



SAR TEST REPORT

Applicant ZTE Corporation

FCC ID SRQ-Z-01K

Product LTE/WCDMA/GSM Multi-Mode
Digital Mobile Phone

Model Z-01K

Report No. RXC1708-0286SAR01

Issue Date October 27, 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.

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Table of Contents

1	Test Laboratory.....	4
1.1	Notes of the Test Report	4
1.2	Test facility	4
1.3	Testing Location.....	5
1.4	Laboratory Environment.....	5
2	Statement of Compliance	6
3	Description of Equipment under Test.....	7
4	Test Specification, Methods and Procedures	9
5	Operational Conditions during Test	10
5.1	Test Positions.....	10
5.1.1	Against Phantom Head	10
5.1.2	Body Worn Configuration	10
5.1.3	Phablet SAR test considerations	11
5.2	Measurement Variability	12
5.3	Test Configuration	12
5.3.1	GSM Test Configuration	12
5.3.2	3G Test Configuration	13
5.3.2.1	WCDMA Test Configuration	13
5.3.3	Wi-Fi Test Configuration	17
6	SAR Measurements System Configuration	19
6.1	SAR Measurement Set-up	19
6.2	DASY5 E-field Probe System.....	20
6.3	SAR Measurement Procedure	21
7	Main Test Equipment.....	23
8	Tissue Dielectric Parameter Measurements & System Verification	24
8.1	Tissue Verification	24
8.2	System Performance Check.....	26
9	Normal and Maximum Output Power	28
9.1	GSM Mode	28
9.2	WCDMA Mode	30
9.3	WLAN Mode.....	31
9.4	Bluetooth Mode	34
10	Measured and Reported (Scaled) SAR Results	35
10.1	EUT Antenna Locations	35
10.2	Standalone SAR test exclusion considerations	37
10.3	Measured SAR Results	38
10.4	Simultaneous Transmission Analysis	48
11	Measurement Uncertainty	54
	ANNEX A: Test Layout.....	55
	ANNEX B: System Check Results.....	61
	ANNEX C: Highest Graph Results.....	71



ANNEX D: Probe Calibration Certificate.....	98
ANNEX E: D835V2 Dipole Calibration Certificate.....	109
ANNEX F: D1900V2 Dipole Calibration Certificate.....	117
ANNEX G: D2450V2 Dipole Calibration Certificate	125
ANNEX H: D5GHzV2 Dipole Calibration Certificate	133
ANNEX I: DAE4 Calibration Certificate.....	147
ANNEX J: The EUT Appearances and Test Configuration.....	150

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 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 (Designation number: CN1179, Test Firm Registration Number: 446626)

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-10766)

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

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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

Mode	Highest Reported SAR (W/kg)						
	For Single Screen Mode				For Double Screen Mode		
	1g SAR Head	1g SAR Body-worn (Separation 10mm)	1g SAR Hotspot (Separation 10mm)	Product Specific 10-g SAR (Separation 0mm)	1g SAR Body-worn (Separation 10mm)	1g SAR Hotspot (Separation 10mm)	Product Specific 10-g SAR (Separation 0mm)
GSM 850	0.173	0.451	0.369	NA	0.686	0.686	NA
GSM 1900	0.080	0.596	0.900	NA	0.680	1.493	1.826
WCDMA Band V	0.341	0.603	0.603	NA	0.742	0.742	NA
Wi-Fi (2.4G)	1.485	0.156	0.156	NA	0.218	0.218	NA
Wi-Fi (5G)	0.707	0.125	NA	0.273	0.217	NA	0.449
Date of Testing:	September 28, 2017~ October 18, 2017						
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	For Single Screen Mode				For Double Screen Mode		
	1g SAR Head	1g SAR Body-worn (Separation 10mm)	1g SAR Hotspot (Separation 10mm)	Product Specific 10-g SAR (Separation 0mm)	1g SAR Body-worn (Separation 10mm)	1g SAR Hotspot (Separation 10mm)	Product Specific 10-g SAR (Separation 0mm)
Highest Simultaneous Transmission SAR (W/kg)	1.485	0.759	0.900	0.273	0.959	1.493	1.826
Note: 1. The detail for simultaneous transmission consideration is described in chapter 10.4.							

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

General Technologies

Application Purpose:	Original Grant
EUT Stage	Identical Prototype
Model:	Z-01K
IMEI:	865318030009277
Hardware Version:	udnA
Software Version:	P996A20_DCMV1.0.0B20
Antenna Type:	Internal Antenna
Device Class:	B
Wi-Fi Hotspot	Wi-Fi 2.4G Wi-Fi 5G U-NII-1
Power Class:	GSM 850:4 GSM 1900:1 UMTS Band V:3
Power Level	GSM 850:level 5 GSM 1900:level 0 UMTS Band V:all up bits
EUT Accessory	
Battery	Manufacturer: SCUD (Fujian) Electronics Co., Ltd Model: Li3929T44P8h686049 Power Rating: DC 3.85V, Li-ion

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	824 ~ 849
BT	2.4G	Version 4.2 LE		2402 ~2480
Wi-Fi	2.4G	DSSS,OFDM	802.11b/g/n HT20	2412 ~ 2462
	5G	OFDM	802.11a/n 20M/40M/ ac 20M/40M/80M	5150 ~ 5350 5470 ~ 5725
	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 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.

5.1.3 Phablet SAR test considerations

For smart phones, with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm, that can provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets and support voice calls next to the ear, unless it is confirmed otherwise through KDB inquiries, the following phablet procedures should be applied to evaluate SAR compliance for each applicable wireless modes and frequency band. Devices marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance.

- a) The normally required head and body-worn accessory SAR test procedures for handsets, including hotspot mode, must be applied.
- b) The UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna located at ≤ 25 mm from that surface or edge, in direct contact with a flat phantom, for 10-g extremity SAR / product specific 10-g SAR according to the body-equivalent tissue dielectric parameters in KDB Publication 865664 D01 to address interactive hand use exposure conditions. The 1-g SAR at 5 mm for UMPC mini-tablets is not required. When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg; however, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold. The normal tablet procedures in KDB Publication 616217 are required when the overall diagonal dimension of the device is > 20.0 cm. Hotspot mode SAR is not required when normal tablet procedures are applied. Extremity 10-g SAR is also not required for the front (top) surface of larger form factor full size tablets. The more conservative normal tablet SAR results can be used to support phablet mode 10-g extremity SAR.
- c) The simultaneous transmission operating configurations applicable to voice and data transmissions for both phone and mini-tablet modes must be taken into consideration separately for 1-g and 10-g SAR to determine the simultaneous transmission SAR test exclusion and measurement requirements for the relevant wireless modes and exposure conditions.

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 performed 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 ($\sim 10\%$ 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

The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.

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 $\leq \frac{1}{4}$ 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 required 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 spreading 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 (β_c , β_d), and HS-DPCCH power offset parameters (Δ_{ACK} , Δ_{NACK} , Δ_{CQI}) should be set according to values indicated in the Table below. The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the H-set.

Table 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 $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$
Note2: CM=1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$.
Note3: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period(TF1,TF0) is achieved by setting the signaled gain factors for the reference TFC (TFC1,TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.

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	$\beta_{hs}^{(1)}$	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} , Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.

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

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

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

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

Note 6: β_{ed} 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 3GPP 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

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

5.3.3 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.

6.1 SAR Measurement Set-up

- 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 EX3DV4 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

EX3DV4 Probe Specification

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 μ W/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μ W/g)
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure Scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.



E-field Probe Calibration

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

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

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



temperature probe is used in conjunction with the E-field probe.

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

Where: Δt = Exposure time (30 seconds),

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

ΔT = Temperature increase due to RF exposure.

Or

$$\text{SAR} = I E^2 \sigma / \rho$$

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	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: $\Delta x_{\text{Area}}, \Delta y_{\text{Area}}$	≤ 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 $\leq$ 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 to 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 whose 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.

			≤3GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{zoom} Δy_{zoom}			≤2GHz: ≤8mm 2 – 3GHz: ≤5mm*	3 – 4GHz: ≤5mm* 4 – 6GHz: ≤4mm*
Maximum zoom scan spatial resolution, normal to phantom surface	Uniform grid: $\Delta z_{\text{zoom}}(n)$		≤5mm	3 – 4GHz: ≤4mm 4 – 5GHz: ≤3mm 5 – 6GHz: ≤2mm
	Graded grid	$\Delta z_{\text{zoom}}(1)$: between 1 st two points closest to phantom surface	≤4mm	3 – 4GHz: ≤3mm 4 – 5GHz: ≤2.5mm 5 – 6GHz: ≤2mm
		$\Delta z_{\text{zoom}}(n>1)$: between subsequent points	≤1.5• $\Delta z_{\text{zoom}}(n-1)$	
Minimum zoom scan volume	X, y, z		≥30mm	3 – 4GHz: ≥28mm 4 – 5GHz: ≥25mm 5 – 6GHz: ≥22mm
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 <i>area scan based 1-g SAR estimation</i> 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.				

Volume Scan Procedures

The volume scan is used to 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	2017-05-20	2018-05-19
Dielectric Probe Kit	HP	85070E	US44020115	2017-05-20	2018-05-19
Power meter	Agilent	E4417A	GB41291714	2017-05-21	2018-05-20
Power sensor	Agilent	N8481H	MY50350004	2017-05-21	2018-05-20
Power sensor	Agilent	E9327A	US40441622	2017-05-20	2018-05-19
Dual directional coupler	Agilent	778D-012	50519	2017-05-21	2018-05-20
Dual directional coupler	Agilent	777D	50146	2017-05-20	2018-05-19
Amplifier	INDEXSAR	IXA-020	0401	2017-05-20	2018-05-19
Wideband radio communication tester	R&S	CMW 500	113645	2017-05-20	2018-05-19
BT Base Station Simulator	R&S	CBT	100271	2017-05-14	2018-05-13
E-field Probe	SPEAG	EX3DV4	3677	2017-01-23	2018-01-22
DAE	SPEAG	DAE4	1291	2017-01-19	2018-01-18
Validation Kit 835MHz	SPEAG	D835V2	4d020	2017-08-28	2020-08-27
Validation Kit 1900MHz	SPEAG	D1900V2	5d060	2017-08-26	2020-08-25
Validation Kit 2450MHz	SPEAG	D2450V2	786	2017-08-29	2020-08-28
Validation Kit 5GHz	SPEAG	D5GHzV2	1151	2017-01-05	2020-01-04
Temperature Probe	Tianjin jinming	JM222	AA1009129	2017-05-20	2018-05-19
Hygrothermograph	Anymetr	NT-311	20150731	2017-05-17	2018-05-16

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 $\pm 2^\circ\text{C}$ 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	$\sigma(\text{s/m})$
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
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
Frequency (MHz)		Water (%)	Diethylenglycol monohexylether			Triton X-100		ϵ_r	$\sigma(\text{s/m})$
Head	5250	65.53	17.24			17.23		35.9	4.71
	5600	65.53	17.24			17.23		35.5	5.07
Body	5250	72.52	13.74			13.74		48.9	5.36
	5600	72.52	13.74			13.74		48.5	5.77

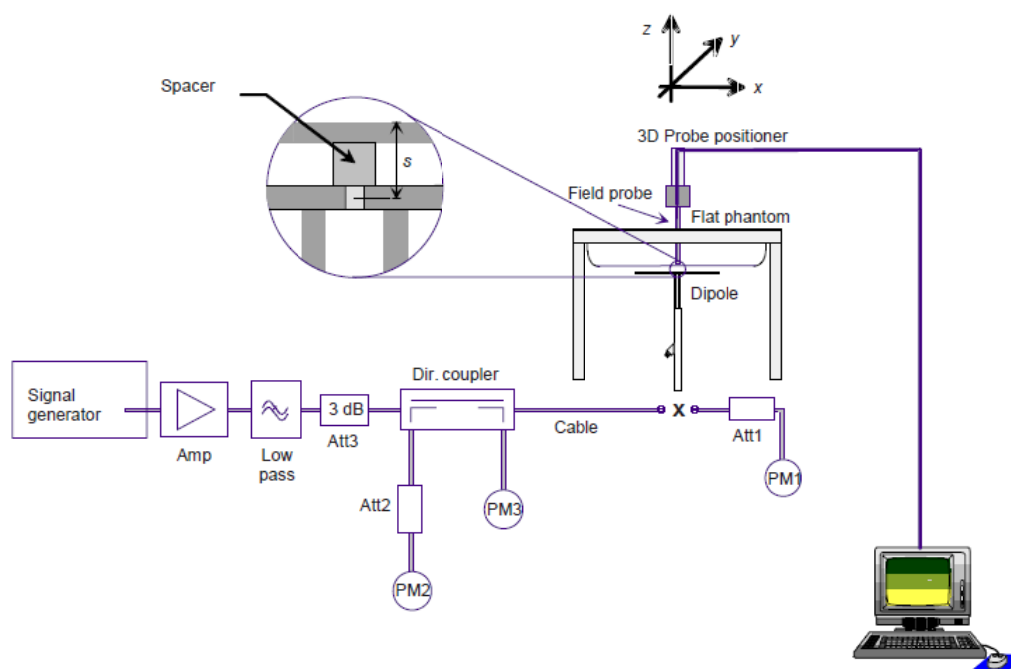
Measurements results

Frequency (MHz)		Test Date	Temp °C	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	9/28/2017	21.5	41.4	0.88	41.5	0.90	-0.24	-2.22
	Body	10/9/2017	21.5	54.2	0.96	55.2	0.97	-1.81	-1.03
1900	Head	9/28/2017	21.5	40.1	1.41	40.0	1.40	0.25	0.71
	Body	10/18/2017	21.5	52.6	1.51	53.3	1.52	-1.31	-0.66
2450	Head	10/9/2017	21.5	38.6	1.81	39.2	1.80	-1.53	0.56
	Body	10/17/2017	21.5	52.5	1.98	52.7	1.95	-0.38	1.54
5250	Head	10/13/2017	21.5	35.5	4.80	35.9	4.71	-1.11	1.91
	Body	10/14/2017	21.5	48.1	5.32	48.9	5.36	-1.64	-0.75
5600	Head	10/13/2017	21.5	34.2	5.21	35.5	5.07	-3.66	2.76
	Body	10/14/2017	21.5	47.9	5.78	48.5	5.77	-1.24	0.17
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

**System Check results**

Frequency (MHz)		Test Date	Temp °C	250mW/ 100mW Measured SAR _{1g/10g} (W/kg)	1W Normalized SAR _{1g/10g} (W/kg)	1W Target SAR _{1g/10g} (W/kg)	Δ % (Limit ±10%)	Plot No.
835	Head	9/28/2017	21.5	2.44 (1g)	9.76	9.45	3.28	1
	Body	10/9/2017	21.5	2.41 (1g)	9.64	9.75	-1.13	2
1900	Head	9/28/2017	21.5	9.88 (1g)	39.52	40.10	-1.45	3
	Body	10/18/2017	21.5	9.93 (1g)	39.72	39.50	0.56	4
				5.25 (10g)	21.00	20.80	0.96	
2450	Head	10/9/2017	21.5	13.7 (1g)	54.80	52.60	4.18	5
	Body	10/17/2017	21.5	12.5 (1g)	50.00	50.80	-1.57	6
5250	Head	10/13/2017	21.5	7.87 (1g)	31.48	78.40	0.38	7
	Body	10/14/2017	21.5	7.46 (1g)	29.84	75.60	-1.32	8
				2.26 (10g)	22.60	21.40	5.61	
5600	Head	10/13/2017	21.5	7.97 (1g)	30.68	81.50	-2.21	9
	Body	10/14/2017	21.5	8.10 (1g)	32.40	80.20	1.00	10
				2.11 (10g)	21.10	22.30	-5.38	
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)		34.03	34.09	34.05	9.03	25.00	25.06	25.02	34.50
GPRS (GMSK)	1Txslot	33.75	34.04	33.95	9.03	24.72	25.01	24.92	34.50
	2Txslots	30.39	30.41	30.45	6.02	24.37	24.39	24.43	31.50
	3Txslots	28.57	28.59	28.74	4.26	24.31	24.33	24.48	29.50
	4Txslots	26.64	26.63	26.68	3.01	23.63	23.62	23.67	27.50
EGPRS (GMSK)	1Txslot	33.68	33.99	33.90	9.03	24.65	24.96	24.87	34.50
	2Txslots	30.31	30.33	30.41	6.02	24.29	24.31	24.39	31.50
	3Txslots	28.51	28.55	28.66	4.26	24.25	24.29	24.40	29.50
	4Txslots	26.61	26.66	26.72	3.01	23.60	23.65	23.71	27.50
EGPRS (8PSK)	1Txslot	27.03	27.04	27.07	9.03	18.00	18.01	18.04	27.50
	2Txslots	24.88	24.83	24.94	6.02	18.86	18.81	18.92	25.50
	3Txslots	22.92	22.97	23.01	4.26	18.66	18.71	18.75	23.50
	4Txslots	22.44	22.39	22.42	3.01	19.43	19.38	19.41	23.50
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)		31.04	31.05	31.03	9.03	22.01	22.02	22.00	32.00
GPRS (GMSK)	1Txslot	31.01	31.02	31.05	9.03	21.98	21.99	22.02	32.00
	2Txslots	27.68	27.59	27.71	6.02	21.66	21.57	21.69	29.00
	3Txslots	26.67	26.69	26.65	4.26	22.41	22.43	22.39	27.00
	4Txslots	24.08	24.02	24.03	3.01	21.07	21.01	21.02	25.00
EGPRS (GMSK)	1Txslot	30.66	30.67	30.61	9.03	21.63	21.64	21.58	32.00
	2Txslots	27.53	27.41	27.46	6.02	21.51	21.39	21.44	29.00
	3Txslots	26.40	26.44	26.41	4.26	22.14	22.18	22.15	27.00
	4Txslots	24.02	24.01	23.91	3.01	21.01	21.00	20.90	25.00
EGPRS (8PSK)	1Txslot	26.53	26.39	26.29	9.03	17.50	17.36	17.26	27.50
	2Txslots	23.60	23.42	23.34	6.02	17.58	17.40	17.32	24.50



3Txslots	21.57	21.45	21.26	4.26	17.31	17.19	17.00	22.50
4Txslots	20.05	19.98	19.77	3.01	17.04	16.97	16.76	20.50

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

1. Standalone: GSM 850 GMSK (GPRS) mode with 1 time slot for Max power, GSM 1900 GMSK (GPRS) mode with 3 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(dBm)			
Tx Channel		4132	4183	4233	Tune-up Limit (dBm)
Frequency(MHz)		826.4	836.6	846.6	
RMC	12.2kbps	24.28	24.73	24.66	25.00
	64kbps	24.21	24.59	24.60	25.00
	144kbps	24.20	24.58	24.50	25.00
	384kbps	24.19	24.57	24.49	25.00
HSDPA	Sub 1	24.18	24.56	24.50	25.00
	Sub 2	24.12	24.57	24.49	25.00
	Sub 3	23.61	24.17	24.07	24.50
	Sub 4	23.62	24.16	24.09	24.50
HSUPA	Sub 1	24.11	24.65	24.58	25.00
	Sub 2	22.36	22.81	22.74	23.00
	Sub 3	23.18	23.63	23.56	24.00
	Sub 4	22.37	22.82	22.75	23.00
	Sub 5	24.16	24.61	24.54	25.00
DC-HSDPA	Sub 1	24.15	24.60	24.53	25.00
	Sub 2	24.24	24.58	24.52	25.00
	Sub 3	23.73	24.07	24.01	24.50
	Sub 4	23.72	24.06	24.00	24.50

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 $\leq \frac{1}{4}$ 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 WLAN Mode

Wi-Fi 2.4G	Channel	Frequency (MHz)	Average Conducted Power (dBm) for Data Rates (bps)	Tune-up Limit (dBm)	TX Power Setting level
Mode			1M		
802.11b	1	2412	17.81	18.50	16
	6	2437	17.39	18.50	16
	11	2462	18.12	18.50	16
Mode	Channel	Frequency (MHz)	6M	Tune-up Limit (dBm)	TX Power Setting level
802.11g	1	2412	14.36	15.50	15
	6	2437	14.14	15.50	15
	11	2462	14.41	15.50	15
Mode	Channel	Frequency (MHz)	6.5M	Tune-up Limit (dBm)	TX Power Setting level
802.11n (HT20)	1	2412	13.24	14.50	14
	6	2437	13.02	14.50	14
	11	2462	13.44	14.50	14

Note: Initial test configuration is 802.11b mode, since the highest maximum output power.

Wi-Fi 5G	Channel	Frequency (MHz)	Average Conducted Power (dBm) Data Rate (bps)	Tune-up Limit (dBm)	TX Power Setting level
Mode			6M		
802.11a	36	5180	11.55	12.50	14
	40	5200	11.49	12.50	14
	44	5220	11.55	12.50	14
	48	5240	11.65	12.50	14
	52	5260	11.66	12.50	14
	56	5280	11.69	12.50	14
	60	5300	11.70	12.50	14
	64	5320	11.79	12.50	14
	100	5500	11.84	12.50	14
	116	5580	11.78	12.50	14
	132	5660	11.17	12.50	14
	140	5700	10.95	12.50	14



Mode	Channel	Frequency (MHz)	MCS0	Tune-up Limit (dBm)	TX Power Setting level
802.11n (HT20)	36	5180	10.41	12.00	13
	40	5200	10.47	12.00	13
	44	5220	10.57	12.00	13
	48	5240	10.58	12.00	13
	52	5260	10.59	12.00	13
	56	5280	10.38	12.00	13
	60	5300	10.61	12.00	13
	64	5320	10.73	12.00	13
	100	5500	10.83	12.00	13
	116	5580	10.60	12.00	13
	132	5660	9.89	12.00	13
	140	5700	9.86	12.00	13
Mode	Channel	Frequency (MHz)	MCS0	Tune-up Limit (dBm)	TX Power Setting level
802.11n (HT40)	38	5190	10.92	12.00	13
	46	5270	10.90	12.00	13
	54	5270	11.04	12.00	13
	62	5310	10.88	12.00	13
	102	5510	10.92	12.00	13
	110	5550	10.45	12.00	13
	118	5590	10.18	12.00	13
	134	5670	10.43	12.00	13
Mode	Channel	Frequency (MHz)	MCS0	Tune-up Limit (dBm)	TX Power Setting level
802.11ac (HT20)	36	5180	7.62	9.00	10
	40	5200	7.35	9.00	10
	44	5220	7.56	9.00	10
	48	5240	7.58	9.00	10
	52	5260	7.78	9.00	10
	56	5280	7.52	9.00	10
	60	5300	7.81	9.00	10
	64	5320	7.87	9.00	10
	100	5500	7.96	9.00	10
	116	5580	7.59	9.00	10
	132	5660	7.12	9.00	10
	140	5700	7.00	9.00	10



Mode	Channel	Frequency (MHz)	MCS0	Tune-up Limit (dBm)	TX Power Setting level
802.11ac (HT40)	38	5190	8.25	9.00	10
	46	5270	8.17	9.00	10
	54	5270	8.62	9.00	10
	62	5310	8.89	9.00	10
	102	5510	8.77	9.00	10
	110	5550	7.46	9.00	10
	118	5590	7.31	9.00	10
	134	5670	8.22	9.00	10
Mode	Channel	Frequency (MHz)	MCS0	Tune-up Limit (dBm)	TX Power Setting level
802.11ac (HT80)	42	5210	7.53	9.00	10
	58	5290	7.89	9.00	10
	106	5530	7.89	9.00	10
	122	5610	7.48	9.00	10

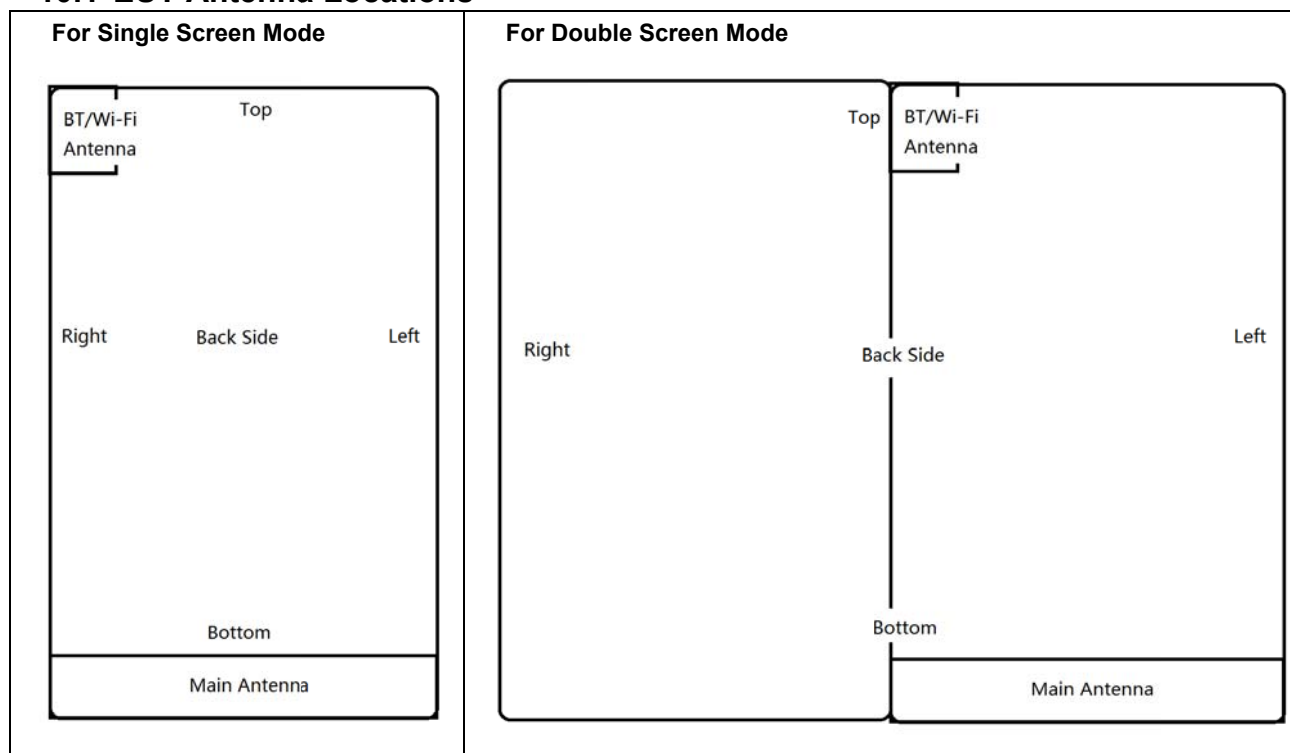
Note. Initial test configuration is 802.11a mode, since the highest maximum output power.

