



# SAR TEST REPORT

**Applicant** Huawei Technologies Co., Ltd.  
**FCC ID** QISAMN-LX3B  
**Product** Smart Phone  
**Model** AMN-LX3X  
**Report No.** R1904H0063-S1  
**Issue Date** May 7, 2019

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **IEEE 1528-2013, ANSI C95.1: 1992/IEEE C95.1: 1991**. 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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# 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.

## 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

Company: TA Technology (Shanghai) Co., Ltd.  
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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 $\Omega$
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 1: Highest Reported SAR

Mode	Highest Reported SAR (W/kg)		
	1g SAR Head	1g SAR Body-worn (Separation 15mm)	1g SAR Hotspot (Separation 10mm)
GSM 850	0.40	0.72	0.71
GSM 1900	0.39	0.21	0.20
WCDMA Band II	<b>0.65</b>	0.40	0.27
WCDMA Band IV	0.23	0.34	0.40
WCDMA Band V	0.47	<b>0.81</b>	<b>0.89</b>
LTE FDD 2	0.52	0.33	0.28
LTE FDD 4	0.22	0.37	0.37
LTE FDD 5	0.39	0.68	0.79
LTE FDD 7	0.15	0.45	0.39
Wi-Fi (2.4G)	0.35	<0.10	0.17
Bluetooth	0.36	NA	NA
Date of Testing:	April 11, 2019~ April 24, 2019		

Note: 1) The highest Reported SAR for head, body-worn, hotspot and simultaneous transmission exposure conditions are 0.65 W/kg, 0.81W/kg,0.89 W/kg and 1.06W/kg.

2) Sand-alone SAR evaluation is not required for Bluetooth, more details information see section 10.2

3) For body worn operation, this device has been tested and meets FCC RF exposure guidelines when used with any accessory that contains no metal and that positions the handset a minimum of 15mm from the body. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.

The device is in compliance with Specific Absorption Rate (SAR) for general population/uncontraolled exposure limits according to the FCC rule § 2.1093, the ANSI C95.1: 1992/IEEE C95.1: 1991, and had been tested in accordance with the measurement methods and procedures specified in IEEE Std 1528-2013.

### 3 Description of Equipment under Test

#### Client Information

<b>Applicant</b>	Huawei Technologies Co., Ltd.
<b>Applicant address</b>	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.China.
<b>Manufacturer</b>	Huawei Technologies Co., Ltd.
<b>Manufacturer address</b>	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.China.

#### General Technologies

Application Purpose:	Original Grant
EUT Stage:	Identical Prototype
Model:	AMN-LX3X
SN:	BKLNU19330100173 (Battery 1) BKLNU19330100134 (Battery 2) BKLNU19330100145 (Battery 3)
Hardware Version:	HL1AMNMY
Software Version:	9.0.1.75(C900E31R1P2)
Antenna Type:	Internal Antenna
Device Class:	B
Wi-Fi Hotspot:	Wi-Fi 2.4G
Power Class:	GSM 850:4 GSM 1900:1 UMTS Band II/IV/V:3 LTE FDD 2/4/5/7:3
Power Level:	GSM 850:level 5 GSM 1900:level 0 UMTS Band II/IV/V:all up bits LTE FDD 2/4/5/7:max power
<b>EUT Accessory</b>	
Battery 1	Manufacturer: Huawei Technologies Co., Ltd. (SCUD (Fujian) Electronics Co., LTD.) Model: HB405979ECW
Battery 2	Manufacturer: Huawei Technologies Co., Ltd. (Desay Battery Electronic Co.,LTD) Model: HB405979ECW
Battery 3	Manufacturer: Huawei Technologies Co., Ltd. (Sunwoda Electronic Co.,LTD) Model: HB405979ECW



Earphone 1	Manufacturer: Jiangxi Lianchuang Hongsheng Electronic Co. ,LTD. Model: MEND1532B528A02
Earphone 2	Manufacturer: Boluo County Quancheng Electronic Co.,ltd Model: 1293-3283-3.5MM-322
Earphone 3	Manufacturer: FOXCONN INTERCONNECT TECHNOLOGY LIMITED Model: EPAB542-2WH05-DH



**Wireless Technology and Frequency Range**

Wireless Technology		Modulation	Operating mode	Tx (MHz)
GSM	850	Voice(GMSK) GPRS(GMSK) EGPRS(GMSK,8PSK)	<input type="checkbox"/> Multi-slot Class:8-1UP <input type="checkbox"/> Multi-slot Class:10-2UP <input checked="" type="checkbox"/> Multi-slot Class:12-4UP <input type="checkbox"/> Multi-slot Class:33-4UP	824 ~ 849
	1900			1850 ~ 1910
	Does this device support DTM (Dual Transfer Mode)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
UMTS	Band II	QPSK, 16QAM	HSDPA UE Category:14 HSUPA UE Category:7 DC-HSDPA UE Category:24 HSPA+ Category:7	1850 ~ 1910
	Band IV			1710 ~ 1755
	Band V			824 ~ 849
LTE	FDD 2	QPSK, 16QAM	Rel.10/Category 4	1850 ~ 1910
	FDD 4			1710 ~ 1755
	FDD 5			824 ~ 849
	FDD 7			2500 ~ 2570
	Does this device support Carrier Aggregation (CA) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Does this device support SV-LTE (1xRTT-LTE)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				
Bluetooth	2.4G	Version 5.0 LE		2402 ~2480
Wi-Fi	2.4G	DSSS,OFDM	802.11b/g/n HT20	2412 ~ 2462
		OFDM	802.11n HT40	2422 ~ 2452
Does this device support MIMO <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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 C95.1: 1992/IEEE C95.1: 1991, the following FCC Published RF exposure KDB procedures:

248227 D01 802.11Wi-Fi SAR v02r02  
447498 D01 General RF Exposure Guidance v06  
648474 D04 Handset SAR v01r03  
690783 D01 SAR Listings on Grants v01r03  
865664 D01 SAR measurement 100 MHz to 6 GHz v01r04  
865664 D02 RF Exposure Reporting v01r02  
941225 D01 3G SAR Procedures v03r01  
941225 D05 SAR for LTE Devices v02r05  
941225 D05A LTE Rel.10 KDB Inquiry Sheet v01r02  
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.

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

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

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

## 5.2 Measurement Variability

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

SAR Measurement Variability was assessed using the following procedures for each frequency band:

- 1) When the original highest measured SAR is  $\geq 0.80$  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  $\geq 1.45$  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  $\geq 1.5$  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 2: 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

SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power specified for production units, including tune-up tolerance. The data mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. GSM voice and GPRS data use GMSK, which is a constant amplitude modulation with minimal peak to average power difference within the time-slot burst. For EDGE, GMSK is used for MCS 1 – MCS 4 and 8-PSK is used for MCS 5 – MCS 9; where 8-PSK has an inherently higher peak-to-average power ratio. The GMSK and 8-PSK EDGE configurations are considered separately for SAR compliance. The GMSK EDGE configurations are grouped with GPRS and considered with respect to time-averaged maximum output power to determine compliance. The 3G SAR test reduction procedure is applied to 8-PSK EDGE with GMSK GPRS/EDGE as the primary mode.

### 5.3.2 UMTS Test Configuration

#### 5.3.2.1 3G SAR Test Reduction Procedure

The default test configuration is to measure SAR with an established radio link between the EUT and a communication test set using a 12.2 kbps RMC (reference measurement channel) configured in Test Loop Mode 1. SAR is selectively confirmed for other physical channel configurations modes according to output power, exposure conditions and device operating capabilities. Maximum output power is verified by applying the applicable versions of 3GPP TS 34.121.

#### 5.3.2.2 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 SAR configuration in 12.2 kbps RMC for head exposure.

#### 5.3.2.3 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 EUT 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 EUT, 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

**5.3.2.4 Release 5 HSDPA Test Configuration**

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 SAR body-worn accessory exposure configuration in 12.2 kbps RMC. EUT 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( $\beta_c$ ,  $\beta_d$ ), and HS-DPCCH power offset parameters ( $\Delta_{ACK}$ ,  $\Delta_{NACK}$ ,  $\Delta_{CQI}$ ) should be set according to values indicated in the Table below. The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the H-set.

**Table 3: Subtests for UMTS Release 5 HSDPA**

Sub-set	$\beta_c$	$\beta_d$	$\beta_d$ (SF)	$\beta_c/\beta_d$	$\beta_{hs}$ (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:  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  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  $\beta_c\beta_d$  ratio of 12/15 for the TFC during the measurement period(TF1,TF0) is achieved by setting the signaled gain factors for the reference TFC (TFC1,TF1) to  $\beta_c=11/15$  and  $\beta_d=15/15$ .

**5.3.2.5 Release 6 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 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  $\beta$  values indicated in Table 2 and other applicable procedures described in the 'WCDMA EUT and 'Release 5 HSDPA Data Devices' sections of this document

**Table 4: Sub-Test 5 Setup for Release 6 HSUPA**

Sub-set	$\beta_c$	$\beta_d$	$\beta_d$ (SF)	$\beta_c/\beta_d$	$\beta_{hs}^{(1)}$	$\beta_{ec}$	$\beta_{ed}$	$\beta_{ed}$ (SF)	$\beta_{ed}$ (codes)	CM <sup>(2)</sup> (dB)	MPR (dB)	AG <sup>(4)</sup> Index	E-TFCI
1	11/15 <sup>(3)</sup>	15/15 <sup>(3)</sup>	64	11/15 <sup>(3)</sup>	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}$ 47/15 $\beta_{ed2}$ 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 <sup>(4)</sup>	15/15 <sup>(4)</sup>	64	15/15 <sup>(4)</sup>	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1:  $\Delta_{ACK}, \Delta_{NACK}$  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  $\beta_c/\beta_d$  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  $\beta_c/\beta_d$  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:  $\beta_{ed}$  can not be set directly; it is set by Absolute Grant Value.

**Table 5: 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	4	8	2	2 SF2 & 2 SF4	11484	5.76



(No DPDCH)	4	4	10		20000	2.00
7	4	8	2	2 SF2 & 2 SF4	22996	?
(No DPDCH)	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)						

### 5.3.2.6 HSPA, HSPA+ and DC-HSDPA Test Configuration

SAR test exclusion may apply to 3GPP Rel. 6 HSPA and Rel. 8 DC-HSDPA. When SAR measurement is required for 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. Without prior KDB confirmation to determine the SAR results are acceptable, a PAG is required for equipment 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. 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  $\beta$  and  $\Delta$  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 6: 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	Not applicable (dual cell operation not supported)	
Category 12	5	1	3630	28800	QPSK		
Category 13	15	1	35280	259200	QPSK, 16QAM, 64QAM		
Category 14	15	1	42192	259200	QPSK, 16QAM		
Category 15	15	1	23370	345600	QPSK, 16QAM		
Category 16	15	1	27952	345600	QPSK, 16QAM		
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	QPSK, 16QAM, 64QAM		
Category 21	15	1	23370	345600	-	-	QPSK, 16QAM
Category 22	15	1	27952	345600			
Category 23	15	1	35280	518400			
Category 24	15	1	42192	518400			

### 5.3.3 LTE Test Configuration

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

#### A) Spectrum Plots for RB Configurations

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

#### B) MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to

3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.

### **C)A-MPR**

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

### **D) Largest channel bandwidth standalone SAR test requirements**

#### 1) QPSK with 1 RB allocation

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

#### 2) QPSK with 50% RB allocation

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

#### 3) QPSK with 100% RB allocation

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

#### 4) Higher order modulations

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

### **E) Other channel bandwidth standalone SAR test requirements**

For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section A) to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is  $> \frac{1}{2}$  dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the *reported* SAR of a configuration for the largest channel bandwidth is  $> 1.45$  W/kg.

### **5.3.4 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:

- $\leq 0.4$  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  $\leq 0.8$  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  $\leq 1.2$  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.

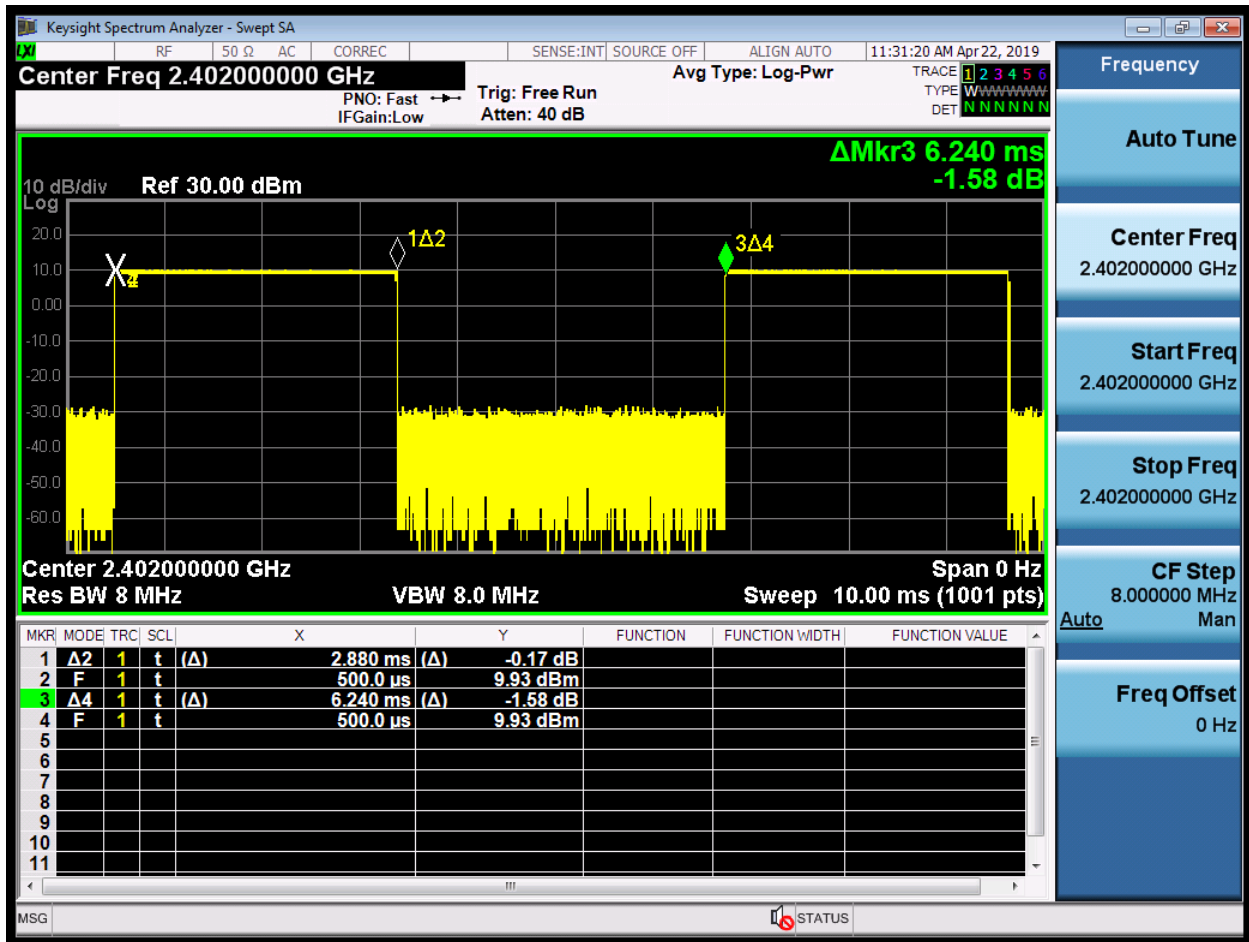
To determine the initial test position, Area Scans were performed to determine the position with the Maximum Value of SAR (measured). The position that produced the highest Maximum Value of SAR is considered the worst case position; thus used as the initial test position.

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.

### 5.3.5 Bluetooth Test Configuration

For Bluetooth SAR testing, BT engineering testing software installed on the EUT can provide continuous transmitting RF signal with maximum output power. And the CBT control the EUT operating with hopping off and data rate set for DH5.

The SAR measurement takes full account of the Bluetooth duty cycle and is reflected in the report, and the duty factor of the device is as follow:



Note: Duty factor= Ton (ms)/ T(on+off) (ms)=2.880/6.240=46.2%

### 5.2.3 Receiver detection mechanism specification

This device support the receiver detection mechanism, the main purpose is to minimize triggering associated with power reduction scenarios by audio receiver detection mechanisms and provide enhanced user experience. It uses the audio receiver to indicate whether the user is making a call in head scenario or not. The selection between head and body power levels is based on the audio receiver detection mechanism. It can determine proximity to head or body and set the relevant power level for 2G&3G&4G antennas accordingly.

More details information followings:

Main Antenna		Power Reduction Level Amount (dBm)									
Power Reduction Scenario	Receiver	GSM850	GSM1900	UMTS B2	UMTS B4	UMTS B5	LTE B2	LTE B4	LTE B5	LTE B7	
Full power	on	34.00	31.00	25.00	24.50	25.00	24.50	24.50	25.00	22.00	
	off	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Standalone	on	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	off	0.00	0.00	1.20	0.00	0.00	0.20	0.00	0.00	0.00	
Simultaneous	Wi-Fi on	on	0.00	2.00	3.00	3.00	0.00	3.00	3.00	2.00	2.00
		off	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

### SAR test Plan

Table: Summary of Receiver detection mechanism

Antenna	Receiver on (head scenario)	Receiver off (Body/other scenario)
2G&3G&4G Main ant	Power Level A1	Power Level B1
2.4G WIFI ant	Power Level A2	Power Level B2



Based on the summary table of Receiver detection mechanism above,

For Head SAR test,

- 1) Standalone Head SAR of 2G&3G&4G Main ant is evaluated at power level A1 (Receiver on);
- 3) Standalone Head SAR of Wi-Fi ant is evaluated at power level A2 (Receiver on);

For Body SAR test,

- 1) Standalone Body SAR of 2G&3G&4G Main ant is evaluated at power level B1 (Receiver off);
- 3) Standalone Body SAR of Wi-Fi ant is evaluated at power level B2 (Receiver off);

#### 5.2.4 Country code detection mechanism

The device uses the mobile country code (MCC) to indicate whether the users in CE countries or FCC countries. The selection between CE countries and FCC countries power levels is based on the country code detection mechanism. It can determine the countries where users are and set the relevant power level for Wi-Fi antennas accordingly.

