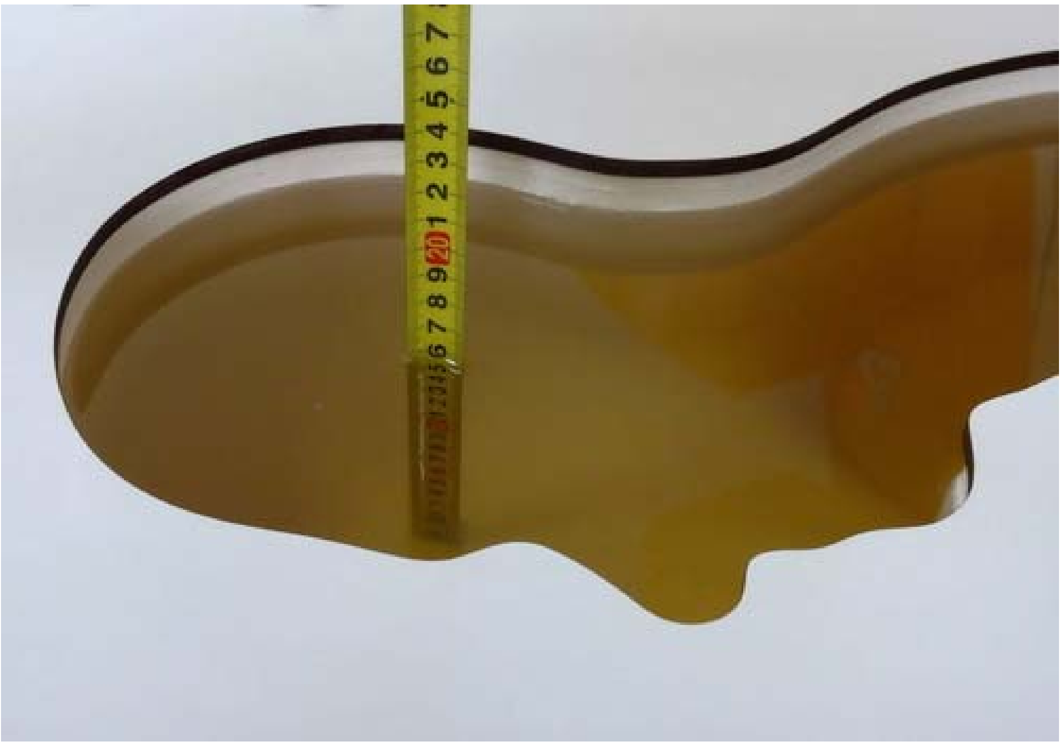
Test Position \ SAR_{1g} (W/kg)		Main-antenna	Wi-Fi 2.4G	MAX. ΣSAR_{1g}
Head	Left, Cheek	0.336	0.096	0.432
	Left, Tilt	0.216	0.092	0.308
	Right, Cheek	0.392	0.280	**0.672**
	Right, Tilt	0.257	0.191	0.448
Body worn	Back Side	0.504	0.085	0.589
	Front Side	0.403	0.047	0.450
Hotspot	Back Side	0.504	0.085	0.589
	Front Side	0.403	0.047	0.450
	Left Edge	0.310	0.039	0.349
	Right Edge	0.293	N/A	0.293
	Top Edge	N/A	N/A	0
	Bottom Edge	0.446	0.024	0.470
Note: 1.The value with blue color is the maximum ΣSAR_{1g} Value. 2. MAX. ΣSAR_{1g}=Unlicensed SAR_{MAX} +Licensed SAR_{MAX}				

MAX. ΣSAR_{1g} = 0.672 W/kg <1.6 W/kg. So the Simultaneous transimition SAR with volum scan are not required for BT and Main-Antenna.

11 Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528- 2013 is not required in SAR reports submitted for equipment approval.

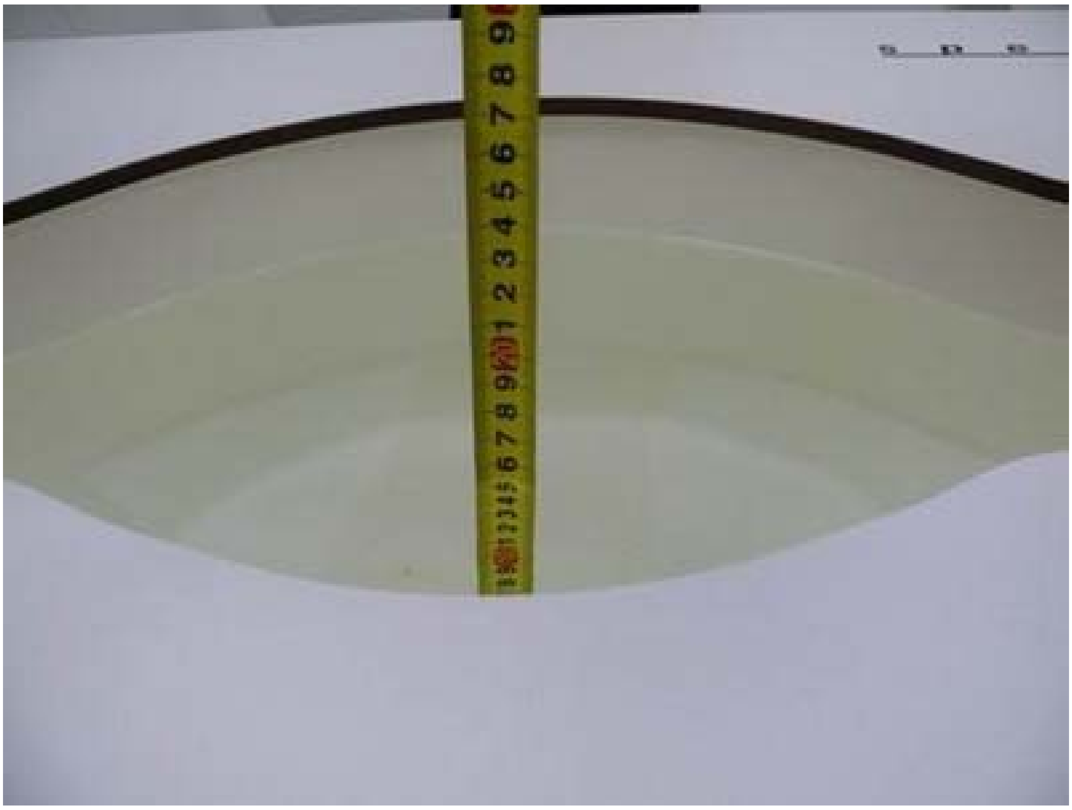
ANNEX A: Test Layout



Picture 3: Liquid depth in the head Phantom (835MHz, 15.3cm depth)

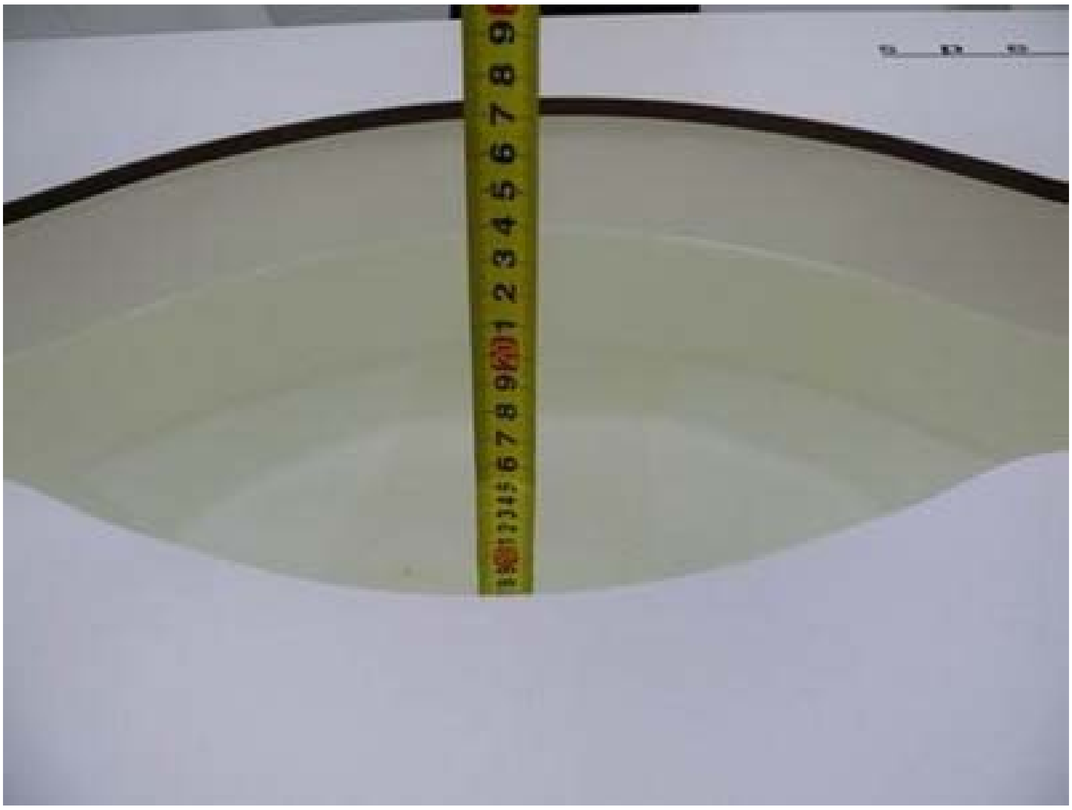
Picture 4: Liquid depth in the flat Phantom (835MHz, 15.4cm depth)

Picture 5: liquid depth in the head Phantom (1900 MHz, 15.3cm depth)



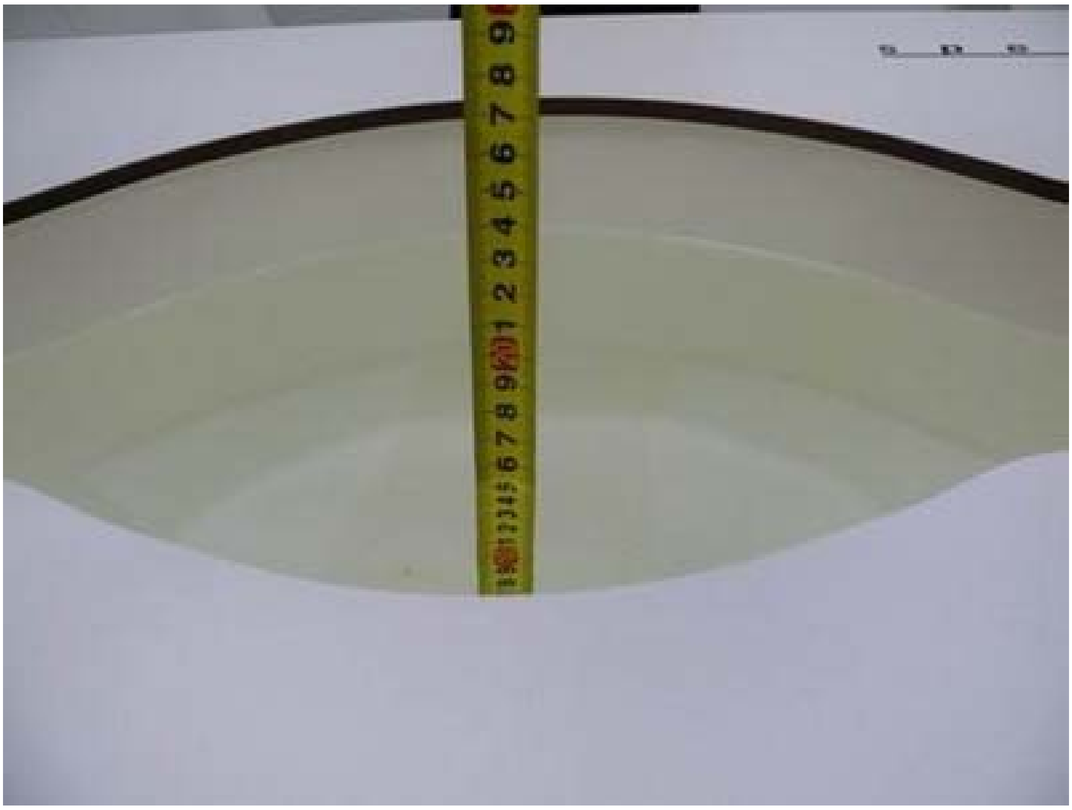
Picture 6: Liquid depth in the flat Phantom (1900 MHz, 15.2cm depth)

Picture 7: Liquid depth in the head Phantom (2450 MHz, 15.4cm depth)



Picture 8: Liquid depth in the flat Phantom (2450 MHz, 15.3cm depth)

Picture 9: Liquid depth in the head Phantom (2600 MHz, 15.4cm depth)



Picture 10: Liquid depth in the flat Phantom (2600 MHz, 15.3cm depth)

ANNEX B: System Check Results

Plot 1 System Performance Check at 835 MHz Head TSL

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020

Date: 11/20/2016

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used: f = 835 MHz; σ = 0.88 mho/m; ε_r = 41.4; ρ = 1000 kg/m^3

Ambient Temperature: 22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(6.22, 6.22, 6.22); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=15mm, Pin=250mW/Area Scan (41x121x1): Measurement grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 2.64 mW/g

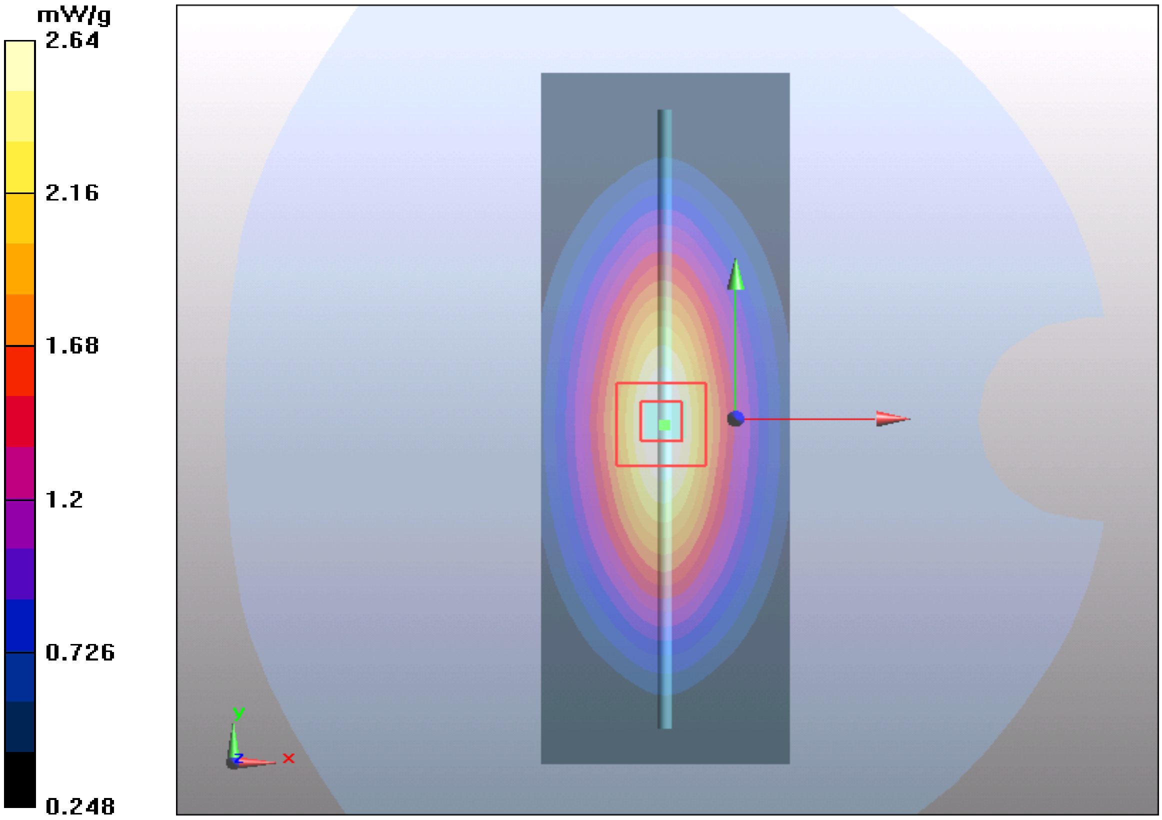
d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 54.4 V/m; Power Drift = -0.076 dB