9.4 Bluetooth Mode

BT	Conducted Power(dBm)			Tune-up Limit (dBm)
	Channel/Frequency(MHz)			
	Ch 0/2402 MHz	Ch 39/2441 MHz	Ch 78/2480 MHz	
GFSK	4.49	4.27	4.00	5.00
π/4DQPSK	1.22	1.19	0.82	5.00
8DPSK	1.28	1.25	0.64	5.00
BLE	Ch 0/2402 MHz	Ch 19/2440 MHz	Ch 39/2480 MHz	Tune-up Limit (dBm)
GFSK	-5.22	-5.44	-4.99	-4.00

10 Measured and Reported (Scaled) SAR Results

10.1 EUT Antenna Locations



For Single Screen Mode						
Overall (Length x Width): 151 mm x 69 mm						
Overall Diagonal: 162 mm/Display Diagonal: 131mm						
Distance of the Antenna to the EUT surface/edge						
Antenna	Back Side	Front side	Left Edge	Right Edge	Top Edge	Bottom Edge
Main-Antenna	0	0	0	0	>25	0
BT/Wi-Fi Antenna	0	0	>25	0	0	>25
Hotspot mode, Positions for SAR tests						
Mode	Back Side	Front side	Left Edge	Right Edge	Top Edge	Bottom Edge
Main-Antenna	Yes	Yes	Yes	Yes	N/A	Yes
BT/Wi-Fi Antenna	Yes	Yes	N/A	Yes	Yes	N/A
For Double Screen Mode						
Overall (Length x Width): 151 mm x 137 mm						
Overall Diagonal: 200 mm/Display Diagonal: 175mm						
Distance of the Antenna to the EUT surface/edge						
Antenna	Back Side	Front side	Left Edge	Right Edge	Top Edge	Bottom Edge
Main-Antenna	0	0	0	>25	>25	0
BT/Wi-Fi Antenna	0	0	>25	>25	0	>25
Hotspot mode, Positions for SAR tests						
Mode	Back Side	Front side	Left Edge	Right Edge	Top Edge	Bottom Edge
Main-Antenna	Yes	Yes	Yes	N/A	N/A	Yes



BT/Wi-Fi Antenna	Yes	Yes	N/A	N/A	Yes	N/A
Note: 1. When the voice starts working, it is automatically locked in the single screen mode. 2. Per KDB 941225 D06, when the overall device length and width are $\geq 9\text{cm} \times 5\text{cm}$, 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. 3. For smart phones with an overall diagonal dimension is 162mm. Per KDB 648474 D04, for smart phones with a display diagonal dimension $> 15.0\text{ cm}$ or an overall diagonal dimension $> 16.0\text{ cm}$, 10-g extremity SAR must be tested as a phablet to determine SAR compliance.						

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:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR

- $f(\text{GHz})$ 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	5.00	2480	1.00	No
Body-worn	10	5.00	2480	0.50	No
Hotspot	10	5.00	2480	0.50	No
Extremity	5	5.00	2480	1.00	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 for Single Screen Mode											
Left Cheek	standard	190/836.6	GSM	1:8.3	34.50	34.09	-0.090	0.157	1.10	0.173	11
Left Tilt	standard	190/836.6	GSM	1:8.3	34.50	34.09	0.030	0.063	1.10	0.069	/
Right Cheek	standard	190/836.6	GSM	1:8.3	34.50	34.09	0.090	0.126	1.10	0.138	/
Right Tilt	standard	190/836.6	GSM	1:8.3	34.50	34.09	-0.070	0.053	1.10	0.059	/
Body-worn for Single Screen Mode (Distance 10mm)											
Back Side	standard	190/836.6	GSM	1:8.3	34.50	34.09	0.020	0.355	1.10	0.390	/
Front Side	standard	190/836.6	GSM	1:8.3	34.50	34.09	-0.070	0.410	1.10	0.451	12
Hotspot for Single Screen Mode (Distance 10mm)											
Back Side	standard	190/836.6	1Txslot	1:8.3	34.50	34.04	0.040	0.267	1.11	0.297	/
Front Side	standard	190/836.6	1Txslot	1:8.3	34.50	34.04	0.080	0.332	1.11	0.369	13
Left Edge	standard	190/836.6	1Txslot	1:8.3	34.50	34.04	-0.060	0.240	1.11	0.267	/
Right Edge	standard	190/836.6	1Txslot	1:8.3	34.50	34.04	0.010	0.240	1.11	0.267	/
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	190/836.6	1Txslot	1:8.3	34.50	34.04	0.040	0.244	1.11	0.271	/
Body-worn & Hotspot for Double Screen Mode (Distance 10mm)											
Back Side	standard	190/836.6	1Txslot	1:8.3	34.50	34.04	-0.010	0.617	1.11	0.686	14
Front Side	standard	190/836.6	1Txslot	1:8.3	34.50	34.04	-0.030	0.566	1.11	0.629	/
Left Edge	standard	190/836.6	1Txslot	1:8.3	34.50	34.04	0.027	0.118	1.11	0.131	/
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	190/836.6	1Txslot	1:8.3	34.50	34.04	0.010	0.553	1.11	0.615	/

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.

5. 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 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 for Single Screen Mode											
Left Cheek	standard	661/1880	GSM	1:8.3	32.00	31.05	0.060	0.039	1.24	0.049	/
Left Tilt	standard	661/1880	GSM	1:8.3	32.00	31.05	0.010	0.046	1.24	0.057	/
Right Cheek	standard	661/1880	GSM	1:8.3	32.00	31.05	0.020	0.064	1.24	0.080	15
Right Tilt	standard	661/1880	GSM	1:8.3	32.00	31.05	-0.070	0.022	1.24	0.028	/
Body-worn for Single Screen Mode (Distance 10mm)											
Back Side	standard	661/1880	GSM	1:8.3	32.00	31.05	-0.110	0.279	1.24	0.347	/
Front Side	standard	661/1880	GSM	1:8.3	32.00	31.05	-0.060	0.479	1.24	0.596	16
Hotspot for Single Screen Mode (Distance 10mm)											
Back Side	standard	661/1880	3Txslots	1:2.77	27.00	26.69	0.022	0.285	1.07	0.306	/
Front Side	standard	661/1880	3Txslots	1:2.77	27.00	26.69	0.030	0.582	1.07	0.625	/
Left Edge	standard	661/1880	3Txslots	1:2.77	27.00	26.69	0.180	0.145	1.07	0.156	/
Right Edge	standard	661/1880	3Txslots	1:2.77	27.00	26.69	0.057	0.020	1.07	0.021	/
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	810/1909.8	3Txslots	1:2.77	27.00	26.65	0.032	0.821	1.08	0.890	/
		661/1880	3Txslots	1:2.77	27.00	26.69	0.045	0.838	1.07	0.900	17
		512/1850.2	3Txslots	1:2.77	27.00	26.67	0.021	0.809	1.08	0.873	/
Body-worn & Hotspot for Double Screen Mode (Distance 10mm)											
Back Side	standard	661/1880	3Txslots	1:2.77	27.00	26.69	0.049	0.633	1.07	0.680	18
Front Side	standard	661/1880	3Txslots	1:2.77	27.00	26.69	0.043	0.441	1.07	0.474	/
Left Edge	standard	661/1880	3Txslots	1:2.77	27.00	26.69	0.026	0.143	1.07	0.154	/
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	810/1909.8	3Txslots	1:2.77	27.00	26.65	0.020	1.220	1.08	1.322	/
		661/1880	3Txslots	1:2.77	27.00	26.69	0.041	1.390	1.07	1.493	19
		512/1850.2	3Txslots	1:2.77	27.00	26.67	0.036	1.290	1.08	1.392	/
Bottom Edge	Repeated	661/1880	3Txslots	1:2.77	27.00	26.69	-0.017	1.304	1.07	1.400	/
Test Position	Cover Type	Channel/ Frequency (MHz)	Time slot	Duty Cycle	Tune-up limit (dBm)	Conducted Power (dBm)	Drift (dB)	Measured SAR _{10g} (W/kg)	Scaling Factor	Reported SAR _{10g} (W/kg)	Plot No.
Product specific SAR for Double Screen Mode (Distance 0mm)											
Bottom Edge	standard	661/1880	3Txslots	1:2.77	27.00	26.69	0.030	1.700	1.07	1.826	20

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.

5. 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.

Measurement Variability				
Test Position	Channel/ Frequency(MHz)	MAX Measured SAR _{1g} (W/kg)	1 st Repeated SAR _{1g} (W/kg)	Ratio
Bottom Edge	661/1880	1.304	1.390	1.07

Note: 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.

2) A second repeated measurement was performed 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



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 for Single Screen Mode											
Left Cheek	standard	4183/836.6	RMC 12.2K	1:1	25.00	24.73	-0.055	0.320	1.06	0.341	21
Left Tilt	standard	4183/836.6	RMC 12.2K	1:1	25.00	24.73	-0.060	0.147	1.06	0.156	/
Right Cheek	standard	4183/836.6	RMC 12.2K	1:1	25.00	24.73	0.190	0.242	1.06	0.258	/
Right Tilt	standard	4183/836.6	RMC 12.2K	1:1	25.00	24.73	0.170	0.173	1.06	0.184	/
Body-worn & Hotspot for Single Screen Mode (Distance 10mm)											
Back Side	standard	4183/836.6	RMC 12.2K	1:1	25.00	24.73	-0.021	0.396	1.06	0.421	/
Front Side	standard	4183/836.6	RMC 12.2K	1:1	25.00	24.73	0.070	0.567	1.06	0.603	22
Left Edge	standard	4183/836.6	RMC 12.2K	1:1	25.00	24.73	-0.050	0.300	1.06	0.319	/
Right Edge	standard	4183/836.6	RMC 12.2K	1:1	25.00	24.73	-0.120	0.099	1.06	0.105	/
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	25.00	24.73	-0.024	0.380	1.06	0.404	/
Body-worn & Hotspot for Double Screen Mode (Distance 10mm)											
Back Side	standard	4183/836.6	RMC 12.2K	1:1	25.00	24.73	0.160	0.697	1.06	0.742	23
Front Side	standard	4183/836.6	RMC 12.2K	1:1	25.00	24.73	-0.020	0.618	1.06	0.658	/
Left Edge	standard	4183/836.6	RMC 12.2K	1:1	25.00	24.73	0.180	0.085	1.06	0.090	/
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	4183/836.6	RMC 12.2K	1:1	25.00	24.73	0.050	0.552	1.06	0.587	/

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

- 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).
- When the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq \frac{1}{4}$ 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
- 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.
- 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 4: Wi-Fi (2.4G)

Test Position	Cover Type	Channel/Frequency (MHz)	Mode 802.11b	Duty Cycle	Tune-up limit (dBm)	Conducted Power (dBm)	Drift (dB)	Area Scan Max.SAR (W/Kg)	Measured SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)	Plot No.
Head SAR for Single Screen Mode												
Left Cheek	standard	11/2462	DSSS	1:1	18.50	18.12	0.056	0.774	0.989	1.09	1.079	/
		6/2437	DSSS	1:1	18.50	17.39	0.120	0.935	1.150	1.29	1.485	24
		1/2412	DSSS	1:1	18.50	17.81	0.021	0.797	0.985	1.17	1.155	/
Left Tilt	standard	11/2462	DSSS	1:1	18.50	18.12	0.032	0.833	0.902	1.09	0.984	/
		6/2437	DSSS	1:1	18.50	17.39	0.170	0.907	0.979	1.29	1.264	/
		1/2412	DSSS	1:1	18.50	17.81	0.085	0.863	0.949	1.17	1.112	/
Right Cheek	standard	11/2462	DSSS	1:1	18.50	18.12	0.170	0.397	0.381	1.09	0.416	/
Right Tilt	standard	11/2462	DSSS	1:1	18.50	18.12	0.160	0.334	0.273	1.09	0.298	/
Left Cheek	Repeated	6/2437	DSSS	1:1	18.50	17.39	-0.015	0.916	1.042	1.29	1.345	/
Body-worn & Hotspot for Single Screen Mode (Distance 10mm)												
Back Side	standard	11/2462	DSSS	1:1	18.50	18.12	-0.091	0.088	0.086	1.09	0.094	/
Front Side	standard	11/2462	DSSS	1:1	18.50	18.12	0.022	0.164	0.143	1.09	0.156	25
Left 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
Right Edge	standard	11/2462	DSSS	1:1	18.50	18.12	0.049	0.060	0.052	1.09	0.056	/
Top Edge	standard	11/2462	DSSS	1:1	18.50	18.12	0.000	0.100	0.103	1.09	0.112	/
Bottom 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
Body-worn & Hotspot for Double Screen Mode (Distance 10mm)												
Back Side	standard	11/2462	DSSS	1:1	18.50	18.12	0.042	0.187	0.190	1.09	0.207	/
Front Side	standard	11/2462	DSSS	1:1	18.50	18.12	0.040	0.203	0.200	1.09	0.218	26
Left 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
Right Edge	standard	11/2462	DSSS	1:1	18.50	18.12	0.139	0.012	0.013	1.09	0.014	/
Top Edge	standard	11/2462	DSSS	1:1	18.50	18.12	0.088	0.174	0.171	1.09	0.187	/
Bottom 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
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. 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.												

MAX Adjusted SAR							
Mode	Test Position	Channel/Frequency(MHz)	MAX Reported SAR _{1g} (W/kg)	802.11b Tune-up limit (dBm)	Tune-up limit (dBm)	Scaling Factor	Adjusted SAR _{1g} (W/kg)
802.11g	Left Cheek	6/2437	1.485	18.50	15.50	0.50	0.744
802.11n HT20	Left Cheek	6/2437	1.485	18.50	14.50	0.40	0.591
Note: 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.							

**Table 5: Wi-Fi (5G, U-NII-2A)**

Per 248227, for band U-NII-1 and U-NII-2A, when the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.

Test Position	Cover Type	Channel/Frequency (MHz)	Mode 802.11a	Duty Cycle	Tune-up limit (dBm)	Conducted Power (dBm)	Drift (dB)	Area Scan Max.SAR (W/Kg)	Measured SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)	Plot No.
Head SAR for Single Screen Mode												
Left Cheek	standard	64/5320	OFDM	1:1	12.50	11.79	-0.089	0.289	0.330	1.18	0.389	27
Left Tilt	standard	64/5320	OFDM	1:1	12.50	11.79	0.137	0.286	0.326	1.18	0.384	/
Right Cheek	standard	64/5320	OFDM	1:1	12.50	11.79	0.026	0.240	0.278	1.18	0.327	/
Right Tilt	standard	64/5320	OFDM	1:1	12.50	11.79	0.022	0.253	0.313	1.18	0.369	/
Body-worn for Single Screen Mode (Distance 10mm)												
Back Side	standard	64/5320	OFDM	1:1	12.50	11.79	0.000	0.029	0.025	1.18	0.029	/
Front Side	standard	64/5320	OFDM	1:1	12.50	11.79	0.000	0.098	0.106	1.18	0.125	28
Body-worn for Double Screen Mode (Distance 10mm)												
Back Side	standard	64/5320	OFDM	1:1	12.00	11.79	-0.090	0.037	0.014	1.05	0.015	29
Front Side	standard	64/5320	OFDM	1:1	12.00	11.79	-0.108	0.034	0.013	1.05	0.014	/

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 adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the other band/ configuration; Otherwise, each band/configuration is tested independently for SAR.
 4. For band U-NII-2A/ U-NII-2C don't support hotspot function, 10-g extremity SAR must be tested as a phablet to determine SAR compliance.

Test Position	Cover Type	Channel/Frequency (MHz)	Mode 802.11a	Duty Cycle	Tune-up limit (dBm)	Conducted Power (dBm)	Drift (dB)	Area Scan Max.SAR (W/Kg)	Measured SAR _{10g} (W/kg)	Scaling Factor	Reported SAR _{10g} (W/kg)	Plot No.
Product specific SAR for Single Screen Mode (Distance 0mm)												
Back Side	standard	64/5320	OFDM	1:1	12.50	11.79	0.000	0.046	0.059	1.18	0.069	/
Front Side	standard	64/5320	OFDM	1:1	12.50	11.79	0.000	0.230	0.193	1.18	0.227	/
Left 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
Right Edge	standard	64/5320	OFDM	1:1	12.50	11.79	-0.024	0.067	0.069	1.18	0.081	/
Top Edge	standard	64/5320	OFDM	1:1	12.50	11.79	0.034	0.143	0.232	1.18	0.273	30
		60/5300	OFDM	1:1	12.50	11.70	0.012	0.133	0.212	1.20	0.255	/
		52/5260	OFDM	1:1	12.50	11.66	-0.051	0.126	0.199	1.21	0.241	/
Bottom 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



Product specific SAR for Double Screen Mode (Distance 0mm)

Back Side	standard	64/5320	OFDM	1:1	12.50	11.79	0.000	0.230	0.226	1.18	0.266	/
Front Side	standard	64/5320	OFDM	1:1	12.50	11.79	0.000	0.184	0.215	1.18	0.253	/
Left 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
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	standard	64/5320	OFDM	1:1	12.50	11.79	0.099	0.296	0.281	1.18	0.331	31
Bottom 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

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



Table 6: Wi-Fi (5G, U-NII-1)

Test Position	Cover Type	Channel/Frequency (MHz)	Mode 802.11a	Duty Cycle	Tune-up limit (dBm)	Conducted Power (dBm)	Drift (dB)	Area Scan Max.SAR (W/Kg)	Measured SAR _{10g} (W/kg)	Scaling Factor	Reported SAR _{10g} (W/kg)	Plot No.
Hotspot for Double Screen Mode (Distance 10mm)												
Back Side	standard	48/5240	OFDM	1:1	12.50	11.65	0.000	0.040	0.017	1.22	0.020	32
Front Side	standard	48/5240	OFDM	1:1	12.50	11.65	0.000	0.020	0.009	1.22	0.010	/
Left 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
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	standard	48/5240	OFDM	1:1	12.50	11.65	0.000	0.019	0.008	1.22	0.010	/
Bottom 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

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

- 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).
- When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the other band/ configuration; Otherwise, each band/configuration is tested independently for SAR.
- 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 7: Wi-Fi (5G, U-NII-2C)

Test Position	Cover Type	Channel/Frequency (MHz)	Mode 802.11a	Duty Cycle	Tune-up limit (dBm)	Conducted Power (dBm)	Drift (dB)	Area Scan Max.SAR (W/Kg)	Measured SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)	Plot No.
Head SAR for Single Screen Mode												
Left Cheek	standard	100/5500	OFDM	1:1	12.50	11.84	0.027	0.330	0.607	1.16	0.707	33
Left Tilt	standard	100/5500	OFDM	1:1	12.50	11.84	0.063	0.351	0.601	1.16	0.700	/
Right Cheek	standard	100/5500	OFDM	1:1	12.50	11.84	0.076	0.406	0.440	1.16	0.512	/
Right Tilt	standard	100/5500	OFDM	1:1	12.50	11.84	0.024	0.298	0.464	1.16	0.540	/
Body-worn for Single Screen Mode (Distance 10mm)												
Back Side	standard	100/5500	OFDM	1:1	12.50	11.84	0.145	0.029	0.012	1.16	0.014	/
Front Side	standard	100/5500	OFDM	1:1	12.50	11.84	0.000	0.051	0.036	1.16	0.042	34
Body-worn for Double Screen Mode (Distance 10mm)												
Back Side	standard	100/5500	OFDM	1:1	12.00	11.84	0.000	0.217	0.209	1.04	0.217	35
Front Side	standard	100/5500	OFDM	1:1	12.00	11.84	-0.090	0.224	0.208	1.04	0.216	/

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

- 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).
- When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the other band/ configuration; Otherwise, each band/configuration is tested independently for SAR.
- For band U-NII-2A/ U-NII-2C don't support hotspot function, 10-g extremity SAR must be tested as a phablet to determine SAR compliance.

Test Position	Cover Type	Channel/Frequency (MHz)	Mode 802.11a	Duty Cycle	Tune-up limit (dBm)	Conducted Power (dBm)	Drift (dB)	Area Scan Max.SAR (W/Kg)	Measured SAR _{10g} (W/kg)	Scaling Factor	Reported SAR _{10g} (W/kg)	Plot No.
Product specific SAR for Single Screen Mode (Distance 0mm)												
Back Side	standard	100/5500	OFDM	1:1	12.50	11.84	0.000	0.013	0.008	1.16	0.009	/
Front Side	standard	140/5700	OFDM	1:1	12.50	10.95	0.000	0.178	0.181	1.43	0.259	/
		116/5580	OFDM	1:1	12.50	11.78	0.000	0.214	0.216	1.18	0.255	/
		100/5500	OFDM	1:1	12.50	11.84	0.000	0.229	0.230	1.16	0.268	36
Left 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
Right Edge	standard	100/5500	N/A	1:1	12.50	11.84	-0.027	0.075	0.083	1.16	0.096	/
Top Edge	standard	100/5500	OFDM	1:1	12.50	11.84	0.154	0.141	0.133	1.16	0.155	/
Bottom 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
Product specific SAR for Double Screen Mode (Distance 0mm)												
Back Side	standard	100/5500	OFDM	1:1	12.50	11.84	-0.038	0.399	0.319	1.16	0.371	/
Front Side	standard	100/5500	OFDM	1:1	12.50	11.84	0.000	0.354	0.386	1.16	0.449	37
Left 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
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	standard	100/5500	OFDM	1:1	12.50	11.84	0.074	0.289	0.309	1.16	0.360	/
Bottom 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

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

Table 8: BT

Band	Configuration	Frequency (MHz)	Maximum Power (dBm)	Separation Distance (mm)	Estimated SAR (W/kg)
Bluetooth	Head	2480	5.00	5	0.133
	Body-worn	2480	5.00	10	0.067
	Hotspot	2480	5.00	10	0.067
	Extremity	2480	5.00	5	0.053
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/kg for 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	Product Specific 10-g SAR
GSM(Voice) + Bluetooth(data)	Yes	Yes	Yes	Yes
GPRS/EDGE(Data) + Bluetooth(data)	Yes	Yes	Yes	Yes
WCDMA(Voice) + Bluetooth(data)	Yes	Yes	Yes	Yes
WCDMA(Data) + Bluetooth(data)	Yes	Yes	Yes	Yes
GSM(Voice) + Wi-Fi-2.4GHz(data)	Yes	Yes	Yes	Yes
GPRS/EDGE(Data) + Wi-Fi-2.4GHz(data)	Yes	Yes	Yes	Yes
WCDMA(Voice) + Wi-Fi-2.4GHz(data)	Yes	Yes	Yes	Yes
WCDMA(Data) + Wi-Fi-2.4GHz(data)	Yes	Yes	Yes	Yes
GSM(Voice) + Wi-Fi-5GHz(data)	Yes	Yes	Yes	Yes
GPRS/EDGE(Data) + Wi-Fi-5GHz(data)	Yes	Yes	Yes	Yes
WCDMA(Voice) + Wi-Fi-5GHz(data)	Yes	Yes	Yes	Yes
WCDMA(Data) + Wi-Fi-5GHz(data)	Yes	Yes	Yes	Yes
Wi-Fi-2.4GHz(data) + Bluetooth(data)	No	No	No	No
Wi-Fi-5GHz(data) + Bluetooth(data)	No	No	No	No

General Note:

- When the voice starts working, it is automatically locked in the single screen mode
- For WIFI5G band U-NII-2A/ U-NII-2C don't support hotspot function
- The Scaled SAR summation is calculated based on the same configuration and test position.
- Per KDB 447498 D01, simultaneous transmission SAR is compliant if,
 - Scalar SAR summation $< 1.6W/kg$, simultaneously transmission SAR measurement is not necessary.
 - $SPLSR = (SAR1 + SAR2)^{1.5} / (\text{min. separation distance, mm})$, 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.
 - If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary.