Table: Summary of country code detection mechanism

Antenna	MCC OF CE COUNTRY (CE standard)	MCC OF FCC COUNTRY (FCC standard)
Wi-Fi 2.4G	Power Level A3	Power Level B3

Table: Bands supporting country code detection mechanism

Wi-Fi Antenna Power Level				
Wi-Fi 2.4G	CE		FCC	
	Mode	Power Level (dBm)	Mode	Power Level (dBm)
Rec Off	802.11b(ch1~13)	18.00	802.11b(ch1~11)	18.00
	802.11g(ch1~13)	17.50	802.11g(ch1)	13.50
	802.11n HT20(ch1~13)	17.00	802.11g(ch2~10)	17.50
	802.11n HT40(ch3~11)	16.00	802.11g(ch11)	13.50
	/		802.11n HT20(ch1)	13.50
			802.11n HT20(ch2~10)	17.00
			802.11n HT20(ch11)	13.50
			802.11n HT40(ch3~8)	14.50
Rec On	802.11b(ch1~13)	14.50	802.11b(ch1~11)	14.50
	802.11g(ch1~13)	14.50	802.11g(ch1)	13.50
	802.11n HT20(ch1~13)	14.50	802.11g(ch2~10)	14.50
	802.11n HT40(ch3~11)	14.50	802.11g(ch11)	13.50
	/		802.11n HT20(ch1)	13.50
			802.11n HT20(ch2~10)	14.50
			802.11n HT20(ch11)	13.50
			802.11n HT40(ch3~8)	14.50



		802.11n HT40(ch9)	11.50
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**Summary test plan:**

**For conducted power test,** both the full power level and reduced power level will be tested by setting different MCC to validate that the country code detection mechanism works.

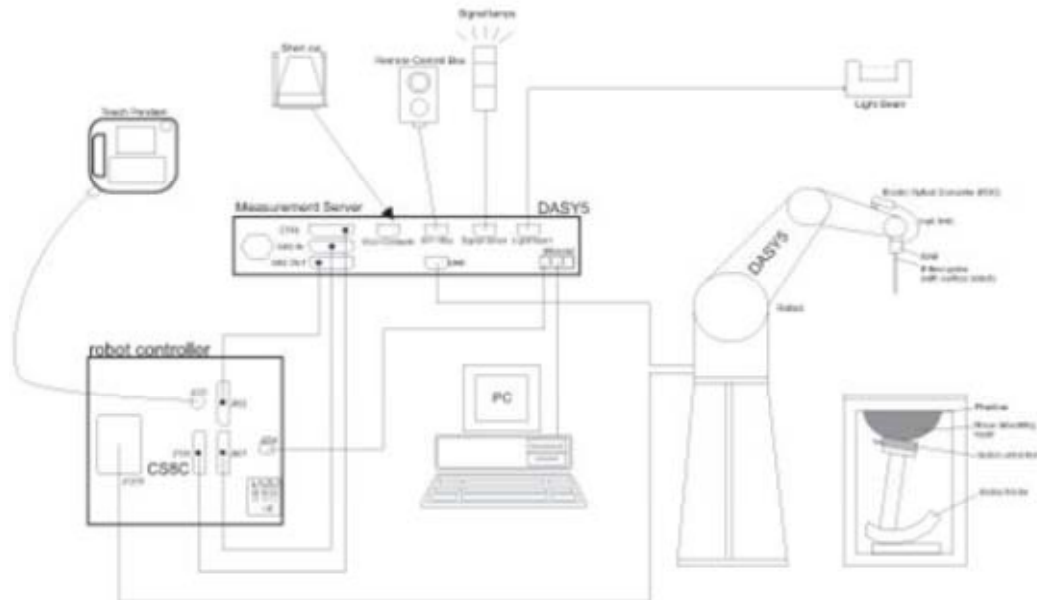
**For FCC SAR test,**

Standalone FCC SAR of Wi-Fi2.4G is evaluated at power level B3.

## 6 SAR Measurements System Configuration

### 6.1 SAR Measurement Set-up

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



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

## 6.2 DASYS 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: $\pm 0.2$ dB (30 MHz to 6 GHz)
Directivity	$\pm 0.3$ dB in HSL (rotation around probe axis) $\pm 0.5$ dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 $\mu$ W/g to > 100 mW/g Linearity: $\pm 0.2$ dB (noise: typically < 1 $\mu$ 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  $\pm 0.25$  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.



$$SAR=C\Delta T/\Delta t$$

Where:  $\Delta t$  = Exposure time (30 seconds),  
 C = Heat capacity of tissue (brain or muscle),  
 $\Delta T$  = Temperature increase due to RF exposure.

Or

$$SAR=|E|^2\sigma/\rho$$

Where:  $\sigma$  = Simulated tissue conductivity,  
 $\rho$  = Tissue density (kg/m<sup>3</sup>).

### 6.3 SAR Measurement Procedure

#### Power Reference Measurement

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

#### Area Scan

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

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

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

### Zoom Scan

Zoom scans are used 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: $\Delta x_{zoom} \Delta y_{zoom}$			≤2GHz: ≤8mm 2 – 3GHz: ≤5mm*	3 – 4GHz: ≤5mm* 4 – 6GHz: ≤4mm*
Maximum zoom scan spatial resolution, normal to phantom surface	Uniform grid: $\Delta z_{zoom}(n)$		≤5mm	3 – 4GHz: ≤4mm 4 – 5GHz: ≤3mm 5 – 6GHz: ≤2mm
	Graded grid	$\Delta z_{zoom}(1)$ : between 1 <sup>st</sup> two points closest to phantom surface	≤4mm	3 – 4GHz: ≤3mm 4 – 5GHz: ≤2.5mm 5 – 6GHz: ≤2mm
		$\Delta z_{zoom}(n > 1)$ : between subsequent points	≤1.5 • $\Delta z_{zoom}(n-1)$	
Minimum zoom scan volume	X, y, z		≥30mm	3 – 4GHz: ≥28mm 4 – 5GHz: ≥25mm 5 – 6GHz: ≥22mm
<p>Note: <math>\delta</math> is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.</p> <p>* 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.</p>				

### 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 DASYS 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	2018-05-20	2019-05-19
Dielectric Probe Kit	HP	85070E	US44020115	2018-05-20	2019-05-19
Power meter	Agilent	E4417A	GB41291714	2018-05-21	2019-05-20
Power sensor	Agilent	N8481H	MY50350004	2018-05-21	2019-05-20
Power sensor	Agilent	E9327A	US40441622	2018-05-20	2019-05-19
Dual directional coupler	Agilent	778D-012	50519	2018-05-21	2019-05-20
Dual directional coupler	Agilent	777D	50146	2018-05-20	2019-05-19
Amplifier	INDEXSAR	IXA-020	0401	2018-05-20	2019-05-19
Wideband radio communication tester	R&S	CMW 500	113645	2018-05-20	2019-05-19
BT Base Station Simulator	R&S	CBT	100271	2018-05-14	2019-05-13
E-field Probe	SPEAG	EX3DV4	3677	2018-05-29	2019-05-28
DAE	SPEAG	DAE4	1291	2018-12-04	2019-12-03
Validation Kit 835MHz	SPEAG	D835V2	4d020	2017-08-28	2020-08-27
Validation Kit 1750MHz	SPEAG	D1750V2	1033	2017-01-10	2020-01-09
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 2600MHz	SPEAG	D2600V2	1025	2018-05-02	2021-05-01
Temperature Probe	Tianjin jinming	JM222	AA1009129	2018-05-17	2019-05-16
Hygrothermograph	Anymetr	NT-311	20150731	2018-05-17	2019-05-16
Software for Test	Speag	DASY5	52.8.8.1222	/	/
Software for Tissue	Agilent	85070	E06.01.36	/	/

## 8 Tissue Dielectric Parameter Measurements & System Verification

### 8.1 Tissue Verification

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

#### Target values

Frequency (MHz)	Water (%)	Salt (%)	Sugar (%)	Glycol (%)	Preventol (%)	Cellulose (%)	$\epsilon_r$	$\sigma$ (s/m)	
Head	835	41.45	1.45	56	0	0.1	1.0	41.5	0.90
	1750	55.24	0.31	0	44.45	0	0	40.1	1.37
	1900	55.242	0.306	0	44.452	0	0	40.0	1.40
	2450	62.7	0.5	0	36.8	0	0	39.2	1.80
	2600	55.242	0.306	0	44.452	0	0	39.0	1.96
Body	835	52.5	1.4	45	0	0.1	1.0	55.2	0.97
	1750	69.91	0.12	0	29.97	0	0	53.4	1.49
	1900	69.91	0.13	0	29.96	0	0	53.3	1.52
	2450	73.2	0.1	0	26.7	0	0	52.7	1.95
	2600	72.6	0.1	0	27.3	0	0	52.5	2.16

#### Measurements results

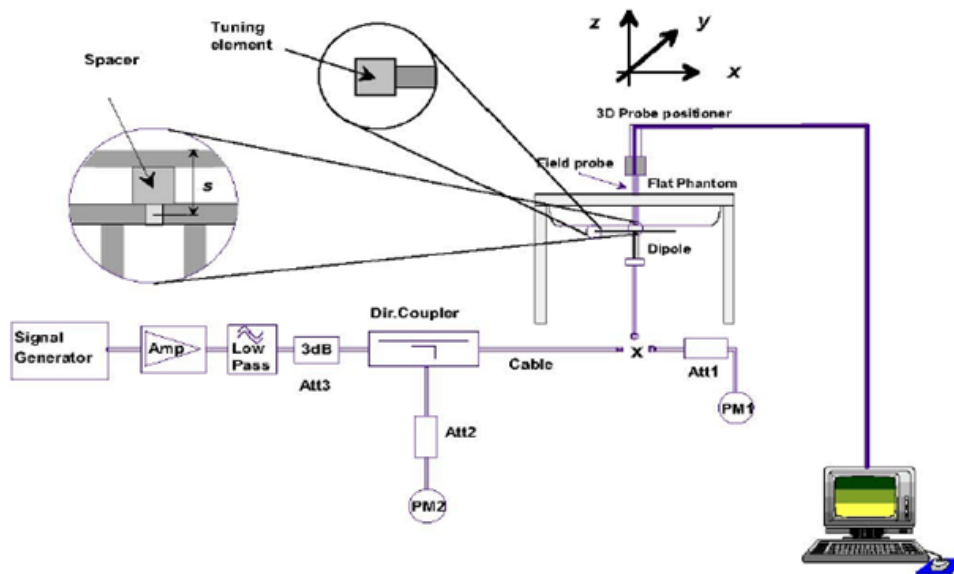
Frequency (MHz)	Test Date	Temp °C	Measured Dielectric Parameters		Target Dielectric Parameters		Limit (Within ±5%)		
			$\epsilon_r$	$\sigma$ (s/m)	$\epsilon_r$	$\sigma$ (s/m)	Dev $\epsilon_r$ (%)	Dev $\sigma$ (%)	
835	Head	4/12/2019	21.5	42.0	0.91	41.5	0.90	1.20	1.11
	Body	4/11/2019	21.5	53.8	0.97	55.2	0.97	-2.54	0.00
1750	Head	4/16/2019	21.5	40.0	1.41	40.1	1.37	-0.25	2.92
	Body	4/16/2019	21.5	51.4	1.44	53.4	1.49	-3.75	-3.36
1900	Head	4/24/2019	21.5	40.7	1.39	40.0	1.40	1.75	-0.71
	Body	4/15/2019	21.5	52.8	1.51	53.3	1.52	-0.94	-0.66
2450	Head	4/24/2019	21.5	38.7	1.86	39.2	1.80	-1.28	3.33
	Body	4/24/2019	21.5	51.1	1.97	52.7	1.95	-3.04	1.03
2600	Head	4/14/2019	21.5	38.1	2.02	39.0	1.96	-2.31	3.06
	Body	4/14/2019	21.5	50.7	2.16	52.5	2.16	-3.43	0.00

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

## 8.2 System Performance Check

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

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



Picture 1 System Performance Check setup



Picture 2 Setup Photo

**Justification for Extended SAR Dipole Calibrations**

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

Dipole		Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
Dipole D835V2 SN: 4d020	Head	8/28/2017	-31.9	/	50.3	/
	Liquid	8/27/2018	-29.0	9.09	46.6	-3.7
	Body	8/28/2017	-24.8	/	46.8	/
	Liquid	8/27/2018	-27.4	-10.48	48.1	1.3
Dipole D1750V2 SN: 1033	Head	1/10/2017	-40.3	/	49.8	/
	Liquid	1/9/2018	-40.0	0.74	49.9	0.1
	Body	1/10/2017	-35.0	/	44.7	/
	Liquid	1/9/2018	-34.7	0.86	44.9	-0.2
Dipole D1900V2 SN: 5d060	Head	8/26/2017	-23.4	/	52.0	/
	Liquid	8/25/2018	-24.7	-5.56	54.4	2.4
	Body	8/26/2017	-21.4	/	52.7	/
	Liquid	8/25/2018	-24.6	-14.95	55.6	2.9
Dipole D2450V2 SN: 786	Head	8/29/2017	-25.5	/	53.4	/
	Liquid	8/28/2018	-23.0	9.80	57.2	3.8
	Body	8/29/2017	-23.6	/	51.0	/
	Liquid	8/28/2018	-23.7	-0.42	55.2	4.2

**System Check results**

Frequency (MHz)		Test Date	Temp °C	250mW Measured SAR <sub>1g</sub> (W/kg)	1W Normalized SAR <sub>1g</sub> (W/kg)	1W Target SAR <sub>1g</sub> (W/kg)	Δ % (Limit ±10%)	Plot No.
835	Head	4/12/2019	21.5	2.44	9.76	9.45	3.28	1
	Body	4/11/2019	21.5	2.41	9.64	9.75	-1.13	2
1750	Head	4/16/2019	21.5	8.95	35.80	37.20	-3.76	3
	Body	4/16/2019	21.5	9.24	36.96	37.60	-1.70	4
1900	Head	4/24/2019	21.5	9.88	39.52	40.10	-1.45	5
	Body	4/15/2019	21.5	9.93	39.72	39.50	0.56	6
2450	Head	4/24/2019	21.5	13.70	54.80	52.60	4.18	7
	Body	4/24/2019	21.5	12.50	50.00	50.80	-1.57	8
2600	Head	4/14/2019	21.5	13.90	55.60	54.10	2.77	9
	Body	4/14/2019	21.5	13.50	54.00	54.50	-0.92	10

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 (Full Power)		Burst-Averaged output power(dBm)				Division Factors	Frame-Averaged output power(dBm)			
		Tune-up	Channel/Frenqucy(MHz)				Tune-up	Channel/Frenqucy(MHz)		
		MAX	128 /824.2	190 /836.6	251 /848.8		MAX	128 /824.2	190 /836.6	251 /848.8
GSM	CS	34.00	33.34	33.08	32.96	9.03	24.97	24.31	24.05	23.93
GPRS/ EGPRS (GMSK)	1 Tx Slot	34.00	33.32	33.09	32.95	9.03	24.97	24.29	24.06	23.92
	2 Tx Slots	31.00	30.41	30.15	30.02	6.02	24.98	24.39	24.13	24.00
	3 Tx Slots	29.00	28.64	28.36	28.28	4.26	24.74	24.38	24.10	24.02
	4 Tx Slots	28.00	27.28	27.05	26.96	3.01	24.99	24.27	24.04	23.95
EGPRS (8PSK)	1 Tx Slot	28.00	27.15	27.25	27.28	9.03	18.97	18.12	18.22	18.25
	2 Tx Slots	25.00	24.34	24.41	24.41	6.02	18.98	18.32	18.39	18.39
	3 Tx Slots	23.20	22.41	22.51	22.57	4.26	18.94	18.15	18.25	18.31
	4 Tx Slots	22.00	21.20	21.32	21.36	3.01	18.99	18.19	18.31	18.35
GSM 1900 (Full Power)		Burst-Averaged output power(dBm)				Division Factors	Frame-Averaged output power(dBm)			
		Tune-up	Channel/Frenqucy(MHz)				Tune-up	Channel/Frenqucy(MHz)		
		MAX	512 /1850.2	661 /1880	810 /1909.8		MAX	512 /1850.2	661 /1880	810 /1909.8
GSM	CS	31.00	30.06	29.91	30.11	9.03	21.97	21.03	20.88	21.08
GPRS/ EGPRS (GMSK)	1 Tx Slot	31.00	30.06	29.94	30.11	9.03	21.97	21.03	20.91	21.08
	2 Tx Slots	28.00	27.20	27.08	27.26	6.02	21.98	21.18	21.06	21.24
	3 Tx Slots	26.20	25.45	25.33	25.54	4.26	21.94	21.19	21.07	21.28
	4 Tx Slots	25.00	24.17	24.04	24.26	3.01	21.99	21.16	21.03	21.25
EGPRS (8PSK)	1 Tx Slot	27.00	26.67	26.64	26.52	9.03	17.97	17.64	17.61	17.49
	2 Tx Slots	24.00	23.82	23.76	23.59	6.02	17.98	17.80	17.74	17.57
	3 Tx Slots	22.20	22.01	21.95	21.67	4.26	17.94	17.75	17.69	17.41
	4 Tx Slots	21.00	20.63	20.44	20.43	3.01	17.99	17.62	17.43	17.42
GSM 1900 (Receiver off+ Hotspot on)		Burst-Averaged output power(dBm)				Division Factors	Frame-Averaged output power(dBm)			
		Tune-up	Channel/Frenqucy(MHz)				Tune-up	Channel/Frenqucy(MHz)		
		MAX	512 /1850.2	661 /1880	810 /1909.8		MAX	512 /1850.2	661 /1880	810 /1909.8
GPRS/ EGPRS (GMSK)	1 Tx Slot	29.00	28.07	27.93	28.12	9.03	19.97	19.04	18.90	19.09
	2 Tx Slots	26.00	25.20	25.06	25.28	6.02	19.98	19.18	19.04	19.26
	3 Tx Slots	24.20	23.49	23.34	23.54	4.26	19.94	19.23	19.08	19.28





	4 Tx Slots	23.00	22.19	22.03	22.28	3.01	19.99	19.18	19.02	19.27
EGPRS (8PSK)	1 Tx Slot	27.00	26.64	26.61	26.48	9.03	17.97	17.61	17.58	17.45
	2 Tx Slots	24.00	23.73	23.78	23.63	6.02	17.98	17.71	17.76	17.61
	3 Tx Slots	22.20	21.97	21.96	21.69	4.26	17.94	17.71	17.70	17.43
	4 Tx Slots	21.00	20.58	20.40	20.34	3.01	17.99	17.57	17.39	17.33

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

1. Standalone: GSM 850 GMSK (GPRS) mode with 4 time slots for Max power, GSM 1900 GMSK (GPRS) mode with 4 time slots for Max power, based on the output power measurements above.