Peak SAR (extrapolated) = 3.67 W/kg

SAR (1 g) = 2.44 mW/g; SAR (10 g) = 1.6 mW/g

Maximum value of SAR (measured) = 2.64 mW/g



Plot 2 System Performance Check at 835 MHz Head TSL

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020

Date: 11/22/2016

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used: f = 835 MHz; σ = 0.87 mho/m; ε_r = 41.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(6.22, 6.22, 6.22); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=15mm, Pin=250mW/Area Scan (41x121x1): Measurement grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 2.64 mW/g

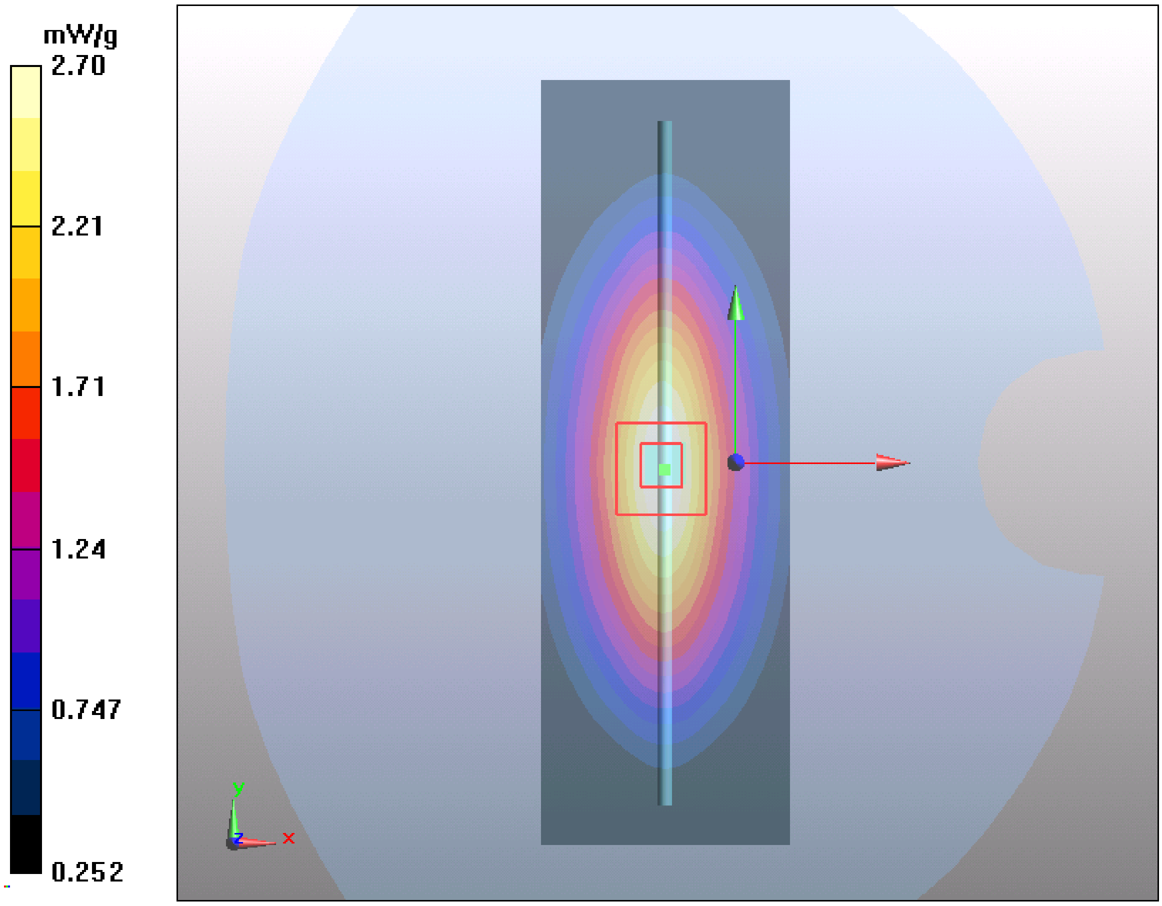
d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 54.4 V/m; Power Drift = -0.076 dB

Peak SAR (extrapolated) = 3.67 W/kg

SAR(1 g) = 2.46 mW/g; SAR(10 g) = 1.65 mW/g

Maximum value of SAR (measured) = 2.70 mW/g



Plot 3 System Performance Check at 835 MHz Head TSL

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020

Date: 12/17/2016

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used: f = 835 MHz; σ = 0.92 mho/m; ε_r = 41.91; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(6.22, 6.22, 6.22); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=15mm, Pin=250mW/Area Scan (41x121x1): Measurement grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 2.64 mW/g

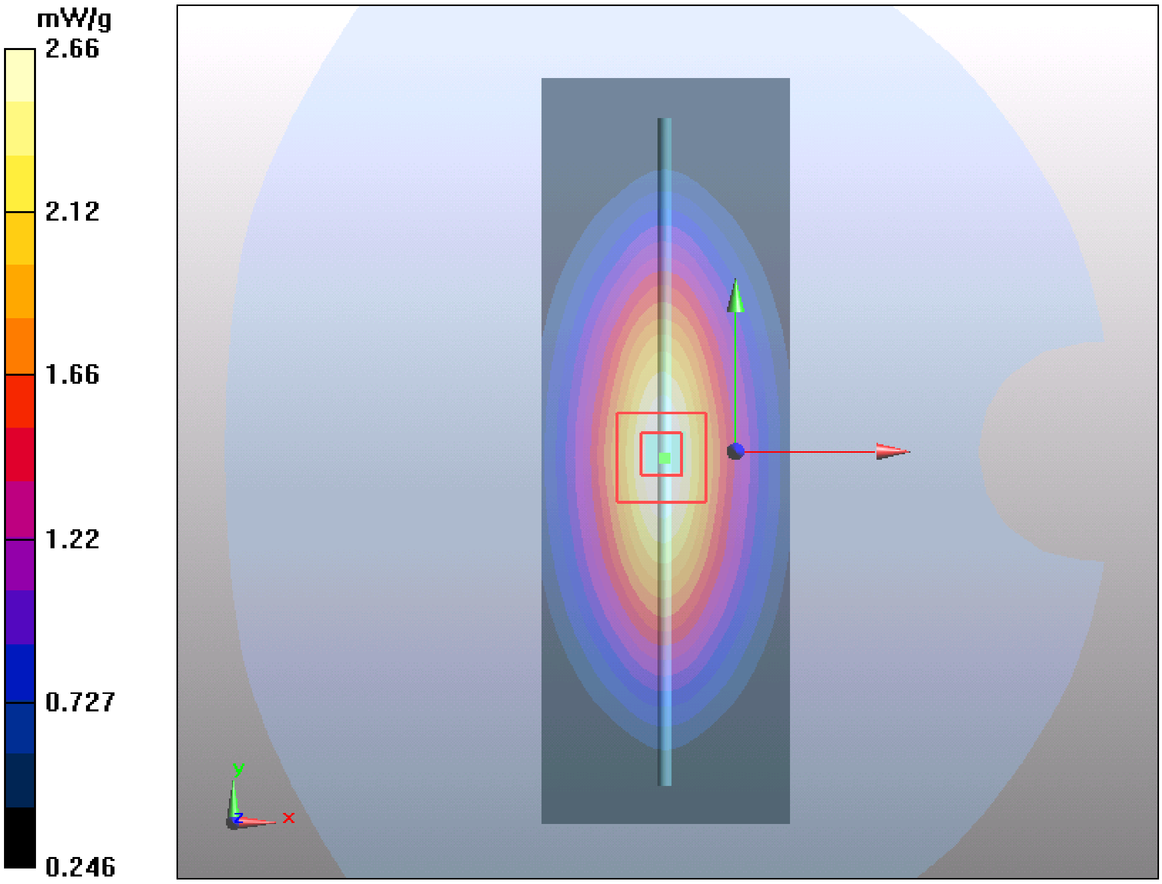
d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 55.2 V/m; Power Drift = -0.011 dB

Peak SAR (extrapolated) = 3.79 W/kg

SAR(1 g) = 2.48 mW/g; SAR(10 g) = 1.58 mW/g

Maximum value of SAR (measured) = 2.66 mW/g



Plot 4 System Performance Check at 835 MHz Body TSL

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020

Date: 11/23/2016

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1

Medium parameters used: f = 835 MHz; σ = 0.96 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(5.87, 5.87, 5.87); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=15mm, Pin=250mW/Area Scan (41x121x1): Measurement grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 2.58 mW/g

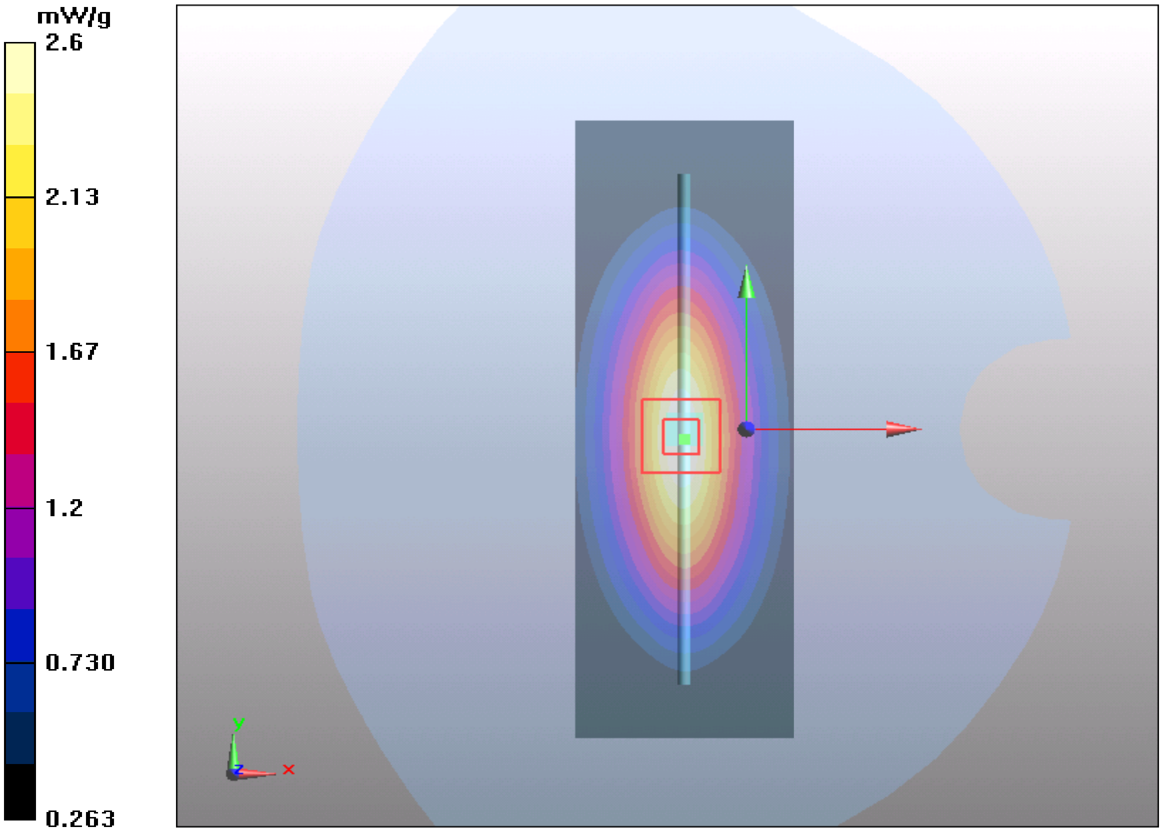
d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 51.9 V/m; Power Drift = -0.058 dB

Peak SAR (extrapolated) = 3.5 W/kg

SAR(1 g) = 2.41 mW/g; SAR(10 g) = 1.6 mW/g

Maximum value of SAR (measured) = 2.6 mW/g



Plot 5 System Performance Check at 835 MHz Body TSL

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020

Date: 11/26/2016

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1

Medium parameters used: f = 835 MHz; σ = 0.95 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(5.87, 5.87, 5.87); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=15mm, Pin=250mW/Area Scan (41x121x1): Measurement grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 2.58 mW/g

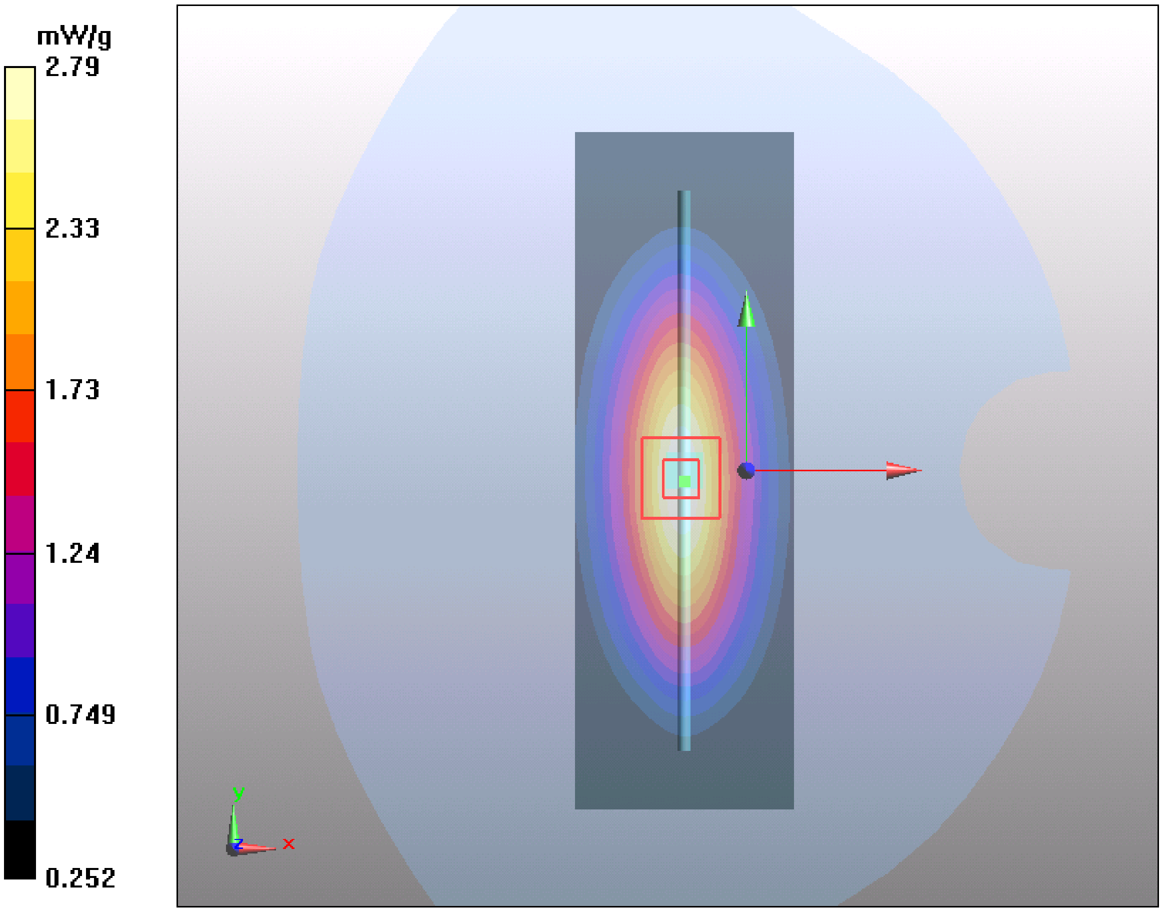
d=15mm, Pin=250mW/Zoom Scan(5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 51.9 V/m; Power Drift = -0.058 dB

Peak SAR (extrapolated) = 3.5 W/kg

SAR(1 g) = 2.42 mW/g; SAR(10 g) = 1.63 mW/g

Maximum value of SAR (measured) = 2.79 mW/g



Plot 6 System Performance Check at 835 MHz Body TSL

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020

Date: 12/16/2016

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used: f = 835 MHz; σ = 1.03 mho/m; ε_r = 55.36; ρ = 1000 kg/m^3

Ambient Temperature: 22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(5.87, 5.87, 5.87); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=15mm, Pin=250mW/Area Scan (41x121x1): Measurement grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 2.58 mW/g