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

Test Position		SAR _{1g/10g} (W/kg)	GSM 850	GSM 1900	WCDMA Band V	MAX. SAR _{1g/10g}
For Single Screen Mode	Left Cheek		0.173	0.049	0.341	0.341
	Left Tilt		0.069	0.057	0.156	0.156
	Right Cheek		0.138	0.080	0.258	0.258
	Right Tilt		0.059	0.028	0.184	0.184
	Body worn	Back Side	0.390	0.347	0.421	0.421
		Front Side	0.451	0.596	0.603	0.603
	Hotspot	Back Side	0.297	0.306	0.421	0.421
		Front Side	0.369	0.625	0.603	0.625
		Left Edge	0.267	0.156	0.319	0.319
		Right Edge	0.267	0.021	0.105	0.267
		Top Edge	N/A	N/A	N/A	0
		Bottom Edge	0.271	0.900	0.404	0.900
For Double Screen Mode	Body worn	Back Side	0.686	0.680	0.742	0.742
		Front Side	0.629	0.474	0.658	0.658
	Hotspot	Back Side	0.686	0.680	0.742	0.742
		Front Side	0.629	0.474	0.658	0.658
		Left Edge	0.131	0.154	0.090	0.154
		Right Edge	N/A	N/A	N/A	0
		Top Edge	N/A	N/A	N/A	0
		Bottom Edge	0.615	1.493	0.587	1.493
	Extremity	Bottom Edge	N/A	1.826	N/A	1.826

About BT and Main- Antenna

SAR _{1g/10g} (W/kg)			Main-antenna	BT	MAX. Σ SAR _{1g/10g}
Test Position					
For Single Screen Mode	Left Cheek		0.341	0.167	0.508
	Left Tilt		0.156	0.167	0.323
	Right Cheek		0.258	0.167	0.425
	Right Tilt		0.184	0.167	0.351
	Body worn	Back Side	0.421	0.084	0.505
		Front Side	0.603	0.084	0.687
	Hotspot	Back Side	0.421	0.084	0.505
		Front Side	0.625	0.084	0.709
		Left Edge	0.319	N/A	0.319
		Right Edge	0.267	0.084	0.351
		Top Edge	0	0.084	0.084
		Bottom Edge	0.900	N/A	0.900
For Double Screen Mode	Body worn	Back Side	0.742	0.084	0.826
		Front Side	0.658	0.084	0.742
	Hotspot	Back Side	0.742	0.084	0.826
		Front Side	0.658	0.084	0.742
		Left Edge	0.154	N/A	0.154
		Right Edge	0	N/A	0.000
		Top Edge	0	0.084	0.084
		Bottom Edge	1.493	N/A	1.493
	Extremity	Bottom Edge	1.826	N/A	1.826

Note: 1.The value with blue color is the maximum Σ SAR_{1g/10g} Value.
2. MAX. Σ SAR_{1g/10g} =Unlicensed SAR_{MAX} +Licensed SAR_{MAX}

MAX. Σ SAR_{1g} = 1.493 W/kg <1.6 W/kg and MAX. Σ SAR_{10g} = 1.826 W/kg <4 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/10g} (W/kg)	Main- antenna	Wi-Fi 2.4G	Wi-Fi (U-NII-1)	Wi-Fi (U-NII-2A)	Wi-Fi (U-NII-2C)	MAX. ΣSAR _{1g/10g}
For Single Screen Mode	Left, Cheek		0.341	1.485	N/A	0.389	0.707	1.826
	Left, Tilt		0.156	1.264	N/A	0.384	0.700	1.420
	Right, Cheek		0.258	0.416	N/A	0.327	0.512	0.770
	Right, Tilt		0.184	0.298	N/A	0.369	0.540	0.724
	Body worn	Back Side	0.421	0.094	N/A	0.029	0.014	0.515
		Front Side	0.603	0.156	N/A	0.125	0.042	0.759
	Hotspot	Back Side	0.421	0.094	N/A	N/A	N/A	0.515
		Front Side	0.625	0.156	N/A	N/A	N/A	0.781
		Left Edge	0.319	N/A	N/A	N/A	N/A	0.319
		Right Edge	0.267	0.056	N/A	N/A	N/A	0.323
		Top Edge	0	0.112	N/A	N/A	N/A	0.112
		Bottom Edge	0.900	N/A	N/A	N/A	N/A	0.900
	Extremity	Back Side	N/A	N/A	N/A	0.069	0.009	0.069
		Front Side	N/A	N/A	N/A	0.227	0.268	0.268
		Left Edge	N/A	N/A	N/A	N/A	N/A	N/A
		Right Edge	N/A	N/A	N/A	0.081	0.096	0.096
		Top Edge	N/A	N/A	N/A	0.273	0.155	0.273
		Bottom Edge	N/A	N/A	N/A	N/A	N/A	N/A
For Double Screen Mode	Body worn	Back Side	0.742	0.207	N/A	0.015	0.217	0.959
		Front Side	0.658	0.218	N/A	0.014	0.216	0.876
	Hotspot	Back Side	0.742	0.207	0.020	N/A	N/A	0.949
		Front Side	0.658	0.218	0.010	N/A	N/A	0.876
		Left Edge	0.154	N/A	N/A	N/A	N/A	0.154
		Right Edge	0	0.014	N/A	N/A	N/A	0.014
		Top Edge	0	0.187	0.010	N/A	N/A	0.187
		Bottom Edge	1.493	N/A	N/A	N/A	N/A	1.493
	Extremity	Back Side	N/A	N/A	N/A	0.266	0.371	0.371
		Front Side	N/A	N/A	N/A	0.253	0.449	0.449
		Top Edge	N/A	N/A	N/A	0.331	0.360	0.360
		Bottom Edge	1.826	N/A	N/A	N/A	N/A	1.826

Note: 1. The value with blue color is the maximum ΣSAR_{1g} Value.

2. MAX. ΣSAR_{1g/10g} = Unlicensed SAR_{MAX} + Licensed SAR_{MAX}

MAX. ΣSAR_{1g} = 1.826 W/kg > 1.6 W/kg, so the SAR to peak location separation ratio should be considered

Reported SAR _{1g} (W/kg)	GSM 850	GSM 1900	WCDMA Band V	Wi-Fi 2.4G	Wi-Fi (U-NII-2A)	Wi-Fi (U-NII-2C)	MAX. ΣSAR _{1g}
Test Position							
Left, Cheek	0.173	/	/	1.485	/	/	1.658
	/	0.049	/	1.485	/	/	1.534
	/	/	0.341	1.485	/	/	1.826
	0.173	/	/	/	0.389	/	0.562
	/	0.049	/	/	0.389	/	0.438
	/	/	0.341	/	0.389	/	0.730
	0.173	/	/	/	/	0.707	0.880
	/	0.049	/	/	/	0.707	0.756
	/	/	0.341	/	/	0.707	1.048

Note: 1. The value with blue color is the SAR_{1g} > 1.6 W/kg.

2. When the MAX. Σ SAR_{1g} > 1.6 W/kg in a position, Ratio need consideration in this position.

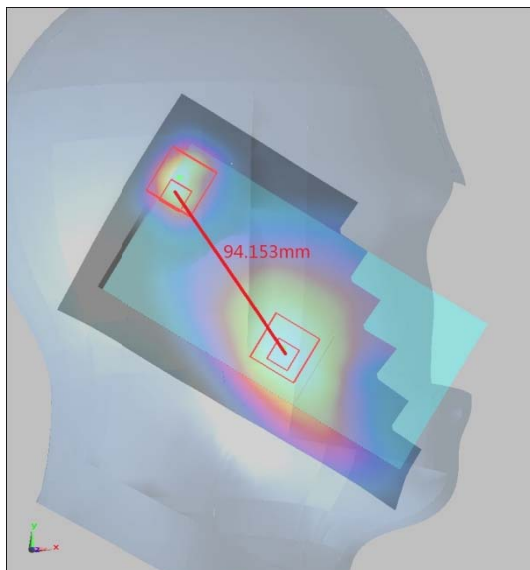
About GSM 850 and Wi-Fi 2.4G

(SAR_{Max} = 1.658W/Kg)

The position SAR_{GSM 850} is (x₁ = 72.34, y₁ = 251.7, z₁ = -171),

The position SAR_{Wi-Fi 2.4G} is (x₂ = 20.36, y₂ = 330.2, z₂ = -171.8)

so the distance is 94.153mm.



PSLS=Peak SAR Location Separation

Ratio = [(Reported SAR_{GSM 850}) 0.173W/kg + (Reported SAR_{Wi-Fi 2.4G}) 1.485W/kg]^{3/2} / PSLS = 0.02 < 0.04

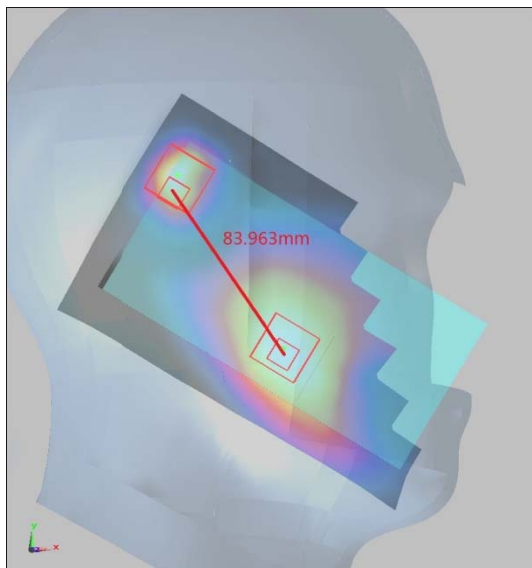
About WCDMA Band V and Wi-Fi 2.4G

(SAR_{Max} = 1.826W/Kg)

The position SAR_{WCDMA Band V} is (x₁= 64.05, y₁= 258.5, z₁= -171.6),

The position SAR_{Wi-Fi 2.4G} is (x₂= 20.36, y₂=330.2, z₂= -171.8)

so the distance is 83.963mm.



PSLS=Peak SAR Location Separation

Ratio =[(Reported SAR_{WCDMA Band V}) 0.341W/kg +(Reported SAR_{Wi-Fi 2.4G}) 1.485W/kg]^{3/2} /PSLS =0.03
<0.04

so the Simultaneous transimition SAR with volum scan are not required for Wi-Fi and Main- Antenna.

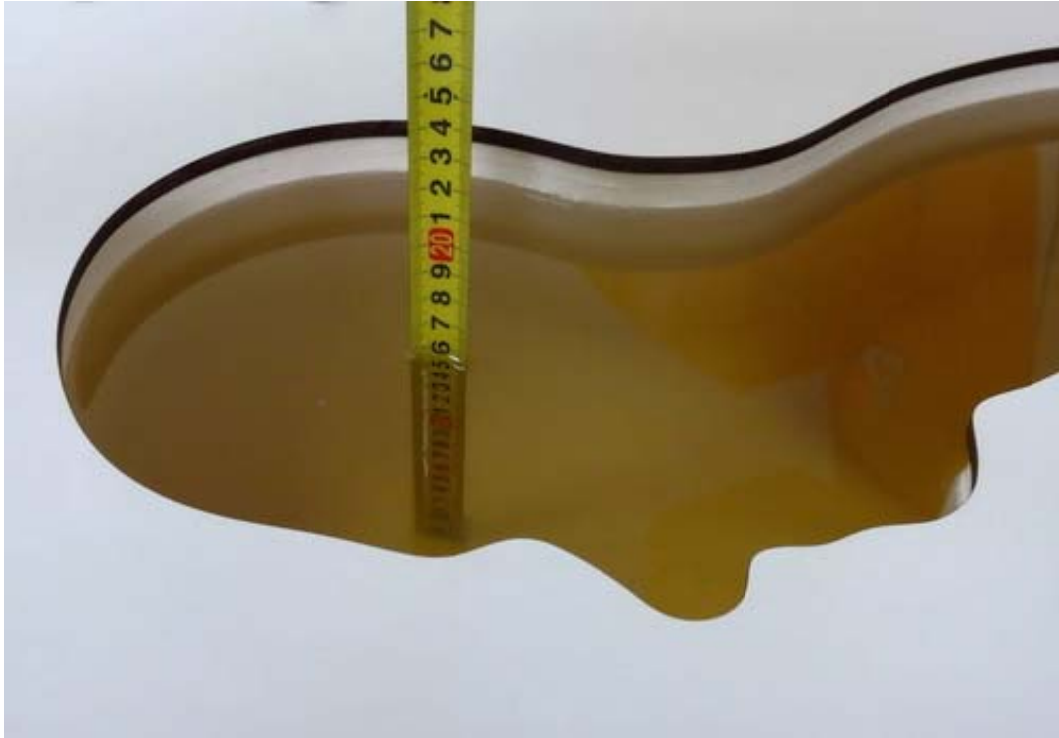


11 Measurement Uncertainty

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. This also applies to the 10-g SAR required for phablets in KDB Publication 648474.

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)



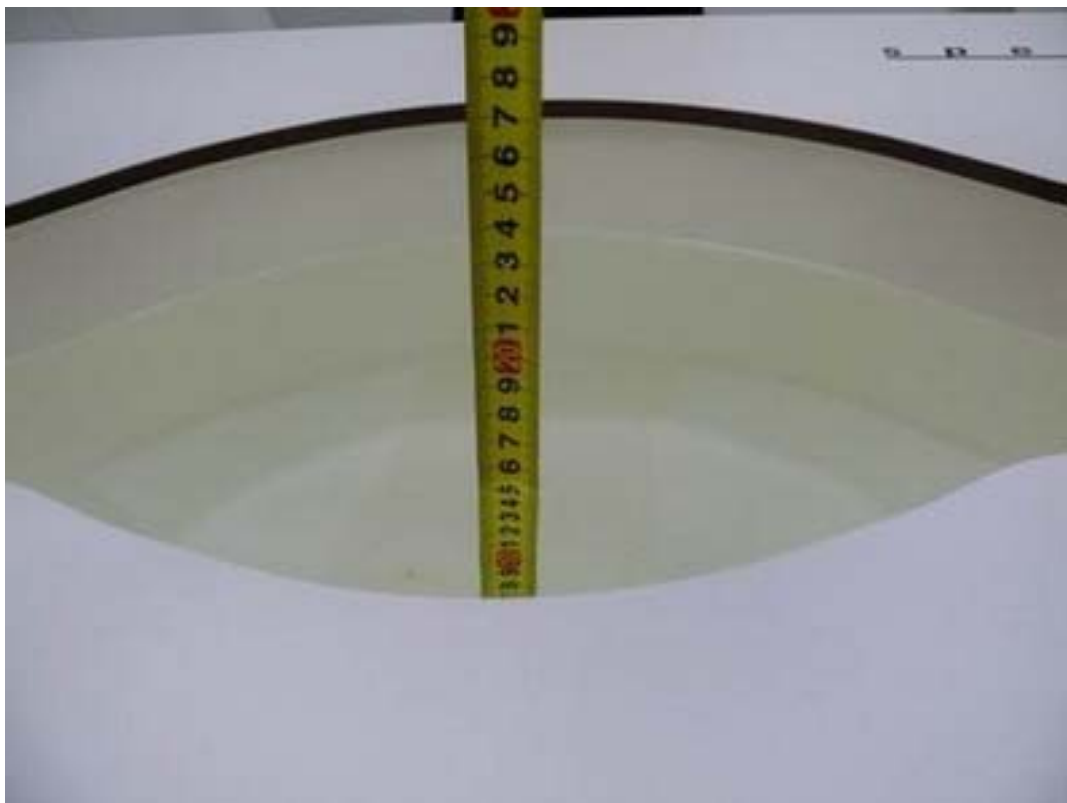
Picture 7: Liquid depth in the head Phantom (2450 MHz, 15.4cm depth)



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



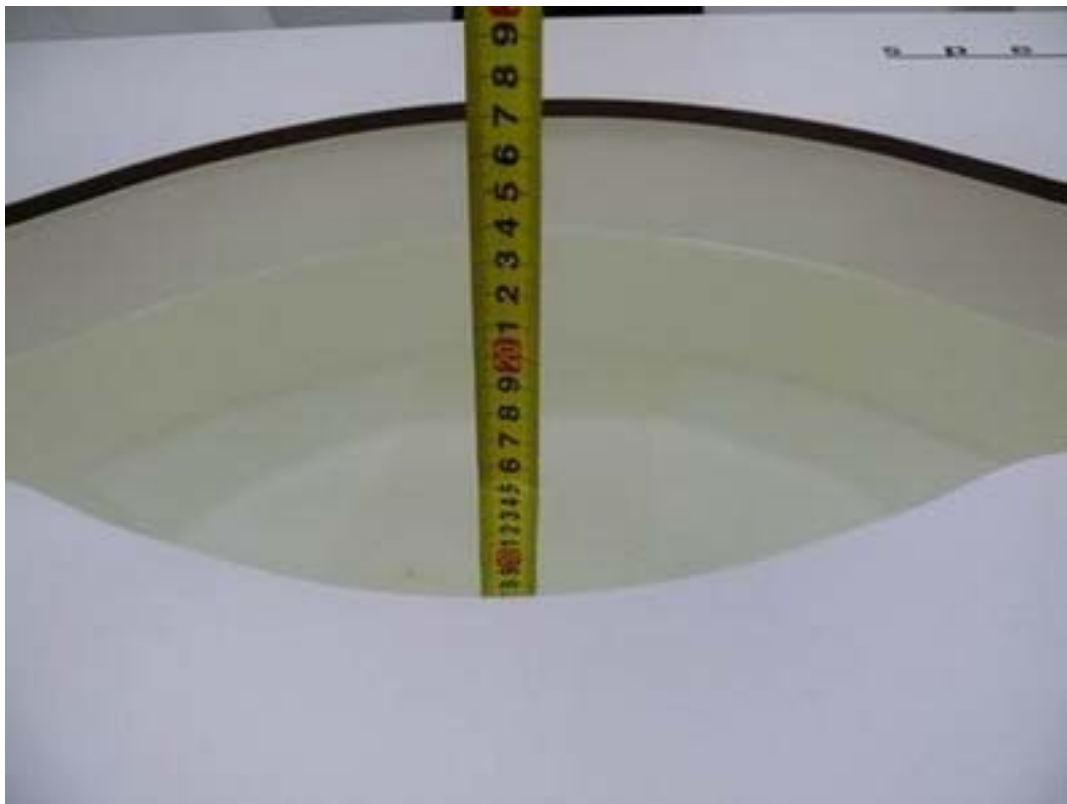
Picture 9: Liquid depth in the head Phantom (5250 MHz, 15.4cm depth)



Picture 10: Liquid depth in the flat Phantom (5250 MHz, 15.3cm depth)



Picture 11: Liquid depth in the head Phantom (5600 MHz, 15.4cm depth)



Picture 12: Liquid depth in the flat Phantom (5600 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: 9/28/2017

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

Medium parameters used: $f = 835$ MHz; $\sigma = 0.88$ mho/m; $\epsilon_r = 41.4$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.31, 9.31, 9.31); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

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

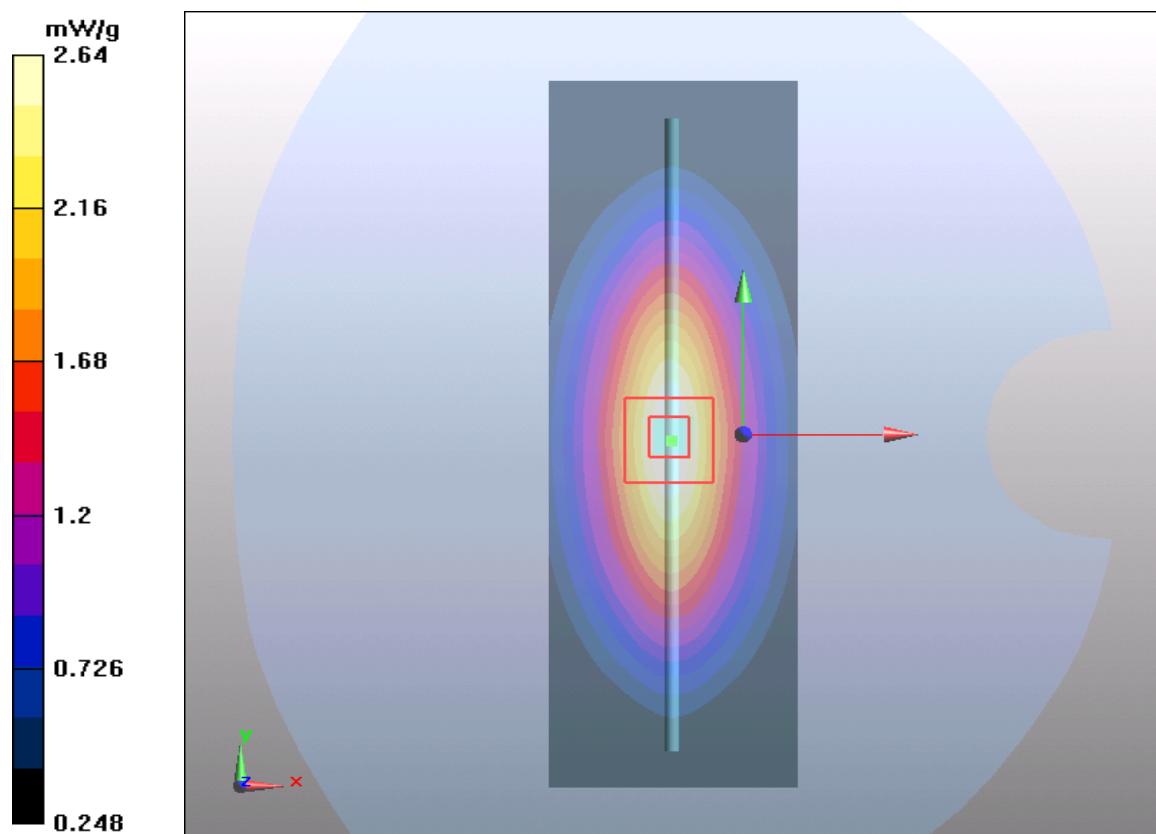
d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

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 Body TSL

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

Date: 10/9/2017

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

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.96 \text{ mho/m}$; $\epsilon_r = 54.2$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature: 22.3°C Liquid Temperature: 21.5°C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.74, 9.74, 9.74); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

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: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

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

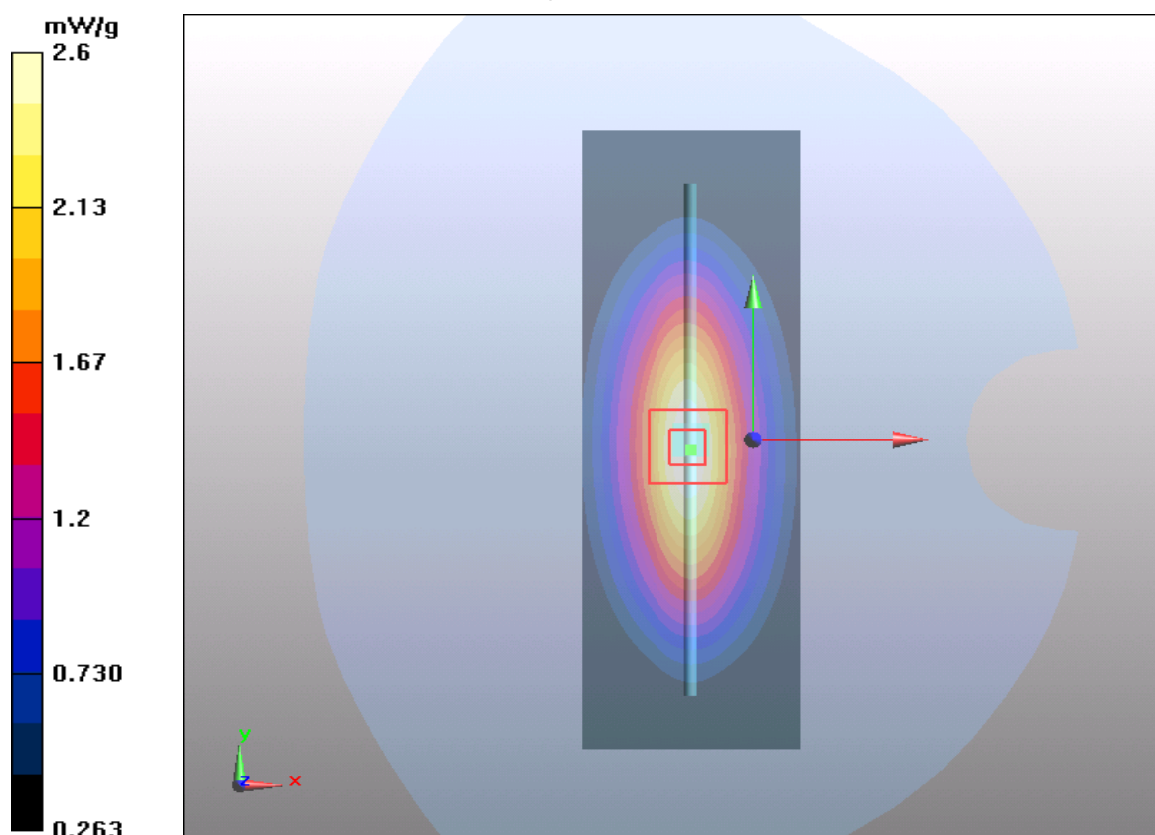
d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

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 3 System Performance Check at 1900 MHz Head TSL

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

Date: 9/28/2017

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

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.41$ mho/m; $\epsilon_r = 40.1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C

Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(8.39, 8.39, 8.39); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