## 9.2 WCDMA Mode

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

WCDMA (Full Power)		Band II(dBm)				Band IV(dBm)				Band V(dBm)			
Tx Channel		9262	9400	9538	Tune-up	1312	1413	1513	Tune-up	4132	4183	4233	Tune-up
Frequency(MHz)		1852.4	1880	1907.6	Limit	1712.4	1732.6	1752.6	Limit	826.4	836.6	846.6	Limit
RMC	12.2kbps	24.21	24.19	24.26	25.00	23.79	23.80	23.81	24.50	23.64	23.59	23.69	25.00
AMR	12.2kbps	24.33	24.21	24.18	25.00	23.69	23.74	23.89	24.50	23.68	23.51	23.75	25.00
HSDPA	Sub 1	23.61	23.63	23.66	24.50	23.33	23.44	23.33	24.00	23.02	23.03	23.17	24.50
	Sub 2	23.65	23.85	23.66	24.50	23.17	23.44	23.45	24.00	23.28	23.23	23.33	24.50
	Sub 3	23.13	23.27	23.34	24.00	22.75	22.86	22.95	23.50	22.58	22.45	22.65	24.00
	Sub 4	23.31	23.31	23.24	24.00	22.91	22.74	22.83	23.50	22.66	22.65	22.81	24.00
HSUPA	Sub 1	21.57	21.71	21.90	22.50	21.81	21.84	21.65	22.50	21.54	21.65	21.85	23.00
	Sub 2	21.71	21.85	21.70	22.50	21.67	21.76	21.89	22.50	21.68	21.63	21.55	23.00
	Sub 3	22.77	22.55	22.80	23.50	22.65	22.84	22.79	23.50	22.80	22.75	22.85	24.00
	Sub 4	21.13	21.15	21.24	22.00	21.13	21.14	21.41	22.00	21.14	21.17	21.31	22.50
	Sub 5	22.55	22.57	22.74	23.50	22.95	22.74	22.67	23.50	22.78	22.65	22.79	24.00
DC-HSDPA	Sub 1	23.65	23.75	23.86	24.50	23.31	23.38	23.39	24.00	23.04	23.01	23.35	24.50
	Sub 2	23.73	23.81	23.74	24.50	23.41	23.22	23.45	24.00	23.18	23.13	23.29	24.50
	Sub 3	23.07	23.27	23.42	24.00	22.81	22.70	22.79	23.50	22.68	22.73	22.79	24.00
	Sub 4	23.11	23.35	23.42	24.00	22.63	22.68	22.87	23.50	22.50	22.67	22.81	24.00
HSPA+	16QAM	22.25	22.15	22.12	22.50	22.21	22.16	22.27	22.50	22.06	21.97	22.31	23.00

Note: 1.Per KDB 941225 D01, SAR for each exposure is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".



WCDMA (Receiver off+ Hotspot on)		Band II(dBm)				Band IV(dBm)			
Tx Channel		9262	9400	9538	Tune-up Limit	1312	1413	1513	Tune-up Limit
Frequency(MHz)		1852.4	1880	1907.6		1712.4	1732.6	1752.6	
RMC	12.2kbps	21.20	21.22	21.24	22.00	20.73	20.76	20.78	21.50
AMR	12.2kbps	21.36	21.32	21.32	22.00	20.79	20.60	20.66	21.50
HSDPA	Sub 1	20.54	20.86	20.60	21.50	20.29	20.38	20.24	21.00
	Sub 2	20.58	20.88	20.64	21.50	20.23	20.42	20.40	21.00
	Sub 3	20.30	20.10	20.24	21.00	19.75	19.70	19.92	20.50
	Sub 4	20.26	20.34	20.14	21.00	19.57	19.74	19.64	20.50
HSUPA	Sub 1	18.62	18.66	18.58	19.50	18.87	18.84	18.92	19.50
	Sub 2	18.84	18.74	18.78	19.50	18.89	18.74	18.86	19.50
	Sub 3	19.64	19.88	19.76	20.50	19.59	19.64	19.74	20.50
	Sub 4	18.32	18.36	18.30	19.00	18.17	18.42	18.12	19.00
	Sub 5	19.60	19.58	19.78	20.50	19.69	19.80	19.80	20.50
DC-HSDPA	Sub 1	20.84	20.66	20.88	21.50	20.19	20.24	20.20	21.00
	Sub 2	20.58	20.78	20.76	21.50	20.19	20.32	20.34	21.00
	Sub 3	20.14	20.38	20.26	21.00	19.59	19.88	19.88	20.50
	Sub 4	20.12	20.26	20.10	21.00	19.83	19.84	19.86	20.50
HSPA+	16QAM	19.34	19.26	19.26	19.50	19.29	19.30	19.28	19.50

Note: 1.Per KDB 941225 D01, SAR for each exposure is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".

### 9.3 LTE Mode

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

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

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

LTE FDD Band 2 Full Power				Conducted Power(dBm)			Tune-up Limit
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			
				18607/1850.7	18900/1880	19193/1909.3	
1.4MHz	QPSK	1	0	23.35	23.48	23.44	24.50
		1	2	23.82	23.72	23.72	24.50
		1	5	23.28	23.26	23.24	24.50
		3	0	23.65	23.75	23.59	24.50
		3	2	23.78	23.69	23.68	24.50
		3	3	23.73	23.55	23.50	24.50
		6	0	22.77	22.76	22.67	23.50
	16QAM	1	0	23.15	22.86	22.82	23.50
		1	2	23.13	22.97	23.00	23.50
		1	5	22.58	22.56	22.80	23.50
		3	0	22.65	22.67	22.64	23.50
		3	2	22.76	22.62	22.73	23.50
		3	3	22.71	22.59	22.54	23.50
		6	0	21.73	21.81	21.72	22.50
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				18615/1851.5	18900/1880	19185/1908.5	
3MHz	QPSK	1	0	23.37	23.52	23.47	24.50
		1	7	23.80	23.75	23.76	24.50
		1	14	23.31	23.31	23.28	24.50
		8	0	22.75	22.87	22.72	23.50
		8	4	22.90	22.79	22.80	23.50
		8	7	22.83	22.66	22.60	23.50
		15	0	22.77	22.80	22.70	23.50
	16QAM	1	0	23.18	22.88	22.85	23.50
		1	7	23.16	22.97	23.04	23.50
		1	14	22.60	22.60	22.83	23.50



Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				18625/1852.5	18900/1880	19175/1907.5	
		8	0	21.76	21.80	21.76	22.50
		8	4	21.87	21.75	21.85	22.50
		8	7	21.81	21.71	21.67	22.50
		15	0	21.76	21.85	21.75	22.50
5MHz	QPSK	1	0	23.34	23.50	23.43	24.50
		1	13	23.78	23.71	23.73	24.50
		1	24	23.28	23.26	23.24	24.50
		12	0	22.72	22.82	22.68	23.50
		12	6	22.88	22.75	22.75	23.50
		12	13	22.81	22.64	22.56	23.50
		25	0	22.77	22.79	22.68	23.50
	16QAM	1	0	23.15	22.84	22.82	23.50
		1	13	23.13	22.95	23.01	23.50
		1	24	22.57	22.58	22.79	23.50
		12	0	21.74	21.76	21.73	22.50
		12	6	21.84	21.70	21.81	22.50
		12	13	21.78	21.66	21.63	22.50
		25	0	21.74	21.81	21.70	22.50
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				18650/1855	18900/1880	19150/1905	
10MHz	QPSK	1	0	23.36	23.51	23.46	24.50
		1	25	23.81	23.76	23.77	24.50
		1	49	23.30	23.30	23.27	24.50
		25	0	22.75	22.87	22.72	23.50
		25	13	22.91	22.80	22.79	23.50
		25	25	22.83	22.68	22.61	23.50
		50	0	22.81	22.81	22.72	23.50
	16QAM	1	0	23.17	22.87	22.84	23.50
		1	25	23.16	22.99	23.04	23.50
		1	49	22.60	22.60	22.82	23.50
		25	0	21.77	21.81	21.77	22.50
		25	13	21.86	21.74	21.84	22.50
		25	25	21.81	21.71	21.67	22.50
		50	0	21.77	21.86	21.74	22.50
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				18675/1857.5	18900/1880	19125/1902.5	
15MHz	QPSK	1	0	23.35	23.47	23.44	24.50
		1	38	23.79	23.75	23.74	24.50
		1	74	23.27	23.25	23.23	24.50
		36	0	22.73	22.83	22.69	23.50
		36	18	22.88	22.75	22.75	23.50



Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				18700/1860	18900/1880	19100/1900	
20MHz	16QAM	36	39	22.80	22.65	22.57	23.50
		75	0	22.79	22.77	22.67	23.50
		1	0	23.12	22.85	22.82	23.50
		1	38	23.14	22.96	23.02	23.50
		1	74	22.57	22.56	22.79	23.50
		36	0	21.74	21.79	21.74	22.50
		36	18	21.83	21.69	21.80	22.50
		36	39	21.79	21.67	21.64	22.50
		75	0	21.74	21.81	21.70	22.50
	QPSK	1	0	23.32	23.43	23.41	24.50
		1	50	23.78	23.71	23.72	24.50
		1	99	23.25	23.24	23.20	24.50
		50	0	22.70	22.78	22.65	23.50
		50	25	22.86	22.71	22.72	23.50
		50	50	22.77	22.60	22.53	23.50
		100	0	22.76	22.72	22.63	23.50
16QAM	1	0	22.75	22.81	22.77	23.50	
	1	50	23.10	22.94	22.98	23.50	
	1	99	22.55	22.53	22.77	23.50	
	50	0	21.71	21.75	21.71	22.50	
	50	25	21.80	21.67	21.77	22.50	
	50	50	21.76	21.62	21.60	22.50	
	100	0	21.72	21.77	21.67	22.50	

LTE FDD Band 2 Receiver off+Hotspot on				Conducted Power(dBm)			Tune-up Limit
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			
				18607/1850.7	18900/1880	19193/1909.3	
1.4MHz	QPSK	1	0	20.56	20.58	20.40	21.50
		1	2	20.82	20.81	20.77	21.50
		1	5	20.40	20.32	20.43	21.50
		3	0	20.85	20.87	20.70	21.50
		3	2	20.73	20.71	20.71	21.50
		3	3	20.74	20.72	20.63	21.50
	16QAM	6	0	20.75	20.77	20.72	21.50
		1	0	20.76	20.79	20.77	21.50
		1	2	21.09	21.11	21.17	21.50
		1	5	20.88	20.62	20.89	21.50
		3	0	20.69	20.82	20.75	21.50
		3	2	20.73	20.78	20.77	21.50



Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				18615/1851.5	18900/1880	19185/1908.5	
3MHz	QPSK	3	3	20.77	20.74	20.63	21.50
		6	0	20.75	20.79	20.69	21.50
		1	0	20.58	20.62	20.43	21.50
		1	7	20.82	20.83	20.81	21.50
		1	14	20.43	20.37	20.47	21.50
		8	0	20.89	20.94	20.77	21.50
		8	4	20.76	20.79	20.77	21.50
	16QAM	8	7	20.78	20.77	20.67	21.50
		15	0	20.77	20.81	20.75	21.50
		1	0	20.79	20.81	20.80	21.50
		1	7	21.12	21.13	21.21	21.50
		1	14	20.90	20.66	20.92	21.50
		8	0	20.74	20.86	20.78	21.50
		8	4	20.78	20.85	20.83	21.50
5MHz	QPSK	8	7	20.81	20.80	20.70	21.50
		15	0	20.78	20.83	20.72	21.50
		1	0	20.55	20.60	20.39	21.50
		1	13	20.80	20.79	20.78	21.50
		1	24	20.40	20.32	20.43	21.50
		12	0	20.86	20.89	20.73	21.50
		12	6	20.74	20.75	20.72	21.50
	16QAM	12	13	20.76	20.75	20.63	21.50
		25	0	20.75	20.80	20.73	21.50
		1	0	20.76	20.77	20.77	21.50
		1	13	21.09	21.11	21.18	21.50
		1	24	20.87	20.64	20.88	21.50
		12	0	20.72	20.82	20.75	21.50
		12	6	20.75	20.80	20.79	21.50
10MHz	QPSK	12	13	20.78	20.75	20.66	21.50
		25	0	20.76	20.79	20.67	21.50
		1	0	20.56	20.59	20.41	21.50
		1	25	20.81	20.83	20.80	21.50
		1	49	20.41	20.34	20.45	21.50
		25	0	20.87	20.93	20.75	21.50
		25	13	20.76	20.78	20.75	21.50
10MHz	QPSK	25	25	20.76	20.75	20.67	21.50
		50	0	20.75	20.81	20.74	21.50



	16QAM	1	0	20.75	20.75	20.77	21.50
		1	25	21.11	21.14	21.16	21.50
		1	49	20.88	20.62	20.90	21.50
		25	0	20.70	20.86	20.76	21.50
		25	13	20.74	20.79	20.80	21.50
		25	25	20.80	20.79	20.65	21.50
		50	0	20.75	20.81	20.67	21.50
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				18675/1857.5	18900/1880	19125/1902.5	
15MHz	QPSK	1	0	20.56	20.57	20.40	21.50
		1	38	20.81	20.83	20.79	21.50
		1	74	20.39	20.31	20.42	21.50
		36	0	20.87	20.90	20.74	21.50
		36	18	20.74	20.75	20.72	21.50
		36	39	20.75	20.76	20.64	21.50
		75	0	20.78	20.78	20.72	21.50
	16QAM	1	0	20.73	20.78	20.77	21.50
		1	38	21.10	21.12	21.19	21.50
		1	74	20.87	20.62	20.88	21.50
		36	0	20.72	20.85	20.76	21.50
		36	18	20.74	20.79	20.78	21.50
		36	39	20.79	20.76	20.67	21.50
		75	0	20.76	20.79	20.67	21.50
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				18700/1860	18900/1880	19100/1900	
20MHz	QPSK	1	0	20.53	20.53	20.37	21.50
		1	50	20.80	20.79	20.77	21.50
		1	99	20.37	20.30	20.39	21.50
		50	0	20.84	20.85	20.70	21.50
		50	25	20.72	20.71	20.69	21.50
		50	50	20.72	20.71	20.60	21.50
		100	0	20.75	20.73	20.68	21.50
	16QAM	1	0	20.71	20.74	20.72	21.50
		1	50	21.06	21.10	21.15	21.50
		1	99	20.85	20.59	20.86	21.50
		50	0	20.69	20.81	20.73	21.50
		50	25	20.71	20.77	20.75	21.50
		50	50	20.76	20.71	20.63	21.50
		100	0	20.74	20.75	20.64	21.50

<b>LTE FDD Band 4</b> <b>Full Power</b>	<b>Conducted Power(dBm)</b>	<b>Tune-up</b> <b>Limit</b>
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Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			
				19957/1710.7	20175/1732.5	20393/1754.3	
1.4MHz	QPSK	1	0	23.42	23.31	23.30	24.50
		1	2	23.86	23.60	23.71	24.50
		1	5	23.21	23.08	23.26	24.50
		3	0	23.67	23.77	23.71	24.50
		3	2	23.57	23.72	23.78	24.50
		3	3	23.60	23.56	23.51	24.50
	16QAM	6	0	22.61	22.66	22.72	23.50
		1	0	23.10	22.87	22.84	23.50
		1	2	23.08	23.08	23.13	23.50
		1	5	22.61	22.15	22.75	23.50
		3	0	22.61	22.58	22.80	23.50
		3	2	22.71	22.73	22.61	23.50
	3MHz	QPSK	3	3	22.42	22.31	22.54
6			0	21.69	21.49	21.81	22.50
1			0	23.44	23.35	23.33	24.50
1			7	23.84	23.63	23.75	24.50
1			14	23.24	23.13	23.30	24.50
8			0	22.77	22.89	22.84	23.50
16QAM		8	4	22.69	22.82	22.90	23.50
		8	7	22.70	22.67	22.61	23.50
		15	0	22.61	22.70	22.75	23.50
		1	0	23.13	22.89	22.87	23.50
		1	7	23.11	23.08	23.17	23.50
		1	14	22.63	22.19	22.78	23.50
		8	0	21.72	21.71	21.92	22.50
5MHz	QPSK	8	4	21.82	21.86	21.73	22.50
		8	7	21.52	21.43	21.67	22.50
		15	0	21.72	21.53	21.84	22.50
		1	0	23.41	23.33	23.29	24.50
		1	13	23.82	23.59	23.72	24.50
		1	24	23.21	23.08	23.26	24.50
	16QAM	12	0	22.74	22.84	22.80	23.50
		12	6	22.67	22.78	22.85	23.50
		12	13	22.68	22.65	22.57	23.50
		25	0	22.61	22.69	22.73	23.50
		1	0	23.10	22.85	22.84	23.50
		1	13	23.08	23.06	23.14	23.50



Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				20000/1715	20175/1732.5	20350/1750	
		1	24	22.60	22.17	22.74	23.50
		12	0	21.70	21.67	21.89	22.50
		12	6	21.79	21.81	21.69	22.50
		12	13	21.49	21.38	21.63	22.50
		25	0	21.70	21.49	21.79	22.50
10MHz	QPSK	1	0	23.43	23.34	23.32	24.50
		1	25	23.85	23.64	23.76	24.50
1		49	23.23	23.12	23.29	24.50	
25		0	22.77	22.89	22.84	23.50	
25		13	22.70	22.83	22.89	23.50	
25		25	22.70	22.69	22.62	23.50	
50		0	22.65	22.71	22.77	23.50	
10MHz	16QAM	1	0	23.12	22.88	22.86	23.50
		1	25	23.11	23.10	23.17	23.50
1		49	22.63	22.19	22.77	23.50	
25		0	21.73	21.72	21.93	22.50	
25		13	21.81	21.85	21.72	22.50	
25		25	21.52	21.43	21.67	22.50	
50		0	21.73	21.54	21.83	22.50	
15MHz	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				20025/1717.5	20175/1732.5	20325/1747.5	
15MHz	QPSK	1	0	23.42	23.30	23.30	24.50
		1	38	23.83	23.63	23.73	24.50
		1	74	23.20	23.07	23.25	24.50
		36	0	22.75	22.85	22.81	23.50
		36	18	22.67	22.78	22.85	23.50
		36	39	22.67	22.66	22.58	23.50
		75	0	22.63	22.67	22.72	23.50
	16QAM	1	0	23.07	22.86	22.84	23.50
		1	38	23.09	23.07	23.15	23.50
		1	74	22.60	22.15	22.74	23.50
		36	0	21.70	21.70	21.90	22.50
		36	18	21.78	21.80	21.68	22.50
		36	39	21.50	21.39	21.64	22.50
		75	0	21.70	21.49	21.79	22.50
20MHz	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				20050/1720	20175/1732.5	20300/1745	
20MHz	QPSK	1	0	23.39	23.26	23.27	24.50
		1	50	23.82	23.59	23.71	24.50
		1	99	23.18	23.06	23.22	24.50
		50	0	22.72	22.80	22.77	23.50



		50	25	22.65	22.74	22.82	23.50
		50	50	22.64	22.61	22.54	23.50
		100	0	22.60	22.62	22.68	23.50
	16QAM	1	0	22.94	22.82	22.79	23.50
		1	50	23.05	23.05	23.11	23.50
		1	99	22.58	22.12	22.72	23.50
		50	0	21.67	21.66	21.87	22.50
		50	25	21.75	21.78	21.65	22.50
		50	50	21.47	21.34	21.60	22.50
		100	0	21.68	21.45	21.76	22.50

LTE FDD Band 4 Receiver off+Hotspot on				Conducted Power(dBm)			Tune-up Limit
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			
				19957/1710.7	20175/1732.5	20393/1754.3	
1.4MHz	QPSK	1	0	20.41	20.42	20.35	21.50
		1	2	20.85	20.70	20.73	21.50
		1	5	20.15	20.28	20.29	21.50
		3	0	20.62	20.69	20.80	21.50
		3	2	20.66	20.59	20.77	21.50
		3	3	20.65	20.56	20.61	21.50
		6	0	20.74	20.65	20.74	21.50
	16QAM	1	0	21.05	20.95	20.89	21.50
		1	2	21.06	21.01	20.71	21.50
		1	5	20.60	20.76	20.88	21.50
		3	0	20.83	20.55	20.73	21.50
		3	2	20.75	20.63	20.84	21.50
		3	3	20.67	20.52	20.62	21.50
		6	0	20.62	20.60	20.86	21.50
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				19965/1711.5	20175/1732.5	20385/1753.5	
3MHz	QPSK	1	0	20.43	20.46	20.44	21.50
		1	7	20.85	20.72	20.77	21.50
		1	14	20.18	20.33	20.31	21.50
		8	0	20.66	20.76	20.87	21.50
		8	4	20.69	20.67	20.83	21.50
		8	7	20.69	20.61	20.65	21.50
		15	0	20.76	20.69	20.77	21.50
	16QAM	1	0	21.08	20.97	20.92	21.50
		1	7	21.09	21.08	20.75	21.50
		1	14	20.62	20.80	20.91	21.50
		8	0	20.88	20.59	20.76	21.50
		8	4	20.80	20.70	20.90	21.50



Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				19975/1712.5	20175/1732.5	20375/1752.5	
5MHz	QPSK	8	7	20.71	20.58	20.69	21.50
		15	0	20.65	20.64	20.89	21.50
		1	0	20.40	20.44	20.46	21.50
		1	13	20.83	20.68	20.74	21.50
		1	24	20.15	20.28	20.29	21.50
		12	0	20.63	20.71	20.83	21.50
		12	6	20.67	20.63	20.78	21.50
	16QAM	12	13	20.67	20.59	20.61	21.50
		25	0	20.74	20.68	20.75	21.50
		1	0	21.05	20.93	20.89	21.50
		1	13	21.00	21.56	20.72	21.50
		1	24	20.59	20.78	20.87	21.50
		12	0	20.86	20.55	20.73	21.50
		12	6	20.77	20.65	20.86	21.50
10MHz	QPSK	12	13	20.68	20.53	20.65	21.50
		25	0	20.63	20.60	20.84	21.50
		1	0	20.41	20.43	20.42	21.50
		1	25	20.84	20.72	20.76	21.50
		1	49	20.16	20.30	20.31	21.50
		25	0	20.64	20.75	20.85	21.50
		25	13	20.69	20.66	20.81	21.50
	16QAM	25	25	20.67	20.59	20.65	21.50
		50	0	20.74	20.69	20.76	21.50
		1	0	21.04	20.91	20.89	21.50
		1	25	21.08	21.09	20.70	21.50
		1	49	20.60	20.76	20.89	21.50
		25	0	20.84	20.59	20.74	21.50
		25	13	20.76	20.64	20.87	21.50
15MHz	QPSK	25	25	20.70	20.57	20.64	21.50
		50	0	20.62	20.62	20.84	21.50
		20025/1717.5	20175/1732.5	20325/1747.5			
		1	0	20.41	20.34	20.40	21.50
		1	38	20.84	20.72	20.75	21.50
		1	74	20.14	20.27	20.28	21.50
		36	0	20.64	20.72	20.84	21.50
	QPSK	36	18	20.67	20.63	20.78	21.50
		36	39	20.66	20.60	20.62	21.50
		75	0	20.77	20.66	20.74	21.50



Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				20050/1720	20175/1732.5	20300/1745	
20MHz	16QAM	1	0	21.02	20.94	20.89	21.50
		1	38	21.07	21.00	20.73	21.50
		1	74	20.59	20.76	20.87	21.50
		36	0	20.86	20.58	20.74	21.50
		36	18	20.76	20.64	20.85	21.50
		36	39	20.69	20.54	20.66	21.50
		75	0	20.63	20.60	20.84	21.50
	QPSK	1	0	20.38	20.37	20.38	21.50
		1	50	20.83	20.68	20.73	21.50
		1	99	20.12	20.26	20.25	21.50
		50	0	20.61	20.67	20.80	21.50
		50	25	20.65	20.59	20.75	21.50
		50	50	20.63	20.55	20.58	21.50
		100	0	20.74	20.61	20.70	21.50
16QAM	1	0	21.00	20.90	20.84	21.50	
	1	50	21.03	21.05	20.69	21.50	
	1	99	20.57	20.73	20.85	21.50	
	50	0	20.83	20.54	20.71	21.50	
	50	25	20.73	20.62	20.82	21.50	
	50	50	20.66	20.49	20.62	21.50	
	100	0	20.61	20.56	20.81	21.50	

LTE FDD Band 5 Full Power				Conducted Power(dBm)			Tune-up Limit
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			
				20407/824.7	20525/836.5	20643/848.3	
1.4MHz	QPSK	1	0	23.91	23.83	23.84	25.00
		1	2	24.08	24.04	23.96	25.00
		1	5	23.85	23.79	23.84	25.00
		3	0	23.93	23.90	23.91	25.00
		3	2	24.01	23.94	23.91	25.00
		3	3	23.96	23.86	23.81	25.00
		6	0	23.03	23.01	22.94	24.00
	16QAM	1	0	23.20	23.27	23.19	24.00
		1	2	23.18	23.12	23.06	24.00
		1	5	23.11	23.15	23.25	24.00
		3	0	22.94	22.88	22.91	24.00
		3	2	22.93	22.87	22.84	24.00
		3	3	22.97	22.97	22.76	24.00



Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				20415/825.5	20525/836.5	20635/847.5	
3MHz	QPSK	6	0	21.96	21.97	21.95	23.00
		1	0	23.93	23.87	23.87	25.00
		1	7	24.06	24.07	24.00	25.00
		1	14	23.88	23.84	23.88	25.00
		8	0	23.03	23.02	23.04	24.00
		8	4	23.13	23.04	23.03	24.00
		8	7	23.06	22.97	22.91	24.00
	16QAM	15	0	23.03	23.05	22.97	24.00
		1	0	23.23	23.29	23.22	24.00
		1	7	23.21	23.12	23.10	24.00
		1	14	23.13	23.19	23.28	24.00
		8	0	22.05	22.01	22.03	23.00
		8	4	22.04	22.00	21.96	23.00
		8	7	22.07	22.09	21.89	23.00
		15	0	21.99	22.01	21.98	23.00
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				20425/826.5	20525/836.5	20625/846.5	
5MHz	QPSK	1	0	23.90	23.85	23.83	25.00
		1	13	24.04	24.03	23.97	25.00
		1	24	23.85	23.79	23.84	25.00
		12	0	23.00	22.97	23.00	24.00
		12	6	23.11	23.00	22.98	24.00
		12	13	23.04	22.95	22.87	24.00
		25	0	23.03	23.04	22.95	24.00
	16QAM	1	0	23.20	23.25	23.19	24.00
		1	13	23.18	23.10	23.07	24.00
		1	24	23.10	23.17	23.24	24.00
		12	0	22.03	21.97	22.00	23.00
		12	6	22.01	21.95	21.92	23.00
		12	13	22.04	22.04	21.85	23.00
		25	0	21.97	21.97	21.93	23.00
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				20450/829	20525/836.5	20600/844	
10MHz	QPSK	1	0	23.88	23.78	23.81	25.00
		1	25	24.04	24.03	23.96	25.00
		1	49	23.82	23.77	23.80	25.00
		25	0	22.98	22.93	22.97	24.00
		25	13	23.09	22.96	22.95	24.00
		25	25	23.00	22.91	22.84	24.00
		50	0	23.02	22.97	22.90	24.00
	16QAM	1	0	23.05	23.22	23.14	24.00



		1	25	23.15	23.09	23.04	24.00
		1	49	23.08	23.12	23.22	24.00
		25	0	22.00	21.96	21.98	23.00
		25	13	21.97	21.92	21.88	23.00
		25	25	22.02	22.00	21.82	23.00
		50	0	21.95	21.93	21.90	23.00

LTE FDD Band 7 Full Power				Conducted Power(dBm)			Tune-up Limit
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			
				20775/2502.5	21100/2535	21425/2567.5	
5MHz	QPSK	1	0	21.91	21.85	21.75	23.00
		1	13	22.32	22.10	22.26	23.00
		1	24	21.97	21.85	21.92	23.00
		12	0	21.24	21.16	21.13	22.00
		12	6	21.32	21.19	21.30	22.00
		12	13	21.36	21.21	21.27	22.00
		25	0	21.28	21.20	21.17	22.00
	16QAM	1	0	21.89	20.97	21.03	22.00
		1	13	21.87	21.74	21.60	22.00
		1	24	21.17	21.09	21.20	22.00
		12	0	20.29	20.09	20.14	22.00
		12	6	20.32	20.21	20.19	22.00
		12	13	20.27	20.24	20.27	22.00
		25	0	20.32	20.07	20.22	21.00
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				20800/2505	21100/2535	21400/2565	
10MHz	QPSK	1	0	21.93	21.86	21.78	23.00
		1	25	22.35	22.15	22.30	23.00
		1	49	21.99	21.89	21.95	23.00
		25	0	21.27	21.21	21.17	22.00
		25	13	21.35	21.24	21.34	22.00
		25	25	21.38	21.25	21.32	22.00
		50	0	21.32	21.22	21.21	22.00
	16QAM	1	0	21.91	21.00	21.05	22.00
		1	25	21.90	21.78	21.63	22.00
		1	49	21.20	21.11	21.23	22.00
		25	0	20.32	20.14	20.18	22.00
		25	13	20.34	20.25	20.22	22.00
		25	25	20.30	20.29	20.31	22.00
		50	0	20.35	20.12	20.26	21.00
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up



Bandwidth	Modulation	RB size	RB offset	20825/2507.5	21100/2535	21375/2562.5	Limit
				15MHz	QPSK	1	0
	1	38	22.33	22.14		22.27	23.00
	1	74	21.96	21.84		21.91	23.00
	36	0	21.25	21.17		21.14	22.00
	36	18	21.32	21.19		21.30	22.00
	36	39	21.35	21.22		21.28	22.00
	75	0	21.30	21.18		21.16	22.00
	16QAM	1	0	21.86	20.98	21.03	22.00
		1	38	21.88	21.75	21.61	22.00
		1	74	21.17	21.07	21.20	22.00
		36	0	20.29	20.12	20.15	22.00
		36	18	20.31	20.20	20.18	22.00
		36	39	20.28	20.25	20.28	22.00
		75	0	20.32	20.07	20.22	21.00
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				20850/2510	21100/2535	21350/2560	
20MHz	QPSK	1	0	21.89	21.78	21.73	23.00
		1	50	22.32	22.10	22.25	23.00
		1	99	21.94	21.83	21.88	23.00
		50	0	21.22	21.12	21.10	22.00
		50	25	21.30	21.15	21.27	22.00
		50	50	21.32	21.17	21.24	22.00
		100	0	21.27	21.13	21.12	22.00
	16QAM	1	0	21.03	20.94	20.98	22.00
		1	50	21.84	21.73	21.57	22.00
		1	99	21.15	21.04	21.18	22.00
		50	0	20.26	20.08	20.12	22.00
		50	25	20.28	20.18	20.15	22.00
		50	50	20.25	20.20	20.24	22.00
		100	0	20.30	20.03	20.19	21.00

LTE FDD Band 7 Receiver off				Conducted Power(dBm)			Tune-up Limit
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			
				20775/2502.5	21100/2535	21425/2567.5	
5MHz	QPSK	1	0	20.93	20.85	20.79	22.00
		1	13	21.42	21.25	21.35	22.00
		1	24	20.98	20.88	20.88	22.00
		12	0	21.28	21.16	21.17	22.00
		12	6	21.33	21.25	21.30	22.00
		12	13	21.38	21.21	21.32	22.00





	16QAM	25	0	21.24	21.20	21.26	22.00
		1	0	21.73	20.83	21.16	22.00
		1	13	21.71	21.59	21.83	22.00
		1	24	21.35	20.96	21.06	22.00
		12	0	20.24	20.16	20.19	21.00
		12	6	20.32	20.20	20.31	21.00
		12	13	20.32	20.24	20.26	21.00
		25	0	20.24	20.18	20.22	21.00
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				20800/2505	21100/2535	21400/2565	
10MHz	QPSK	1	0	20.95	20.86	20.82	22.00
		1	25	21.45	21.30	21.39	22.00
		1	49	21.00	20.92	20.91	22.00
		25	0	21.31	21.21	21.21	22.00
		25	13	21.36	21.30	21.34	22.00
		25	25	21.40	21.25	21.37	22.00
		50	0	21.28	21.22	21.30	22.00
	16QAM	1	0	21.75	20.86	21.18	22.00
		1	25	21.74	21.63	21.86	22.00
		1	49	21.38	20.98	21.09	22.00
		25	0	20.27	20.21	20.23	21.00
		25	13	20.34	20.24	20.34	21.00
		25	25	20.35	20.29	20.30	21.00
		50	0	20.27	20.23	20.26	21.00
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				20825/2507.5	21100/2535	21375/2562.5	
15MHz	QPSK	1	0	20.94	20.82	20.80	22.00
		1	38	21.43	21.29	21.36	22.00
		1	74	20.97	20.87	20.87	22.00
		36	0	21.29	21.17	21.18	22.00
		36	18	21.33	21.25	21.30	22.00
		36	39	21.37	21.22	21.33	22.00
		75	0	21.26	21.18	21.25	22.00
	16QAM	1	0	21.70	20.84	21.16	22.00
		1	38	21.72	21.60	21.84	22.00
		1	74	21.35	20.94	21.06	22.00
		36	0	20.24	20.19	20.20	21.00
		36	18	20.31	20.19	20.30	21.00
		36	39	20.33	20.25	20.27	21.00
		75	0	20.24	20.18	20.22	21.00
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				20850/2510	21100/2535	21350/2560	
20MHz	QPSK	1	0	20.91	20.78	20.77	22.00