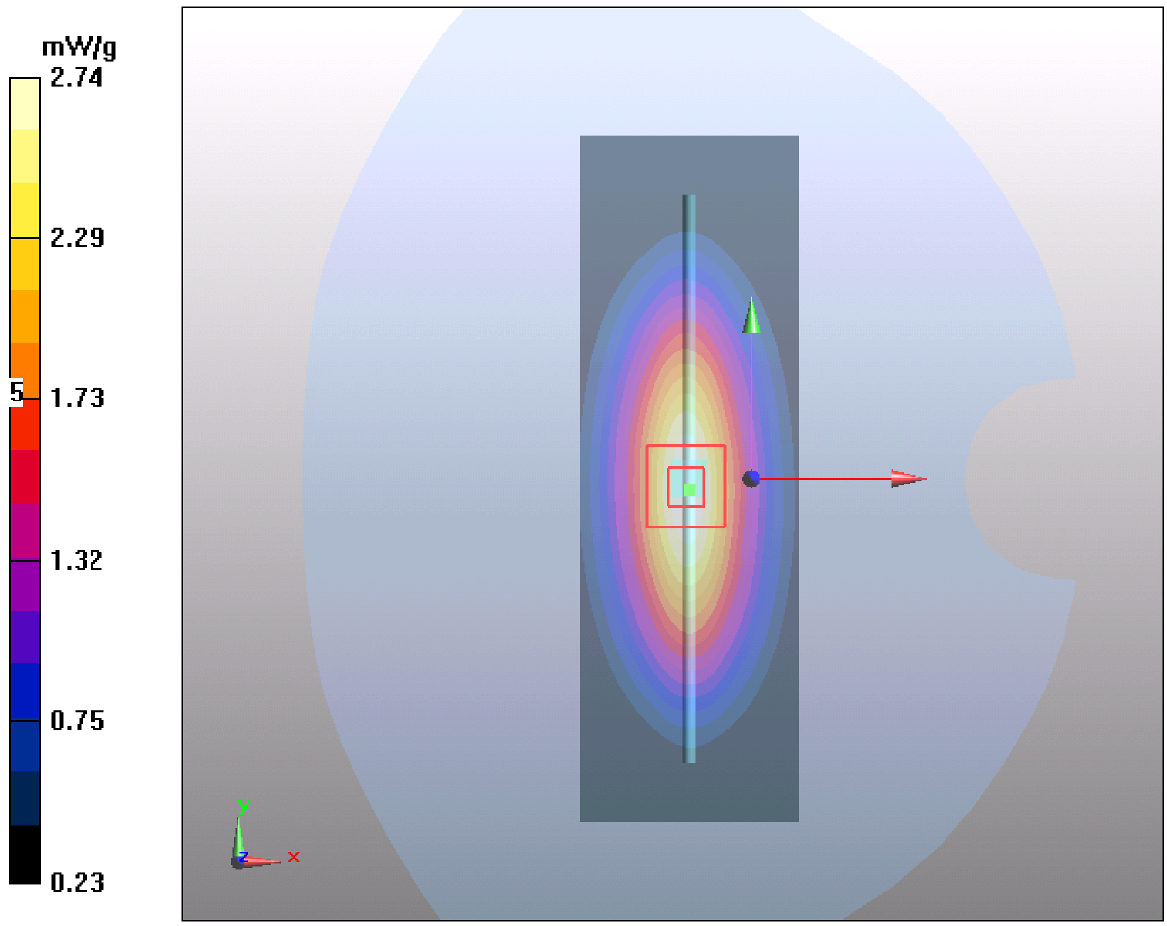
d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 51.9 V/m; Power Drift = -0.058 dB

Peak SAR (extrapolated) = 3.5 W/kg

SAR(1 g) = 2.45 mW/g; SAR(10 g) = 1.63 mW/g

Maximum value of SAR (measured) = 2.74 mW/g



Plot 7 System Performance Check at 1900 MHz Head TSL

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d060

Date: 12/13/2016

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: f = 1900 MHz; σ = 1.38 mho/m; ε_r = 39.01; ρ = 1000 kg/m^3

Ambient Temperature: 22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF (5.09, 5.09, 5.09); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 11.3 mW/g

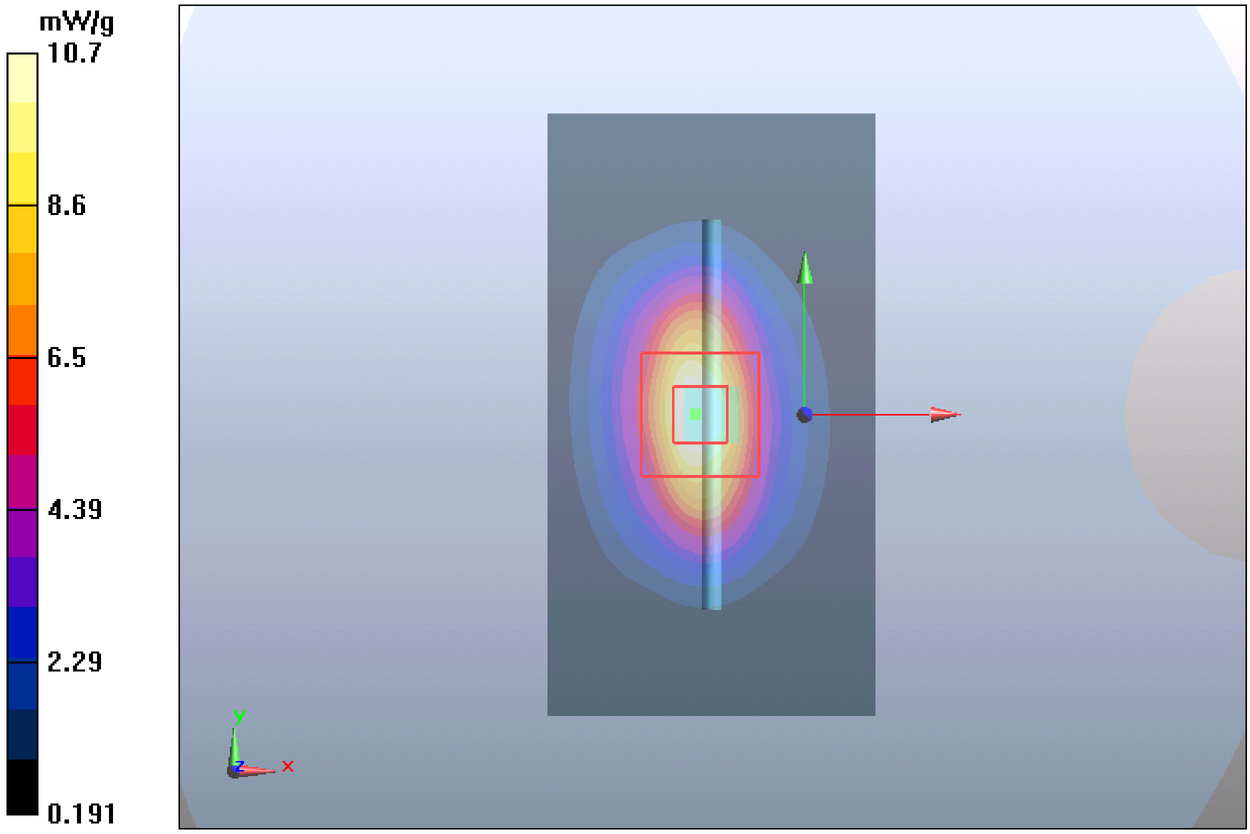
d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 85.5 V/m; Power Drift = 0.028 dB

Peak SAR (extrapolated) = 17.8 W/kg

SAR(1 g) = 9.48 mW/g; SAR(10 g) = 4.9 mW/g

Maximum value of SAR (measured) = 10.7 mW/g



Plot 8 System Performance Check at 1900 MHz Body TSL

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d060

Date: 12/15/2016

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: f = 1900 MHz; σ = 1.49 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3

Ambient Temperature: 22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(4.78, 4.78, 4.78); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 12.2 mW/g

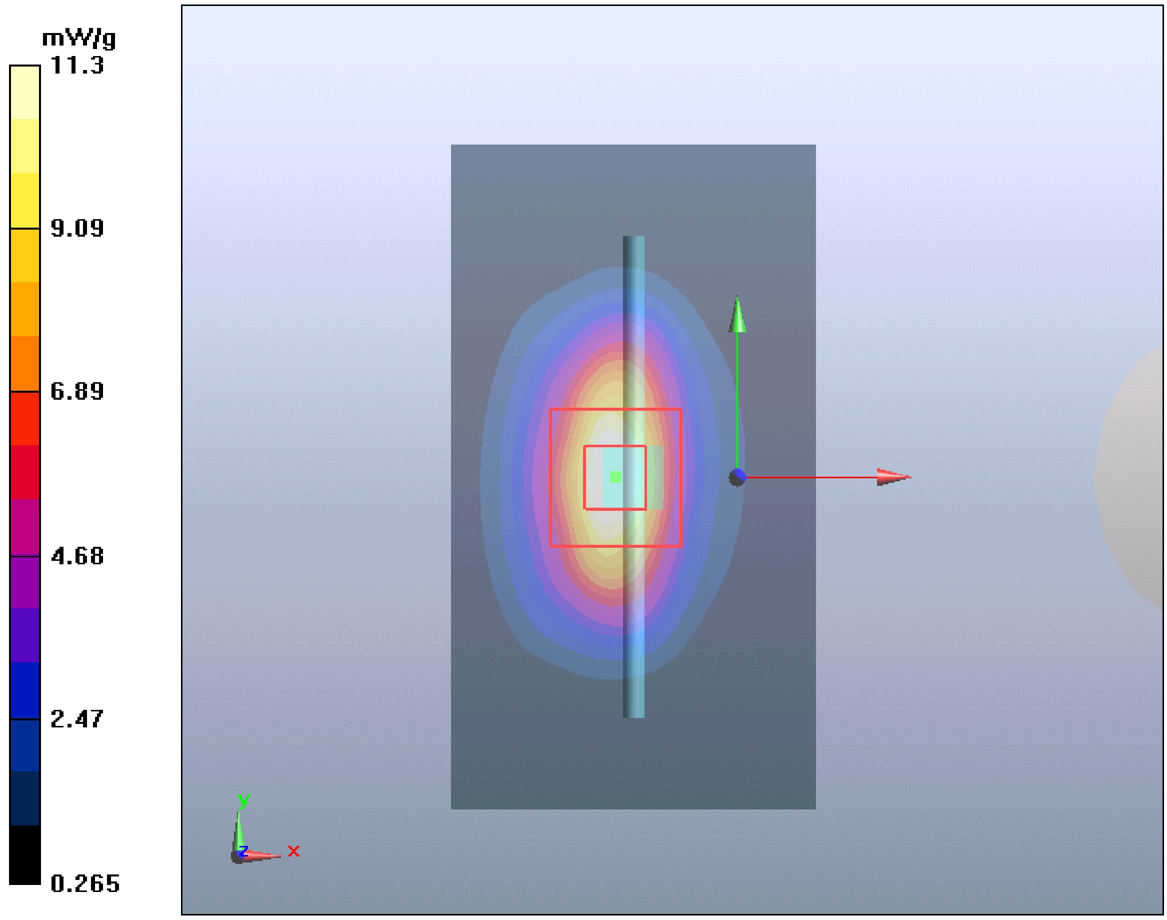
d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 82.3 V/m; Power Drift = 0.068 dB

Peak SAR (extrapolated) = 17.8 W/kg

SAR(1 g) = 9.93 mW/g; SAR(10 g) = 5.25 mW/g

Maximum value of SAR (measured) = 11.3 mW/g



Plot 9 System Performance Check at 2450 MHz Head TSL

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 786

Date: 11/29/2016

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium parameters used: f = 2450 MHz; σ = 1.82 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3

Ambient Temperature: 22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(4.42, 4.42, 4.42); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 18.2 mW/g

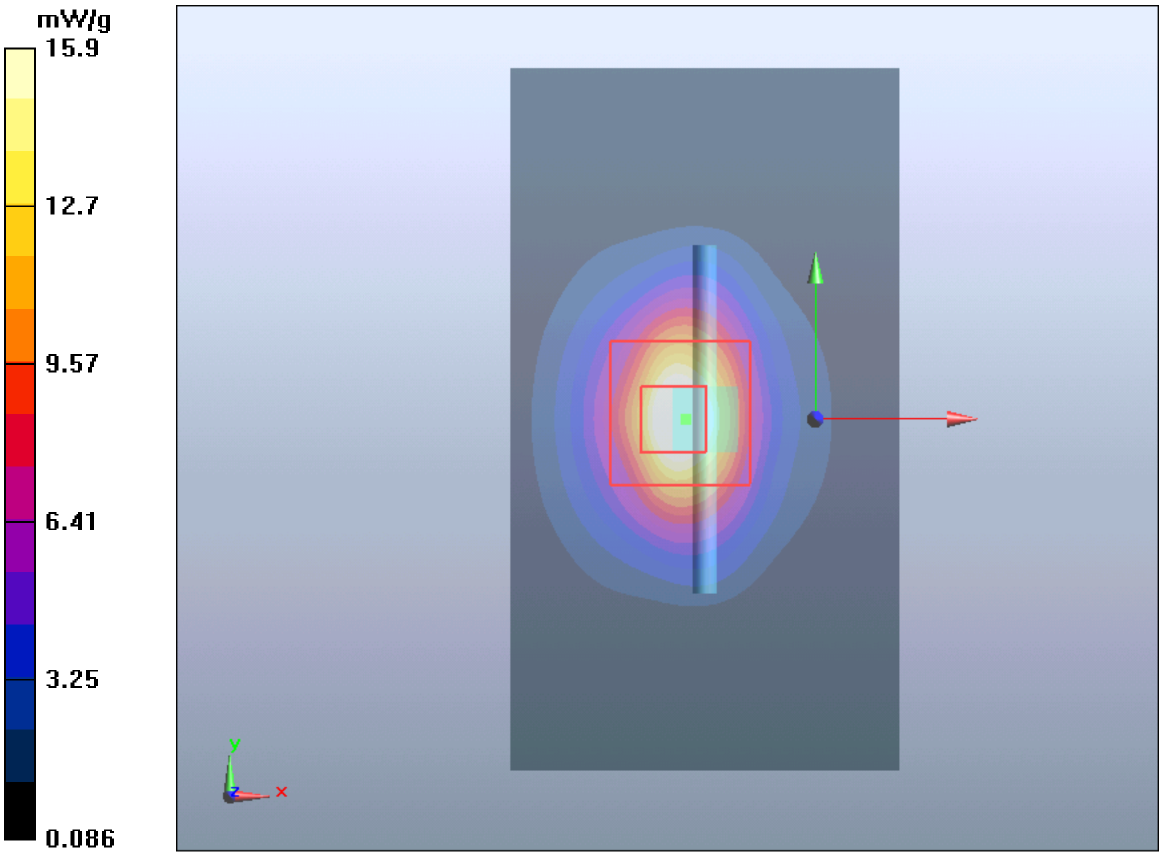
d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.8 V/m; Power Drift = 0.075 dB

Peak SAR (extrapolated) = 30 W/kg

SAR(1 g) = 13.7 mW/g; SAR(10 g) = 6.22 mW/g

Maximum value of SAR (measured) = 15.9 mW/g



Plot 10 System Performance Check at 2450 MHz Body TSL

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 786

Date: 12/2/2016

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3

Ambient Temperature: 22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(4.36, 4.36, 4.36); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 16 mW/g