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

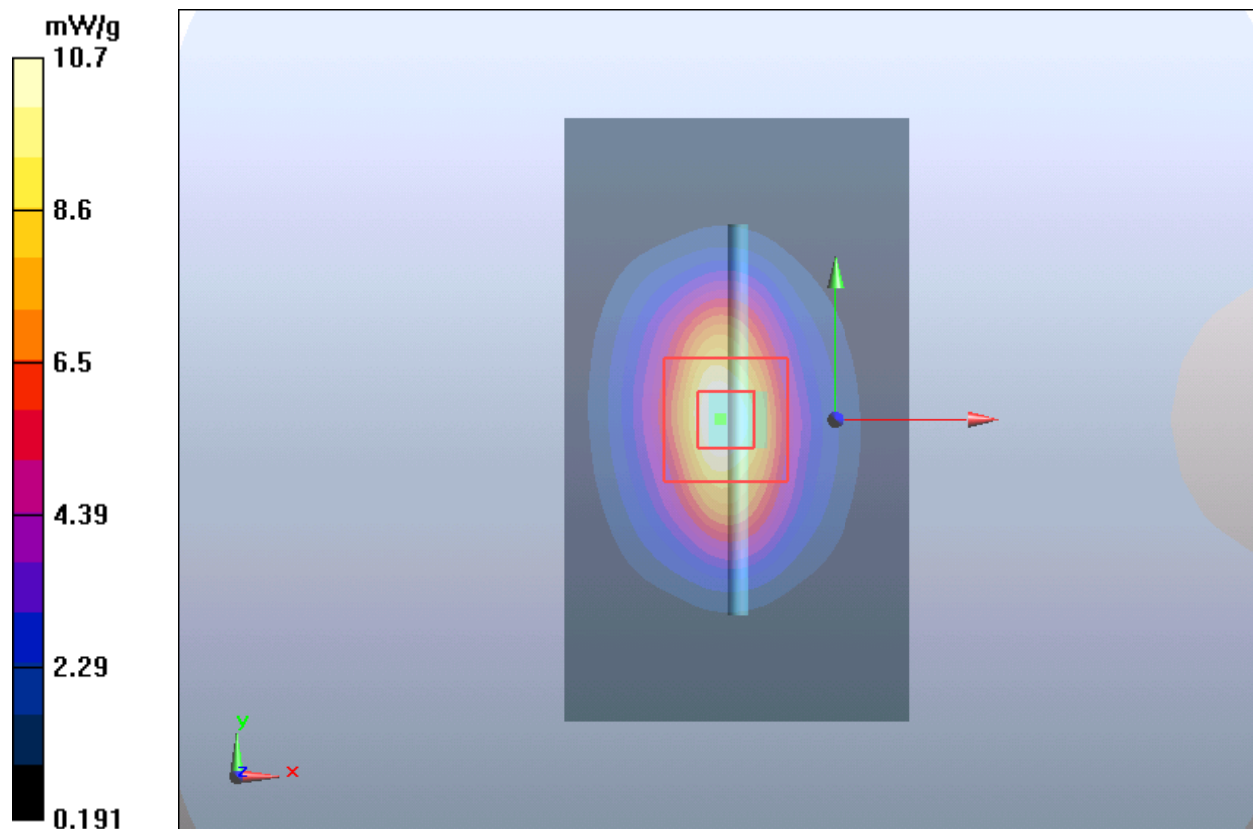
d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

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

Peak SAR (extrapolated) = 17.8 W/kg

SAR(1 g) = 9.88 mW/g; SAR(10 g) = 4.9 mW/g

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



Plot 4 System Performance Check at 1900 MHz Body TSL

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

Date: 10/18/2017

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

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 52.6$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C

Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.98, 7.98, 7.98); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

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

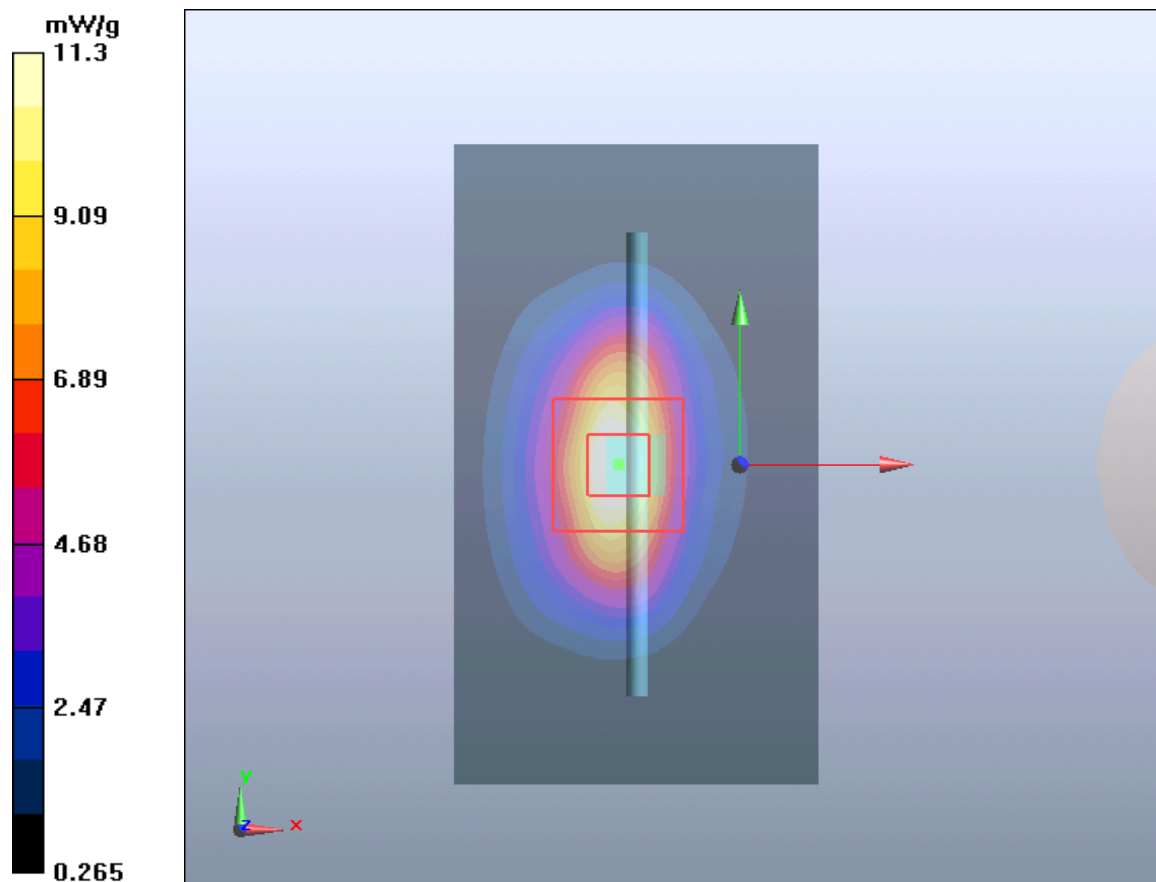
d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

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 5 System Performance Check at 2450 MHz Head TSL

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

Date: 10/9/2017

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

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.81$ mho/m; $\epsilon_r = 38.6$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.90, 7.90, 7.90); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

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

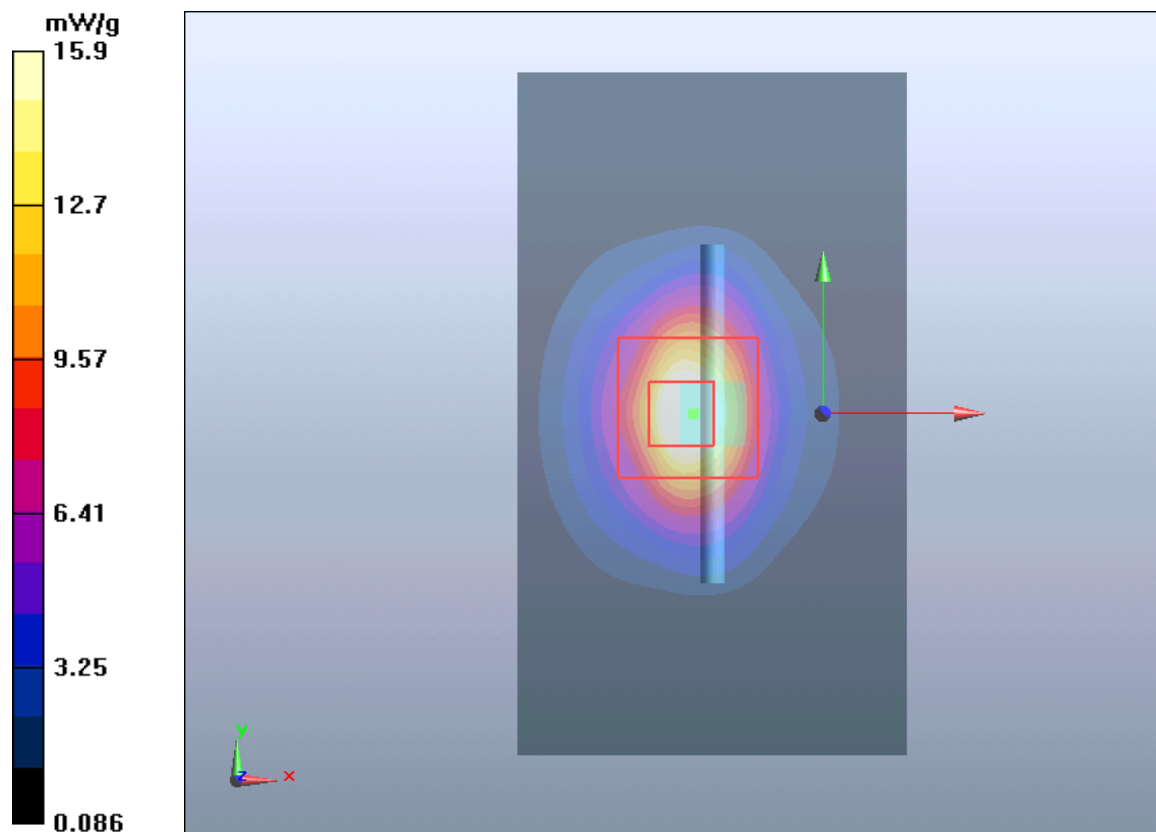
d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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 6 System Performance Check at 2450 MHz Body TSL

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

Date: 10/17/2017

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

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.98$ mho/m; $\epsilon_r = 52.5$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.85, 7.85, 7.85); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

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

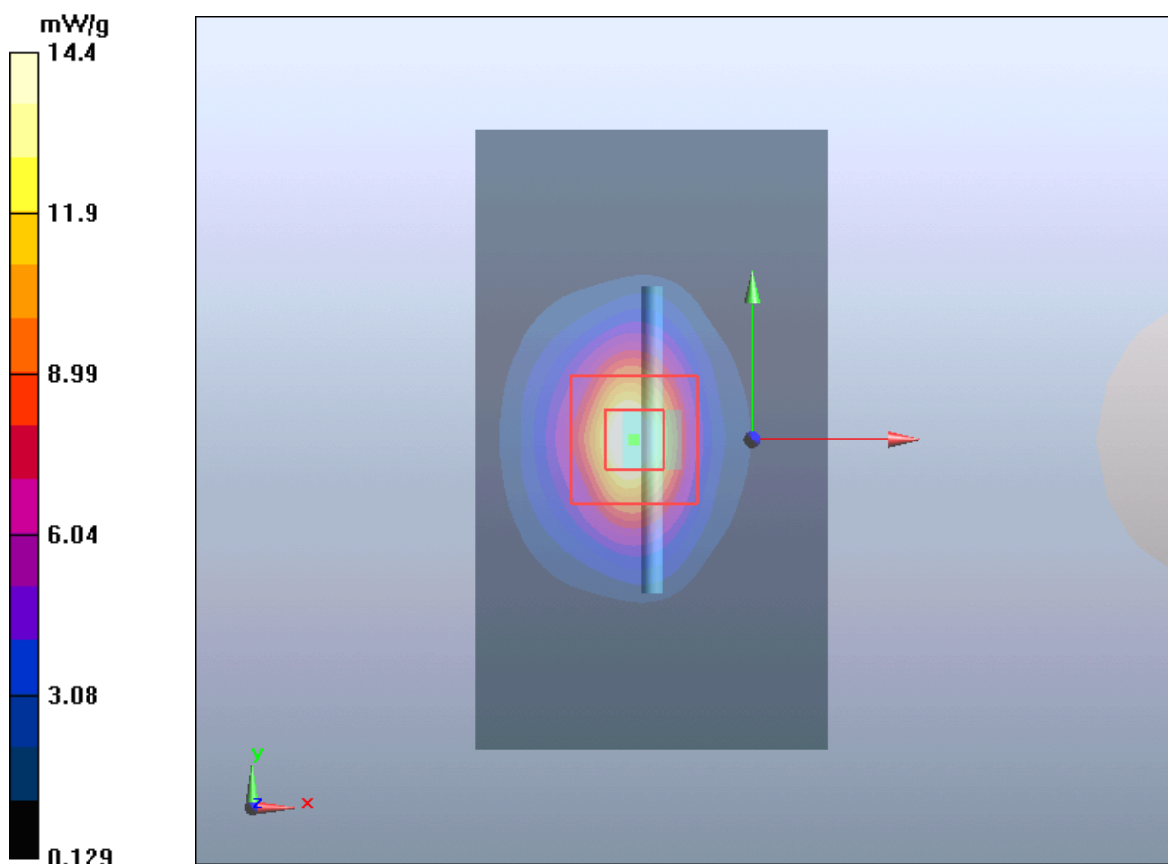
d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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 7 System Performance Check at 5250 MHz Head TSL

DUT: Dipole 5250 MHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1151

Date: 10/13/2017

Communication System: CW; Frequency: 5250 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5250$ MHz; $\sigma = 4.80$ mho/m; $\epsilon_r = 35.5$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.66, 5.66, 5.66); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 2; Type: SAM;

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

d=10mm, Pin=100mW/Area Scan (61x101x1): Measurement grid: dx=1.000mm, dy=1.000mm

Maximum value of SAR (interpolated) = 9.14 mW/g

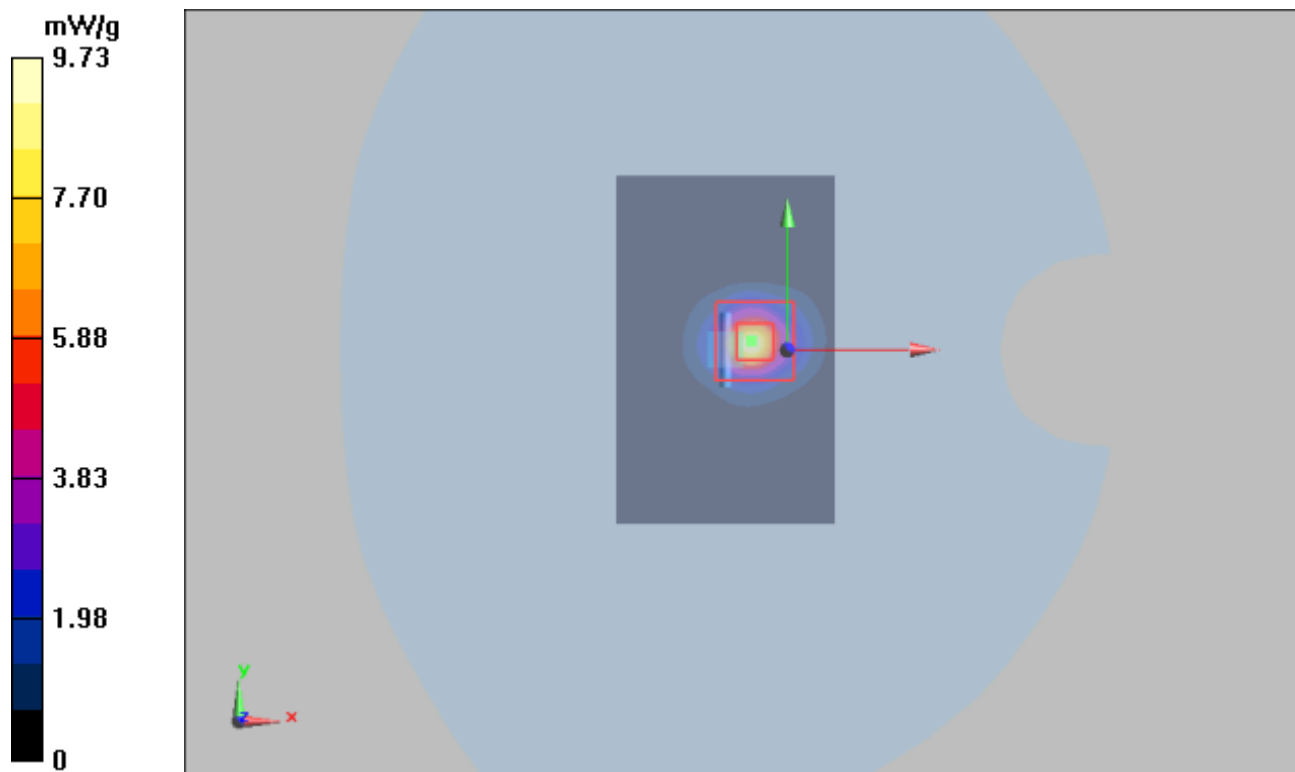
d=10mm, Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 33.6 V/m; Power Drift = -0.095 dB

Peak SAR (extrapolated) = 52.2 W/kg

SAR(1 g) = 7.87 mW/g; SAR(10 g) = 2.25 mW/g

Maximum value of SAR (measured) = 9.73 mW/g



Plot 8 System Performance Check at 5250 MHz Body TSL

DUT: Dipole 5250 MHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1151

Date: 10/14/2017

Communication System: CW; Frequency: 5250 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5250$ MHz; $\sigma = 5.32$ mho/m; $\epsilon_r = 48.1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.03, 5.03, 5.03); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA;

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

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

Maximum value of SAR (interpolated) = 7.69 mW/g

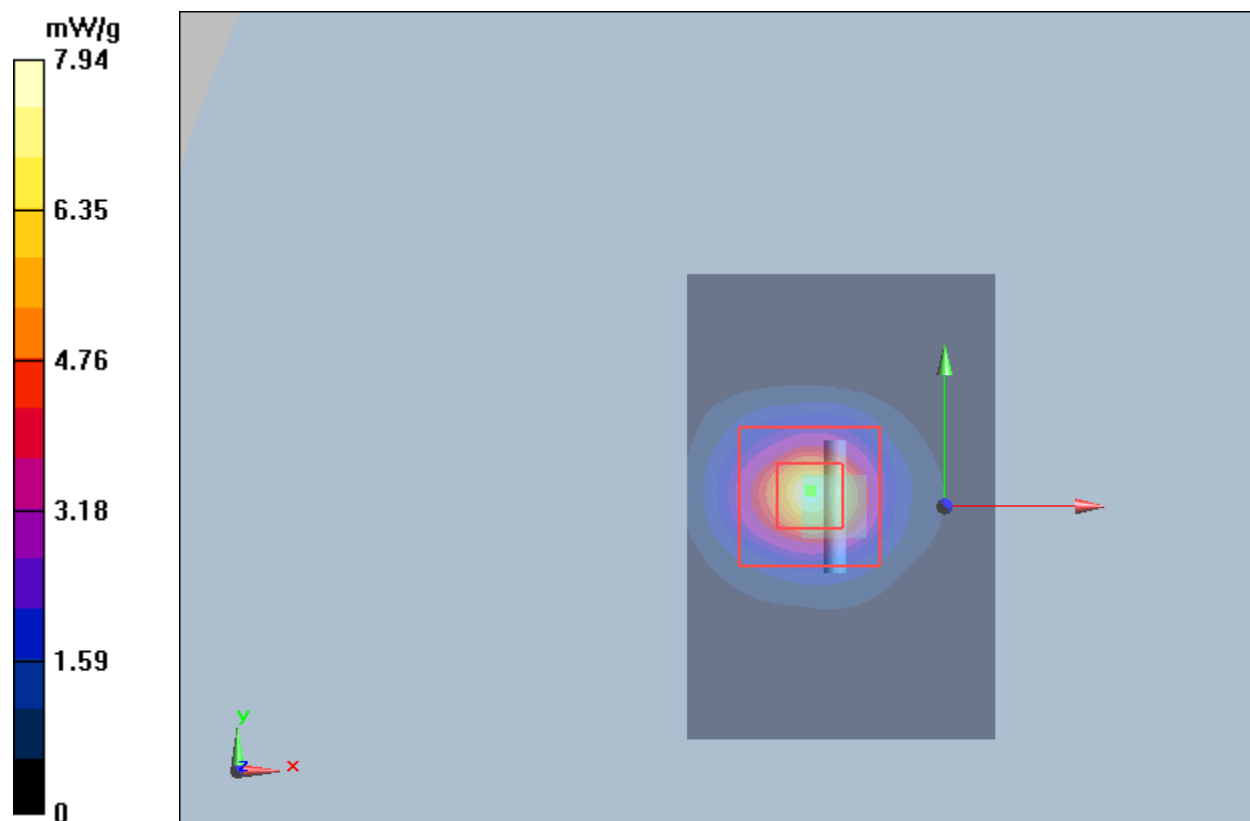
d=10mm, Pin=250mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 36.3 V/m; Power Drift = 0.0277 dB

Peak SAR (extrapolated) = 47.7 W/kg

SAR(1 g) = 7.46 mW/g; SAR(10 g) = 2.26 mW/g

Maximum value of SAR (measured) = 7.94 mW/g



Plot 9 System Performance Check at 5600 MHz Head TSL

DUT: Dipole 5600 MHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1151

Date: 10/13/2017

Communication System: CW; Frequency: 5600 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5600$ MHz; $\sigma = 5.21$ mho/m; $\epsilon_r = 34.2$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(4.99, 4.99, 4.99); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 2; Type: SAM;

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

d=10mm, Pin=100mW/Area Scan (61x101x1): Measurement grid: dx=1.000mm, dy=1.000mm

Maximum value of SAR (interpolated) = 8.25 mW/g

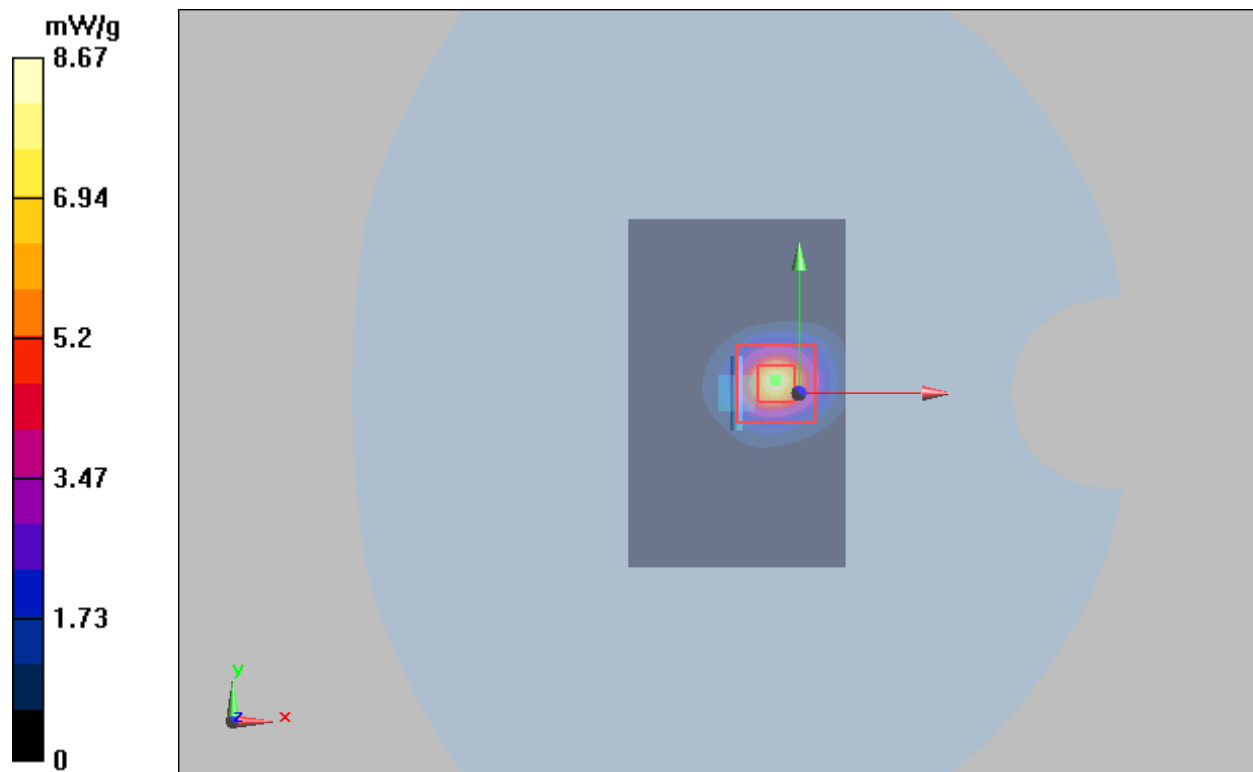
d=10mm, Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 23.1 V/m; Power Drift = -0.028 dB

Peak SAR (extrapolated) = 22.9 W/kg

SAR(1 g) = 7.97 mW/g; SAR(10 g) = 2.27 mW/g

Maximum value of SAR (measured) = 8.67 mW/g



Plot 10 System Performance Check at 5600 MHz Body TSL

DUT: Dipole 5600 MHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1151

Date: 10/14/2017

Communication System: CW; Frequency: 5600 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5600$ MHz; $\sigma = 5.78$ mho/m; $\epsilon_r = 47.9$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(4.34, 4.34, 4.34); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA;

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

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

Maximum value of SAR (interpolated) = 7.84 mW/g

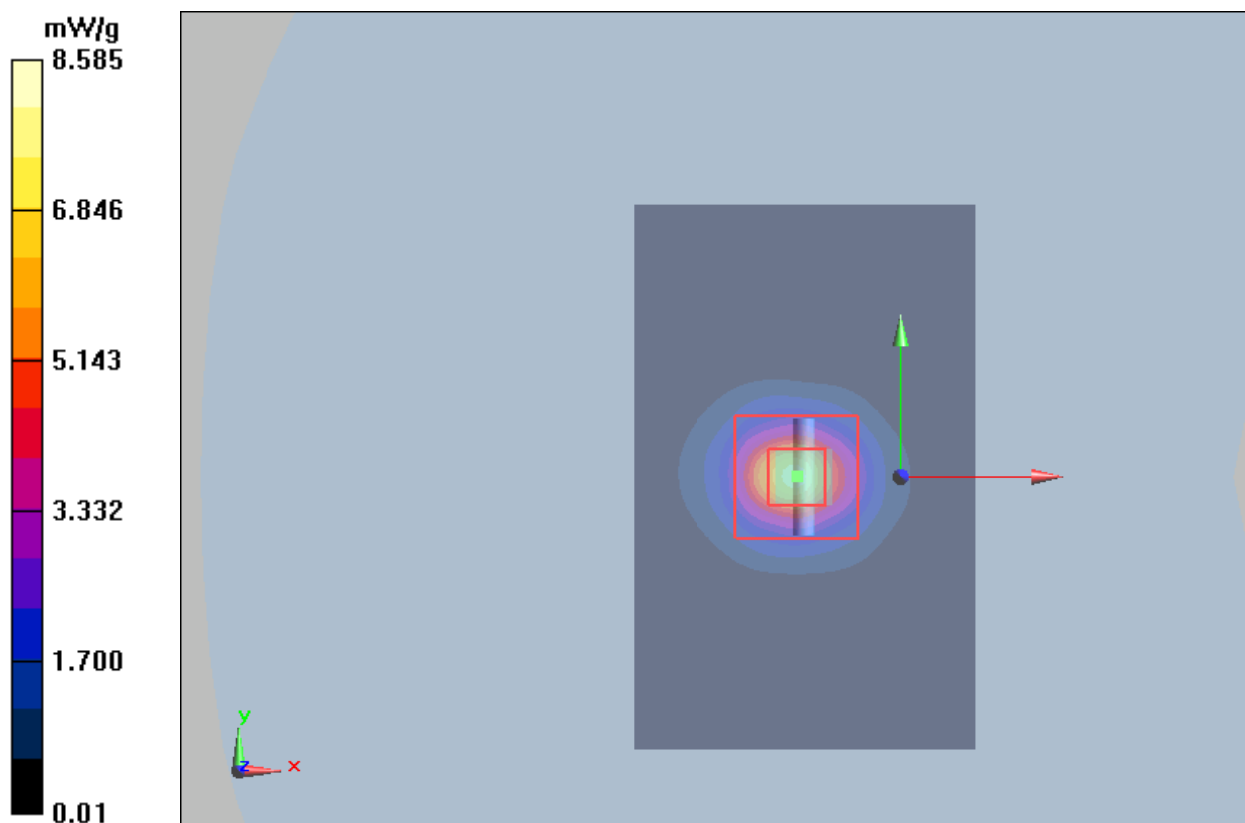
d=10mm, Pin=250mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 38 V/m; Power Drift = -0.018 dB