		1	50	21.42	21.25	21.34	22.00
		1	99	20.95	20.86	20.84	22.00
		50	0	21.26	21.12	21.14	22.00
		50	25	21.31	21.21	21.27	22.00
		50	50	21.34	21.17	21.29	22.00
		100	0	21.23	21.13	21.21	22.00
	16QAM	1	0	21.07	20.80	21.11	22.00
		1	50	21.68	21.58	21.80	22.00
		1	99	21.33	20.91	21.04	22.00
		50	0	20.21	20.15	20.17	21.00
		50	25	20.28	20.17	20.27	21.00
		50	50	20.30	20.20	20.23	21.00
		100	0	20.22	20.14	20.19	21.00

LTE FDD Band 7 Receiver off+Hotspot on				Conducted Power(dBm)			Tune-up Limit
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			
				20775/2502.5	21100/2535	21425/2567.5	
5MHz	QPSK	1	0	18.83	18.67	18.77	20.00
		1	13	19.11	19.05	19.09	20.00
		1	24	18.82	18.67	18.63	20.00
		12	0	19.04	18.88	18.91	20.00
		12	6	19.11	18.91	18.85	20.00
		12	13	19.10	18.92	18.95	20.00
		25	0	19.03	18.94	18.91	20.00
	16QAM	1	0	19.04	19.09	19.09	20.00
		1	13	19.44	19.44	19.48	20.00
		1	24	18.98	19.15	18.96	20.00
		12	0	19.07	18.82	18.97	20.00
		12	6	19.05	18.80	18.96	20.00
		12	13	19.06	18.83	19.01	20.00
		25	0	19.07	18.87	18.91	20.00
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				20800/2505	21100/2535	21400/2565	
10MHz	QPSK	1	0	18.84	18.66	18.79	20.00
		1	25	19.12	19.09	19.11	20.00
		1	49	18.83	18.69	18.65	20.00
		25	0	19.05	18.92	18.93	20.00
		25	13	19.13	18.94	18.88	20.00
		25	25	19.10	18.92	18.99	20.00
		50	0	19.03	18.95	18.92	20.00
	16QAM	1	0	19.03	19.07	19.09	20.00
		1	25	19.46	19.47	19.46	20.00



		1	49	18.99	19.13	18.98	20.00
		25	0	19.05	18.86	18.98	20.00
		25	13	19.04	18.79	18.97	20.00
		25	25	19.08	18.87	19.00	20.00
		50	0	19.06	18.89	18.91	20.00
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				20825/2507.5	21100/2535	21375/2562.5	
15MHz	QPSK	1	0	18.84	18.64	18.78	20.00
		1	38	19.12	19.09	19.10	20.00
		1	74	18.81	18.66	18.62	20.00
		36	0	19.05	18.89	18.92	20.00
		36	18	19.11	18.91	18.85	20.00
		36	39	19.09	18.93	18.96	20.00
		75	0	19.06	18.92	18.90	20.00
	16QAM	1	0	19.01	19.10	19.09	20.00
		1	38	19.45	19.45	19.49	20.00
		1	74	18.98	19.13	18.96	20.00
		36	0	19.07	18.85	18.98	20.00
		36	18	19.04	18.79	18.95	20.00
		36	39	19.07	18.84	19.02	20.00
		75	0	19.07	18.87	18.91	20.00
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)			Tune-up Limit
				20850/2510	21100/2535	21350/2560	
20MHz	QPSK	1	0	18.81	18.60	18.75	20.00
		1	50	19.11	19.05	19.08	20.00
		1	99	18.79	18.65	18.59	20.00
		50	0	19.02	18.84	18.88	20.00
		50	25	19.09	18.87	18.82	20.00
		50	50	19.06	18.88	18.92	20.00
		100	0	19.03	18.87	18.86	20.00
	16QAM	1	0	18.99	19.06	19.04	20.00
		1	50	19.41	19.43	19.45	20.00
		1	99	18.96	19.10	18.94	20.00
		50	0	19.04	18.81	18.95	20.00
		50	25	19.01	18.77	18.92	20.00
		50	50	19.04	18.79	18.98	20.00
		100	0	19.05	18.83	18.88	20.00

### 9.4 WLAN Mode

#### FCC

Wi-Fi 2.4G Full Power Mode	Channel /Frequency(MHz)	Maximum Output Power (dBm)	
		Tune-up	Meas.
802.11b (1M)	1/2412	18.00	17.24
	6/2437	18.00	17.21
	11/2462	18.00	17.22
802.11g (6M)	1/2412	13.50	12.03
	2/2417	17.50	16.38
	6/2437	17.50	15.86
	10/2457	17.50	16.07
	11/2462	13.50	12.11
802.11n-HT20 (MCS0)	1/2412	13.50	12.07
	2/2417	17.00	15.84
	6/2437	17.00	15.48
	10/2457	17.00	15.85
	11/2462	13.50	12.01
802.11n-HT40 (MCS0)	3/2422	14.50	10.81
	5/2432	14.50	11.40
	8/2447	14.50	10.62
	9/2452	11.50	7.83

Wi-Fi 2.4G Receiver on Mode	Channel /Frequency(MHz)	Maximum Output Power (dBm)	
		Tune-up	Meas.
802.11b (1M)	1/2412	14.50	13.98
	6/2437	14.50	14.04
	11/2462	14.50	14.00
802.11g (6M)	1/2412	13.50	13.22
	2/2417	14.50	13.75
	6/2437	14.50	13.77
	10/2457	14.50	13.86
	11/2462	13.50	13.26
802.11n-HT20 (MCS0)	1/2412	13.50	13.53
	2/2417	14.50	13.65
	6/2437	14.50	13.87
	10/2457	14.50	13.76



	11/2462	13.50	13.23
802.11n-HT40 (MCS0)	3/2422	14.50	13.57
	5/2432	14.50	13.60
	8/2447	14.50	13.49
	9/2452	11.50	11.08

## CE

Wi-Fi 2.4GHz (Full Power)	Channel /Frequency(MHz)	Average Conducted Power (dBm)	
		Tune-up	Meas.
802.11b (1M)	1/2412	18.00	17.54
	7/2442	18.00	17.59
	13/2472	18.00	17.64
802.11g (6M)	1/2412	17.50	16.17
	2/2417	17.50	16.29
	7/2442	17.50	16.43
	12/2467	17.50	16.56
	13/2472	17.50	16.31
802.11n-HT20 (MCS0)	1/2412	17.00	15.65
	2/2417	17.00	15.77
	7/2442	17.00	16.02
	12/2467	17.00	16.04
	13/2472	17.00	15.67
802.11n-HT40 (MCS0)	3/2422	16.00	12.79
	7/2442	16.00	12.68
	10/2457	16.00	12.58
	11/2462	16.00	12.47

Wi-Fi 2.4GHz (Receiver on)	Channel /Frequency(MHz)	Average Conducted Power (dBm)	
		Tune-up	Meas.
802.11b (1M)	1/2412	14.50	13.47
	7/2442	14.50	13.64
	13/2472	14.50	13.73
802.11g (6M)	1/2412	14.50	13.35
	2/2417	14.50	13.47
	7/2442	14.50	13.53
	12/2467	14.50	13.56
	13/2472	14.50	13.41
802.11n-HT20	1/2412	14.50	13.29



(MCS0)	2/2417	14.50	13.39
	7/2442	14.50	13.52
	12/2467	14.50	13.50
	13/2472	14.50	13.36
802.11n-HT40 (MCS0)	3/2422	14.50	12.28
	7/2442	14.50	12.23
	10/2457	14.50	12.11
	11/2462	14.50	12.19

### 9.5 Bluetooth Mode

Bluetooth	Conducted Power(dBm)			Tune-up Limit (dBm)
	Channel/Frequency(MHz)			
	Ch 0/2402 MHz	Ch 39/2441 MHz	Ch 78/2480 MHz	
GFSK	9.90	9.39	9.56	12.00
$\pi/4$ DQPSK	9.15	8.64	8.75	10.00
8DPSK	9.09	8.55	8.71	10.00
BLE	Ch 0/2402 MHz	Ch 19/2440 MHz	Ch 39/2480 MHz	Tune-up Limit (dBm)
GFSK	-2.13	-1.48	-2.01	0.00
BT 5.0	-2.11	-1.82	-2.09	0.00

## 10 Measured and Reported (Scaled) SAR Results

### 10.1 EUT Antenna Locations

The Detailed Antenna Locations refer to *Antenna Locations*.

Overall (Length x Width): 147.13 mm x 70.78 mm						
Overall Diagonal: 155mm/Display Diagonal:141.5mm						
Distance of the Antenna to the EUT surface/edge						
Antenna	Back Side	Front side	Left Edge	Right Edge	Top Edge	Bottom Edge
Main-Antenna	<25mm	<25mm	<25mm	<25mm	>25mm	<25mm
Bluetooth/Wi-Fi Antenna	<25mm	<25mm	>25mm	<25mm	<25mm	>25mm
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
Bluetooth/Wi-Fi Antenna	Yes	Yes	N/A	Yes	Yes	N/A
<p>Note: 1. Per KDB 941225 D06, when the overall device length and width are <math>\geq 9\text{cm} \times 5\text{cm}</math>, 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.</p> <p>2. Per FCC KDB 447498 D01, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:</p> <p>a) <math>\leq 0.8 \text{ W/kg}</math> or <math>2.0 \text{ W/kg}</math>, for 1-g or 10-g respectively, when the transmission band is <math>\leq 100\text{MHz}</math></p> <p>b) <math>\leq 0.6 \text{ W/kg}</math> or <math>1.5 \text{ W/kg}</math>, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz.</p> <p>c) <math>\leq 0.4 \text{ W/kg}</math> or <math>1.0 \text{ W/kg}</math>, for 1-g or 10-g respectively, when the transmission band is <math>\geq 200 \text{ MHz}</math>.</p> <p>3. When the original highest measured SAR is <math>\geq 0.80 \text{ W/kg}</math>, the measurement was repeated once.</p> <p>4. Per FCC KDB Publication 648474 D04, SAR was evaluated without a headset connected to the device. Since the reported SAR was <math>\leq 1.2 \text{ W/kg}</math>, no additional SAR evaluations using a headset cable were required.</p>						



## 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  $\leq 50$  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  $\leq 7.5$  for product specific 10-g 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)	MAXPower (dBm)	Frequency (MHz)	Ratio	Evaluation
Head	5	12	2480	4.99	Yes
Body-worn	15	12	2480	1.66	No
Hotspot SAR	10	12	2480	2.50	No

### 10.3 Measured SAR Results

Table 7: GSM 850

Test Position	Cover Type	Time slot	Duty Cycle	Channel/Frequency (MHz)	Tune-up (dBm)	Measured power (dBm)	Limit of SAR 1.6 W/kg (mW/g)				Plot No.
							Measured SAR1g	Power Drift (dB)	Scaling Factor	Report SAR1g	
<b>Head SAR</b>											
Left Cheek	standard	GSM	1:8.3	190/836.6	34.00	33.08	0.326	0.028	1.24	0.403	11
Left Tilt	standard	GSM	1:8.3	190/836.6	34.00	33.08	0.215	0.020	1.24	0.266	/
Right Cheek	standard	GSM	1:8.3	190/836.6	34.00	33.08	0.310	0.091	1.24	0.383	/
Right Tilt	standard	GSM	1:8.3	190/836.6	34.00	33.08	0.220	-0.110	1.24	0.272	/
<b>Body-worn SAR (Distance 15mm)</b>											
Back Side	standard	GSM	1:8.3	190/836.6	34.00	33.08	0.585	0.070	1.24	0.723	12
Front Side	standard	GSM	1:8.3	190/836.6	34.00	33.08	0.423	0.010	1.24	0.523	/
<b>Hotspot SAR(Distance 10mm)</b>											
Back Side	standard	4Txslots	1:2.07	190/836.6	28.00	27.05	0.567	0.000	1.24	0.706	13
Front Side	standard	4Txslots	1:2.07	190/836.6	28.00	27.05	0.355	0.050	1.24	0.442	/
Left Edge	standard	4Txslots	1:2.07	190/836.6	28.00	27.05	0.314	-0.010	1.24	0.391	/
Right Edge	standard	4Txslots	1:2.07	190/836.6	28.00	27.05	0.332	-0.050	1.24	0.413	/
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	4Txslots	1:2.07	190/836.6	28.00	27.05	0.045	-0.170	1.24	0.056	/
<p>Note: 1.The value with blue color is the maximum SAR Value of each test band.</p> <p>2.When multiple slots are used, SAR should be tested to account for the maximum source-based time-averaged output power.</p>											



Table 8: GSM 1900

Test Position	Cover Type	Time slot	Duty Cycle	Channel/Frequency (MHz)	Tune-up (dBm)	Measured power (dBm)	Limit of SAR 1.6 W/kg (mW/g)				Plot No.
							Measured SAR1g	Power Drift (dB)	Scaling Factor	Report SAR1g	
<b>Head SAR (Full Power)</b>											
Left Cheek	standard	GSM	1:8.3	661/1880	31.00	29.91	0.300	0.090	1.29	0.386	14
Left Tilt	standard	GSM	1:8.3	661/1880	31.00	29.91	0.157	0.010	1.29	0.202	/
Right Cheek	standard	GSM	1:8.3	661/1880	31.00	29.91	0.173	0.100	1.29	0.222	/
Right Tilt	standard	GSM	1:8.3	661/1880	31.00	29.91	0.123	0.140	1.29	0.158	/
<b>Body-worn SAR (Distance 15mm) (Full Power)</b>											
Back Side	standard	GSM	1:8.3	661/1880	31.00	29.91	0.158	0.030	1.29	0.203	/
Front Side	standard	GSM	1:8.3	661/1880	31.00	29.91	0.165	0.060	1.29	0.212	15
<b>Hotspot Sarsar (Distance 10mm) (Receiver off+Hotspot on)</b>											
Back Side	standard	4Txslots	1:2.07	661/1880	23.00	22.03	0.153	-0.110	1.25	0.191	/
Front Side	standard	4Txslots	1:2.07	661/1880	23.00	22.03	0.162	0.060	1.25	0.203	16
Left Edge	standard	4Txslots	1:2.07	661/1880	23.00	22.03	0.130	0.140	1.25	0.163	/
Right Edge	standard	4Txslots	1:2.07	661/1880	23.00	22.03	0.061	0.110	1.25	0.076	/
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	4Txslots	1:2.07	661/1880	23.00	22.03	0.117	0.100	1.25	0.146	/
Note: 1.The value with blue color is the maximum SAR Value of each test band. 2.When multiple slots are used, SAR should be tested to account for the maximum source-based time-averaged output power.											



Table 9: UMTS Band II

Test Position	Cover Type	Channel Type	Duty Cycle	Channel/Frequency (MHz)	Tune-up (dBm)	Measured power (dBm)	Limit of SAR 1.6 W/kg (mW/g)				Plot No.
							Measured SAR1g	Power Drift (dB)	Scaling Factor	Report SAR1g	
<b>Head SAR (Full Power)</b>											
Left Cheek	standard	RMC 12.2K	1:1	9400/1880	25.00	24.19	0.542	-0.060	1.21	0.653	17
Left Tilt	standard	RMC 12.2K	1:1	9400/1880	25.00	24.19	0.284	-0.010	1.21	0.342	/
Right Cheek	standard	RMC 12.2K	1:1	9400/1880	25.00	24.19	0.349	-0.110	1.21	0.421	/
Right Tilt	standard	RMC 12.2K	1:1	9400/1880	25.00	24.19	0.228	0.170	1.21	0.275	/
Left Cheek	SIM2	RMC 12.2K	1:1	9400/1880	25.00	24.19	0.503	-0.113	1.21	0.606	/
Left Cheek	Battery2	RMC 12.2K	1:1	9400/1880	25.00	24.19	0.499	0.020	1.21	0.601	/
Left Cheek	Battery3	RMC 12.2K	1:1	9400/1880	25.00	24.19	0.537	0.170	1.21	0.647	/
<b>Body-worn SAR (Distance 15mm) (Full Power)</b>											
Back Side	standard	RMC 12.2K	1:1	9400/1880	25.00	24.19	0.300	0.030	1.21	0.362	/
Front Side	standard	RMC 12.2K	1:1	9400/1880	25.00	24.19	0.332	0.040	1.21	0.400	18
<b>Hotspot SAR(Distance 10mm) (Receiver off+Hotspot on)</b>											
Back Side	standard	RMC 12.2K	1:1	9400/1880	22.00	21.22	0.225	0.040	1.20	0.269	/
Front Side	standard	RMC 12.2K	1:1	9400/1880	22.00	21.22	0.229	0.090	1.20	0.274	19
Left Edge	standard	RMC 12.2K	1:1	9400/1880	22.00	21.22	0.205	0.040	1.20	0.245	/
Right Edge	standard	RMC 12.2K	1:1	9400/1880	22.00	21.22	0.095	0.100	1.20	0.114	/
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	RMC 12.2K	1:1	9400/1880	22.00	21.22	0.193	-0.110	1.20	0.231	/

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

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  $\leq 1.2$  W/kg, SAR measurement is not required for the secondary mode.

3. Accessories that do not contain RF transmitters and have been proven to increase the peak SAR by less than 5 %, such as hands-free kits, do not need SAR tests separate from the SAR tests attached to a main EUT configuration.