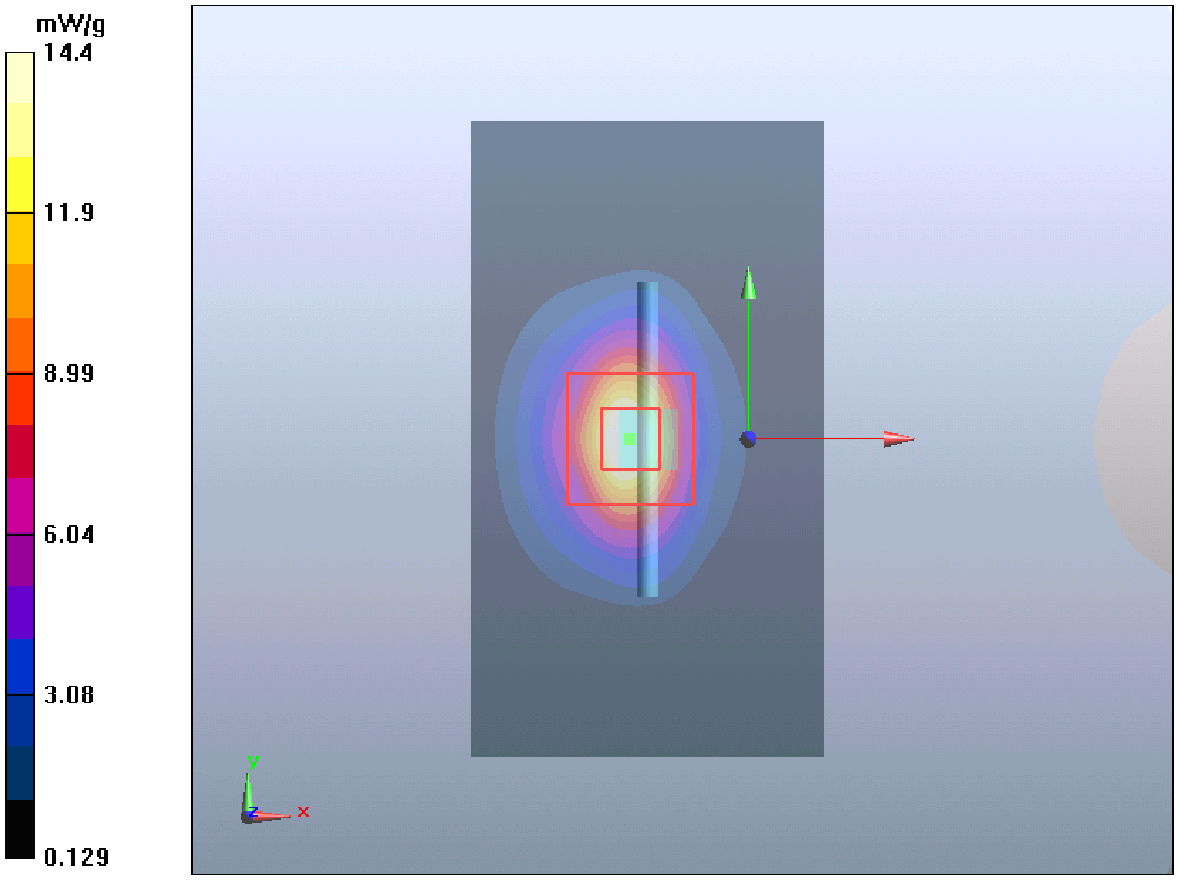
d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 81.2 V/m; Power Drift = 0.003 dB

Peak SAR (extrapolated) = 25.4 W/kg

SAR(1 g) = 12.5 mW/g; SAR(10 g) = 6.20 mW/g

Maximum value of SAR (measured) = 14.4 mW/g



Plot 11 System Performance Check at 2600 MHz Head TSL

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1025

Date: 12/1/2016

Communication System: CW; Frequency: 2600 MHz

Medium parameters used: f = 2600 MHz; σ = 1.99 mho/m; ε_r = 40.0; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(4.25, 4.25, 4.25); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 17.439 mW/g

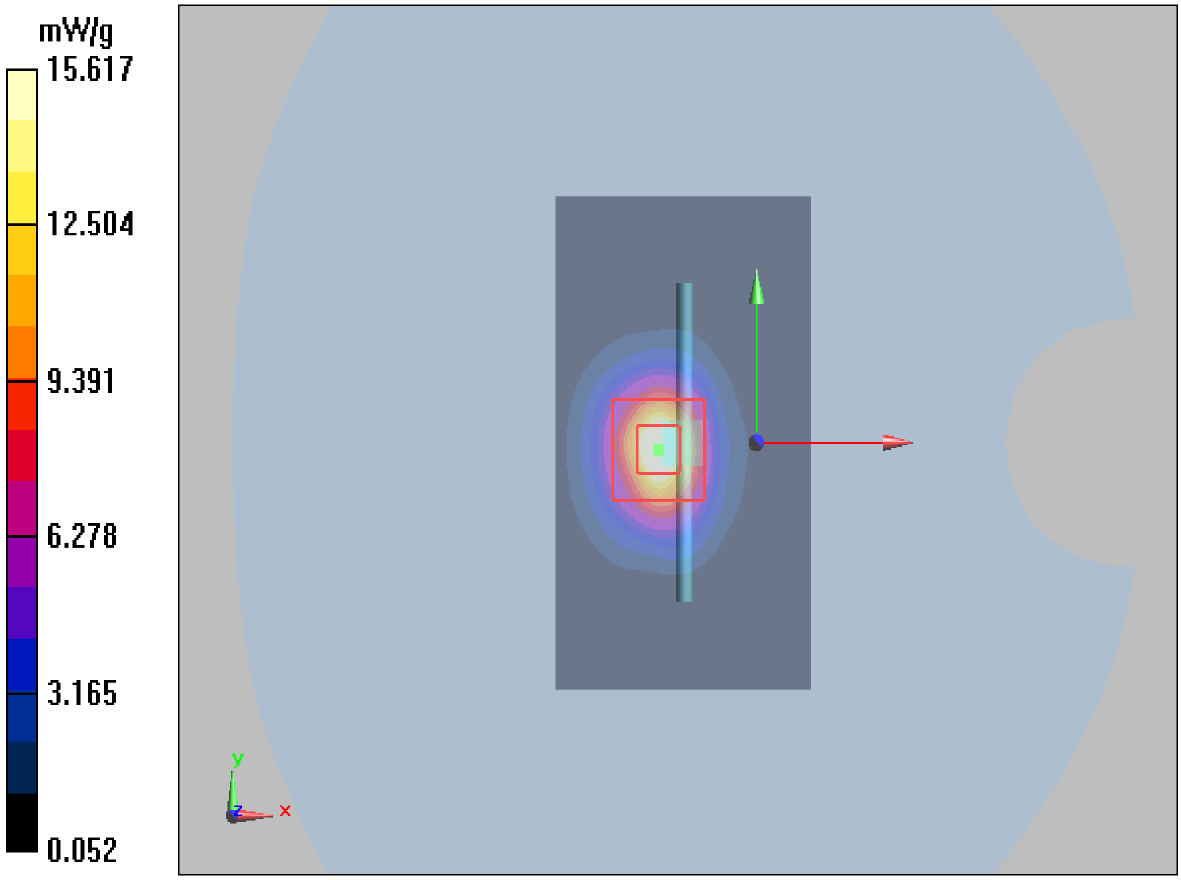
d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 87.998 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 31.858 W/kg

SAR(1 g) = 13.9 mW/g; SAR(10 g) = 6.07 mW/g

Maximum value of SAR (measured) = 15.617 mW/g



Plot 12 System Performance Check at 2600 MHz Body TSL

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1025

Date: 12/3/2016

Communication System: CW; Frequency: 2600 MHz

Medium parameters used: f = 2600 MHz; σ =2.13mho/m; ε_r =50.68; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(4.21, 4.21, 4.21); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 17.59 mW/g

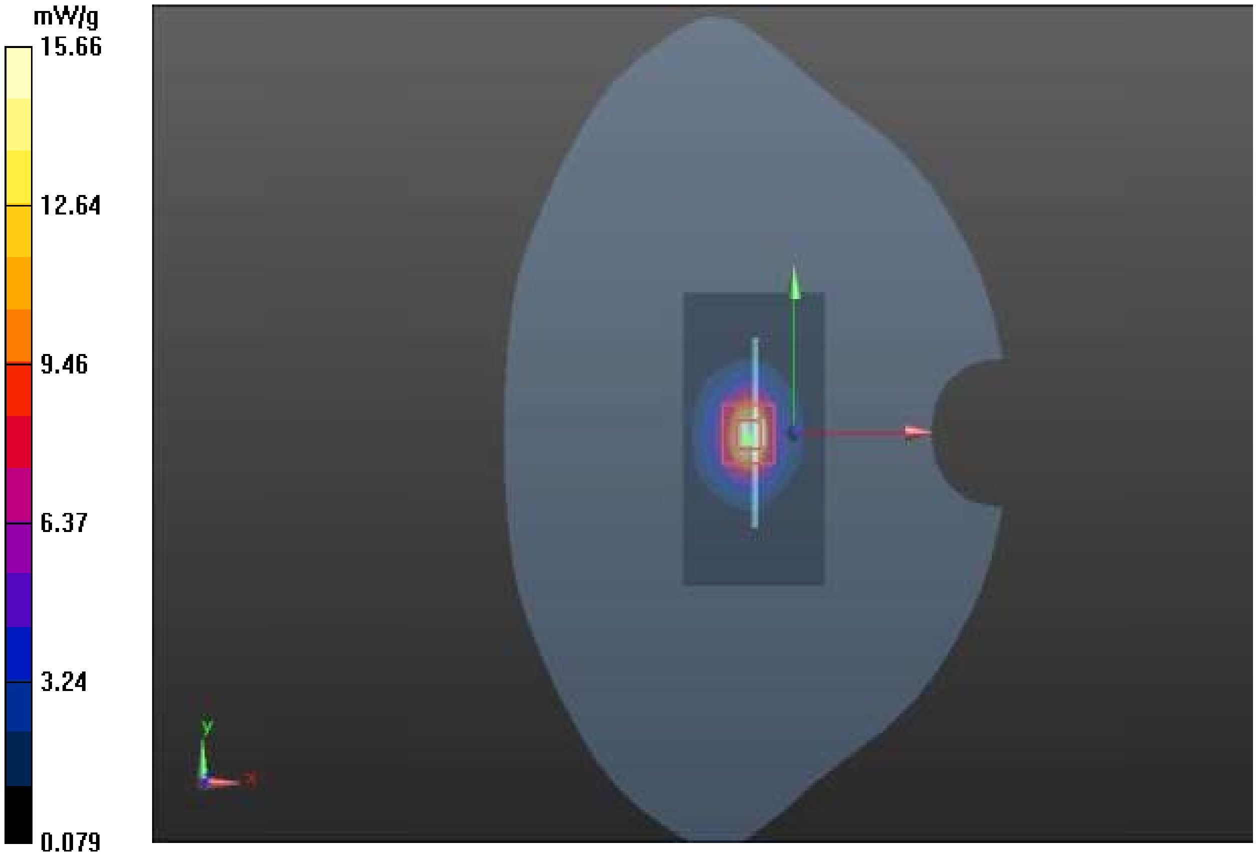
d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 87.998 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 31.858 W/kg

SAR(1 g) = 13.88 mW/g; SAR(10 g) = 6.09 mW/g

Maximum value of SAR (measured) = 15.66 mW/g



ANNEX C: Highest Graph Results

Plot 13 GSM 850 Right Cheek Middle

Date: 12/17/2016

Communication System: UID 0, GSM (0); Frequency: 836.6 MHz; Duty Cycle: 1:8.30042

Medium parameters used: f = 837 MHz; σ = 0.927 S/m; ε_r = 41.918; ρ = 1000 kg/m^3

Ambient Temperature: 22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Right Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(6.22, 6.22, 6.22); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Right Cheek Middle/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.294 W/kg

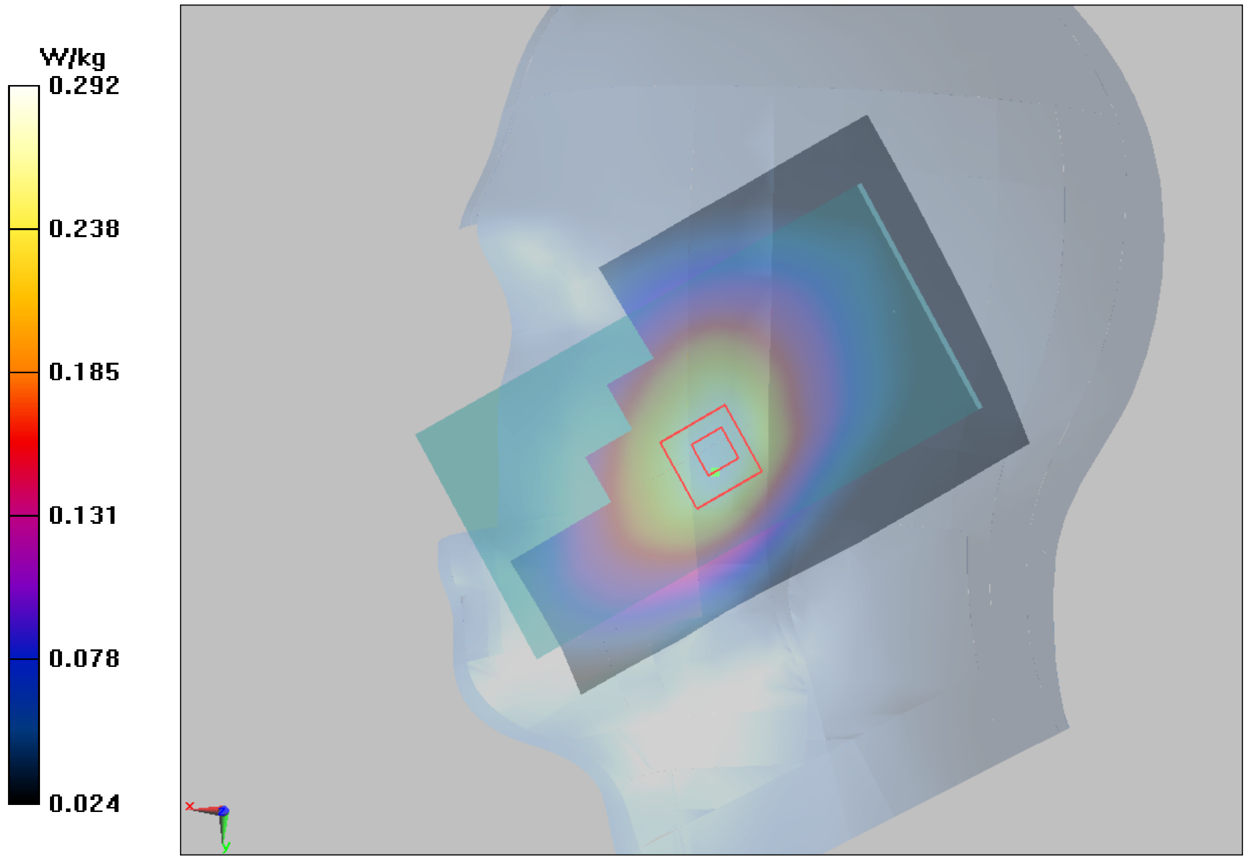
Right Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.416 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.351 W/kg

SAR(1 g) = 0.281 W/kg; SAR(10 g) = 0.210 W/kg

Maximum value of SAR (measured) = 0.292 W/kg



Plot 14 GSM 850 Back Side Middle (Distance 10mm)

Date: 12/16/2016

Communication System: UID 0, GSM (0); Frequency: 836.6 MHz; Duty Cycle: 1:8.30042

Medium parameters used: f = 837 MHz; σ = 1.028 S/m; ε_r = 55.335; ρ = 1000 kg/m^3

Ambient Temperature: 22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(5.87, 5.87, 5.87); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Back Side Middle/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

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

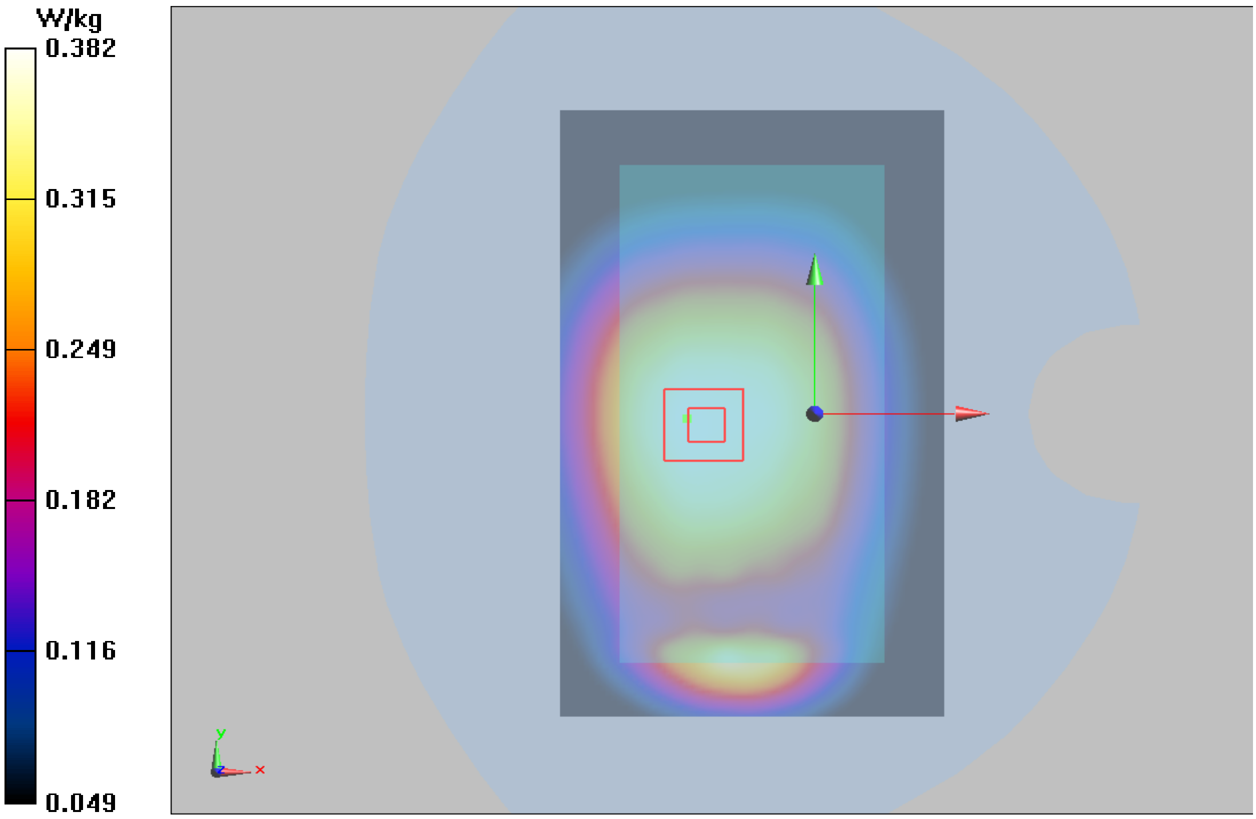
Back Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.40 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.455 W/kg