Peak SAR (extrapolated) = 22.6 W/kg

SAR(1 g) = 8.10 mW/g; SAR(10 g) = 2.11 mW/g

Maximum value of SAR (measured) = 8.585 mW/g



ANNEX C: Highest Graph Results

Plot 11 GSM 850 Left Cheek Middle (For Single Screen Mode)

Date: 9/28/2017

Communication System: GSM 850; Frequency: 836.8 MHz; Duty Cycle: 1:8.3

Medium parameters used (interpolated): $f = 836.8$ MHz; $\sigma = 0.874$ mho/m; $\epsilon_r = 40.5$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.31, 9.31, 9.31); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

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): Measurement grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.179 mW/g

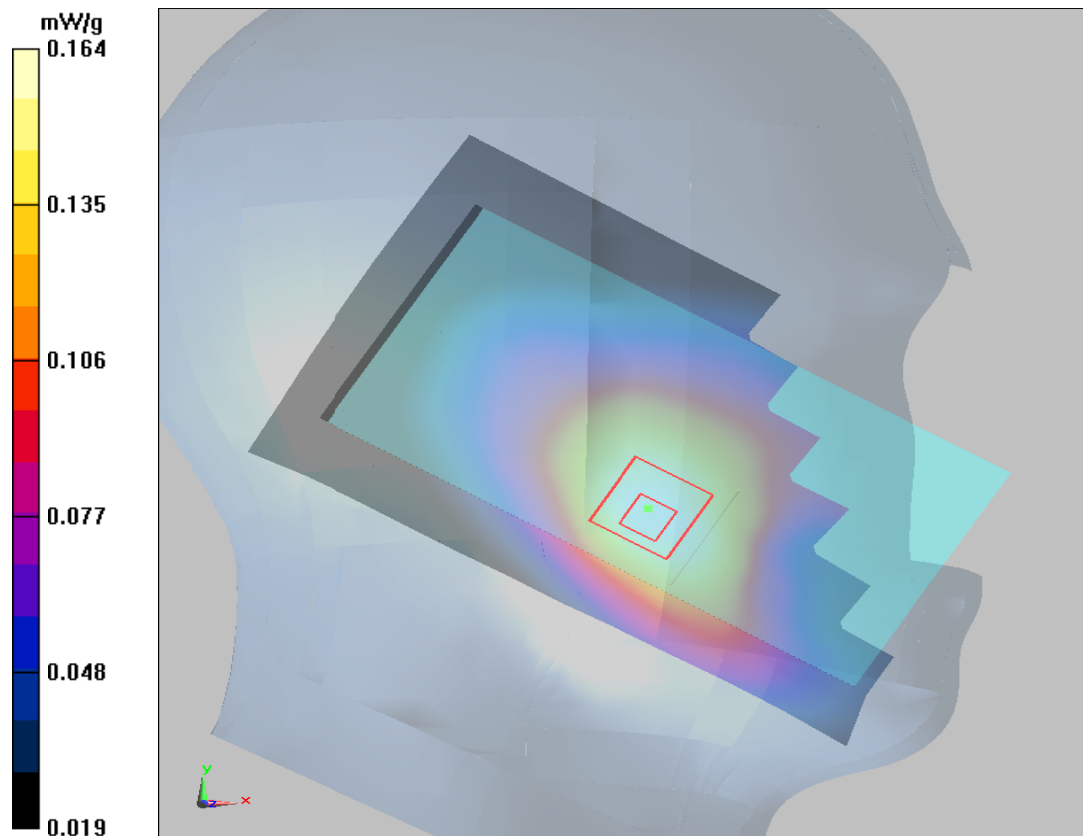
Left Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.76 V/m; Power Drift = -0.098 dB

Peak SAR (extrapolated) = 0.165 W/kg

SAR(1 g) = 0.157 mW/g; SAR(10 g) = 0.130 mW/g

Maximum value of SAR (measured) = 0.164 mW/g



Plot 12 GSM 850 Front Side Middle (For Single Screen Mode, Distance 10mm)

Date: 10/9/2017

Communication System: UID 0, GSM 850 (0); Frequency: 836.6 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 837$ MHz; $\sigma = 1.001$ S/m; $\epsilon_r = 54.375$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.74, 9.74, 9.74); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

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

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

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

Maximum value of SAR (interpolated) = 0.456 W/kg

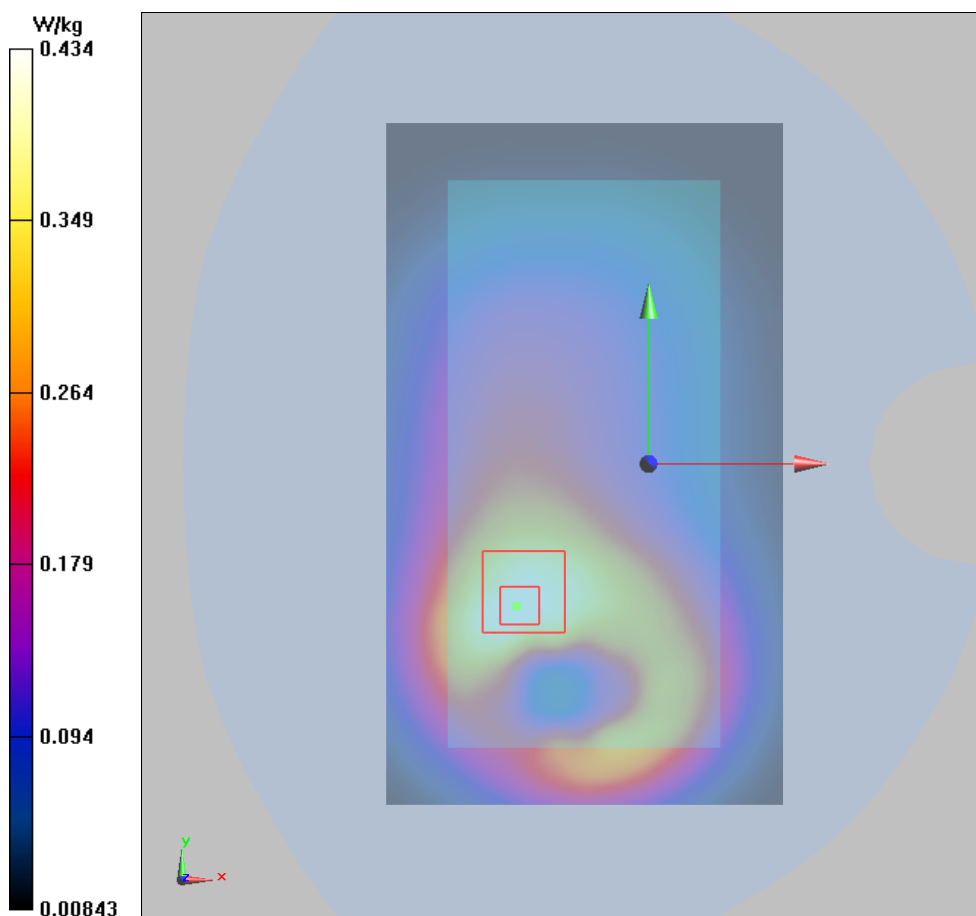
Front Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.90 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 0.573 W/kg

SAR(1 g) = 0.410 W/kg; SAR(10 g) = 0.283 W/kg

Maximum value of SAR (measured) = 0.434 W/kg



Plot 13 GSM 850 GPRS (1Txslot) Front Side Middle (For Single Screen Mode, Distance 10mm)

Date: 10/9/2017

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

Medium parameters used: $f = 837$ MHz; $\sigma = 1.013$ S/m; $\epsilon_r = 55.395$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.74, 9.74, 9.74); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666

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

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

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

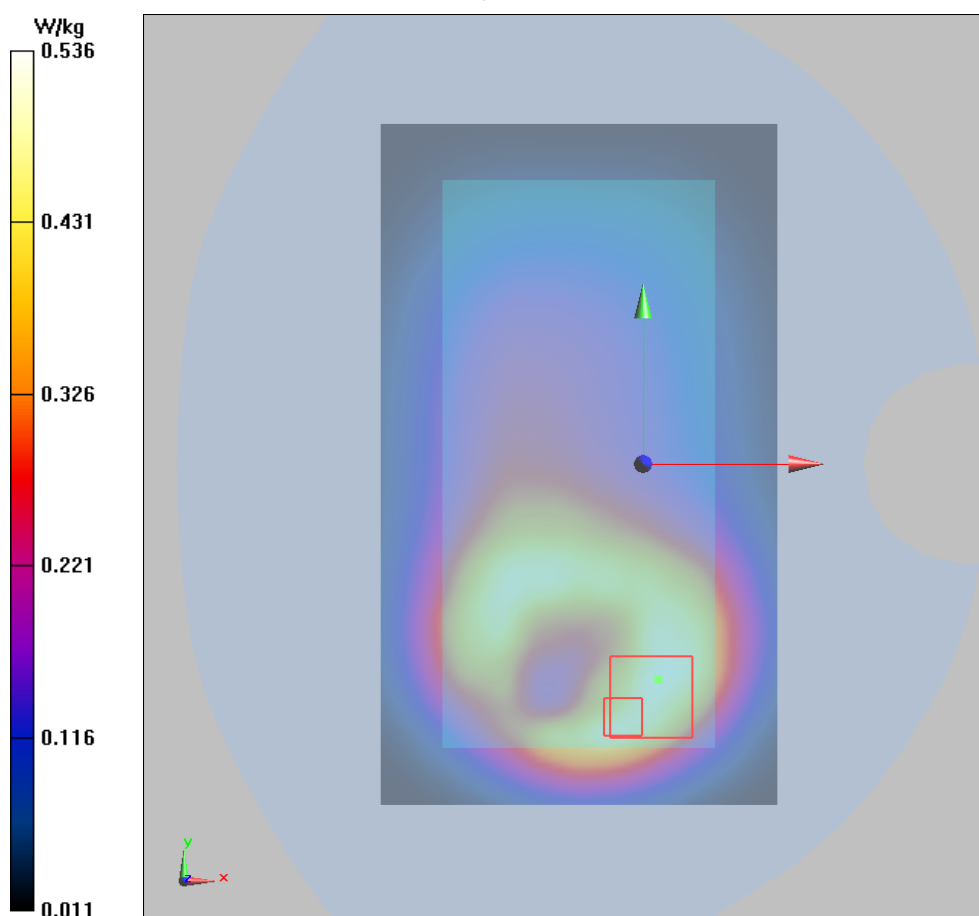
Front Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.62 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.627 W/kg

SAR(1 g) = 0.332W/kg; SAR(10 g) = 0.298 W/kg

Maximum value of SAR (measured) = 0.536 W/kg



Plot 14 GSM 850 GPRS (1Txslot) Back Side Middle (For Double Screen Mode, Distance 10mm)

Date: 10/9/2017

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

Medium parameters used: $f = 837$ MHz; $\sigma = 1.013$ S/m; $\epsilon_r = 55.395$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.74, 9.74, 9.74); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666

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

Back Side Middle/Area Scan (111x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.686 W/kg

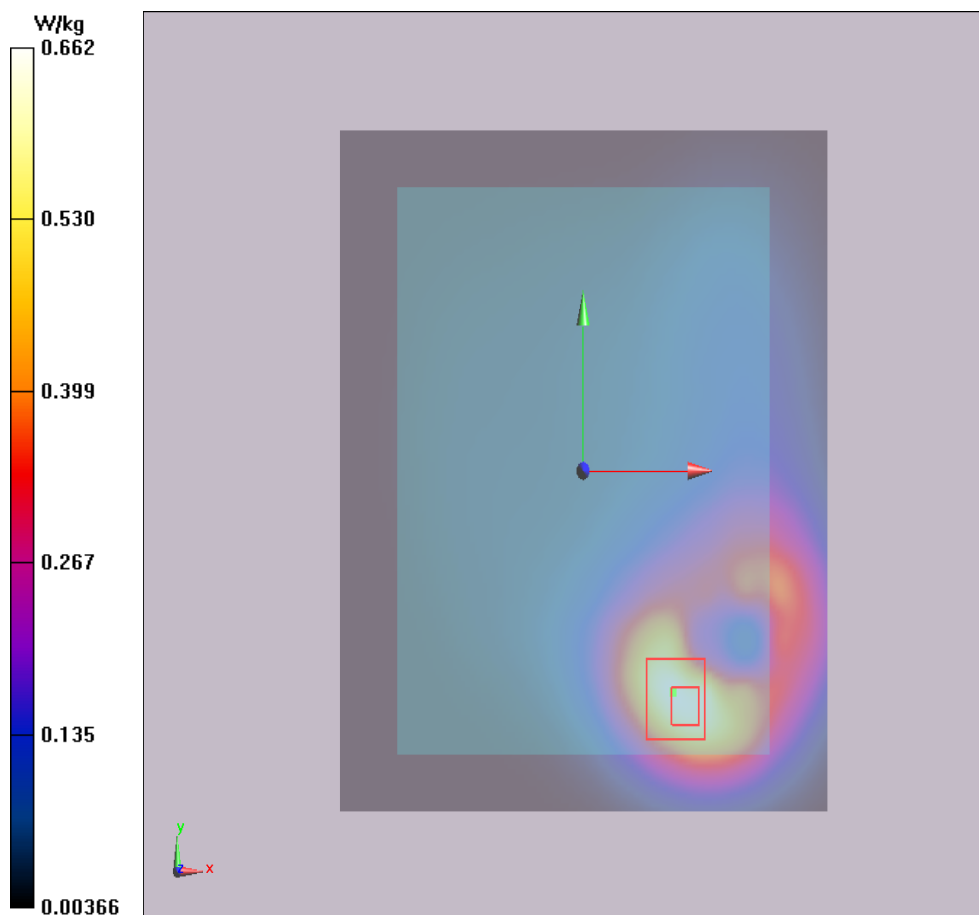
Back Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.946 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.986 W/kg

SAR(1 g) = 0.617 W/kg; SAR(10 g) = 0.374 W/kg

Maximum value of SAR (measured) = 0.662 W/kg



Plot 15 GSM 1900 Right Cheek Middle (For Single Screen Mode)

Date: 9/28/2017

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 41.3$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Right Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(8.39, 8.39, 8.39); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

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

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

Maximum value of SAR (interpolated) = 0.081 mW/g

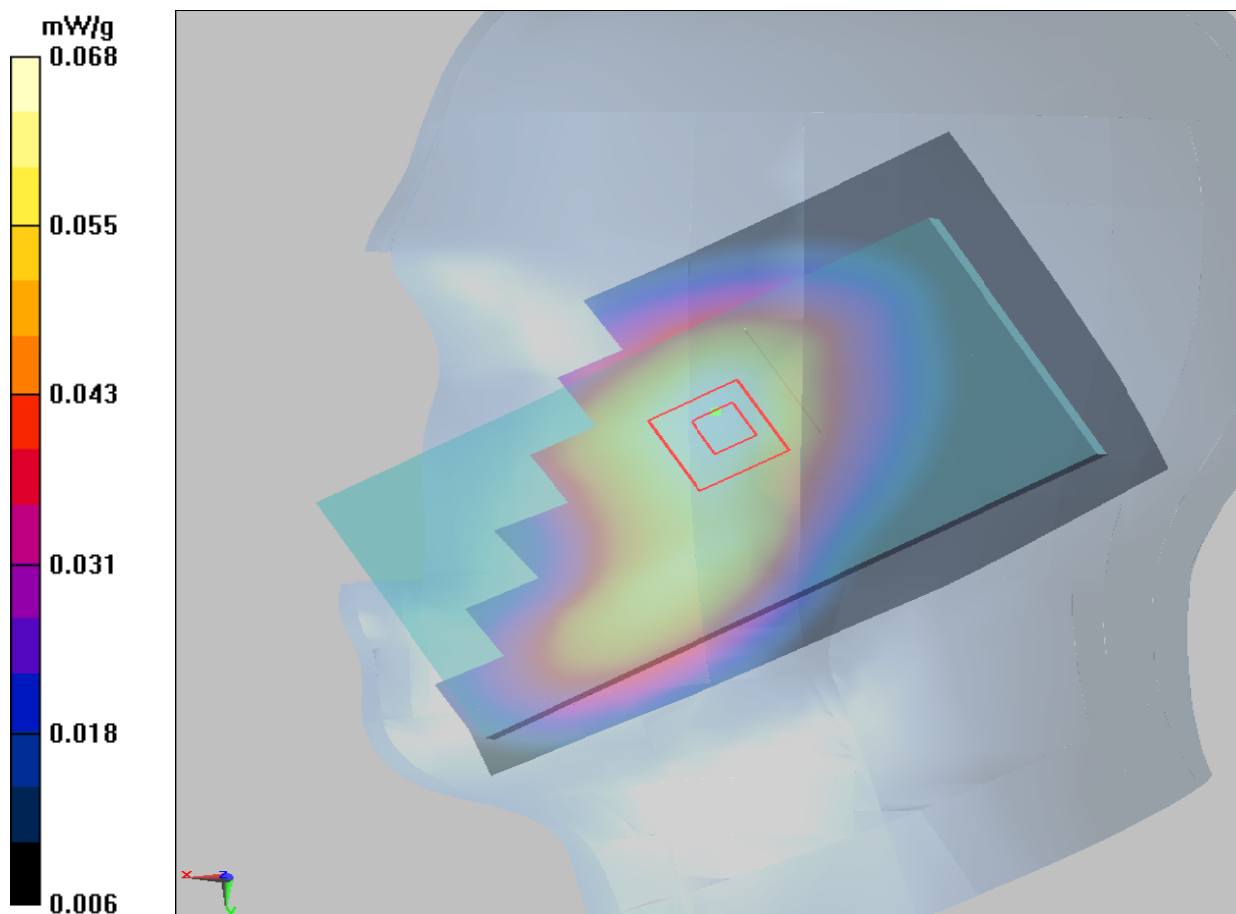
Right Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.21 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.069 W/kg

SAR(1 g) = 0.064 mW/g; SAR(10 g) = 0.047 mW/g

Maximum value of SAR (measured) = 0.068 mW/g



Plot 16 GSM 1900 Front Side Middle (For Single Screen Mode, Distance 10mm)

Date: 10/18/2017

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.49$ S/m; $\epsilon_r = 51.207$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.98, 7.98, 7.98); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

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

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

Maximum value of SAR (interpolated) = 0.484 W/kg

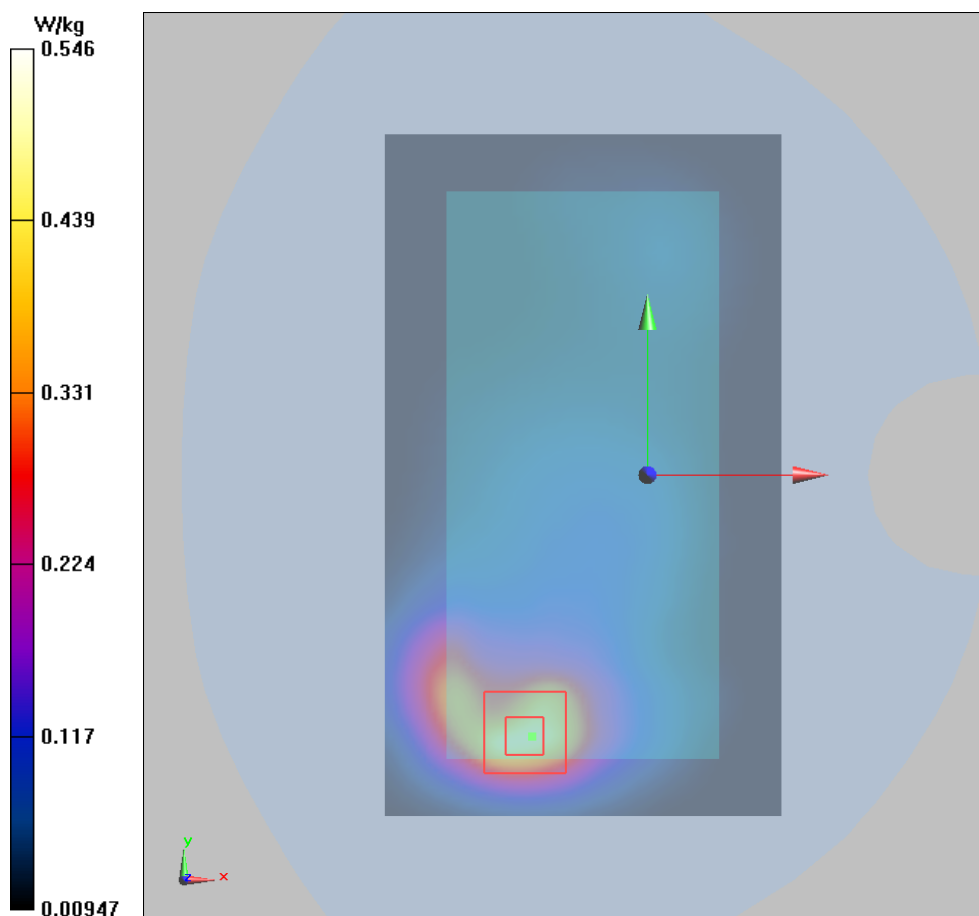
Front Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.454 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.766 W/kg

SAR(1 g) = 0.479 W/kg; SAR(10 g) = 0.268 W/kg

Maximum value of SAR (measured) = 0.546 W/kg



Plot 17 GSM 1900 GPRS (3Txslots) Bottom Edge Middle (For Single Screen Mode, Distance 10mm)

Date: 10/18/2017

Communication System: UID 0, 3 slot GPRS (0); Frequency: 1880 MHz; Duty Cycle: 1:2.76694

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.475$ S/m; $\epsilon_r = 51.872$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.98, 7.98, 7.98); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

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

Bottom Edge Middle/Area Scan (51x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.942 W/kg

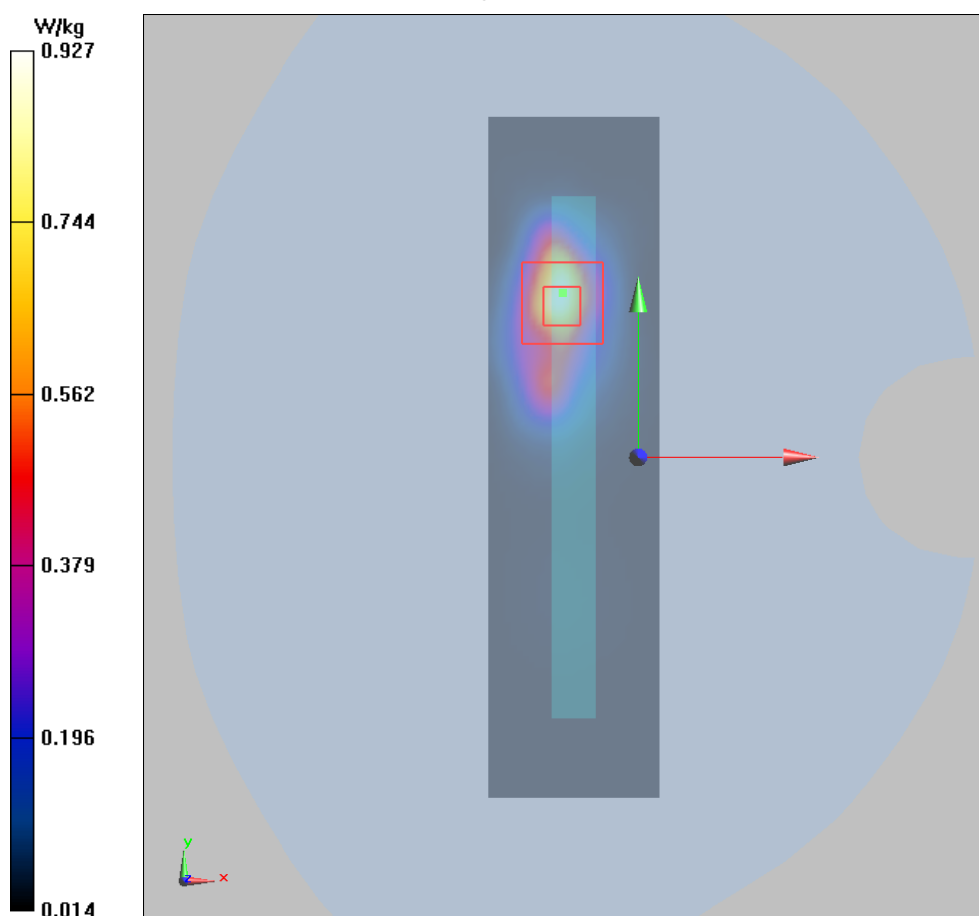
Bottom Edge Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 20.08 V/m; Power Drift = 0.045 dB