Table 10: UMTS Band IV

Test Position	Cover Type	Channel Type	Duty Cycle	Channel/Frequency (MHz)	Tune-up (dBm)	Measured power (dBm)	Limit of SAR 1.6 W/kg (mW/g)				Plot No.
							Measured SAR1g	Power Drift (dB)	Scaling Factor	Report SAR1g	
<b>Head SAR (Full Power)</b>											
Left Cheek	standard	RMC 12.2K	1:1	1413/1732.6	24.50	23.80	0.196	0.052	1.17	0.230	20
Left Tilt	standard	RMC 12.2K	1:1	1413/1732.6	24.50	23.80	0.140	0.190	1.17	0.164	/
Right Cheek	standard	RMC 12.2K	1:1	1413/1732.6	24.50	23.80	0.179	0.120	1.17	0.210	/
Right Tilt	standard	RMC 12.2K	1:1	1413/1732.6	24.50	23.80	0.116	0.028	1.17	0.136	/
<b>Body-worn SAR (Distance 15mm) (Full Power)</b>											
Back Side	standard	RMC 12.2K	1:1	1413/1732.6	24.50	23.80	0.286	0.046	1.17	0.336	21
Front Side	standard	RMC 12.2K	1:1	1413/1732.6	24.50	23.80	0.259	0.080	1.17	0.304	/
<b>Hotspot SAR(Distance 10mm) (Receiver off+Hotspot on)</b>											
Back Side	standard	RMC 12.2K	1:1	1413/1732.6	21.50	20.76	0.333	0.050	1.19	0.395	22
Front Side	standard	RMC 12.2K	1:1	1413/1732.6	21.50	20.76	0.182	0.070	1.19	0.216	/
Left Edge	standard	RMC 12.2K	1:1	1413/1732.6	21.50	20.76	0.085	0.027	1.19	0.101	/
Right Edge	standard	RMC 12.2K	1:1	1413/1732.6	21.50	20.76	0.069	0.036	1.19	0.081	/
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	RMC 12.2K	1:1	1413/1732.6	21.50	20.76	0.306	0.032	1.19	0.363	/
<p>Note: 1. The value with blue color is the maximum SAR Value of each test band.</p> <p>2. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is <math>\leq \frac{1}{4}</math> 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 <math>\leq 1.2</math> W/kg, SAR measurement is not required for the secondary mode.</p>											



Table 11: UMTS Band V

Test Position	Cover Type	Channel Type	Duty Cycle	Channel/Frequency (MHz)	Tune-up (dBm)	Measured power (dBm)	Limit of SAR 1.6 W/kg (mW/g)				Plot No.
							Measured SAR1g	Power Drift (dB)	Scaling Factor	Report SAR1g	
<b>Head SAR</b>											
Left Cheek	standard	RMC 12.2K	1:1	4183/836.6	25.00	23.59	0.339	0.070	1.38	0.469	23
Left Tilt	standard	RMC 12.2K	1:1	4183/836.6	25.00	23.59	0.222	0.170	1.38	0.307	/
Right Cheek	standard	RMC 12.2K	1:1	4183/836.6	25.00	23.59	0.330	0.026	1.38	0.457	/
Right Tilt	standard	RMC 12.2K	1:1	4183/836.6	25.00	23.59	0.242	0.060	1.38	0.335	/
<b>Body-worn SAR (Distance 15mm)</b>											
Back Side	standard	RMC 12.2K	1:1	4132/826.4	25.00	23.59	0.435	-0.010	1.38	0.602	/
		RMC 12.2K	1:1	4183/836.6	25.00	23.59	0.585	-0.040	1.38	0.809	24
		RMC 12.2K	1:1	4233/846.6	25.00	23.59	0.455	0.020	1.38	0.630	/
Front Side	standard	RMC 12.2K	1:1	4183/836.6	25.00	23.59	0.393	0.030	1.38	0.544	/
Back Side	SIM2	RMC 12.2K	1:1	4183/836.6	25.00	23.59	0.045	0.030	1.38	0.063	/
Back Side	Battery2	RMC 12.2K	1:1	4183/836.6	25.00	23.59	0.415	0.010	1.38	0.574	/
Back Side	Battery3	RMC 12.2K	1:1	4183/836.6	25.00	23.59	0.451	0.010	1.38	0.624	/
<b>Hotspot SAR(Distance 10mm)</b>											
Back Side	standard	RMC 12.2K	1:1	4132/826.4	25.00	23.59	0.642	0.010	1.38	0.888	25
		RMC 12.2K	1:1	4183/836.6	25.00	23.59	0.606	0.000	1.38	0.838	/
		RMC 12.2K	1:1	4233/846.6	25.00	23.59	0.617	0.000	1.38	0.854	/
Front Side	standard	RMC 12.2K	1:1	4183/836.6	25.00	23.59	0.379	0.040	1.38	0.524	/
Left Edge	standard	RMC 12.2K	1:1	4183/836.6	25.00	23.59	0.412	0.020	1.38	0.570	/
Right Edge	standard	RMC 12.2K	1:1	4183/836.6	25.00	23.59	0.300	0.060	1.38	0.415	/
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	RMC 12.2K	1:1	4183/836.6	25.00	23.59	0.013	0.063	1.38	0.018	/
Back Side	SIM2	RMC 12.2K	1:1	4132/826.4	25.00	23.59	0.537	0.010	1.38	0.743	/
Back Side	Battery2	RMC 12.2K	1:1	4132/826.4	25.00	23.59	0.496	0.000	1.38	0.686	/
Back Side	Battery3	RMC 12.2K	1:1	4132/826.4	25.00	23.59	0.485	-0.010	1.38	0.671	/

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

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  $\leq 1.2$  W/kg, SAR measurement is not required for the secondary mode.

3. Accessories that do not contain RF transmitters and have been proven to increase the peak SAR by less than 5 %, such as hands-free kits, do not need SAR tests separate from the SAR tests attached to a main EUT configuration.

**Table 12: LTE Band 2**

Test Position	Cover Type	Duty Cycle	RB allocation	RB offset	Channel/Frequency (MHz)	Tune-up (dBm)	Measured power (dBm)	Limit of SAR 1.6 W/kg (mW/g)				Plot No.
								Measured SAR1g	Power Drift (dB)	Scaling Factor	Report SAR1g	
<b>Head SAR (QPSK) (Full Power)</b>												
Left Cheek	standard	1:1	1	50	18700/1860	24.50	23.78	0.442	0.030	1.18	0.522	26
Left Tilt	standard	1:1	1	50	18700/1860	24.50	23.78	0.214	0.040	1.18	0.253	/
Right Cheek	standard	1:1	1	50	18700/1860	24.50	23.78	0.277	-0.140	1.18	0.327	/
Right Tilt	standard	1:1	1	50	18700/1860	24.50	23.78	0.180	0.090	1.18	0.212	/
Left Cheek	standard	1:1	50%	25	18700/1860	23.50	22.86	0.323	0.050	1.16	0.374	/
Left Tilt	standard	1:1	50%	25	18700/1860	23.50	22.86	0.172	0.090	1.16	0.199	/
Right Cheek	standard	1:1	50%	25	18700/1860	23.50	22.86	0.214	0.036	1.16	0.248	/
Right Tilt	standard	1:1	50%	25	18700/1860	23.50	22.86	0.143	0.040	1.16	0.166	/
<b>Body-worn SAR (QPSK, Distance 15mm) (Full Power)</b>												
Back Side	standard	1:1	1	50	18700/1860	24.50	23.78	0.263	-0.150	1.18	0.310	/
Front Side	standard	1:1	1	50	18700/1860	24.50	23.78	0.275	0.090	1.18	0.325	27
Back Side	standard	1:1	50%	25	18700/1860	23.50	22.86	0.211	-0.050	1.16	0.245	/
Front Side	standard	1:1	50%	25	18700/1860	23.50	22.86	0.218	-0.010	1.16	0.253	/
<b>Hotspot SAR(QPSK, Distance 10mm) (Receiver off+Hotspot on)</b>												
Back Side	standard	1:1	1	50	18700/1860	21.50	20.80	0.233	-0.010	1.17	0.274	/
Front Side	standard	1:1	1	50	18700/1860	21.50	20.80	0.207	0.160	1.17	0.243	/
Left Edge	standard	1:1	1	50	18700/1860	21.50	20.80	0.204	0.070	1.17	0.240	/
Right Edge	standard	1:1	1	50	18700/1860	21.50	20.80	0.097	0.130	1.17	0.114	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	standard	1:1	1	50	18700/1860	21.50	20.80	0.165	0.060	1.17	0.194	/
Back Side	standard	1:1	50%	0	18900/1880	21.50	20.85	0.243	-0.020	1.16	0.282	28
Front Side	standard	1:1	50%	0	18900/1880	21.50	20.85	0.216	0.140	1.16	0.251	/
Left Edge	standard	1:1	50%	0	18900/1880	21.50	20.85	0.191	0.120	1.16	0.222	/
Right Edge	standard	1:1	50%	0	18900/1880	21.50	20.85	0.101	0.150	1.16	0.117	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	standard	1:1	50%	0	18900/1880	21.50	20.85	0.171	0.090	1.16	0.199	/
<p>Note: 1. The value with blue color is the maximum SAR Value of each test band.</p> <p>2. For QPSK with 100% RB allocation, SAR is required when and the highest reported SAR for 1 RB and 50% RB allocation in are <math>\geq 50\%</math> limit(10g).</p>												



Table 13: LTE Band 4

Test Position	Cover Type	Duty Cycle	RB allocation	RB offset	Channel/Frequency (MHz)	Tune-up (dBm)	Measured power (dBm)	Limit of SAR 1.6 W/kg (mW/g)				Plot No.
								Measured SAR1g	Power Drift (dB)	Scaling Factor	Report SAR1g	
<b>Head SAR (QPSK) (Full Power)</b>												
Left Cheek	standard	1:1	1	50	20050/1720	24.50	23.82	0.179	-0.045	1.17	0.209	/
Left Tilt	standard	1:1	1	50	20050/1720	24.50	23.82	0.135	0.028	1.17	0.158	/
Right Cheek	standard	1:1	1	50	20050/1720	24.50	23.82	0.187	0.047	1.17	0.219	29
Right Tilt	standard	1:1	1	50	20050/1720	24.50	23.82	0.111	0.180	1.17	0.130	/
Left Cheek	standard	1:1	50%	25	20300/1745	23.50	22.82	0.147	0.079	1.17	0.172	/
Left Tilt	standard	1:1	50%	25	20300/1745	23.50	22.82	0.103	0.023	1.17	0.120	/
Right Cheek	standard	1:1	50%	25	20300/1745	23.50	22.82	0.134	0.127	1.17	0.157	/
Right Tilt	standard	1:1	50%	25	20300/1745	23.50	22.82	0.089	0.120	1.17	0.104	/
<b>Body-worn SAR (QPSK, Distance 15mm) (Full Power)</b>												
Back Side	standard	1:1	1	50	20050/1720	24.50	23.82	0.315	-0.050	1.17	0.368	30
Front Side	standard	1:1	1	50	20050/1720	24.50	23.82	0.211	0.090	1.17	0.247	/
Back Side	standard	1:1	50%	25	20300/1745	23.50	22.82	0.223	0.027	1.17	0.261	/
Front Side	standard	1:1	50%	25	20300/1745	23.50	22.82	0.172	0.090	1.17	0.201	/
<b>Hotspot SAR(QPSK, Distance 10mm) (Receiver off+Hotspot on)</b>												
Back Side	standard	1:1	1	50	20050/1720	21.50	20.83	0.316	0.024	1.17	0.369	31
Front Side	standard	1:1	1	50	20050/1720	21.50	20.83	0.155	0.080	1.17	0.181	/
Left Edge	standard	1:1	1	50	20050/1720	21.50	20.83	0.076	0.120	1.17	0.088	/
Right Edge	standard	1:1	1	50	20050/1720	21.50	20.83	0.069	0.140	1.17	0.080	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	standard	1:1	1	50	20050/1720	21.50	20.83	0.299	0.020	1.17	0.349	/
Back Side	standard	1:1	50%	0	20300/1745	21.50	20.80	0.275	0.030	1.17	0.323	/
Front Side	standard	1:1	50%	0	20300/1745	21.50	20.80	0.166	0.080	1.17	0.195	/
Left Edge	standard	1:1	50%	0	20300/1745	21.50	20.80	0.085	0.100	1.17	0.099	/
Right Edge	standard	1:1	50%	0	20300/1745	21.50	20.80	0.066	0.020	1.17	0.078	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	standard	1:1	50%	0	20300/1745	21.50	20.80	0.227	0.031	1.17	0.267	/

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

2. For QPSK with 100% RB allocation, SAR is required when and the highest reported SAR for 1 RB and 50% RB allocation in are  $\geq 50\%$  limit(10g).





Table 14: LTE Band 5

Test Position	Cover Type	Duty Cycle	RB allocation	RB offset	Channel/Frequency (MHz)	Tune-up (dBm)	Measured power (dBm)	Limit of SAR 1.6 W/kg (mW/g)				Plot No.
								Measured SAR1g	Power Drift (dB)	Scaling Factor	Report SAR1g	
<b>Head SAR (QPSK)</b>												
Left Cheek	standard	1:1	1	25	20450/829	25.00	24.04	0.313	-0.050	1.25	0.390	32
Left Tilt	standard	1:1	1	25	20450/829	25.00	24.04	0.198	-0.150	1.25	0.247	/
Right Cheek	standard	1:1	1	25	20450/829	25.00	24.04	0.313	0.026	1.25	0.390	/
Right Tilt	standard	1:1	1	25	20450/829	25.00	24.04	0.199	-0.050	1.25	0.248	/
Left Cheek	standard	1:1	50%	13	20450/829	24.00	23.09	0.245	-0.060	1.23	0.302	/
Left Tilt	standard	1:1	50%	13	20450/829	24.00	23.09	0.154	0.010	1.23	0.190	/
Right Cheek	standard	1:1	50%	13	20450/829	24.00	23.09	0.245	0.043	1.23	0.302	/
Right Tilt	standard	1:1	50%	13	20450/829	24.00	23.09	0.160	0.030	1.23	0.197	/
<b>Body-worn SAR (QPSK, Distance 15mm)</b>												
Back Side	standard	1:1	1	25	20450/829	25.00	24.04	0.543	-0.090	1.25	0.677	33
Front Side	standard	1:1	1	25	20450/829	25.00	24.04	0.396	0.010	1.25	0.494	/
Back Side	standard	1:1	50%	13	20450/829	24.00	23.09	0.428	-0.030	1.23	0.528	/
Front Side	standard	1:1	50%	13	20450/829	24.00	23.09	0.316	0.040	1.23	0.390	/
<b>Hotspot SAR(QPSK, Distance 10mm)</b>												
Back Side	standard	1:1	1	25	20450/829	25.00	24.04	0.631	-0.020	1.25	0.787	34
Front Side	standard	1:1	1	25	20450/829	25.00	24.04	0.379	-0.100	1.25	0.473	/
Left Edge	standard	1:1	1	25	20450/829	25.00	24.04	0.289	0.090	1.25	0.360	/
Right Edge	standard	1:1	1	25	20450/829	25.00	24.04	0.282	0.000	1.25	0.352	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	standard	1:1	1	25	20450/829	25.00	24.04	0.062	0.020	1.25	0.078	/
Back Side	standard	1:1	50%	13	20450/829	24.00	23.09	0.501	0.020	1.23	0.618	/
Front Side	standard	1:1	50%	13	20450/829	24.00	23.09	0.311	-0.010	1.23	0.383	/
Left Edge	standard	1:1	50%	13	20450/829	24.00	23.09	0.227	0.080	1.23	0.280	/
Right Edge	standard	1:1	50%	13	20450/829	24.00	23.09	0.226	0.030	1.23	0.279	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	standard	1:1	50%	13	20450/829	24.00	23.09	0.048	0.010	1.23	0.060	/

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

2. For QPSK with 100% RB allocation, SAR is required when and the highest reported SAR for 1 RB and 50% RB allocation in are  $\geq 50\%$  limit(10g).