SAR(1 g) = 0.368 W/kg; SAR(10 g) = 0.285 W/kg

Maximum value of SAR (measured) = 0.382 W/kg



Plot 15 GSM 850 GPRS (2Txslots) Back Side Middle (Distance 10mm)

Date: 12/16/2016

Communication System: UID 0, 2 slot GPRS (0); Frequency: 836.6 MHz; Duty Cycle: 1:4.14954

Medium parameters used: f = 837 MHz; σ = 1.028 S/m; ε_r = 55.335; ρ = 1000 kg/m^3

Ambient Temperature: 22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(5.87, 5.87, 5.87); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Back Side Middle/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.405 W/kg

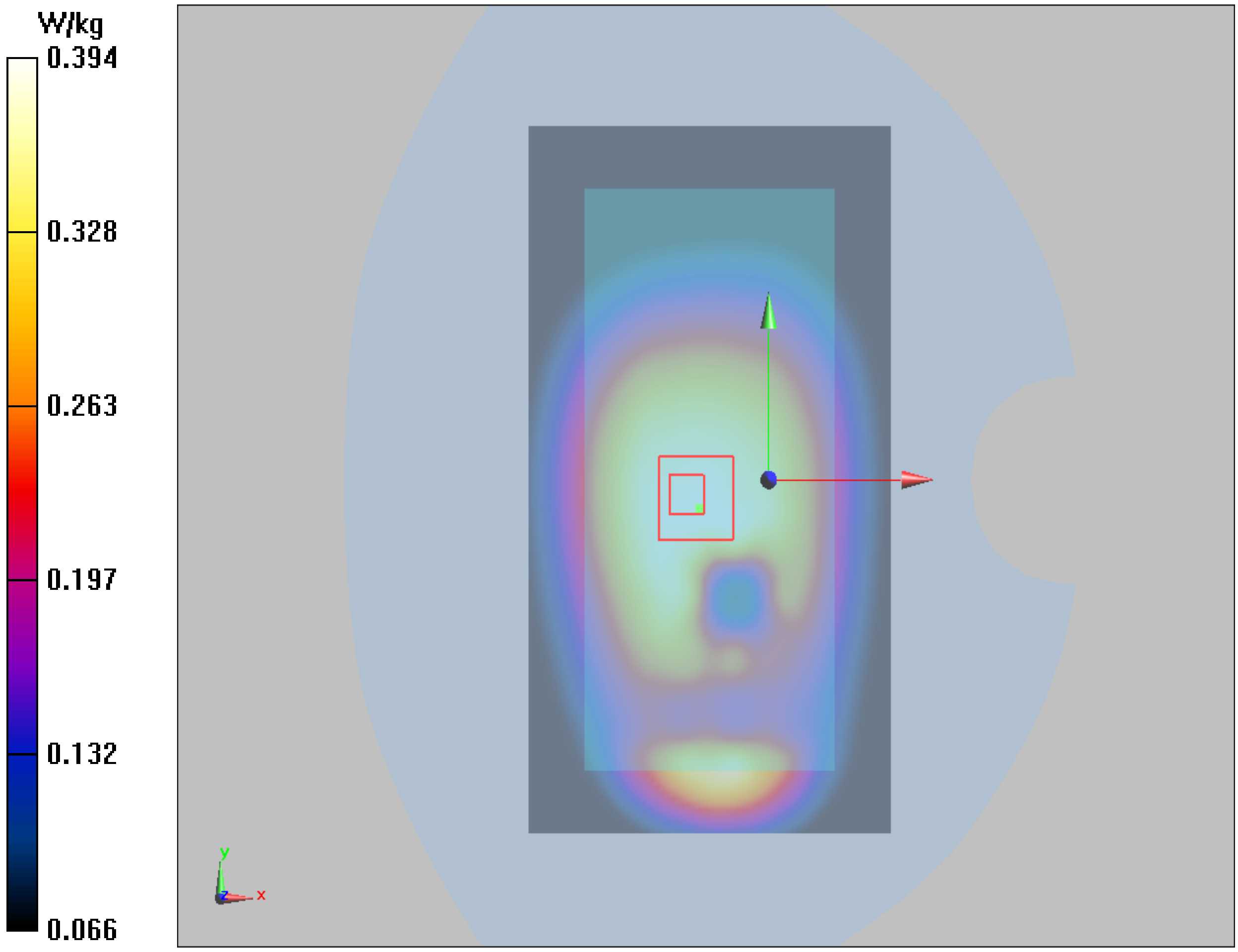
Back Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.50 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.543 W/kg

SAR(1 g) = 0.378 W/kg; SAR(10 g) = 0.292 W/kg

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



Plot 16 GSM 1900 Right Cheek Middle

Date: 12/13/2016

Communication System: UID 0, GSM (0); Frequency: 1880 MHz; Duty Cycle: 1:8.30042

Medium parameters used: f = 1880 MHz; σ = 1.363 S/m; ε_r = 39.073; ρ = 1000 kg/m^3

Ambient Temperature: 22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Right Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF (5.09, 5.09, 5.09); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Right Cheek Middle/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.0994 W/kg

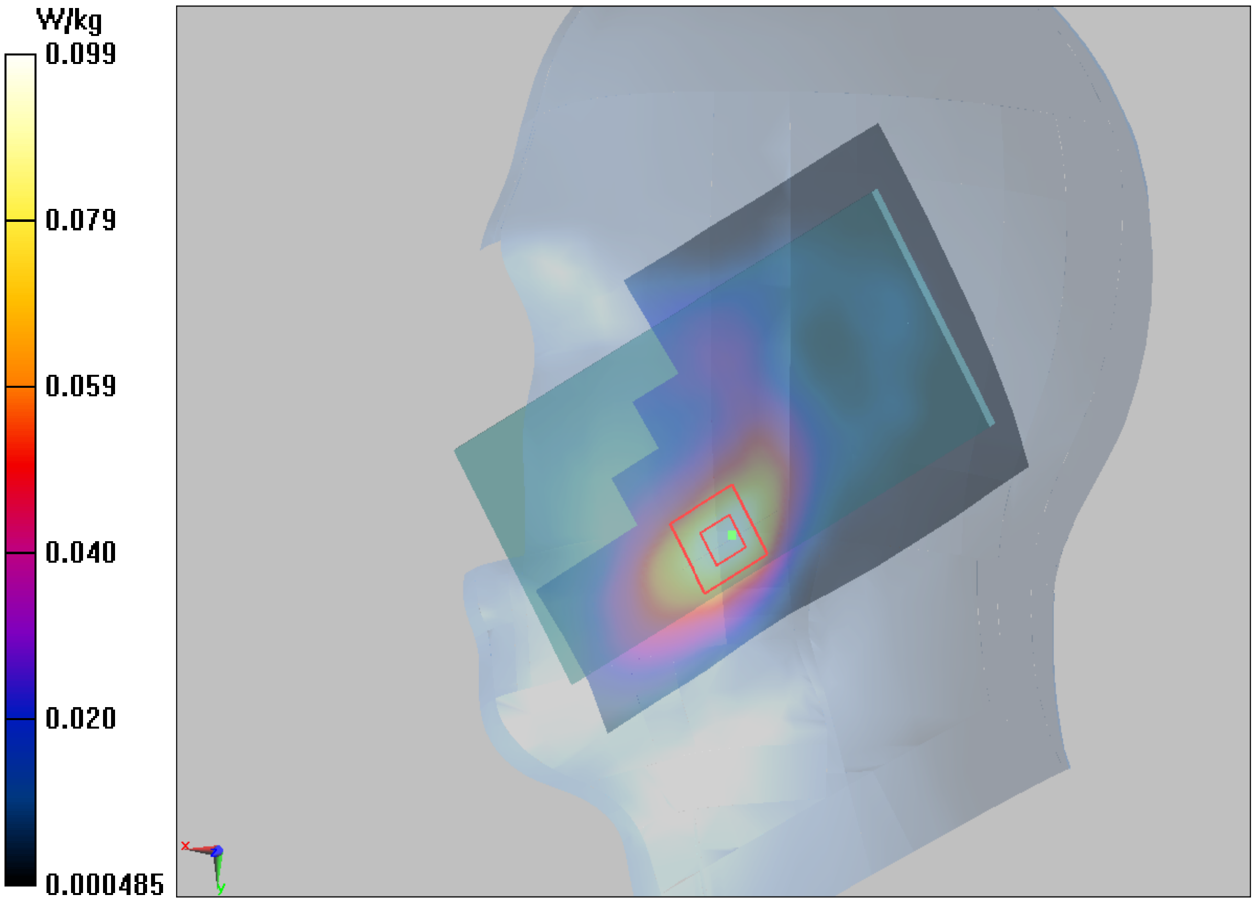
Right Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.837 V/m; Power Drift = -0.033 dB

Peak SAR (extrapolated) = 0.137 W/kg

SAR(1 g) = 0.090 W/kg; SAR(10 g) = 0.054 W/kg

Maximum value of SAR (measured) = 0.099 W/kg



Plot 17 GSM 1900 Back Side Middle (Distance 10mm)

Date: 12/15/2016

Communication System: UID 0, GSM (0); Frequency: 1880 MHz; Duty Cycle: 1:8.30042

Medium parameters used: f = 1880 MHz; σ = 1.477 S/m; ε_r = 51.607; ρ = 1000 kg/m^3

Ambient Temperature: 22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(4.78, 4.78, 4.78); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Back Side Middle/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.169 W/kg

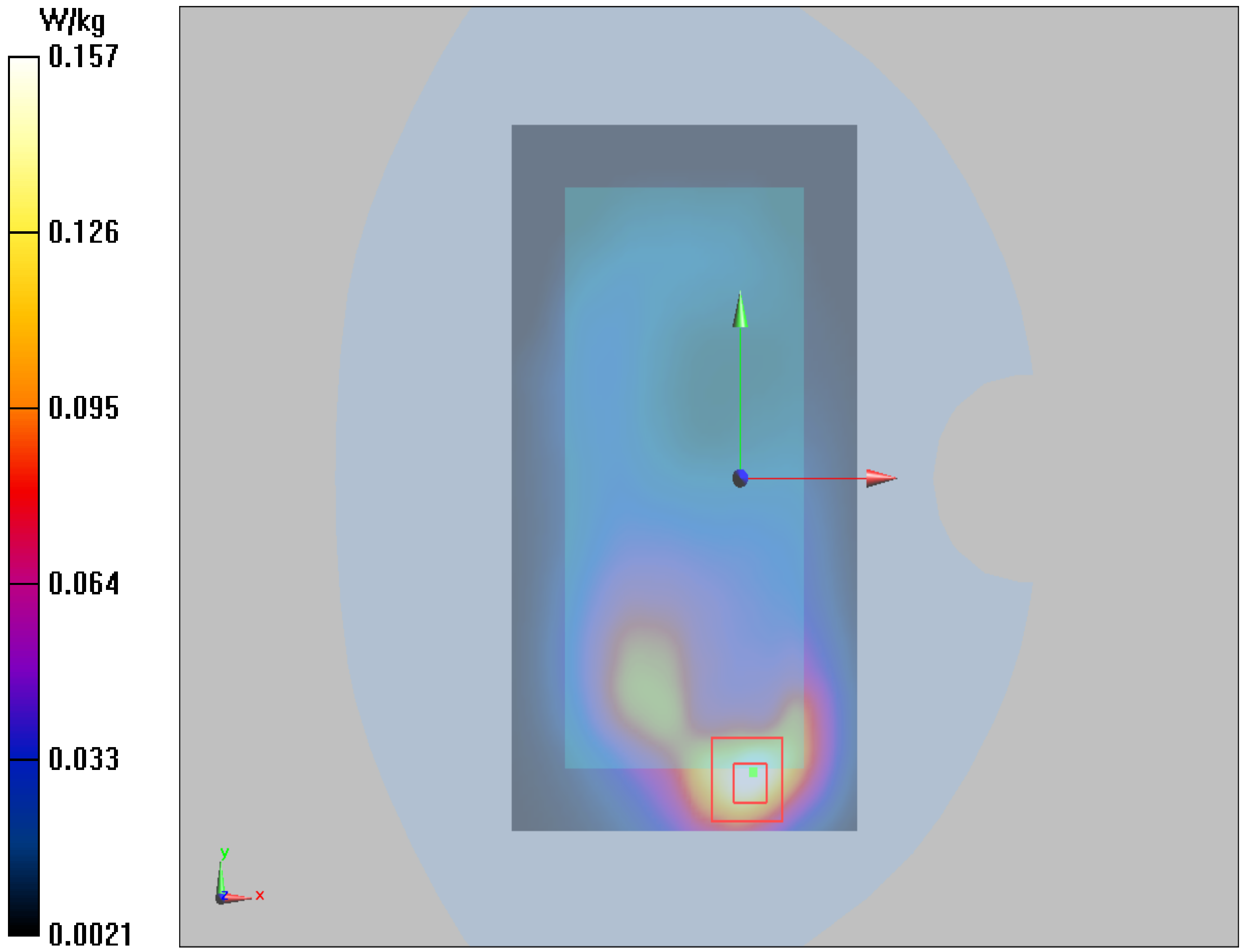
Back Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.914 V/m; Power Drift = -0.042 dB

Peak SAR (extrapolated) = 0.260 W/kg

SAR(1 g) = 0.150 W/kg; SAR(10 g) = 0.081 W/kg

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



Plot 18 GSM 1900 GPRS (2Txslots) Bottom Side Middle (Distance 10mm)

Date: 12/15/2016

Communication System: UID 0, 2 slot GPRS (0); Frequency: 1880 MHz; Duty Cycle: 1:4.14954

Medium parameters used: f = 1880 MHz; σ = 1.477 S/m; ε_r = 51.607; ρ = 1000 kg/m^3

Ambient Temperature: 22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF (4.78, 4.78, 4.78); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Bottom Side Middle/Area Scan (31x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.400 W/kg