Peak SAR (extrapolated) = 1.33 W/kg

SAR(1 g) = 0.838 W/kg; SAR(10 g) = 0.457 W/kg

Maximum value of SAR (measured) = 0.927 W/kg



Plot 18 GSM 1900 GPRS (3Txslots) Back Side Middle (For Double Screen Mode, Distance 10mm)

Date: 10/18/2017

Communication System: UID 0, 3 slot GPRS (0); Frequency: 1880 MHz; Duty Cycle: 1:2.76694

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.49$ S/m; $\epsilon_r = 51.207$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

Electronics: DAE4 Sn913; Calibrated: 2017/5/2

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

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

Back Side Middle/Area Scan (111x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.636 W/kg

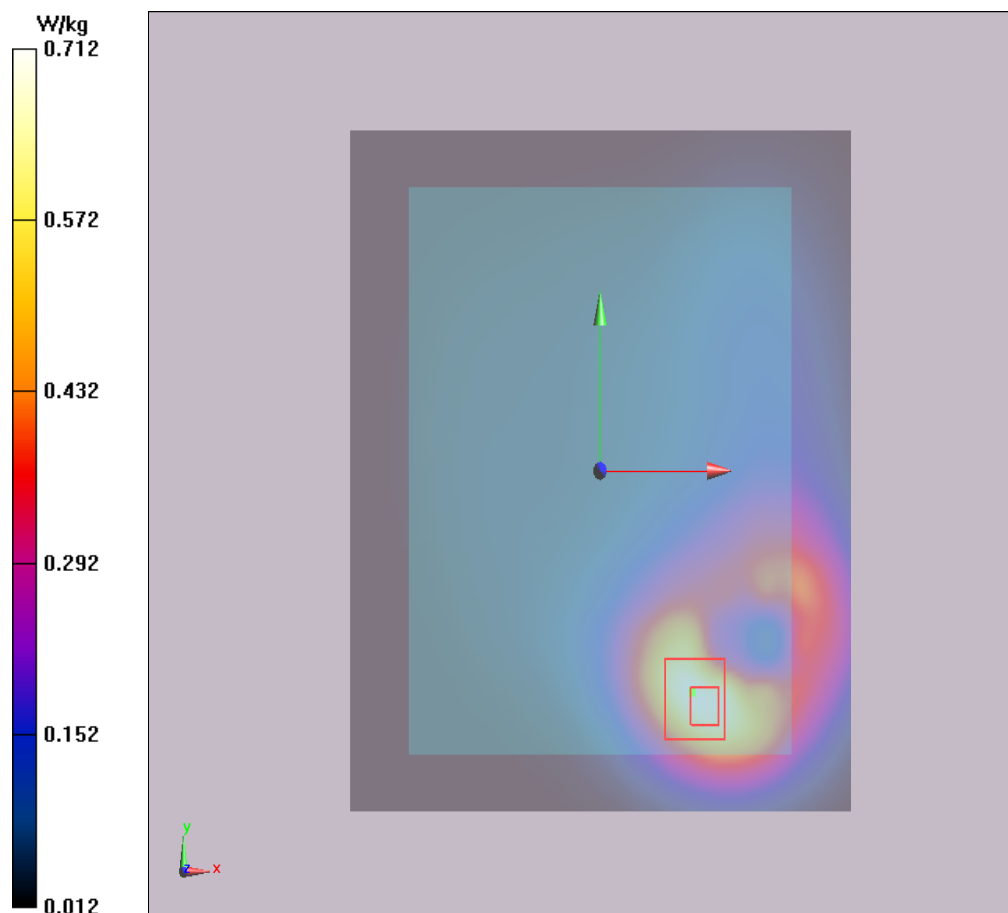
Back Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.161 V/m; Power Drift = 0.049 dB

Peak SAR (extrapolated) = 0.983 W/kg

SAR(1 g) = 0.633 W/kg; SAR(10 g) = 0.360 W/kg

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



Plot 19 GSM 1900 GPRS (3Txslots) Bottom Edge Middle (For Double Screen Mode, Distance 10mm)

Date: 10/18/2017

Communication System: UID 0, 3 slot GPRS (0); Frequency: 1880 MHz; Duty Cycle: 1:2.76694

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.49$ S/m; $\epsilon_r = 51.207$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.98, 7.98, 7.98); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

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

Bottom Edge Middle/Area Scan (51x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.56 W/kg

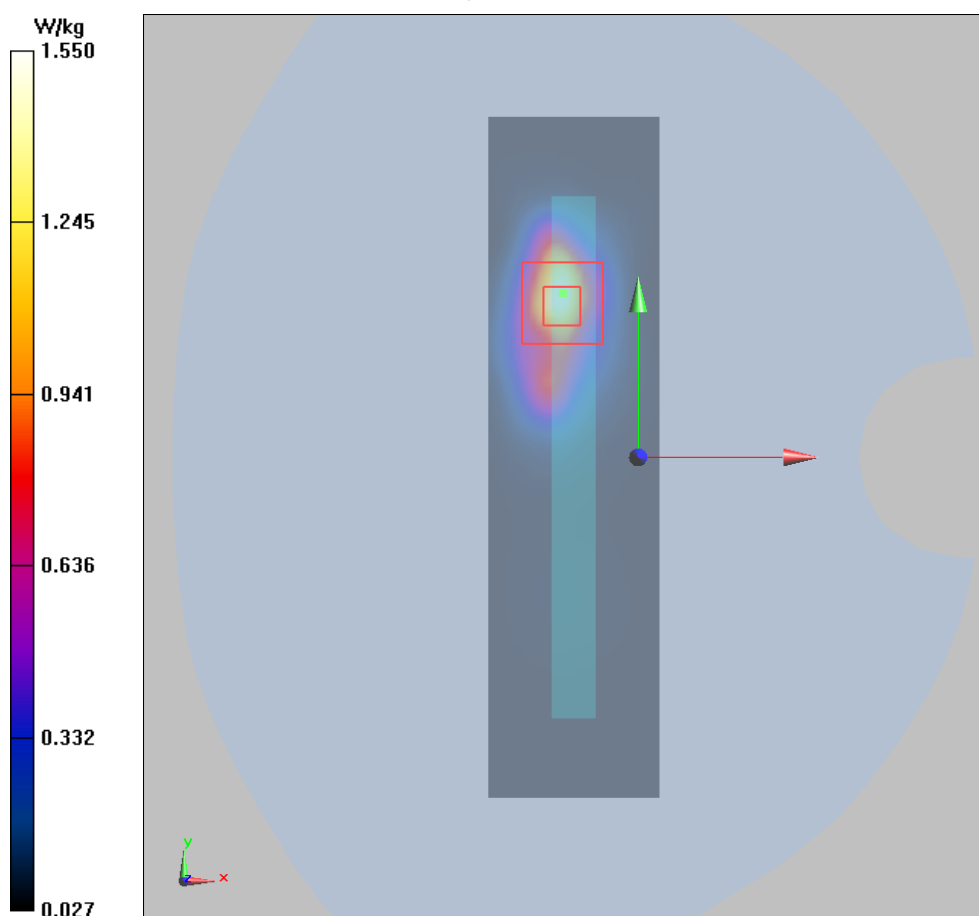
Bottom Edge Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.06 V/m; Power Drift = 0.041 dB

Peak SAR (extrapolated) = 2.32 W/kg

SAR(1 g) = 1.39 W/kg; SAR(10 g) = 0.744 W/kg

Maximum value of SAR (measured) = 1.55 W/kg



Plot 20 GSM 1900 GPRS (3Txslots) Bottom Edge Middle (For Double Screen Mode, Distance 0mm)

Date: 10/18/2017

Communication System: UID 0, 3 slot GPRS (0); Frequency: 1880 MHz; Duty Cycle: 1:2.76694

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.49$ S/m; $\epsilon_r = 51.207$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.98, 7.98, 7.98); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

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

Bottom Edge Middle/Area Scan (51x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 4.94 W/kg

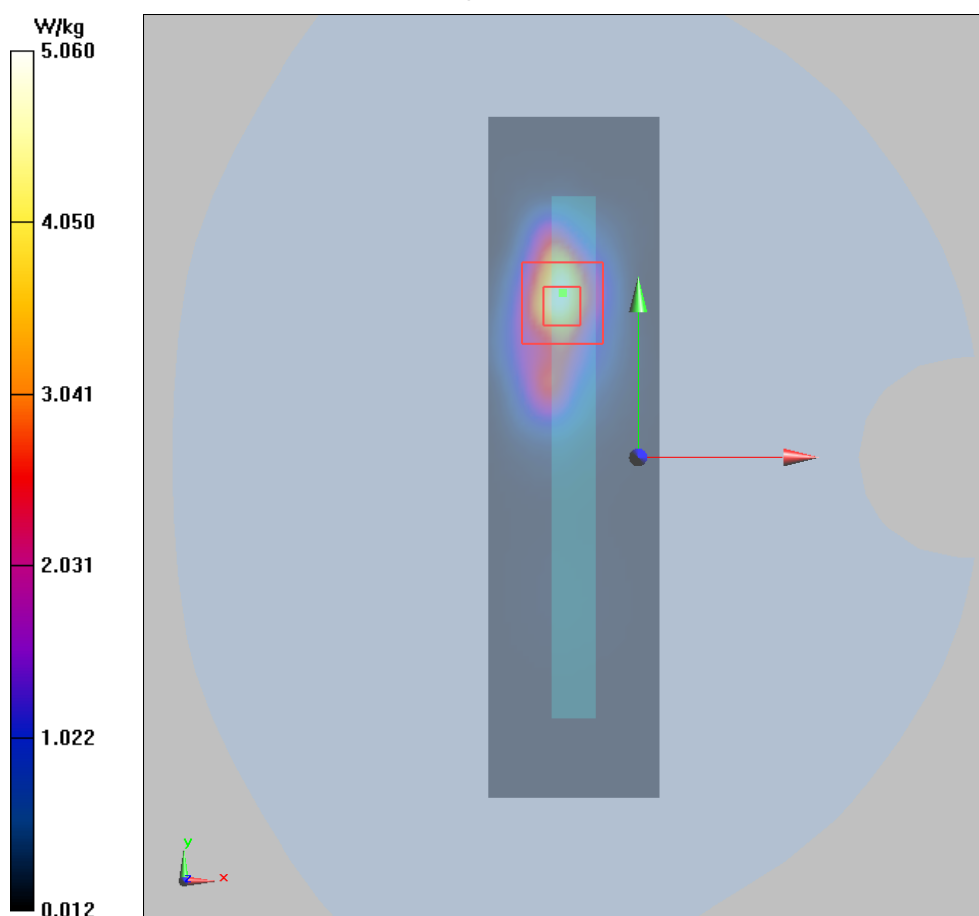
Bottom Edge Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 13.20 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 6.66 W/kg

SAR(1 g) = 3.74 W/kg; SAR(10 g) = 1.7 W/kg

Maximum value of SAR (measured) = 5.06 W/kg



Plot 21 UMTS Band V Left Cheek Middle (For Single Screen Mode)

Date: 9/28/2017

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

Medium parameters used: $f = 837$ MHz; $\sigma = 0.934$ S/m; $\epsilon_r = 41.065$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.31, 9.31, 9.31); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

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) = 0.349 W/kg

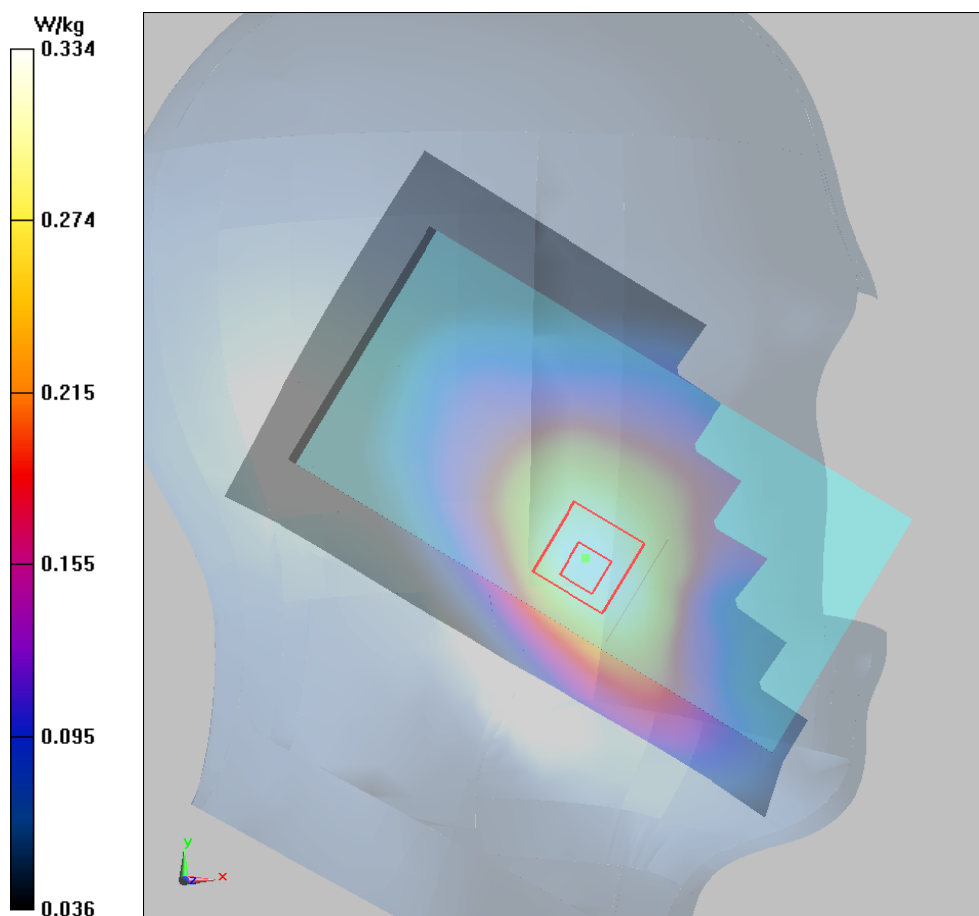
Left Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.265 V/m; Power Drift = -0.055 dB

Peak SAR (extrapolated) = 0.396 W/kg

SAR(1 g) = 0.320 W/kg; SAR(10 g) = 0.245 W/kg

Maximum value of SAR (measured) = 0.334 W/kg



Plot 22 UMTS Band V Front Side Middle (For Single Screen Mode, Distance 10mm)

Date: 10/9/2017

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

Medium parameters used: $f = 837$ MHz; $\sigma = 1.001$ S/m; $\epsilon_r = 54.375$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.74, 9.74, 9.74); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

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

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

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

Maximum value of SAR (interpolated) = 0.625 W/kg

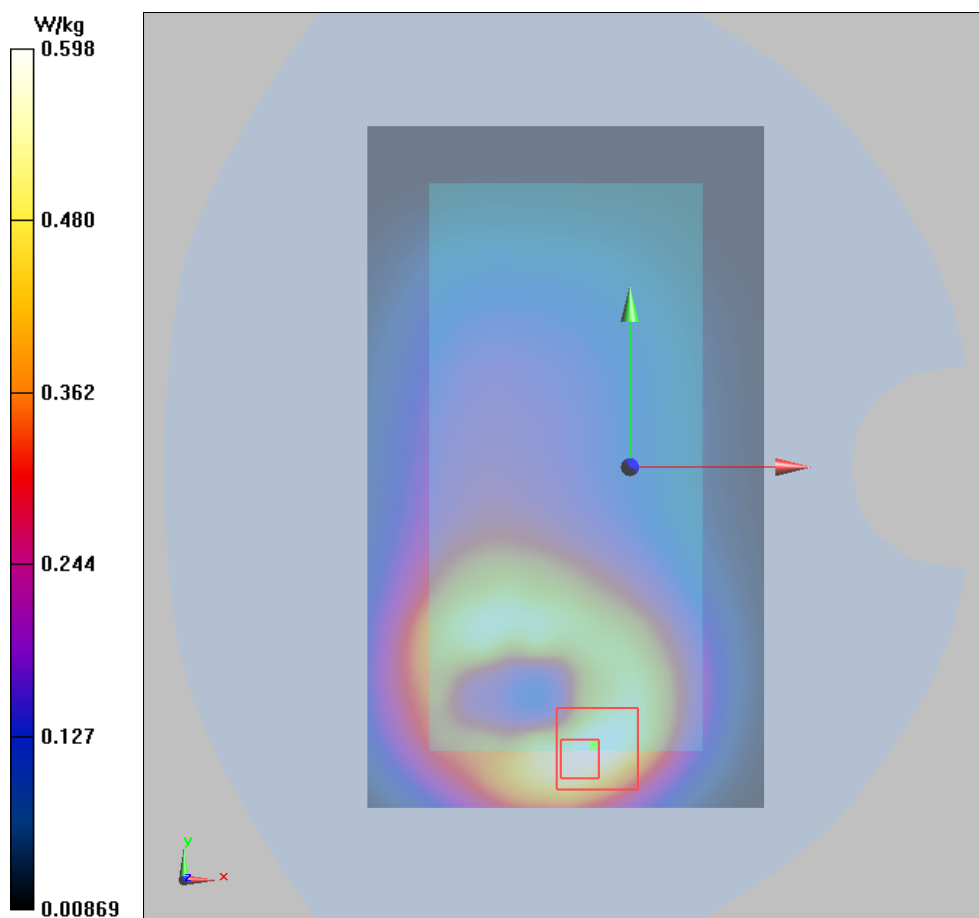
Front Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.84 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.927 W/kg

SAR(1 g) = 0.567 W/kg; SAR(10 g) = 0.339 W/kg

Maximum value of SAR (measured) = 0.598 W/kg



Plot 23 UMTS Band V Back Side Middle (For Double Screen Mode, Distance 10mm)

Date: 10/9/2017

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

Medium parameters used: $f = 837$ MHz; $\sigma = 1.013$ S/m; $\epsilon_r = 55.395$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.74, 9.74, 9.74); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 2; Type: QD000P40CD; Serial: TP:1666

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

Back Side Middle/Area Scan (111x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.760 W/kg

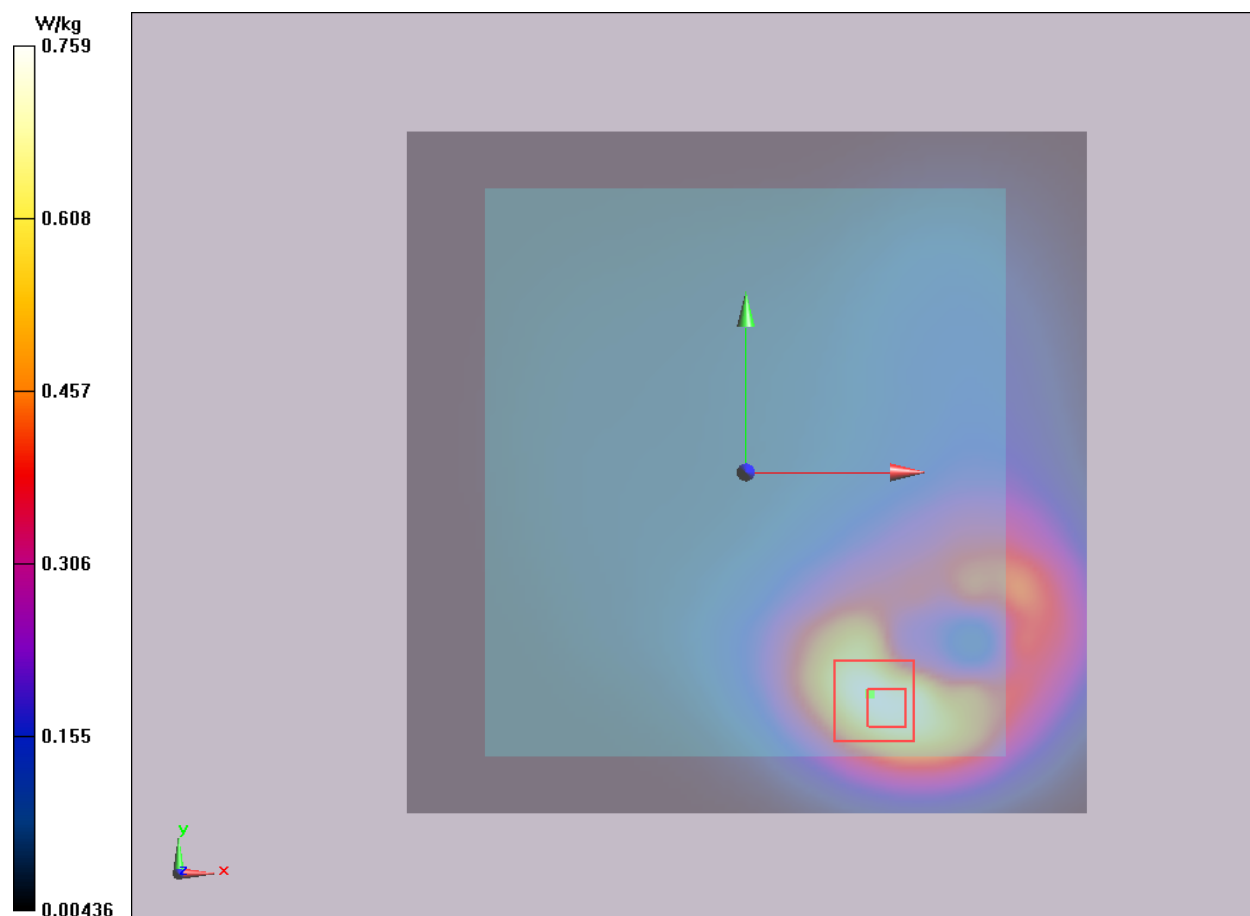
Back Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.321 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 1.10 W/kg

SAR(1 g) = 0.697 W/kg; SAR(10 g) = 0.423 W/kg

Maximum value of SAR (measured) = 0.759 W/kg



Plot 24 802.11b Left Cheek Middle (For Single Screen Mode)

Date: 10/9/2017

Communication System: UID 0, 802.11b (0); Frequency: 2437 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2437$ MHz; $\sigma = 1.829$ S/m; $\epsilon_r = 40.87$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.90, 7.90, 7.90); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 2; Type: SAM;

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

Left Cheek Middle/Area Scan (91x151x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 1.44 W/kg

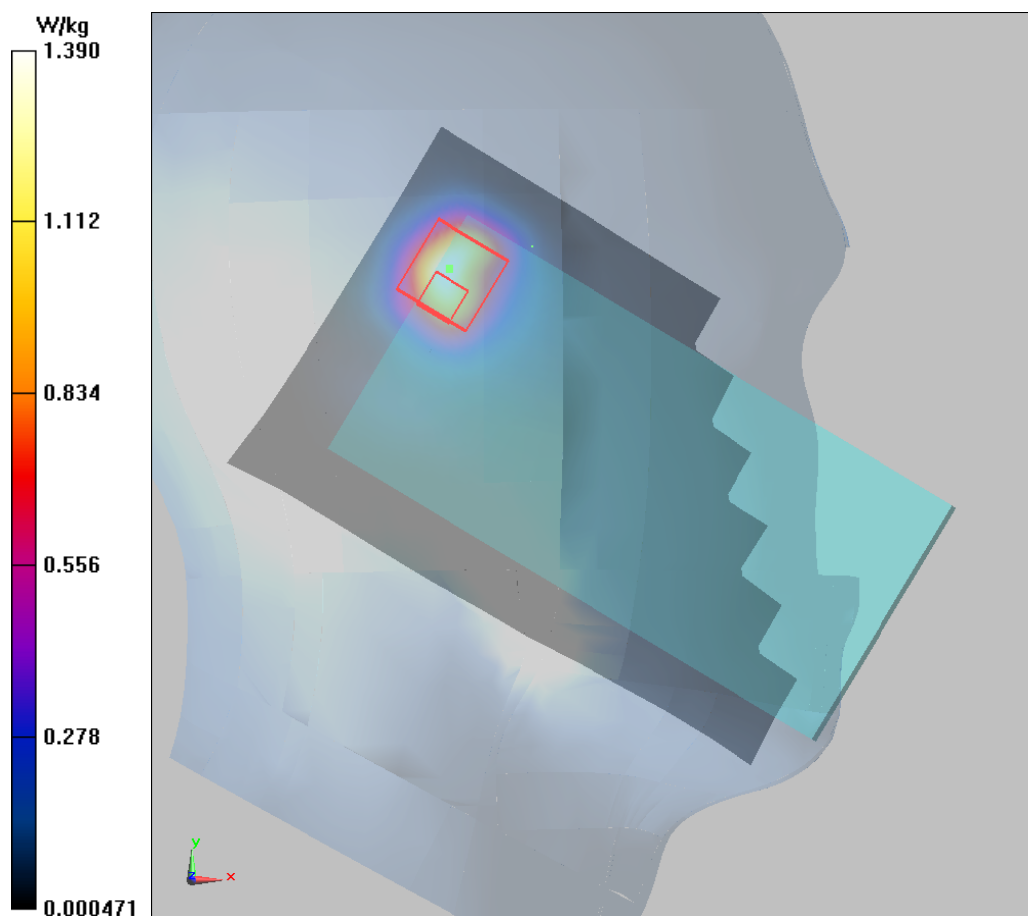
Left Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.33 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 3.03 W/kg

SAR(1 g) = 1.15 W/kg; SAR(10 g) = 0.523 W/kg

Maximum value of SAR (measured) = 1.39 W/kg



Plot 25 802.11b Front Side High (For Single Screen Mode, Distance 10mm)