**Table 15: LTE Band 7**

Test Position	Cover Type	Duty Cycle	RB allocation	RB offset	Channel/Frequency (MHz)	Tune-up (dBm)	Measured power (dBm)	Limit of SAR 1.6 W/kg (mW/g)				Plot No.
								Measured SAR1g	Power Drift (dB)	Scaling Factor	Report SAR1g	
<b>Head SAR (QPSK) (Receiver on )</b>												
Left Cheek	standard	1:1	1	50	20850/2510	23.00	22.32	0.058	0.078	1.17	0.068	/
Left Tilt	standard	1:1	1	50	20850/2510	23.00	22.32	0.030	0.023	1.17	0.035	/
Right Cheek	standard	1:1	1	50	20850/2510	23.00	22.32	0.127	0.053	1.17	0.149	35
Right Tilt	standard	1:1	1	50	20850/2510	23.00	22.32	0.027	0.025	1.17	0.032	/
Left Cheek	standard	1:1	50%	50	20850/2510	22.00	21.32	0.053	0.030	1.17	0.062	/
Left Tilt	standard	1:1	50%	50	20850/2510	22.00	21.32	0.023	0.050	1.17	0.027	/
Right Cheek	standard	1:1	50%	50	20850/2510	22.00	21.32	0.116	0.051	1.17	0.136	/
Right Tilt	standard	1:1	50%	50	20850/2510	22.00	21.32	0.019	0.012	1.17	0.022	/
<b>Body-worn SAR (QPSK, Distance 15mm) (Receiver off)</b>												
Back Side	standard	1:1	1	50	20850/2510	22.00	21.42	0.376	0.136	1.14	0.430	/
Front Side	standard	1:1	1	50	20850/2510	22.00	21.42	0.170	0.068	1.14	0.194	/
Back Side	standard	1:1	50%	50	20850/2510	22.00	21.34	0.387	0.190	1.16	0.451	36
Front Side	standard	1:1	50%	50	20850/2510	22.00	21.34	0.170	0.040	1.16	0.198	/
<b>Hotspot SAR(QPSK, Distance 10mm) (Receiver off+Hotspot on)</b>												
Back Side	standard	1:1	1	50	20850/2510	20.00	19.11	0.289	0.029	1.23	0.355	/
Front Side	standard	1:1	1	50	20850/2510	20.00	19.11	0.121	0.090	1.23	0.149	/
Left Edge	standard	1:1	1	50	20850/2510	20.00	19.11	0.019	0.019	1.23	0.023	/
Right Edge	standard	1:1	1	50	20850/2510	20.00	19.11	0.033	0.020	1.23	0.041	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	standard	1:1	1	50	20850/2510	20.00	19.11	0.286	0.160	1.23	0.351	/
Back Side	standard	1:1	50%	25	20850/2510	20.00	19.09	0.288	0.149	1.23	0.355	/
Front Side	standard	1:1	50%	25	20850/2510	20.00	19.09	0.120	0.091	1.23	0.148	/
Left Edge	standard	1:1	50%	25	20850/2510	20.00	19.09	0.020	0.039	1.23	0.025	/
Right Edge	standard	1:1	50%	25	20850/2510	20.00	19.09	0.040	0.036	1.23	0.050	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	standard	1:1	50%	25	20850/2510	20.00	19.09	0.313	0.020	1.23	0.386	37
<p>Note: 1.The value with blue color is the maximum SAR Value of each test band.</p> <p>2.For QPSK with 100% RB allocation, SAR is required when and the highest reported SAR for 1 RB and 50% RB allocation in are <math>\geq 50\%</math> limit(10g).</p>												



**Table 16: Wi-Fi (2.4G)**

Test Position	Cover Type	Mode 802.11b	Duty Cycle	Channel/Frequency (MHz)	Tune-up dBm	Measured power (dBm)	Limit of SAR 1.6 W/kg (mW/g)					Plot No.
							Area Scan SAR 1g	Zoom Scan SAR 1g	Power Drift (dB)	Scaling Factor	Report SAR 1g	
<b>Head SAR(Receiver on)</b>												
Left Cheek	standard	DSSS	100.0%	6/2437	14.50	14.04	0.243	0.292	0.050	1.11	0.325	/
Left Tilt	standard	DSSS	100.0%	6/2437	14.50	14.04	0.198	0.221	0.150	1.11	0.246	/
Right Cheek	standard	DSSS	100.0%	6/2437	14.50	14.04	0.128	0.134	0.061	1.11	0.149	/
Right Tilt	standard	DSSS	100.0%	6/2437	14.50	14.04	0.117	0.138	0.110	1.11	0.153	/
Left Cheek	Battery 2	DSSS	100.0%	6/2437	14.50	14.04	0.257	0.312	0.180	1.11	0.347	38
Left Cheek	Battery 3	DSSS	100.0%	6/2437	14.50	14.04	0.278	0.306	0.080	1.11	0.340	/
<b>Body-worn SAR (Distance 15mm) (Full Power)</b>												
Back Side	standard	DSSS	100.0%	1/2412	18.00	17.24	0.060	0.060	0.040	1.19	0.071	/
Front Side	standard	DSSS	100.0%	1/2412	18.00	17.24	0.056	0.057	0.190	1.19	0.068	/
Back Side	Battery 2	DSSS	100.0%	1/2412	18.00	17.24	0.063	0.064	0.034	1.19	0.077	39
Back Side	Battery 3	DSSS	100.0%	1/2412	18.00	17.24	0.055	0.056	0.044	1.19	0.066	/
<b>Hotspot SAR(Distance 10mm) (Full Power)</b>												
Back Side	standard	DSSS	100.0%	1/2412	18.00	17.24	0.134	0.140	0.090	1.19	0.167	/
Front Side	standard	DSSS	100.0%	1/2412	18.00	17.24	0.109	0.112	0.052	1.19	0.133	/
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	DSSS	100.0%	1/2412	18.00	17.24	0.066	0.088	0.190	1.19	0.104	/
Top Edge	standard	DSSS	100.0%	1/2412	18.00	17.24	0.067	0.062	0.037	1.19	0.074	/
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
Back Side	Battery2	DSSS	100.0%	1/2412	18.00	17.24	0.148	0.145	0.026	1.19	0.173	40
Back Side	Battery3	DSSS	100.0%	1/2412	18.00	17.24	0.104	0.108	0.023	1.19	0.129	/
<p>Note: 1. The value with blue color is the maximum SAR Value of each test band.</p> <p>2. Accessories that do not contain RF transmitters and have been proven to increase the peak SAR by less than 5 %, such as hands-free kits, do not need SAR tests separate from the SAR tests attached to a main EUT configuration.</p>												

MAX Adjusted SAR							
Mode	Test Position	Channel/Frequency (MHz)	MAX Reported SAR <sub>1g</sub> (W/kg)	802.11b Tune-up limit (dBm)	Tune-up limit (dBm)	Scaling Factor	Adjusted SAR <sub>1g</sub> (W/kg)
802.11g	Left Cheek	6/2437	0.347	14.50	14.50	1.00	0.347
802.11n HT20	Left Cheek	6/2437	0.347	14.50	14.50	1.00	0.347
802.11n HT40	Left Cheek	6/2437	0.347	14.50	14.50	1.00	0.347
802.11g	Back Side	1/2412	0.173	18.00	17.50	0.89	0.154
802.11n HT20	Back Side	1/2412	0.173	18.00	17.00	0.79	0.137
802.11n HT40	Back Side	1/2412	0.173	18.00	14.50	0.45	0.077
<p>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.</p>							



Table 17: Bluetooth

Test Position	Cover Type	Mode	Duty Cycle	Channel/Frequency (MHz)	Tune-up (dBm)	Measured power (dBm)	Limit of SAR 1.6 W/kg (mW/g)				Plot No.
							Measured SAR1g	Power Drift (dB)	Scaling Factor	Report SAR1g	
<b>Head SAR</b>											
Left Cheek	standard	GFSK	46.2%	0/2402	12.00	9.90	0.103	0.057	3.51	0.362	41
Left Tilt	standard	GFSK	46.2%	0/2402	12.00	9.90	0.083	0.170	3.51	0.292	/
Right Cheek	standard	GFSK	46.2%	0/2402	12.00	9.90	0.048	-0.150	3.51	0.169	/
Right Tilt	standard	GFSK	46.2%	0/2402	12.00	9.90	0.050	-0.060	3.51	0.176	/

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

Band	Configuration	Frequency (MHz)	Maximum Power (dBm)	Separation Distance (mm)	Estimated SAR (W/kg)
Bluetooth	Body-worn	2480	12	15	0.222
	Hotspot SAR	2480	12	10	0.333

For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01 based on the formula below.

$(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm}) \cdot [\sqrt{f(\text{GHz})}]^x \text{ W/kg}$   
for test separation distances  $\leq 50 \text{ mm}$ ; where  $x = 7.5$  for 1-g SAR, and  $x = 18.75$  for 10-g SAR.

### 10.4 Simultaneous Transmission Analysis

Simultaneous TX Combination	Head	Body-worn	Hotspot
GSM Voice+ Bluetooth	Yes	Yes	N/A
GSM DATA + Bluetooth	N/A	Yes	N/A
GSM Voice + Wi-Fi 2.4G	Yes	Yes	N/A
GSM DATA + Wi-Fi 2.4G	N/A	Yes	Yes
UMTS Voice + Bluetooth	Yes	Yes	N/A
UMTS Data + Bluetooth	yes	Yes	N/A
UMTS Voice+ Wi-Fi 2.4G	Yes	Yes	N/A
UMTS Data + Wi-Fi 2.4G	yes	Yes	Yes
LTE + Wi-Fi 2.4G	Yes	Yes	Yes
LTE+ Bluetooth	Yes	Yes	N/A
Bluetooth + Wi-Fi 2.4G	N/A	N/A	N/A

**General Note:**

1. The Scaled SAR summation is calculated based on the same configuration and test position.
2. Per KDB 447498 D01, simultaneous transmission SAR is compliant if,
  - i) Scalar SAR summation < 1.6W/kg, simultaneously transmission SAR measurement is not necessary.
  - ii)  $SPLSR = (SAR1 + SAR2)^{1.5} / (\text{min. separation distance, mm})$ , 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.
  - iii) If  $SPLSR \leq 0.04$ , simultaneously transmission SAR measurement is not necessary.

**The maximum SAR<sub>1g</sub> Value for Main-Antenna**

SAR <sub>1g</sub> (W/kg)		GSM	GSM	WCDMA	WCDMA	WCDMA	LTE	LTE	LTE	LTE	MAX.
Test Position		850	1900	Band II	Band IV	Band V	FDD 2	FDD 4	FDD 5	FDD 7	SAR <sub>1g</sub>
Left Cheek		0.403	0.386	0.653	0.230	0.469	0.522	0.209	0.390	0.068	0.653
Left Tilt		0.266	0.202	0.342	0.164	0.307	0.253	0.158	0.247	0.035	0.342
Right Cheek		0.383	0.222	0.421	0.210	0.457	0.327	0.219	0.390	0.149	0.457
Right Tilt		0.272	0.158	0.275	0.136	0.335	0.212	0.130	0.248	0.032	0.335
Body worn	Back Side	0.723	0.203	0.362	0.336	0.809	0.310	0.368	0.677	0.451	0.809
	Front Side	0.523	0.212	0.400	0.304	0.544	0.325	0.247	0.494	0.198	0.544
Hotspot	Back Side	0.706	0.191	0.269	0.395	0.888	0.282	0.369	0.787	0.355	0.888
	Front Side	0.442	0.203	0.274	0.216	0.524	0.251	0.195	0.473	0.149	0.524
	Left Edge	0.391	0.163	0.245	0.101	0.570	0.240	0.099	0.360	0.025	0.570
	Right Edge	0.413	0.076	0.114	0.081	0.415	0.117	0.080	0.352	0.050	0.415
	Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Bottom Edge	0.056	0.146	0.231	0.363	0.018	0.199	0.349	0.078	0.386	0.386

**About Bluetooth and Main- Antenna**

SAR <sub>1g</sub> (W/kg)		Main-antenna	Bluetooth	MAX. ΣSAR <sub>1g</sub>
Left Cheek		0.653	0.362	1.015
Left Tilt		0.342	0.292	0.634
Right Cheek		0.457	0.169	0.626
Right Tilt		0.335	0.176	0.511
Body worn 1g	Back Side	0.809	0.222	1.031
	Front Side	0.544	0.222	0.766

Note: 1.The value with blue color is the maximum ΣSAR<sub>1g</sub> Value.  
 2.MAX. ΣSAR<sub>1g</sub> =Unlicensed SAR<sub>MAX</sub> +Licensed SAR<sub>MAX</sub>

MAX. ΣSAR<sub>1g</sub> =1.031W/kg<1.6W/kg, so the Simultaneous transimition SAR with volum scan are not required for Bluetooth and Main-Antenna.

**About Wi-Fi and Main-Antenna**

SAR <sub>1g</sub> (W/kg)		Main-antenna	Wi-Fi	MAX. ΣSAR <sub>1g</sub>
Test Position				
Left Cheek		0.653	0.347	1.000
Left Tilt		0.342	0.246	0.588
Right Cheek		0.457	0.149	0.606
Right Tilt		0.335	0.153	0.488
Body worn 1g	Back Side	0.809	0.077	0.886
	Front Side	0.544	0.068	0.612
Hotspot 1g	Back Side	0.888	0.173	1.061
	Front Side	0.524	0.133	0.657
	Left Edge	0.570	N/A	0.570
	Right Edge	0.415	0.104	0.519
	Top Edge	N/A	0.074	0.074
	Bottom Edge	0.386	N/A	0.386

Note: 1.The value with blue color is the maximum ΣSAR<sub>1g</sub> Value.  
 2.MAX. ΣSAR<sub>1g</sub> =Unlicensed SAR<sub>MAX</sub> +Licensed SAR<sub>MAX</sub>

MAX. ΣSAR<sub>1g</sub> =1.061W/kg<1.6W/kg, so the Simultaneous transimition SAR with volum scan are not required for Wi-Fi and Main-Antenna.

**Conclusion:**

According to the KDB 690783 D01 section 1) d) i), when the sum of 1-g SAR applies for simultaneous transmission SAR test exclusion, the highest sum of 1-g SAR according to the highest reported stand-alone SAR values is used, and the highest Reported SAR for simultaneous transmission exposure conditions is 1.061 W/kg



## 11 Measurement Uncertainty

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



## ANNEX A: Test Layout



### Tissue Simulating Liquids

For the measurement of the field distribution inside the flat phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For Head and Body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Picture 3 and Picture 4.



Picture 3: liquid depth in the head Phantom



Picture 4: Liquid depth in the flat Phantom

## ANNEX B: System Check Results

### Plot 1 System Performance Check at 835 MHz Head TSL

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2

Date: 4/12/2019

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

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.91 \text{ S/m}$ ;  $\epsilon_r = 42.0$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $22.3 \text{ }^\circ\text{C}$       Liquid Temperature:  $21.5 \text{ }^\circ\text{C}$

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.10, 9.10, 9.10); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

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

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

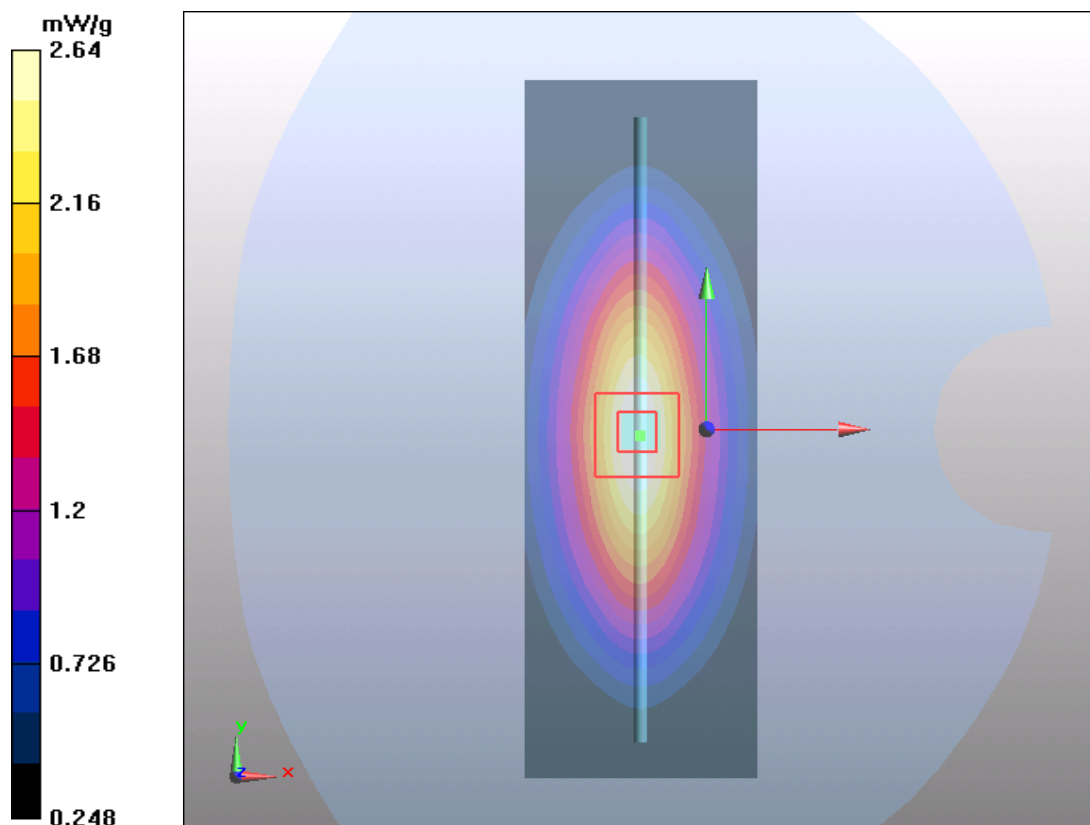
**d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

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**

Date: 4/11/2019

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

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.97 \text{ S/m}$ ;  $\epsilon_r = 53.8$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $22.3 \text{ }^\circ\text{C}$       Liquid Temperature:  $21.5 \text{ }^\circ\text{C}$

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.32, 9.32, 9.32); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