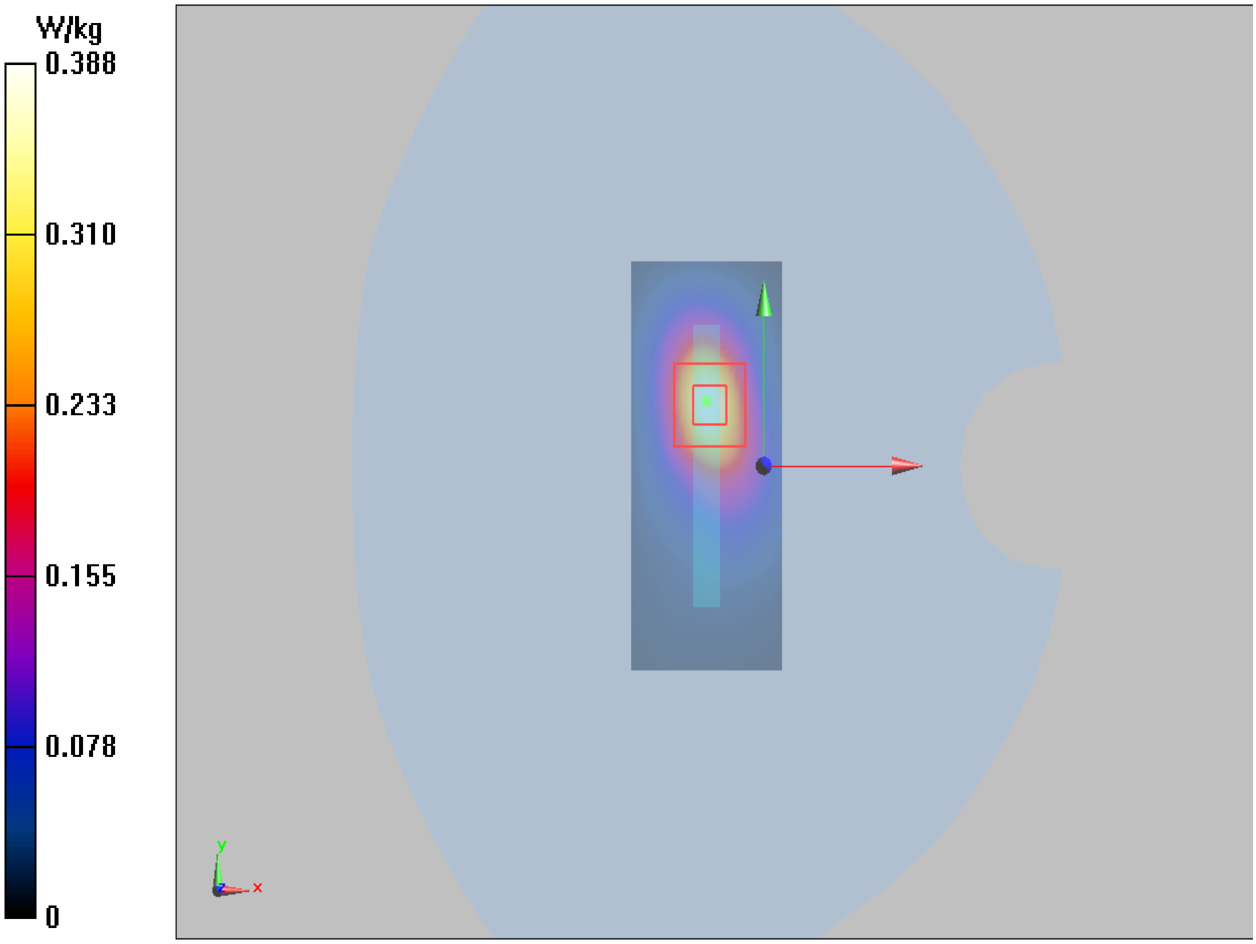
Bottom Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.34 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 0.619 W/kg

SAR(1 g) = 0.342 W/kg; SAR(10 g) = 0.175 W/kg

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



Plot 19 UMTS Band V Left Cheek Middle

Date: 11/20/2016

Communication System: UID 0, WCDMA (0); Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium parameters used: f = 837 MHz; σ = 0.927 S/m; ε_r = 41.918; ρ = 1000 kg/m^3

Ambient Temperature: 22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(6.22, 6.22, 6.22); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Left Cheek Middle/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.263 W/kg

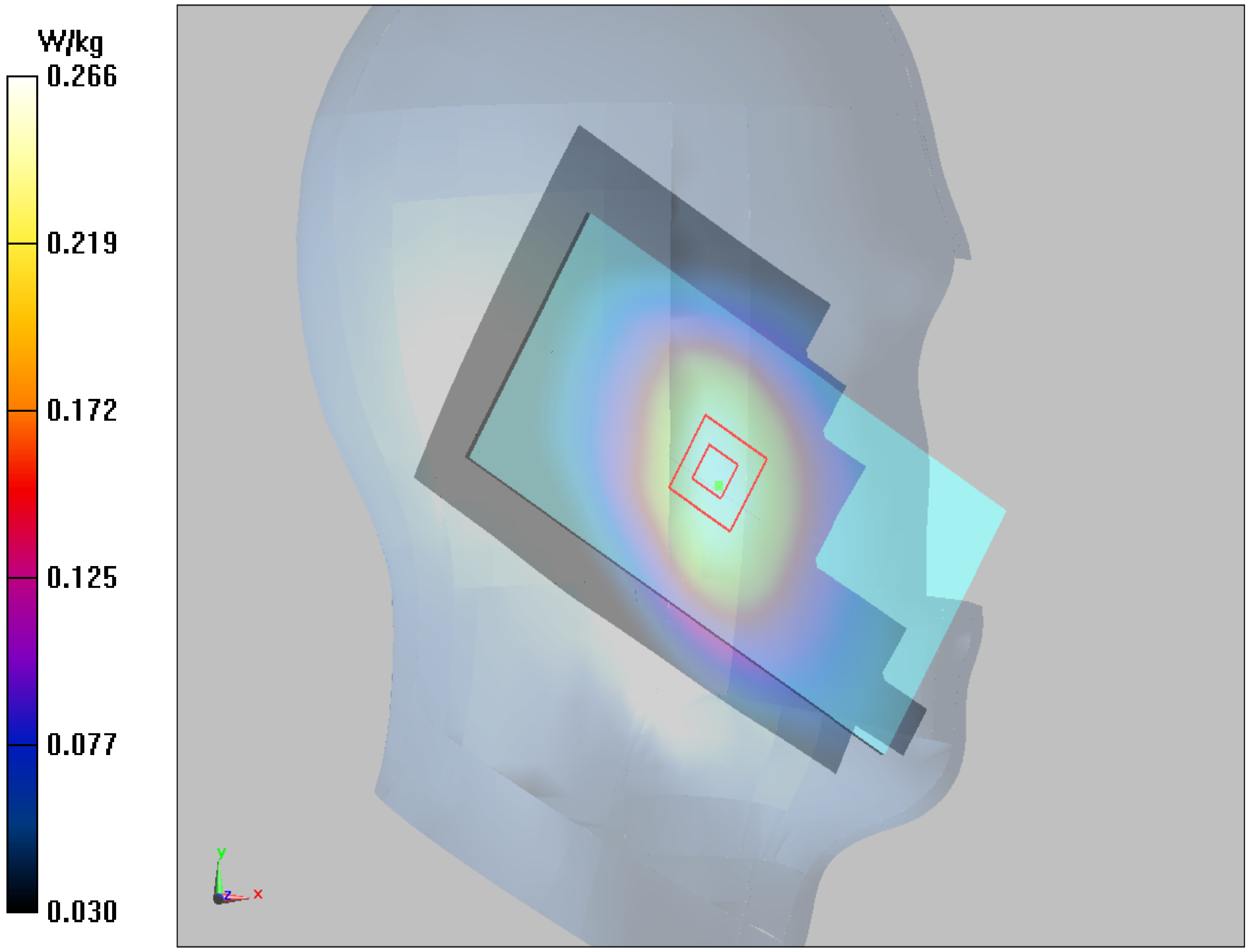
Left Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.349 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.320 W/kg

SAR(1 g) = 0.253 W/kg; SAR(10 g) = 0.190 W/kg

Maximum value of SAR (measured) = 0.266 W/kg



Plot 20 UMTS Band V Back Side Middle (Distance 10mm)

Date: 11/26/2016

Communication System: UID 0, WCDMA (0); Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium parameters used: f = 837 MHz; σ = 1.028 S/m; ε_r = 55.335; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(5.87, 5.87, 5.87); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Back Side Middle/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

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

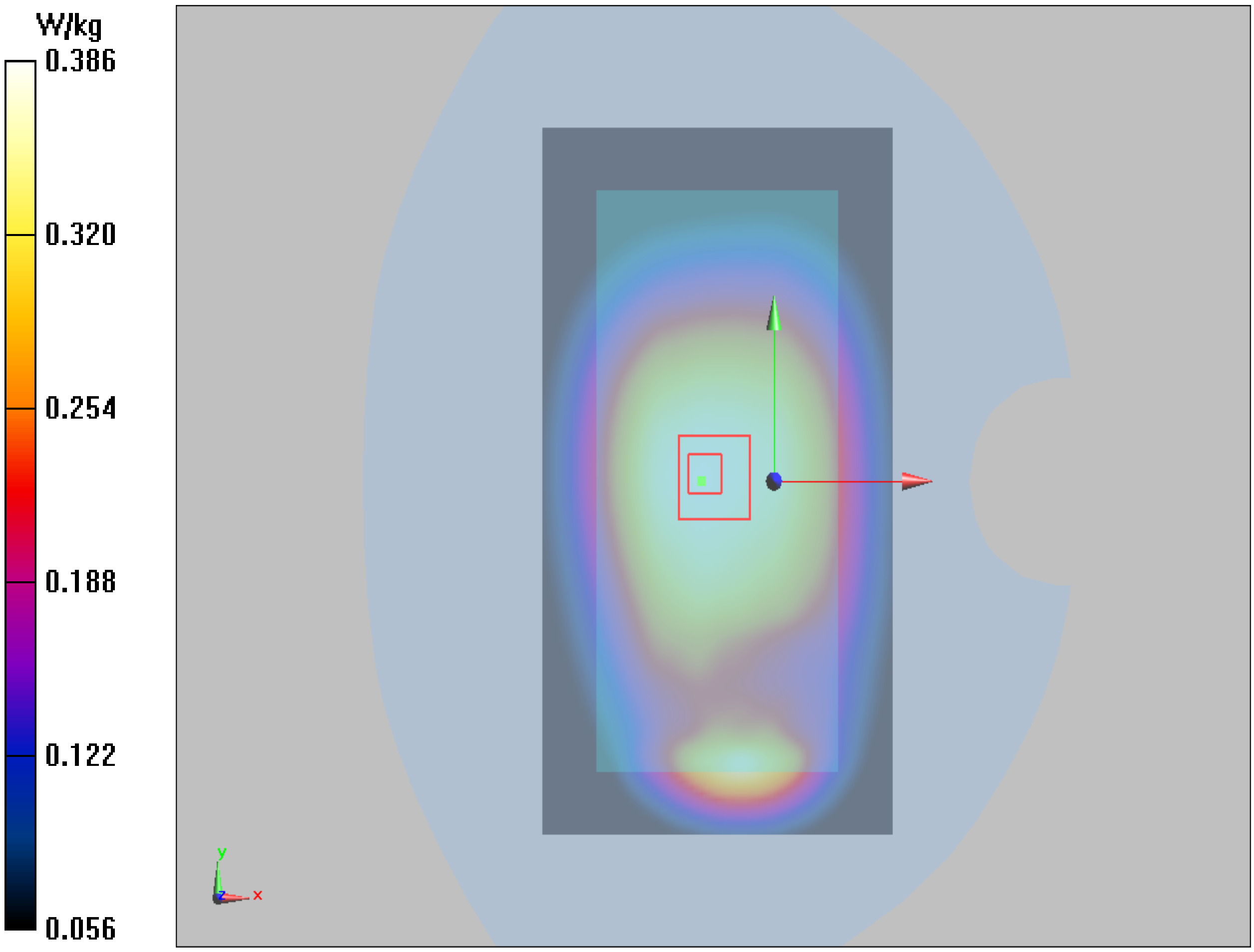
Back Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.93 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.451 W/kg

SAR(1 g) = 0.368 W/kg; SAR(10 g) = 0.286 W/kg

Maximum value of SAR (measured) = 0.386 W/kg



Plot 21 LTE Band 5 1RB Right Cheek Middle

Date: 11/20/2016

Communication System: UID 0, LTE_FDD (0); Frequency: 844 MHz; Duty Cycle: 1:1

Medium parameters used: f = 844 MHz; σ = 0.933 S/m; ε_r = 41.913; ρ = 1000 kg/m^3

Ambient Temperature: 22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Right Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(6.22, 6.22, 6.22); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Right Cheek High/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.361 W/kg

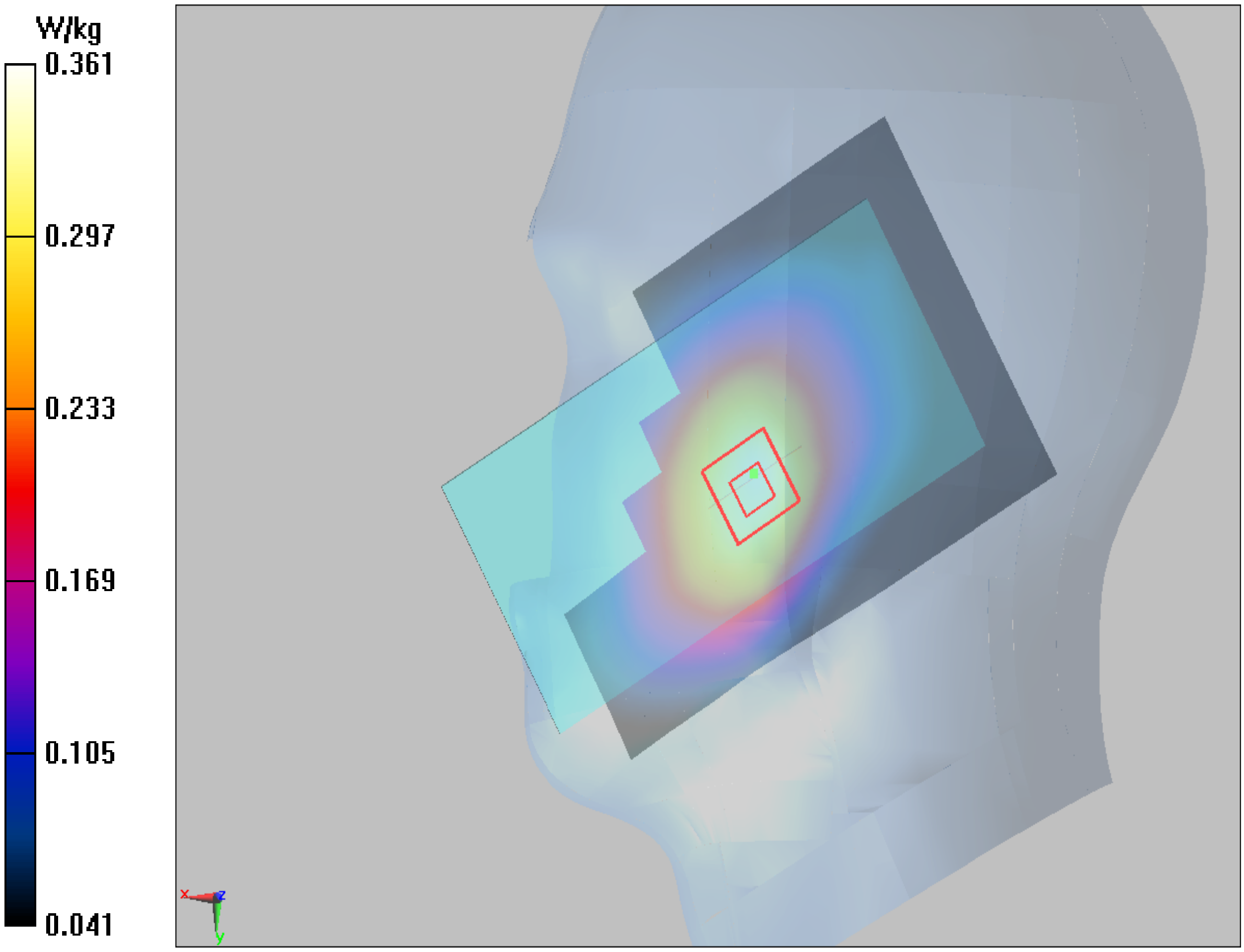
Right Cheek High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.926 V/m; Power Drift = -0.025 dB

Peak SAR (extrapolated) = 0.449 W/kg

SAR(1 g) = 0.338 W/kg; SAR(10 g) = 0.249 W/kg

Maximum value of SAR (measured) = 0.361 W/kg



Plot 22 LTE Band 5 1RB Back Side High (Distance 10mm)

Date: 11/23/2016

Communication System: UID 0, LTE_FDD (0); Frequency: 844 MHz; Duty Cycle: 1:1

Medium parameters used: f = 844 MHz; σ = 1.035 S/m; ε_r = 55.274; ρ = 1000 kg/m^3

Ambient Temperature: 22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(5.87, 5.87, 5.87); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Back Side High/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.462 W/kg