Date: 10/17/2017

Communication System: UID 0, 802.11b (0); Frequency: 2462 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2462$ MHz; $\sigma = 1.974$ S/m; $\epsilon_r = 51.611$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.85, 7.85, 7.85); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 2; Type: SAM;

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

Front Side High/Area Scan (91x151x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.200 W/kg

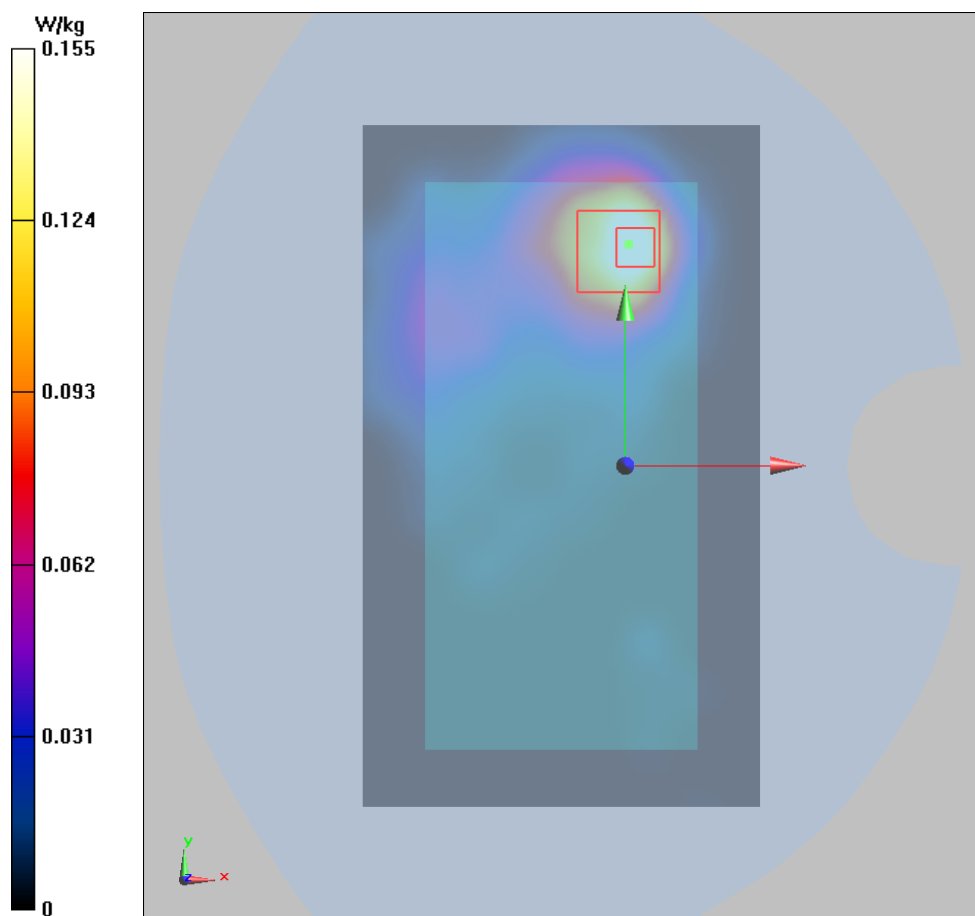
Front Side High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 1.515 V/m; Power Drift = 0.022 dB

Peak SAR (extrapolated) = 0.311 W/kg

SAR(1 g) = 0.143 W/kg; SAR(10 g) = 0.068 W/kg

Maximum value of SAR (measured) = 0.155 W/kg



Plot 26 802.11b Front Side High (For Double Screen Mode, Distance 10mm)

Date: 10/17/2017

Communication System: UID 0, 802.11b (0); Frequency: 2462 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2462$ MHz; $\sigma = 1.918$ S/m; $\epsilon_r = 51.42$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.85, 7.85, 7.85); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

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

Front Side High/Area Scan (141x151x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.243 W/kg

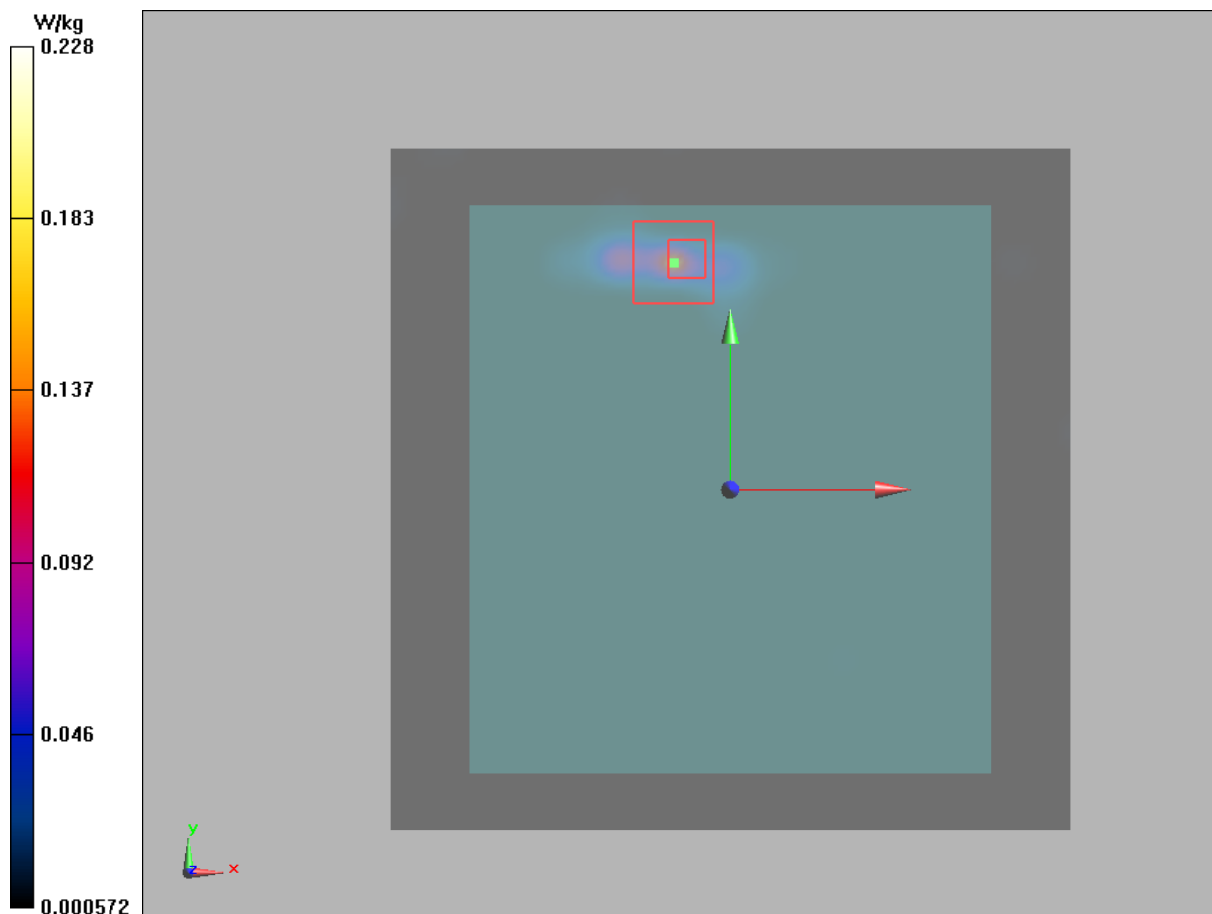
Front Side High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.311 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.399 W/kg

SAR(1 g) = 0.200 W/kg; SAR(10 g) = 0.098 W/kg

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



Plot 27 802.11a U-NII-2A Left Cheek CH64 (For Single Screen Mode)

Date: 10/13/2017

Communication System: UID 0, 802.11a (0); Frequency: 5320 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5320$ MHz; $\sigma = 4.84$ S/m; $\epsilon_r = 35.77$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.66, 5.66, 5.66); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 2; Type: SAM;

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

Left Cheek CH64/Area Scan (111x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.336 W/kg

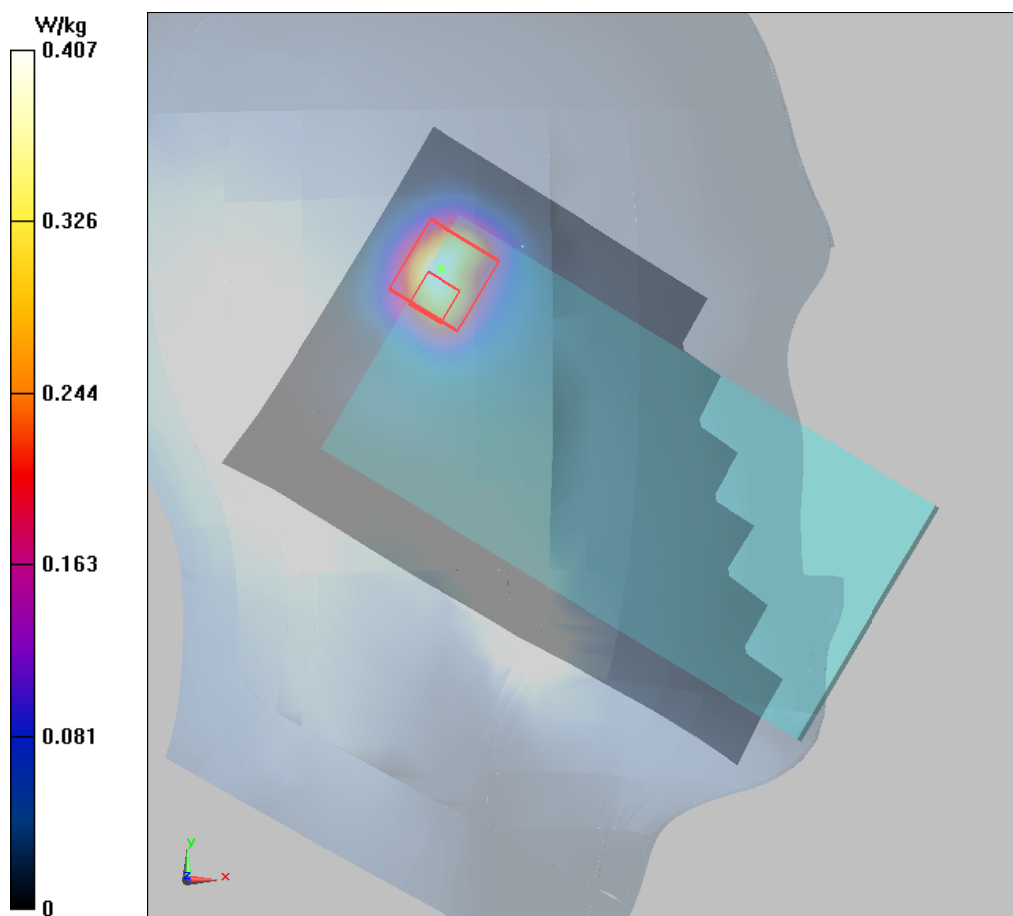
Left Cheek CH64/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 2.729 V/m; Power Drift = -0.089 dB

Peak SAR (extrapolated) = 1.15 W/kg

SAR(1 g) = 0.330 W/kg; SAR(10 g) = 0.100 W/kg

Maximum value of SAR (measured) = 0.407 W/kg



Plot 28 802.11a U-NII-2A Front Side CH64 (For Single Screen Mode, Distance 10mm)

Date: 10/14/2017

Communication System: UID 0, 802.11a (0); Frequency: 5320 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5320$ MHz; $\sigma = 5.518$ S/m; $\epsilon_r = 46.537$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.03, 5.03, 5.03); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 2; Type: SAM;

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

Front Side CH64/Area Scan (111x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.142 W/kg

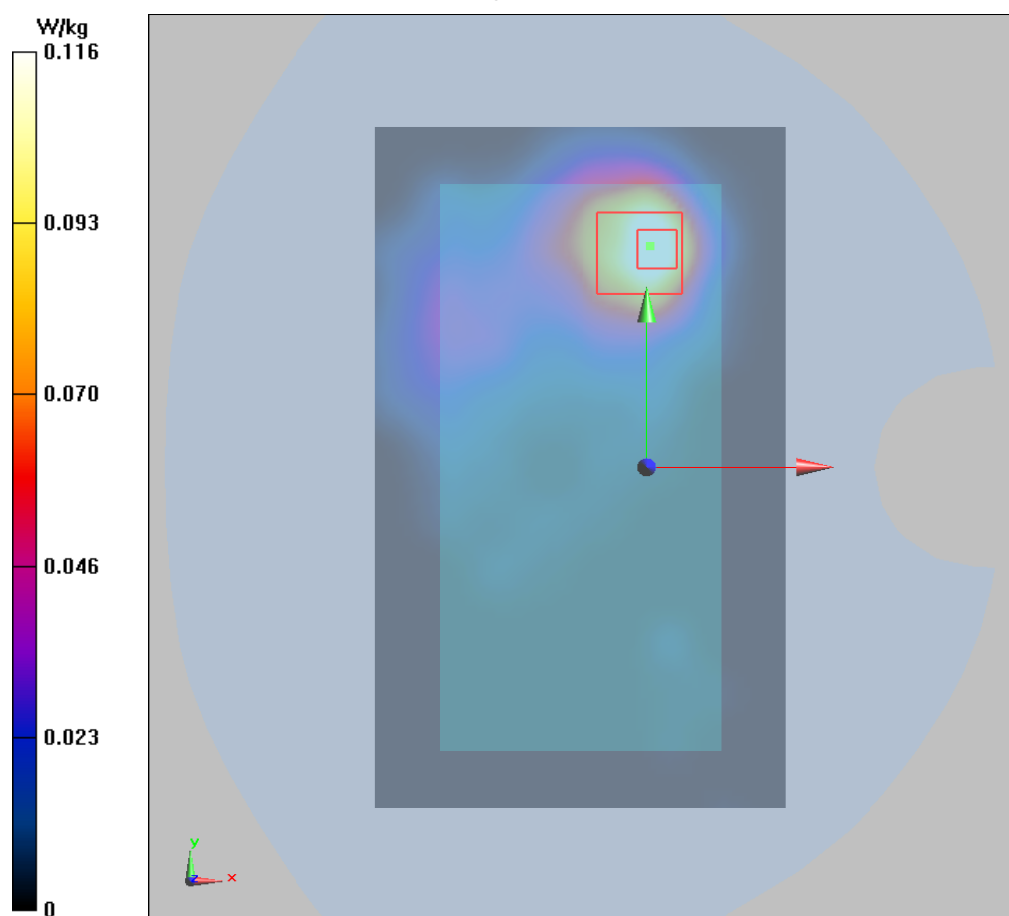
Front Side CH64/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 0.9580 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.427 W/kg

SAR(1 g) = 0.106 W/kg; SAR(10 g) = 0.039 W/kg

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



Plot 29 802.11a U-NII-2A Back Side CH64 (For Double Screen Mode, Distance 10mm)

Date: 10/14/2017

Communication System: UID 0, 802.11a (0); Frequency: 5320 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5320$ MHz; $\sigma = 5.518$ S/m; $\epsilon_r = 46.537$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.03, 5.03, 5.03); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 2; Type: SAM;

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

Back Side CH64/Area Scan (111x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.0752 W/kg

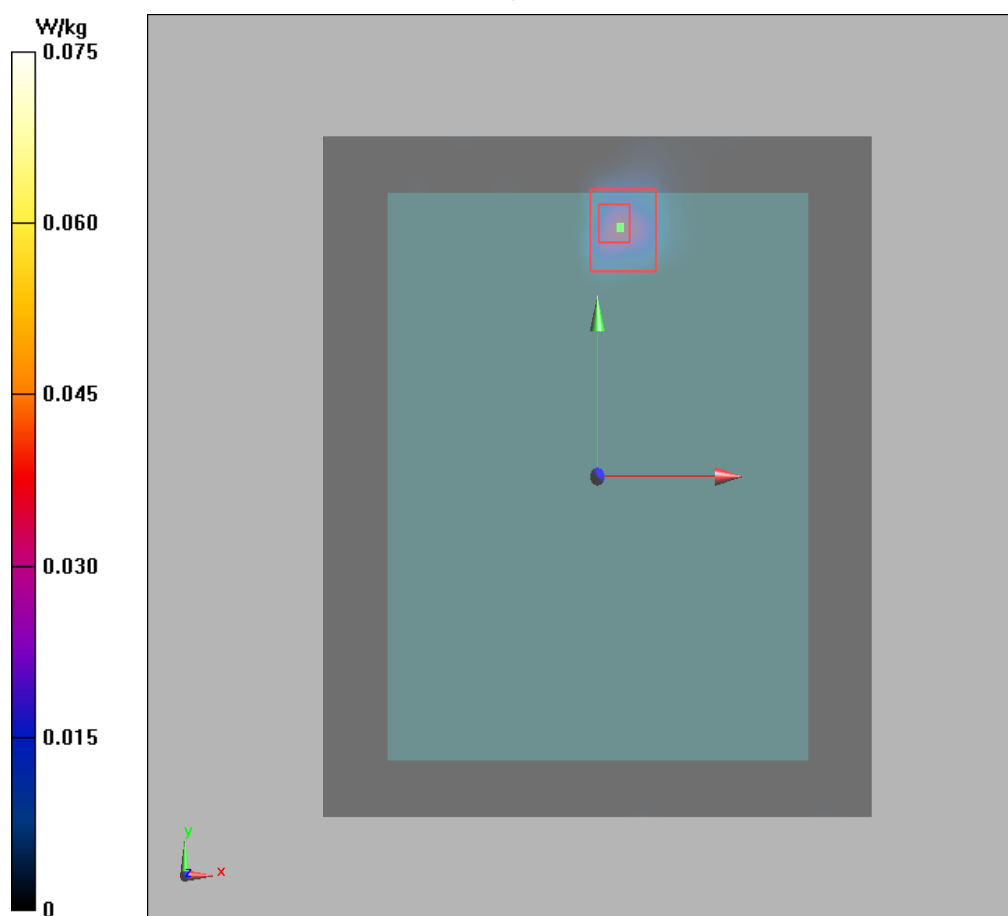
Top Edge CH64/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 1.490 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 0.0830 W/kg

SAR(1 g) = 0.014 W/kg; SAR(10 g) = 0.00344 W/kg

Maximum value of SAR (measured) = 0.0155 W/kg



Plot 30 802.11a U-NII-2A Top Edge CH64 (For Single Screen Mode, Distance 0mm)

Date: 10/14/2017

Communication System: UID 0, 802.11a (0); Frequency: 5320 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5320$ MHz; $\sigma = 5.518$ S/m; $\epsilon_r = 46.537$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.03, 5.03, 5.03); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 2; Type: SAM;

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

Top Edge CH64/Area Scan (51x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.554 W/kg

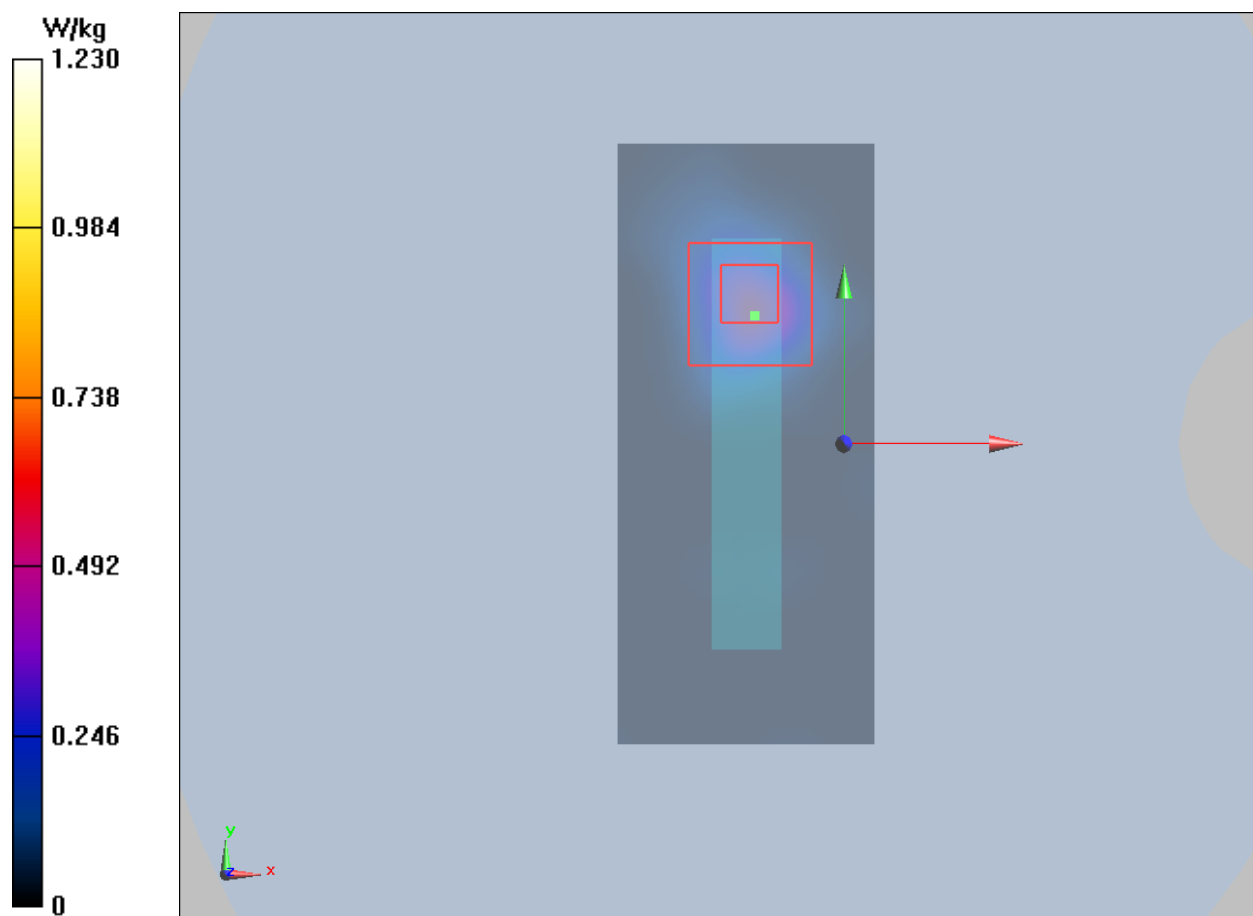
Top Edge CH64/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 5.188 V/m; Power Drift = 0.034 dB

Peak SAR (extrapolated) = 4.53 W/kg

SAR(1 g) = 0.966 W/kg; SAR(10 g) = 0.232 W/kg

Maximum value of SAR (measured) = 1.23 W/kg



Plot 31 802.11a U-NII-2A Top Edge CH64 (For Double Screen Mode, Distance 0mm)

Date: 10/14/2017

Communication System: UID 0, 802.11a (0); Frequency: 5320 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5320$ MHz; $\sigma = 5.518$ S/m; $\epsilon_r = 46.537$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.03, 5.03, 5.03); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 2; Type: SAM;

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

Top Edge CH64/Area Scan (51x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.24 W/kg

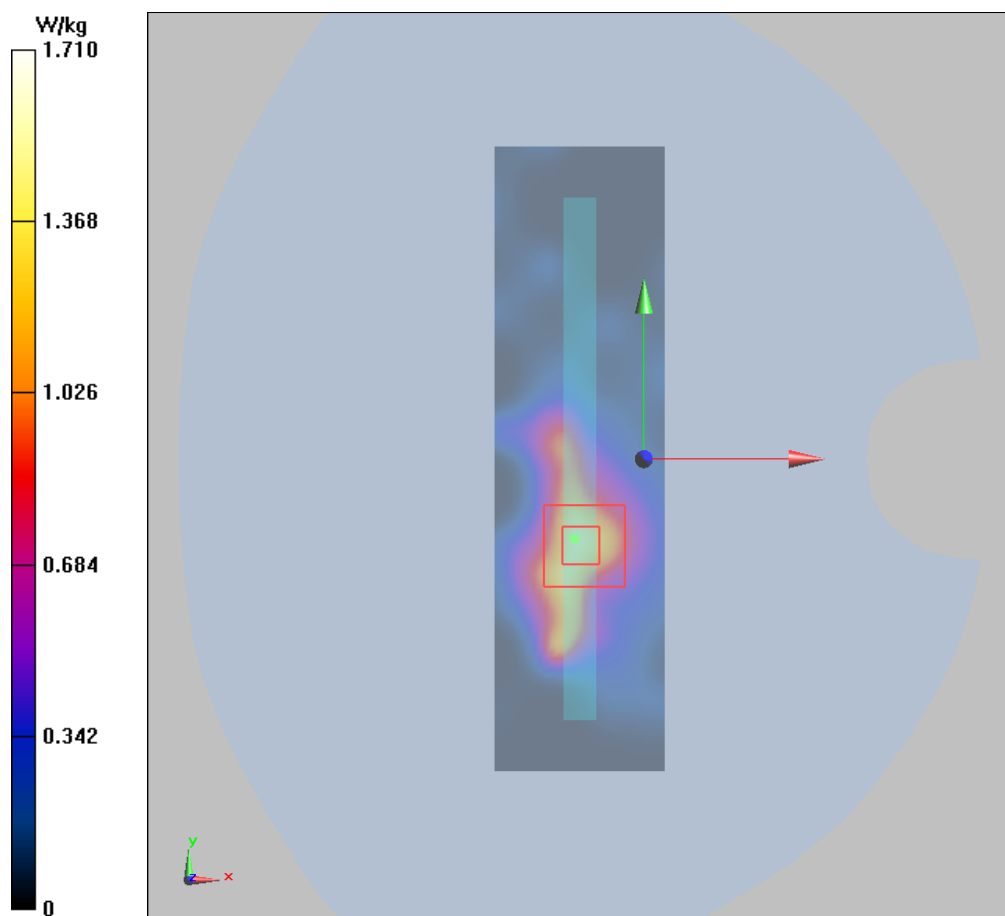
Top Edge CH64/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 10.78 V/m; Power Drift = 0.099 dB