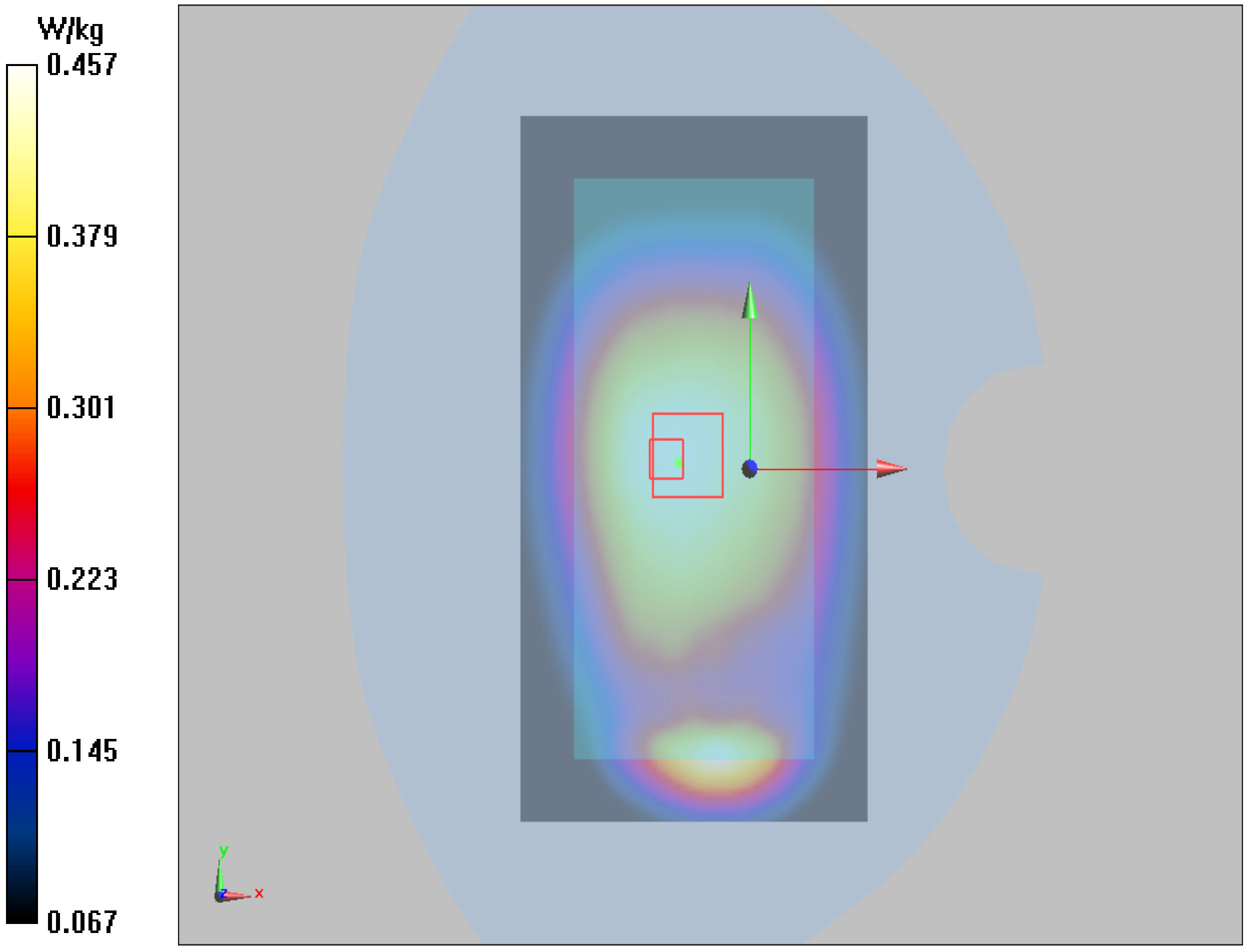
Back Side High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 21.39 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 0.539 W/kg

SAR(1 g) = 0.435 W/kg; SAR(10 g) = 0.336 W/kg

Maximum value of SAR (measured) = 0.457 W/kg



Plot 23 LTE Band 26 1RB Right Cheek High

Date: 11/22/2016

Communication System: UID 0, LTE_FDD (0); Frequency: 841.5 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): f = 841.5 MHz; σ = 0.931 S/m; ε_r = 41.913; ρ = 1000 kg/m^3

Ambient Temperature: 22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Right Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(6.22, 6.22, 6.22); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Right Cheek High/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

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

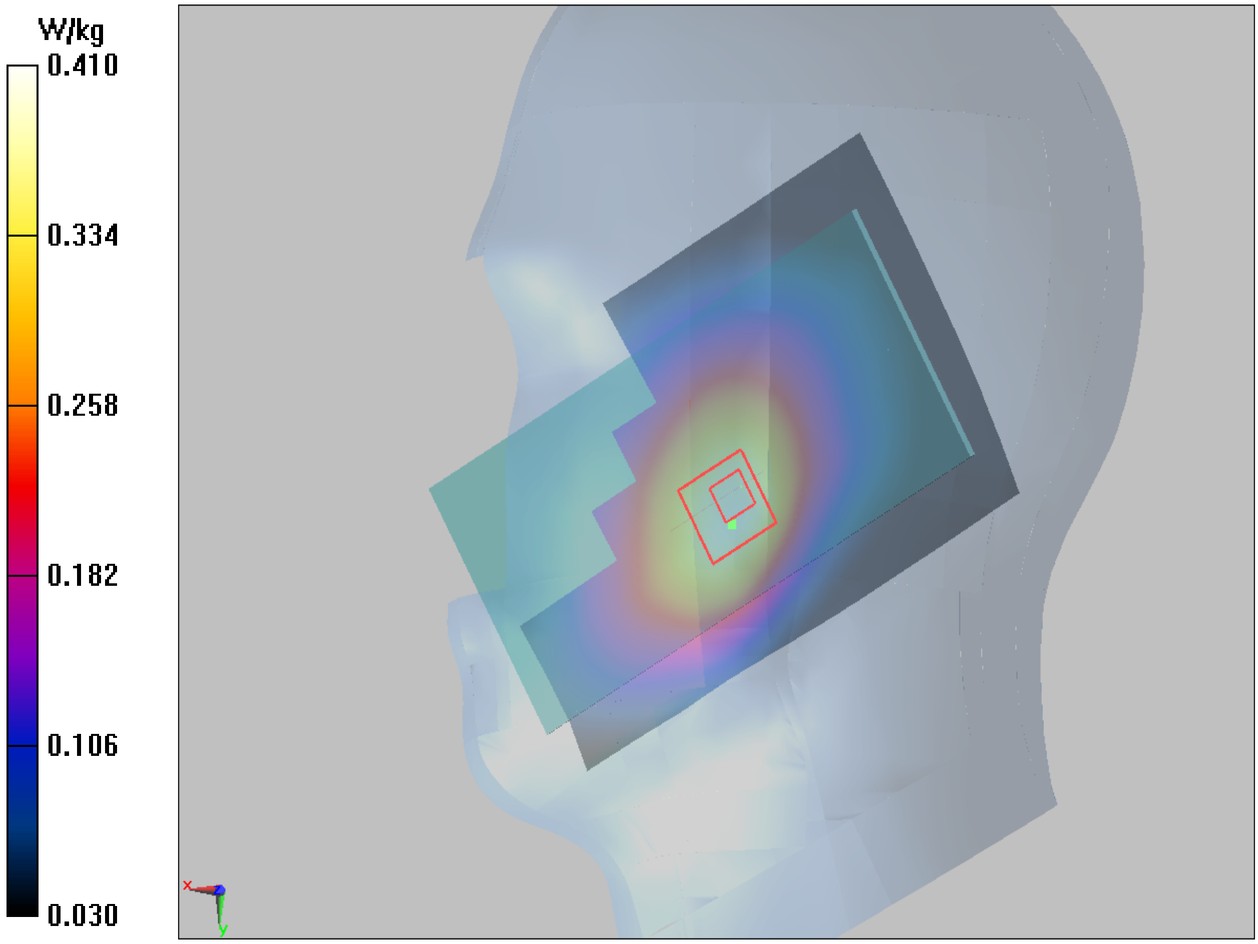
Right Cheek High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.506 V/m; Power Drift = 0.048 dB

Peak SAR (extrapolated) = 0.495 W/kg

SAR(1 g) = 0.382 W/kg; SAR(10 g) = 0.279 W/kg

Maximum value of SAR (measured) = 0.410 W/kg



Plot 24 LTE Band 26 1RB Back Side High (Distance 10mm)

Date: 11/26/2016

Communication System: UID 0, LTE_FDD (0); Frequency: 841.5 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): f = 841.5 MHz; σ = 1.032 S/m; ε_r = 55.298; ρ = 1000 kg/m^3

Ambient Temperature: 22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(5.87, 5.87, 5.87); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Back Side High/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.502 W/kg

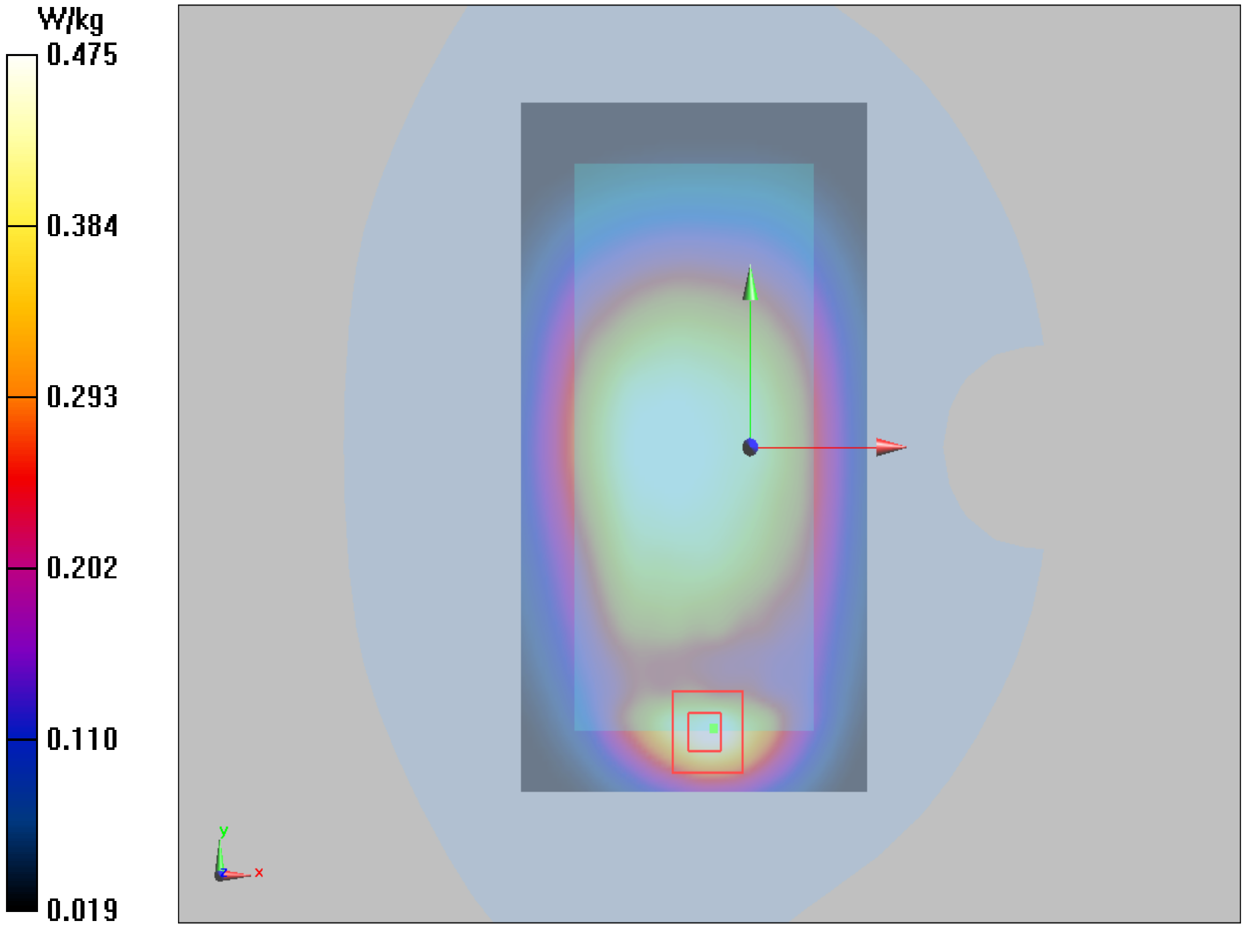
Back Side High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 22.35 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.716 W/kg

SAR(1 g) = 0.430 W/kg; SAR(10 g) = 0.244 W/kg

Maximum value of SAR (measured) = 0.475 W/kg



Plot 25 LTE Band 41 1RB Left Cheek Middle

Date: 12/1/2016

Communication System: UID 0, LTE TDD (0); Frequency: 2603.8 MHz; Duty Cycle: 1:1.57979

Medium parameters used: f = 2604 MHz; σ = 2.036 S/m; ε_r = 39.359; ρ = 1000 kg/m^3

Ambient Temperature: 22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(4.25, 4.25, 4.25); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Left Cheek Middle/Area Scan (71x121x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.289 W/kg

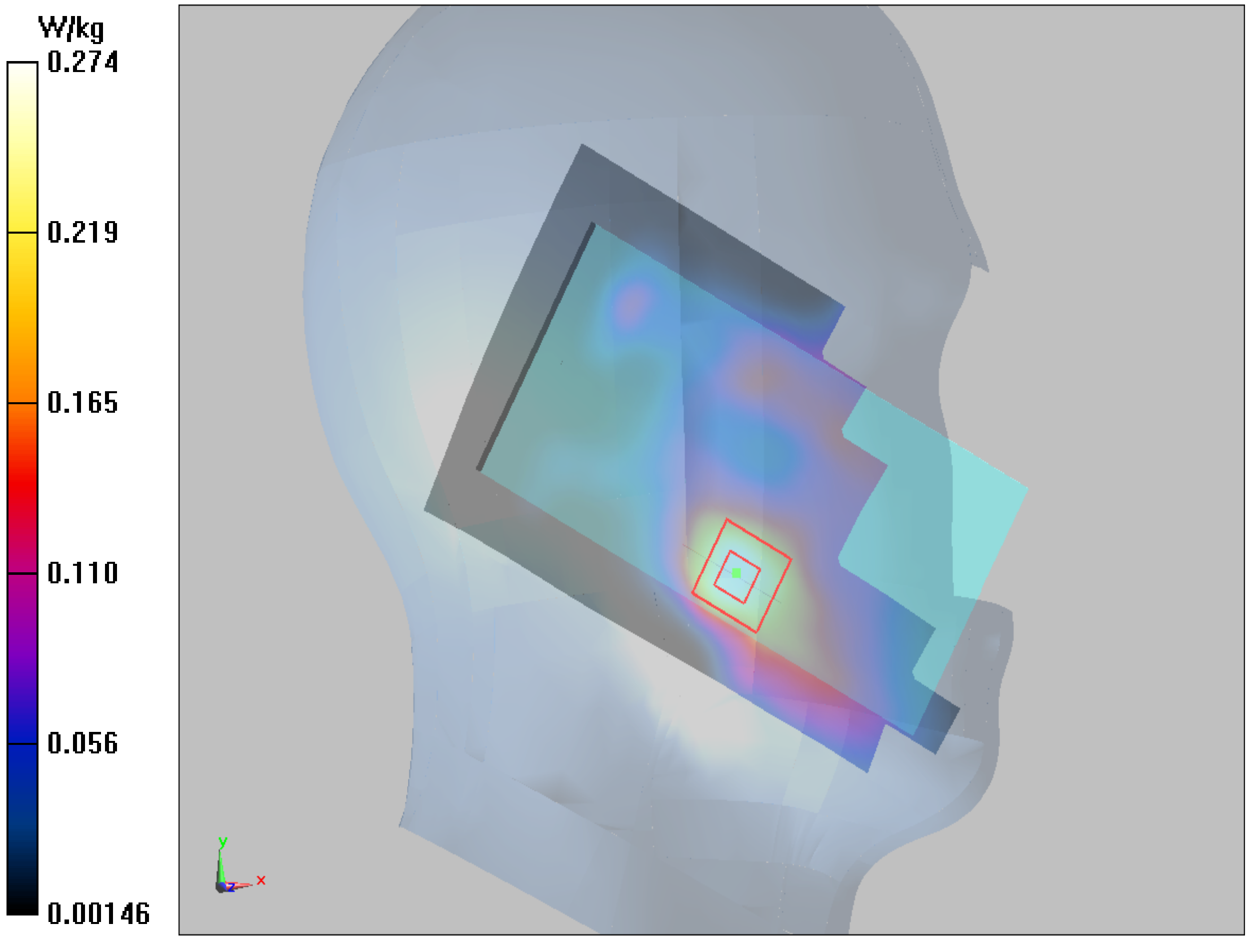
Left Cheek Middle/Zoom Scan (9x15x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.091 V/m; Power Drift = 0.142 dB