Peak SAR (extrapolated) = 3.36 W/kg

SAR(1 g) = 1.06 W/kg; SAR(10 g) = 0.281 W/kg

Maximum value of SAR (measured) = 1.71 W/kg



Plot 32 802.11a U-NII-1 Back Side CH48 (For Double Screen Mode, Distance 10mm)

Date: 10/14/2017

Communication System: UID 0, 802.11a (0); Frequency: 5240 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5240$ MHz; $\sigma = 5.402$ S/m; $\epsilon_r = 46.735$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.03, 5.03, 5.03); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 2; Type: SAM;

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

Back Side CH48/Area Scan (111x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.0495 W/kg

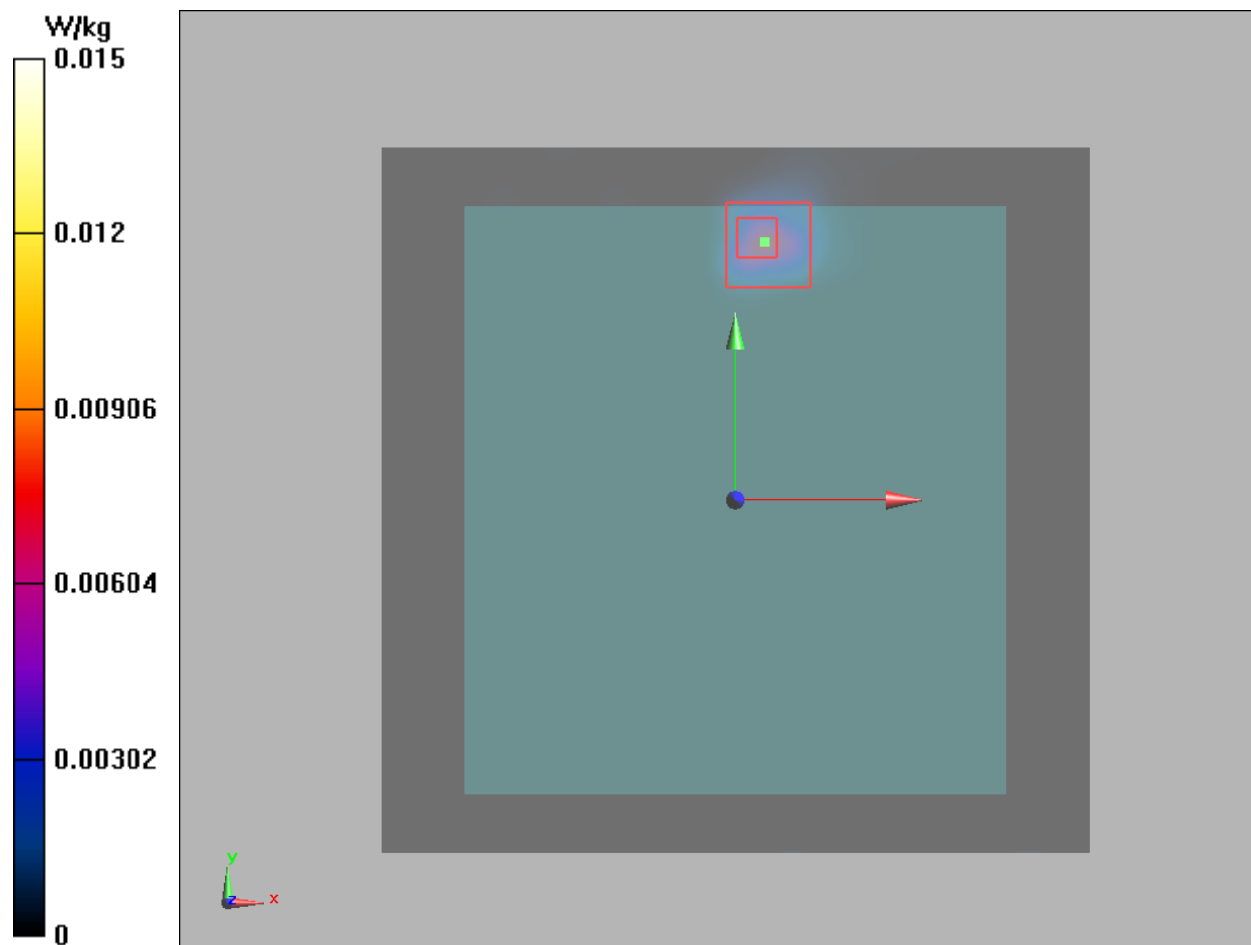
Back Side CH48/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 1.173 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.0790 W/kg

SAR(1 g) = 0.017 W/kg; SAR(10 g) = 0.006 W/kg

Maximum value of SAR (measured) = 0.015 W/kg



Plot 33 802.11a U-NII-2C Left Cheek CH100 (For Single Screen Mode)

Date: 10/13/2017

Communication System: UID 0, 802.11a (0); Frequency: 5500 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5500$ MHz; $\sigma = 5.071$ S/m; $\epsilon_r = 35.318$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(4.99, 4.99, 4.99); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 2; Type: SAM;

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

Left Cheek CH100/Area Scan (111x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.444 W/kg

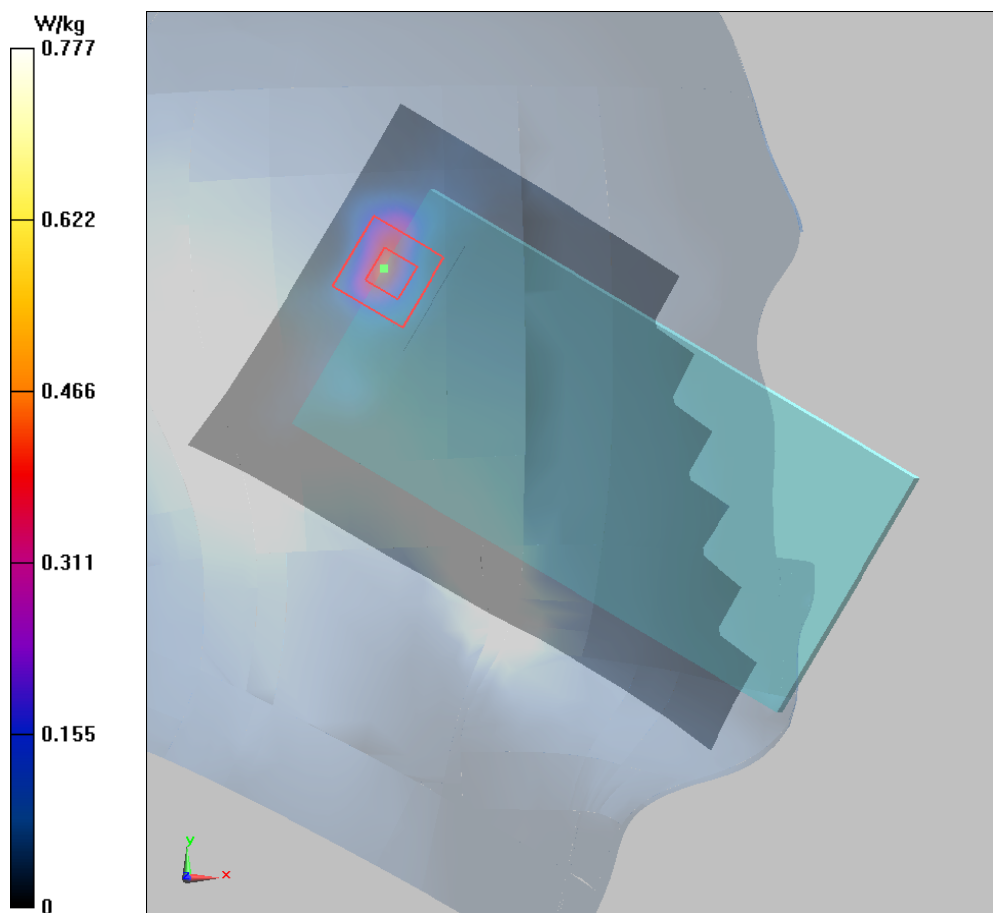
Left Cheek CH100/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 2.943 V/m; Power Drift = 0.027 dB

Peak SAR (extrapolated) = 1.92 W/kg

SAR(1 g) = 0.607 W/kg; SAR(10 g) = 0.159 W/kg

Maximum value of SAR (measured) = 0.777 W/kg



Plot 34 802.11a U-NII-2C Front Side CH100 (For Single Screen Mode, Distance 10mm)

Date: 10/14/2017

Communication System: UID 0, 802.11a (0); Frequency: 5500 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5500$ MHz; $\sigma = 5.793$ S/m; $\epsilon_r = 47.753$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(4.34, 4.34, 4.34); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 2; Type: SAM;

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

Front Side CH100/Area Scan (51x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.0665 W/kg

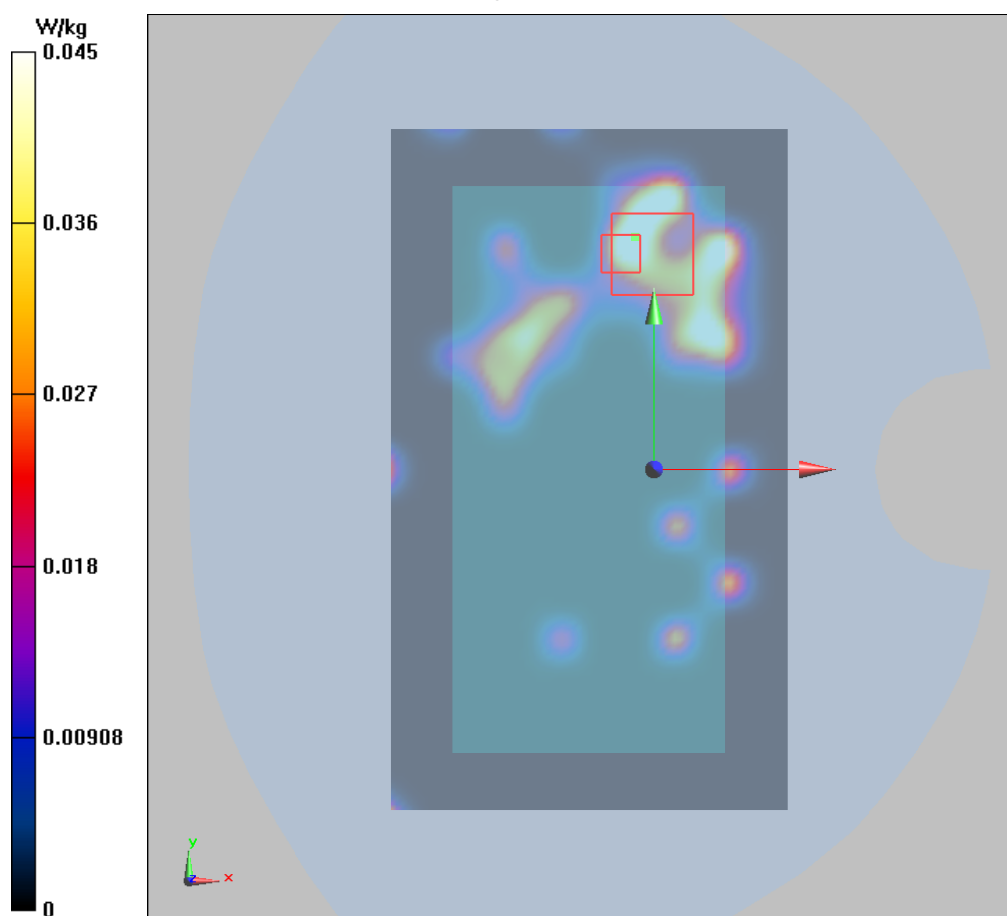
Front Side CH100/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 1.384 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.180 W/kg

SAR(1 g) = 0.036 W/kg; SAR(10 g) = 0.012 W/kg

Maximum value of SAR (measured) = 0.045 W/kg



Plot 35 802.11a U-NII-2C Back Side CH100 (For Double Screen Mode, Distance 10mm)

Date: 10/14/2017

Communication System: UID 0, 802.11a (0); Frequency: 5500 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5500$ MHz; $\sigma = 5.793$ S/m; $\epsilon_r = 47.753$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(4.34, 4.34, 4.34); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 2; Type: SAM;

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

Back Side CH100/Area Scan (111x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.313 W/kg

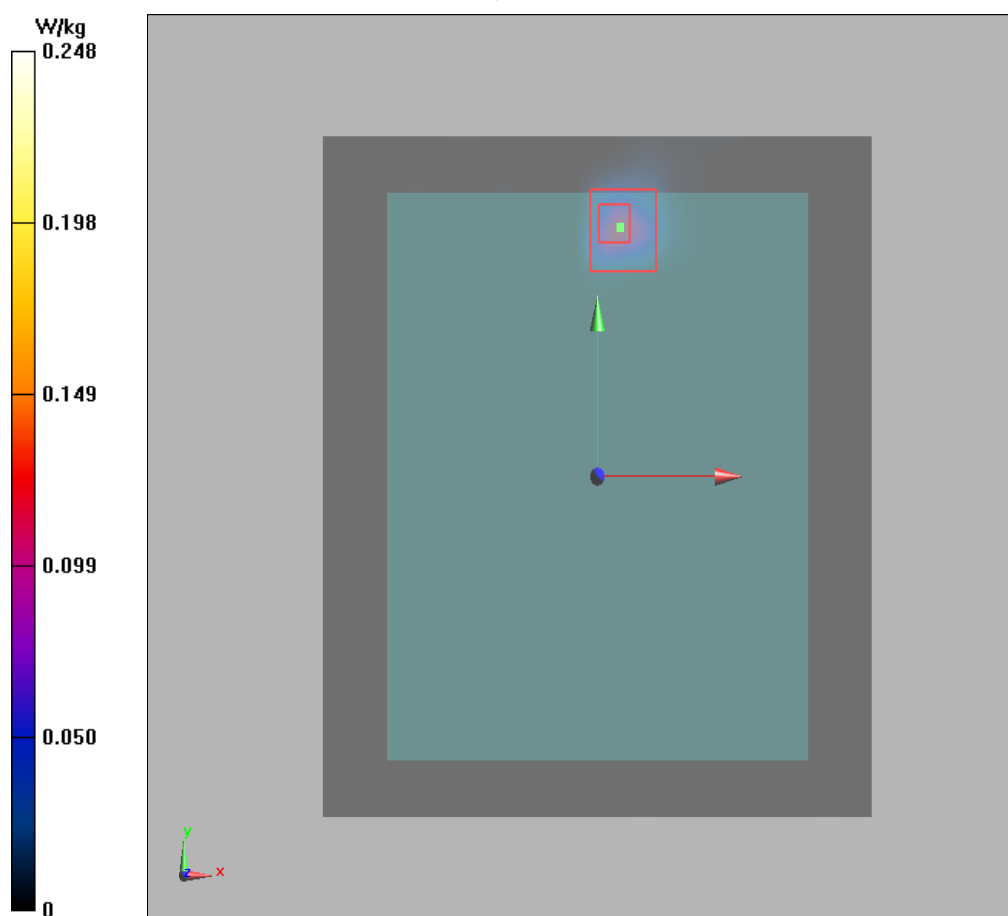
Back Side CH100/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 1.375 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.804 W/kg

SAR(1 g) = 0.209 W/kg; SAR(10 g) = 0.068 W/kg

Maximum value of SAR (measured) = 0.248 W/kg



Plot 36 802.11a U-NII-2C Front Side CH100 (For Single Screen Mode, Distance 0mm)

Date: 10/14/2017

Communication System: UID 0, 802.11a (0); Frequency: 5500 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5500$ MHz; $\sigma = 5.793$ S/m; $\epsilon_r = 47.753$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(4.34, 4.34, 4.34); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 2; Type: SAM;

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

Front Side CH100/Area Scan (51x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.07 W/kg

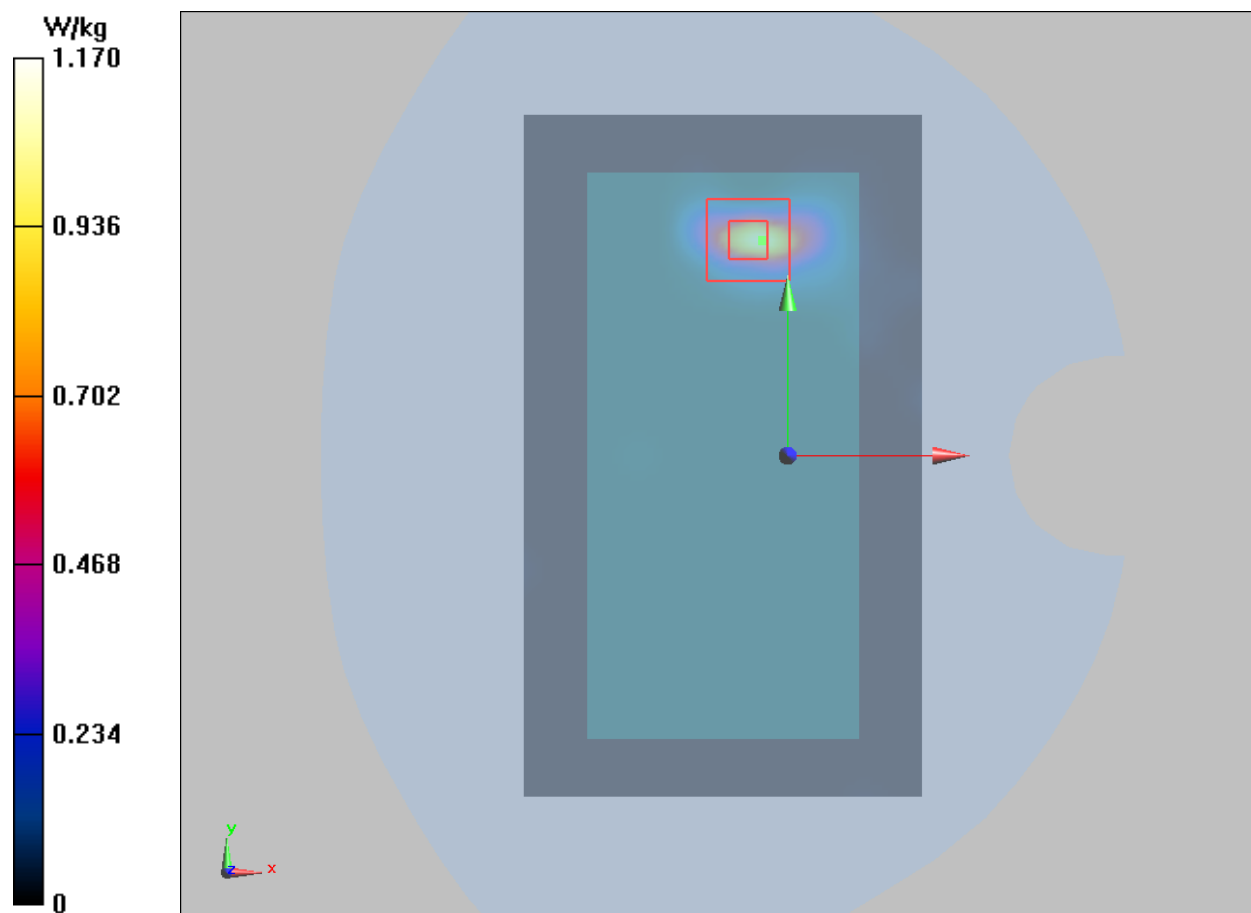
Front Side CH100/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 0 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 2.56 W/kg

SAR(1 g) = 0.854 W/kg; SAR(10 g) = 0.230 W/kg

Maximum value of SAR (measured) = 1.17 W/kg



Plot 37 802.11a U-NII-2C Front Side CH100 (For Double Screen Mode, Distance 0mm)

Date: 10/14/2017

Communication System: UID 0, 802.11a (0); Frequency: 5500 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5500$ MHz; $\sigma = 5.793$ S/m; $\epsilon_r = 47.753$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(4.34, 4.34, 4.34); Calibrated: 1/23/2017;

Electronics: DAE4 Sn1291; Calibrated: 1/19/2017

Phantom: SAM 2; Type: SAM;

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

Front Side CH100/Area Scan (111x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.30 W/kg

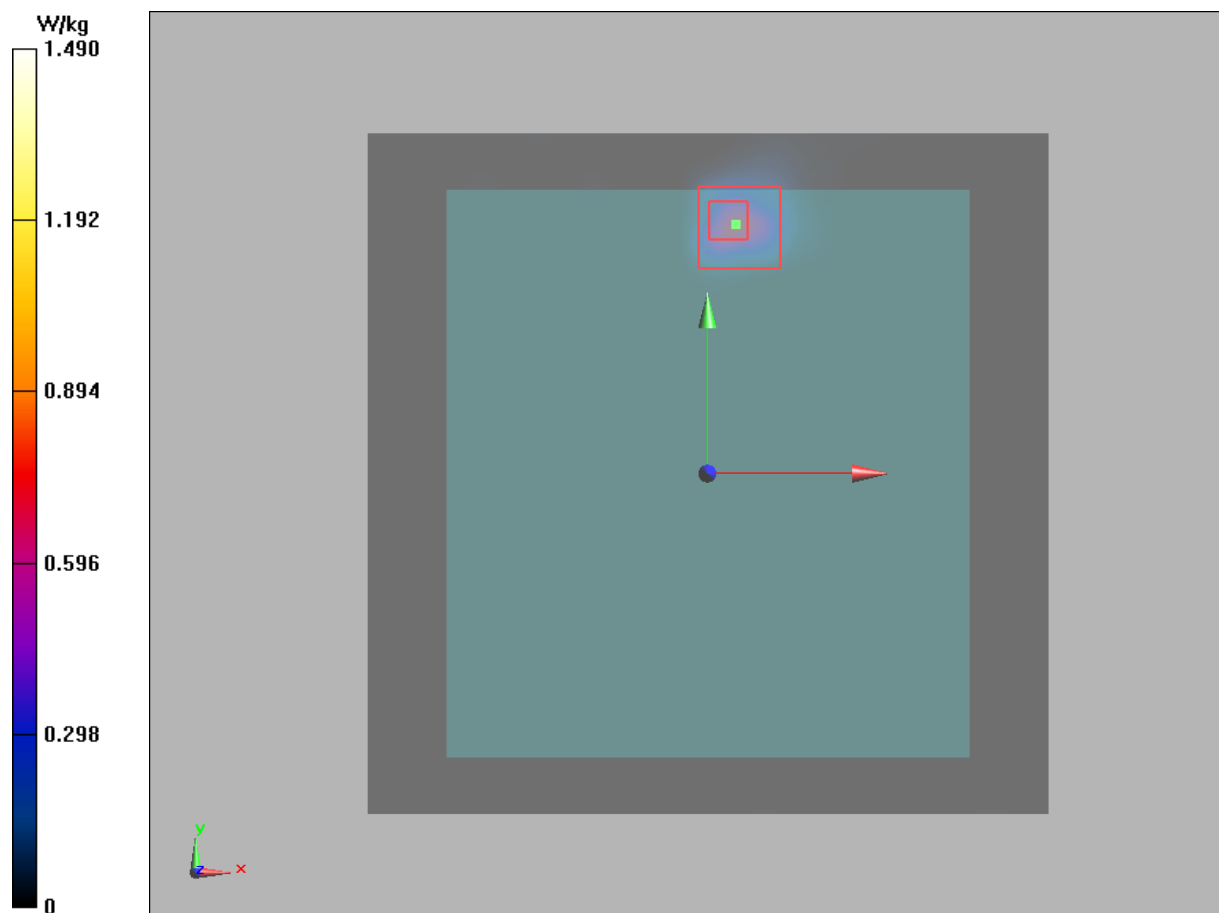
Front Side CH100/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 0.9240 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 3.73 W/kg

SAR(1 g) = 1.25 W/kg; SAR(10 g) = 0.386 W/kg

Maximum value of SAR (measured) = 1.49 W/kg





ANNEX D: Probe Calibration Certificate



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
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 E-mail: cttl@chinattl.com Http://www.chinattl.cn



中国认可
 国际互认
 校准
 CALIBRATION
 CNAS L0570

Client **TA(Shanghai)**Certificate No: **Z17-97012****CALIBRATION CERTIFICATE**Object **EX3DV4 - SN:3677**

Calibration Procedure(s) **FD-Z11-004-01**
Calibration Procedures for Dosimetric E-field Probes

Calibration date: **January 23, 2017**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	27-Jun-16 (CTTL, No.J16X04777)	Jun-17
Power sensor NRP-Z91	101547	27-Jun-16 (CTTL, No.J16X04777)	Jun-17
Power sensor NRP-Z91	101548	27-Jun-16 (CTTL, No.J16X04777)	Jun-17
Reference10dBAttenuator	18N50W-10dB	13-Mar-16(CTTL,No.J16X01547)	Mar-18
Reference20dBAttenuator	18N50W-20dB	13-Mar-16(CTTL, No.J16X01548)	Mar-18
Reference Probe EX3DV4	SN 7433	26-Sep-16(SPEAG,No.EX3-7433_Sep16)	Sep-17
DAE4	SN 549	13-Dec-16(SPEAG, No.DAE4-549_Dec16)	Dec -17
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
SignalGeneratorMG3700A	6201052605	27-Jun-16 (CTTL, No.J16X04776)	Jun-17
Network Analyzer E5071C	MY46110673	26-Jan-16 (CTTL, No.J16X00894)	Jan -17

	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	
Reviewed by:	Qi Dianyuan	SAR Project Leader	
Approved by:	Lu Bingsong	Deputy Director of the laboratory	

Issued: January 24, 2017

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

Certificate No: Z17-97012

Page 1 of 11



Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
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Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A,B,C,D	modulation dependent linearization parameters
Polarization Φ	Φ rotation around probe axis
Polarization θ	θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i $\theta=0$ is normal to probe axis

Connector Angle information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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



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Probe EX3DV4

SN: 3677

Calibrated: January 23, 2017

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)