Peak SAR (extrapolated) = 0.455 W/kg

SAR(1 g) = 0.252 W/kg; SAR(10 g) = 0.138 W/kg

Maximum value of SAR (measured) = 0.274 W/kg



Plot 26 LTE Band 41 1RB Back Side Middle (Distance 10mm)

Date: 12/3/2016

Communication System: UID 0, LTE_TDD (0); Frequency: 2603.8 MHz; Duty Cycle: 1:1.57979

Medium parameters used: f = 2604 MHz; σ = 2.154 S/m; ε_r = 51.926; ρ = 1000 kg/m^3

Ambient Temperature: 22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(4.21, 4.21, 4.21); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Back Side Middle/Area Scan (71x121x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.775 W/kg

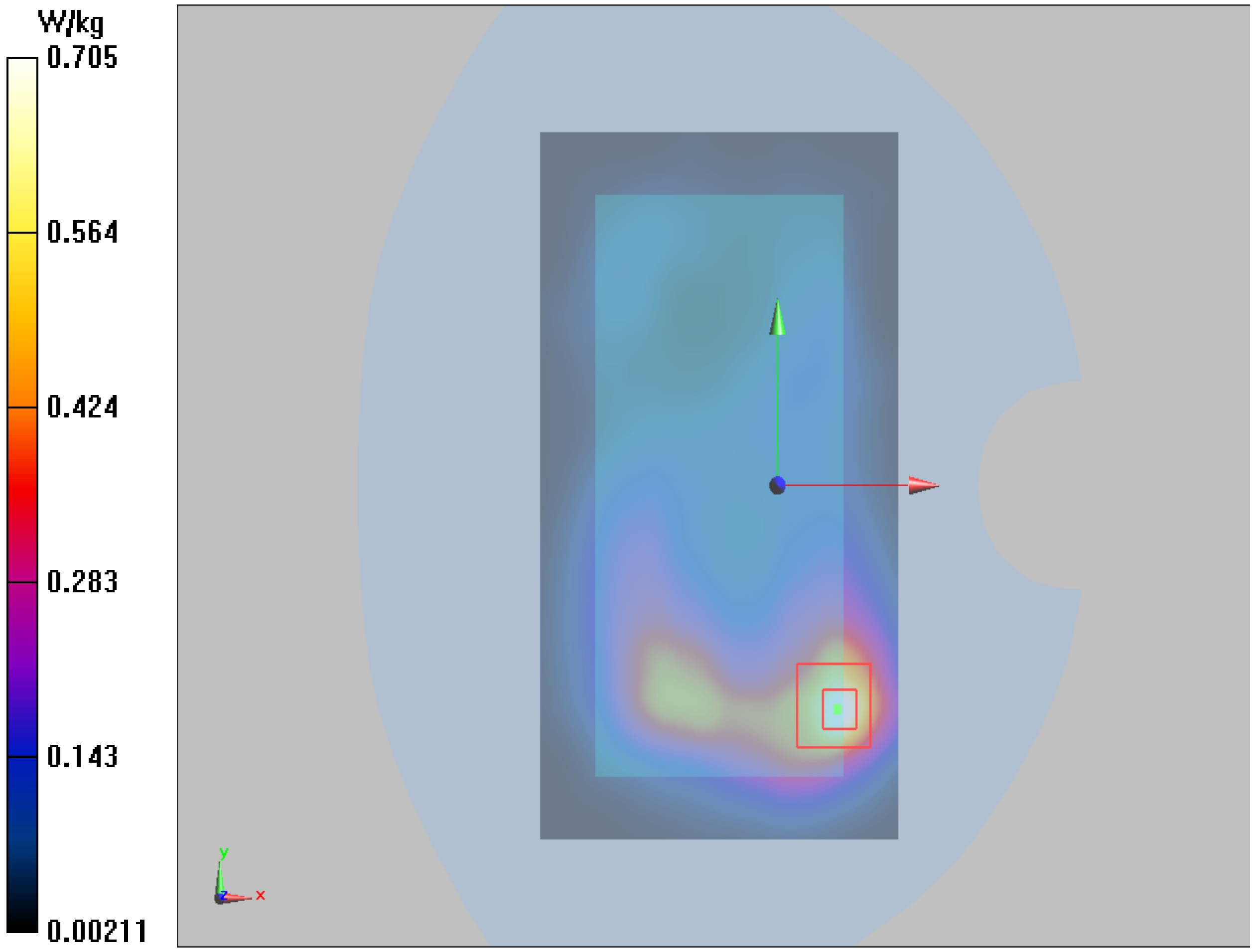
Back Side Middle/Zoom Scan (9x15x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.143 V/m; Power Drift = -0.033 dB

Peak SAR (extrapolated) = 1.27 W/kg

SAR(1 g) = 0.336 W/kg; SAR(10 g) = 0.205 W/kg

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



Wi-Fi-Antenna

Plot 27 802.11b Right Cheek Low

Date: 11/29/2016

Communication System: UID 0, 802.11 b (0); Frequency: 2412 MHz; Duty Cycle: 1:1

Medium parameters used: f = 2412 MHz; σ = 1.818 S/m; ε_r = 40.047; ρ = 1000 kg/m^3

Ambient Temperature: 22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Right Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(4.42, 4.42, 4.42); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Right Cheek Low/Area Scan (71x121x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.372 W/kg

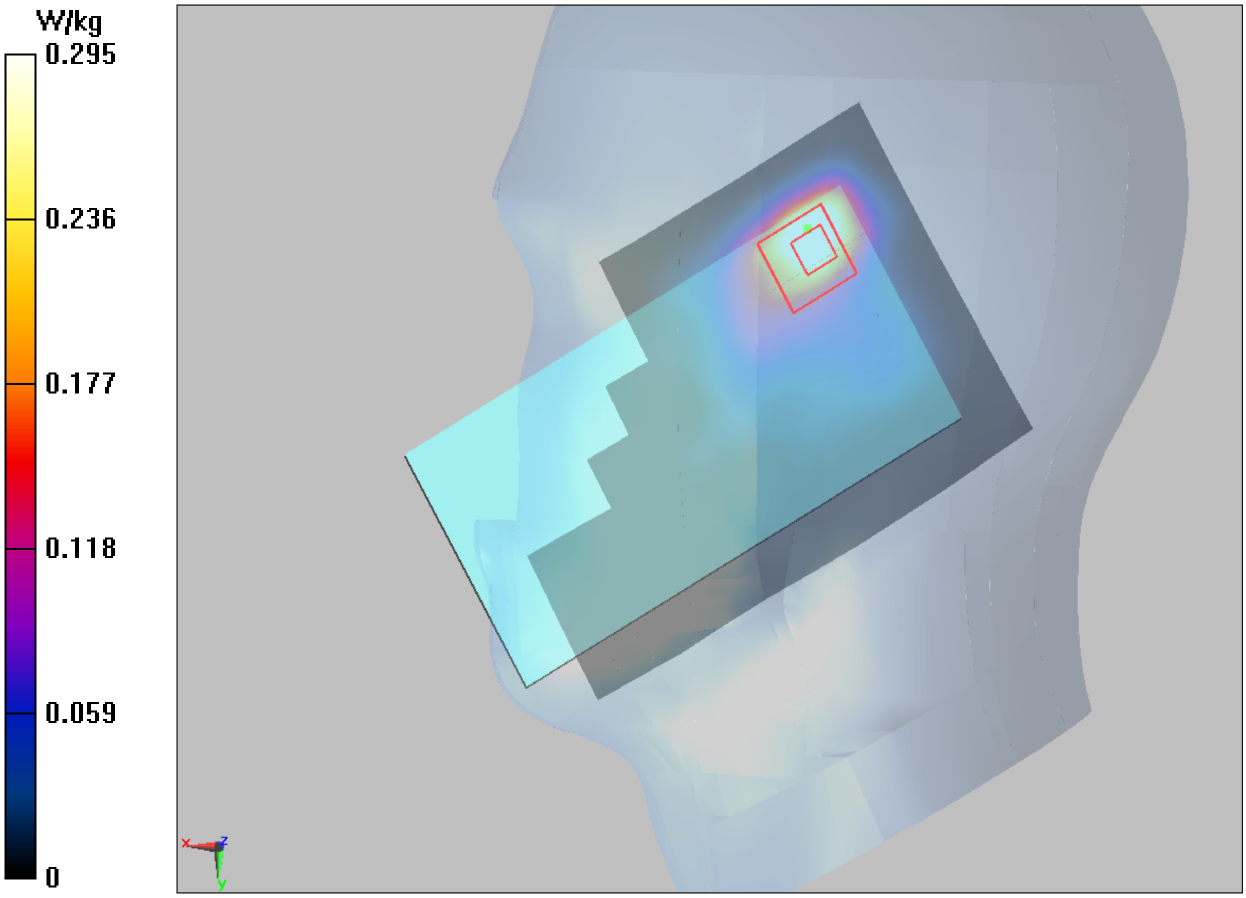
Right Cheek Low/Zoom Scan (9x15x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.049 V/m; Power Drift = -0.15 dB

Peak SAR (extrapolated) = 0.617 W/kg

SAR(1 g) = 0.280 W/kg; SAR(10 g) = 0.130 W/kg

Maximum value of SAR (measured) = 0.295 W/kg



Plot 28 802.11b Back Side Low (Distance 10mm)

Date: 12/2/2016

Communication System: UID 0, 802.11 b (0); Frequency: 2412 MHz; Duty Cycle: 1:1

Medium parameters used: f = 2412 MHz; σ = 1.915 S/m; ε_r = 52.534; ρ = 1000 kg/m^3

Ambient Temperature: 22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(4.36, 4.36, 4.36); Calibrated: 7/27/2016;

Electronics: DAE4 Sn1317; Calibrated: 8/2/2016

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Back Side Low/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.116 W/kg

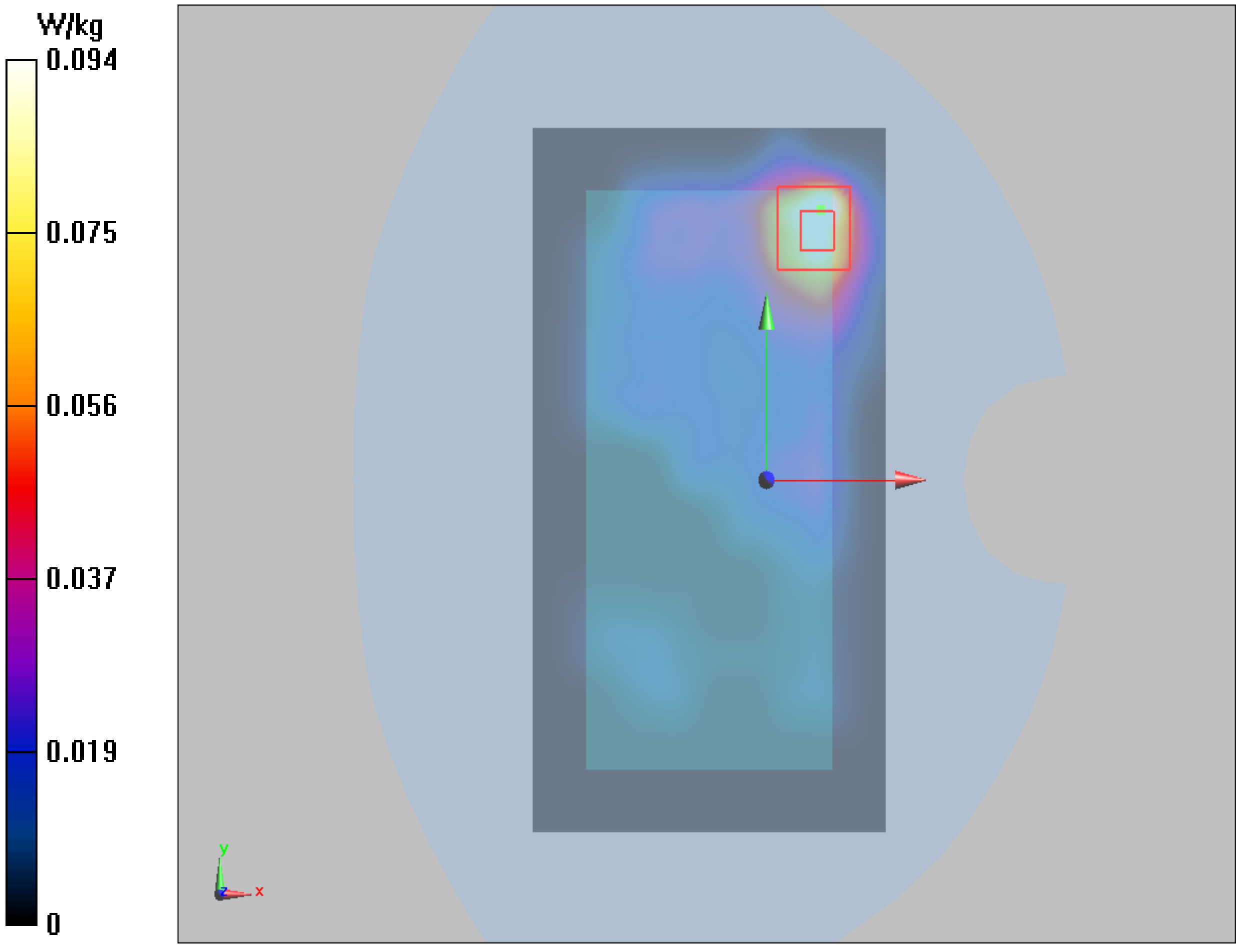
Back Side Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.577 V/m; Power Drift = 0.027 dB

Peak SAR (extrapolated) = 0.172 W/kg

SAR(1 g) = 0.085 W/kg; SAR(10 g) = 0.043 W/kg

Maximum value of SAR (measured) = 0.094 W/kg



ANNEX D: Probe Calibration Certificate

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

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

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

Accreditation No.: **SCS 0108**

Client **TA-SH (Auden)**

Certificate No: **ES3-3189_Jul16**

CALIBRATION CERTIFICATE

Object: ES3DV3 - SN:3189

Calibration procedure(s): QA CAL-01.v9, QA CAL-12.v9, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes

Calibration date: July 27, 2016

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: S5277 (20x)	05-Apr-16 (No. 217-02293)	Apr-17
Reference Probe ES3DV2	SN: 3013	31-Dec-15 (No. ES3-3013_Dec15)	Dec-16
DAE4	SN: 660	23-Dec-15 (No. DAE4-660_Dec15)	Dec-16
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-16)	In house check: Jun-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

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

Issued: July 28, 2016

Certificate No: ES3-3189_Jul16 Page 1 of 11

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

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

Accredited by the Swiss Accreditation Service (SAS) Accreditation No.: **SCS 0108**
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Certificate No: ES3-3189_Jul16 Page 2 of 11

Probe ES3DV3

SN:3189

Manufactured: March 25, 2008
Calibrated: July 27, 2016

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3189

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (μV/(V/m)^2)[A]	0.89	0.75	1.04	± 10.1 %
DCP (mV)[B]	104.1	106.3	102.5	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	176.4	±3.5 %
		Y	0.0	0.0	1.0		196.4	
		Z	0.0	0.0	1.0		191.3	

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

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3189

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
450	43.5	0.87	6.74	6.74	6.74	0.20	1.40	± 13.3 %
750	41.9	0.89	6.63	6.63	6.63	0.72	1.30	± 12.0 %
835	41.5	0.90	6.22	6.22	6.22	0.45	1.56	± 12.0 %
1750	40.1	1.37	5.32	5.32	5.32	0.66	1.29	± 12.0 %
1900	40.0	1.40	5.09	5.09	5.09	0.45	1.57	± 12.0 %
2450	39.2	1.80	4.42	4.42	4.42	0.65	1.42	± 12.0 %
2600	39.0	1.96	4.25	4.25	4.25	0.80	1.26	± 12.0 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.