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

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

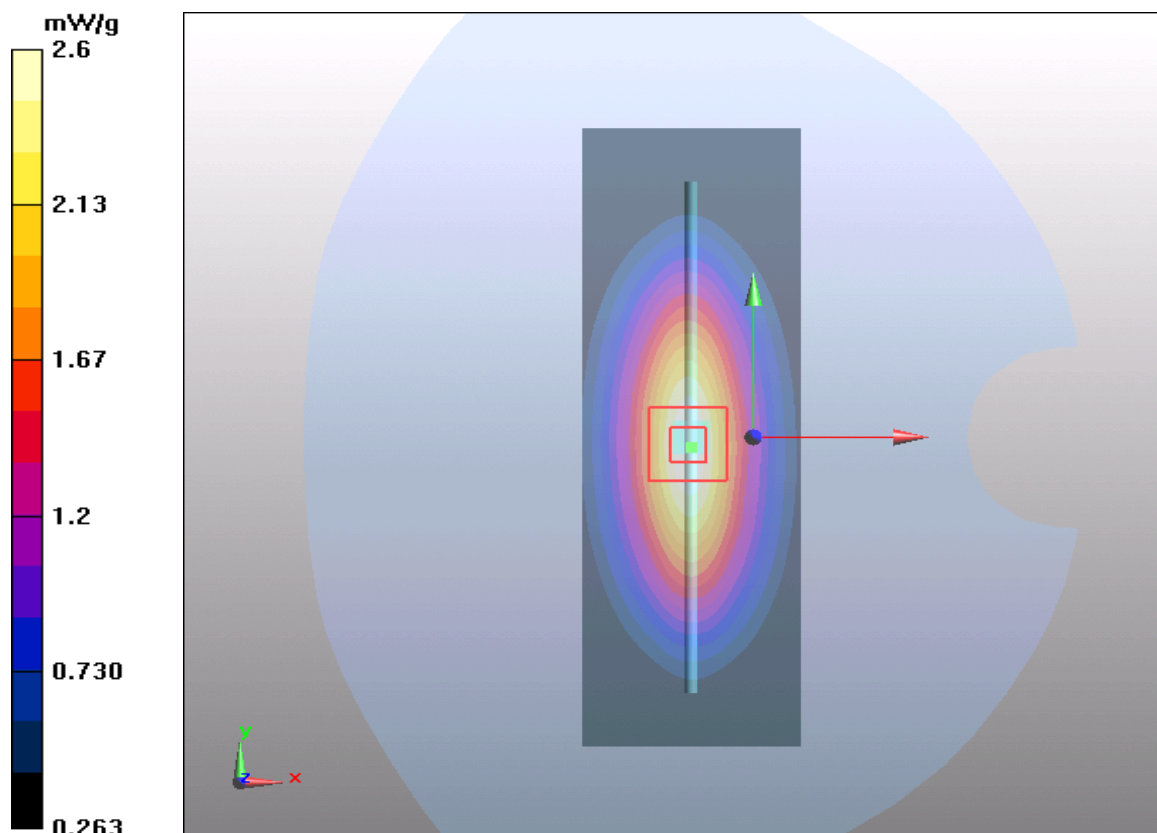
**d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

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

Peak SAR (extrapolated) = 3.5 W/kg

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

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



**Plot 3 System Performance Check at 1750 MHz Head TSL**

**DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2**

Date: 4/16/2019

Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1750$  MHz;  $\sigma = 1.41$  S/m;  $\epsilon_r = 40.0$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(8.19, 8.19, 8.19); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**d=10mm, Pin=250mW/Area Scan (51x81x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 9.78 mW/g

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

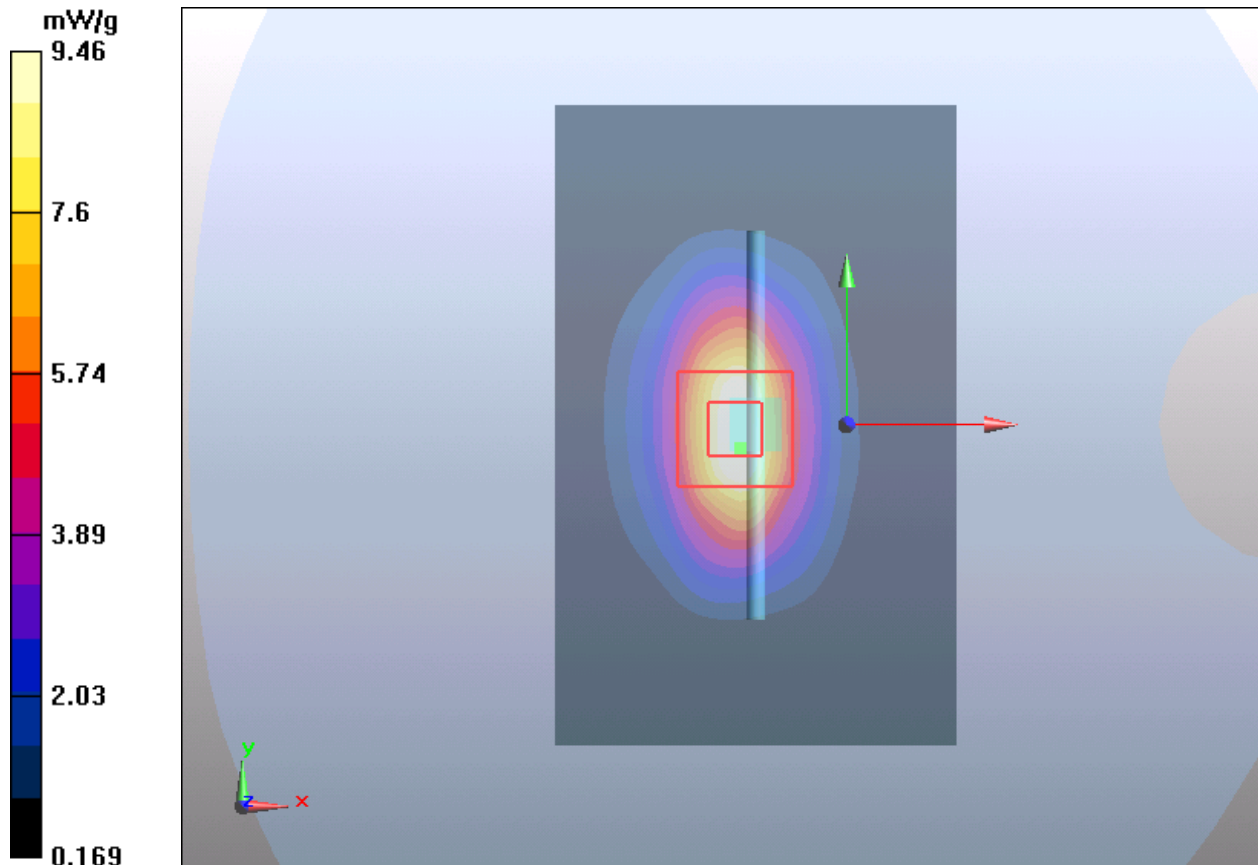
dz=5mm

Reference Value = 80 V/m; Power Drift = 0.075 dB

Peak SAR (extrapolated) = 15.5 W/kg

**SAR(1 g) = 8.95 mW/g; SAR(10 g) = 4.5 mW/g**

Maximum value of SAR (measured) = 9.46 mW/g



**Plot 4 System Performance Check at 1750 MHz Body TSL**

**DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2**

Date: 4/16/2019

Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1750 \text{ MHz}$ ;  $\sigma = 1.44 \text{ S/m}$ ;  $\epsilon_r = 51.4$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $22.3 \text{ }^\circ\text{C}$       Liquid Temperature:  $21.7 \text{ }^\circ\text{C}$

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.91, 7.91, 7.91); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**d=10mm, Pin=250mW/Area Scan (51x81x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 10.6 mW/g

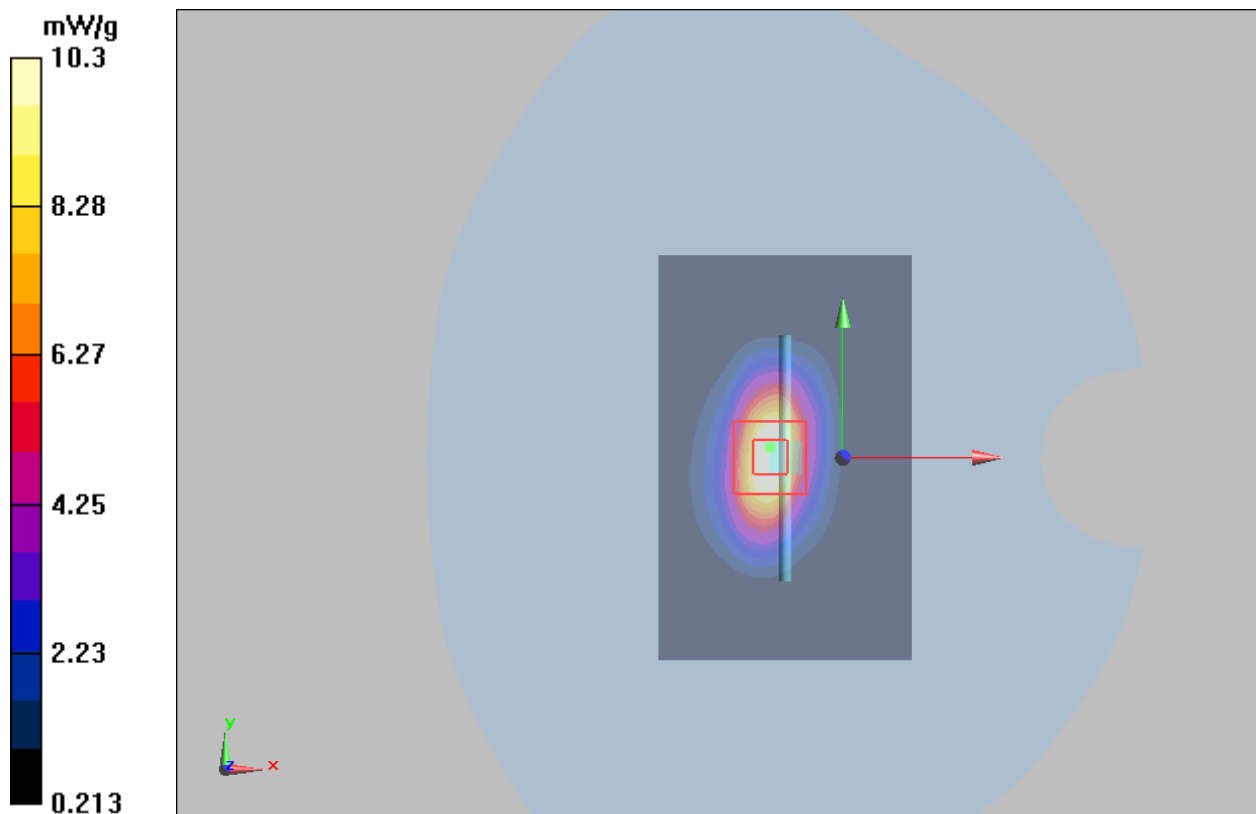
**d=10mm, Pin=250mW/Area Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 77.7 V/m; Power Drift = 0.097 dB

Peak SAR (extrapolated) = 16.8 W/kg

**SAR(1 g) = 9.24 mW/g; SAR(10 g) = 4.9 mW/g**

Maximum value of SAR (measured) = 10.3 mW/g



**Plot 5 System Performance Check at 1900 MHz Head TSL****DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2**

Date: 4/24/2019

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

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.39$  S/m;  $\epsilon_r = 40.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(7.96, 7.96, 7.96); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**d=10mm, Pin=250mW/Area Scan (41x71x1):** Measurement grid: dx=15mm, dy=15mm

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

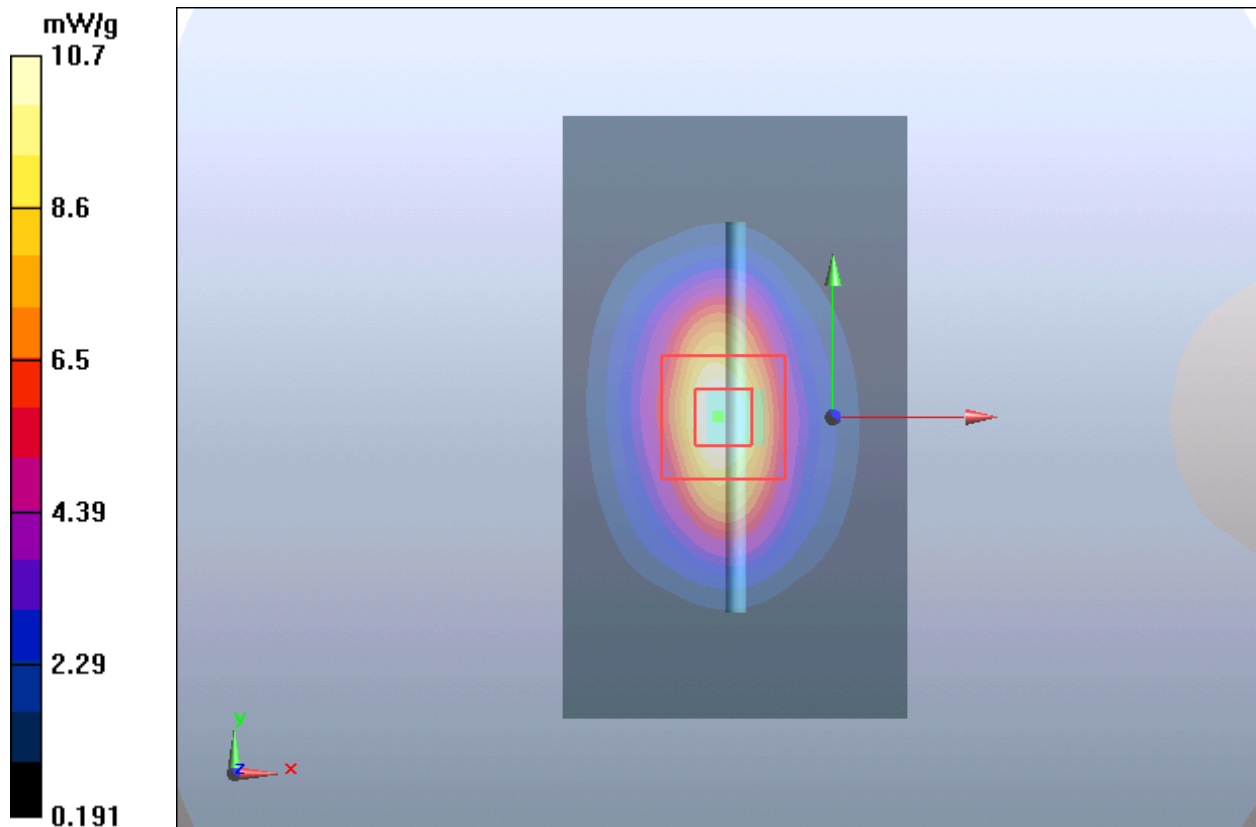
**d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

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 6 System Performance Check at 1900 MHz Body TSL**

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2**

Date: 4/15/2019

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

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.51$  S/m;  $\epsilon_r = 52.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(7.70, 7.70, 7.70); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**d=10mm, Pin=250mW/Area Scan (41x71x1):** Measurement grid: dx=15mm, dy=15mm

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

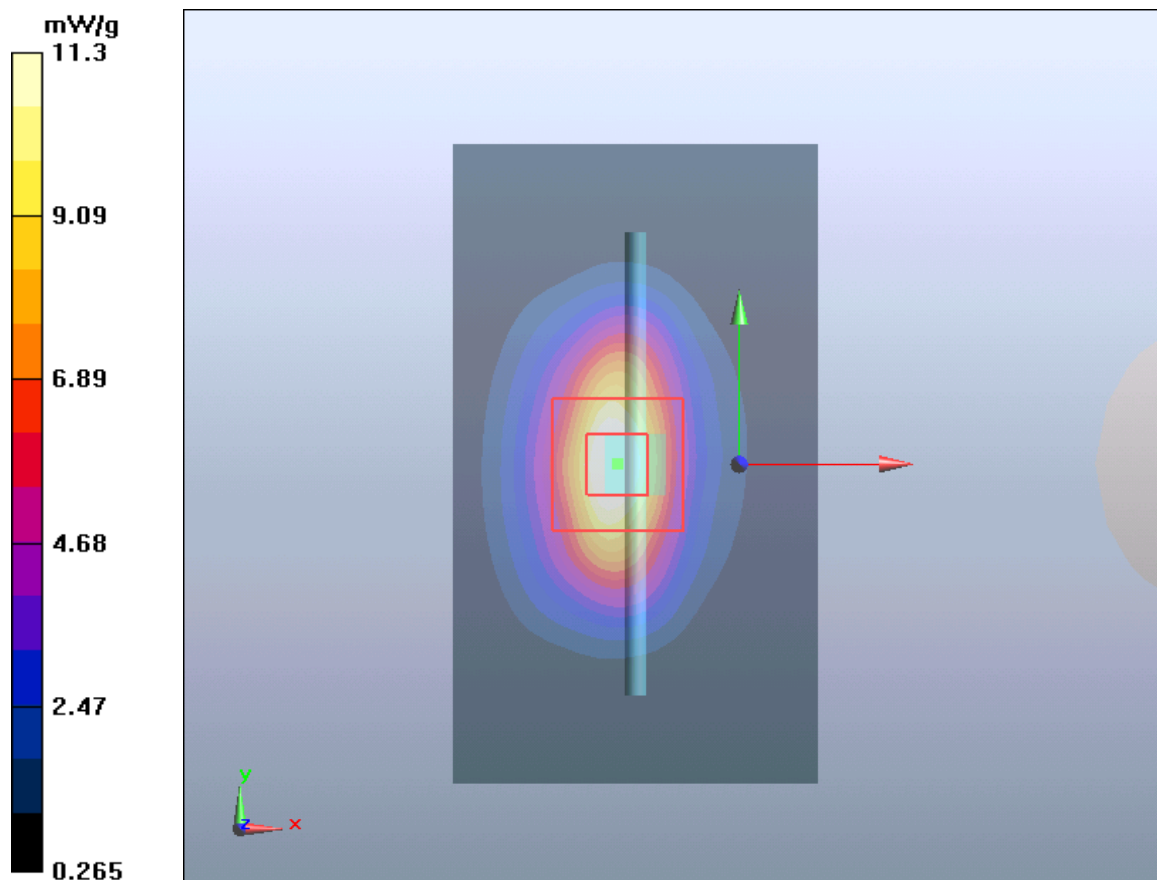
**d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

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 7 System Performance Check at 2450 MHz Head TSL**

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2**

Date: 4/24/2019

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

Medium parameters used:  $f = 2450 \text{ MHz}$ ;  $\sigma = 1.86 \text{ S/m}$ ;  $\epsilon_r = 38.7$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $22.3 \text{ }^\circ\text{C}$       Liquid Temperature:  $21.5 \text{ }^\circ\text{C}$

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.57, 7.57, 7.57); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**d=10mm, Pin=250mW/Area Scan (41x71x1):** Measurement grid: dx=12mm, dy=12mm

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

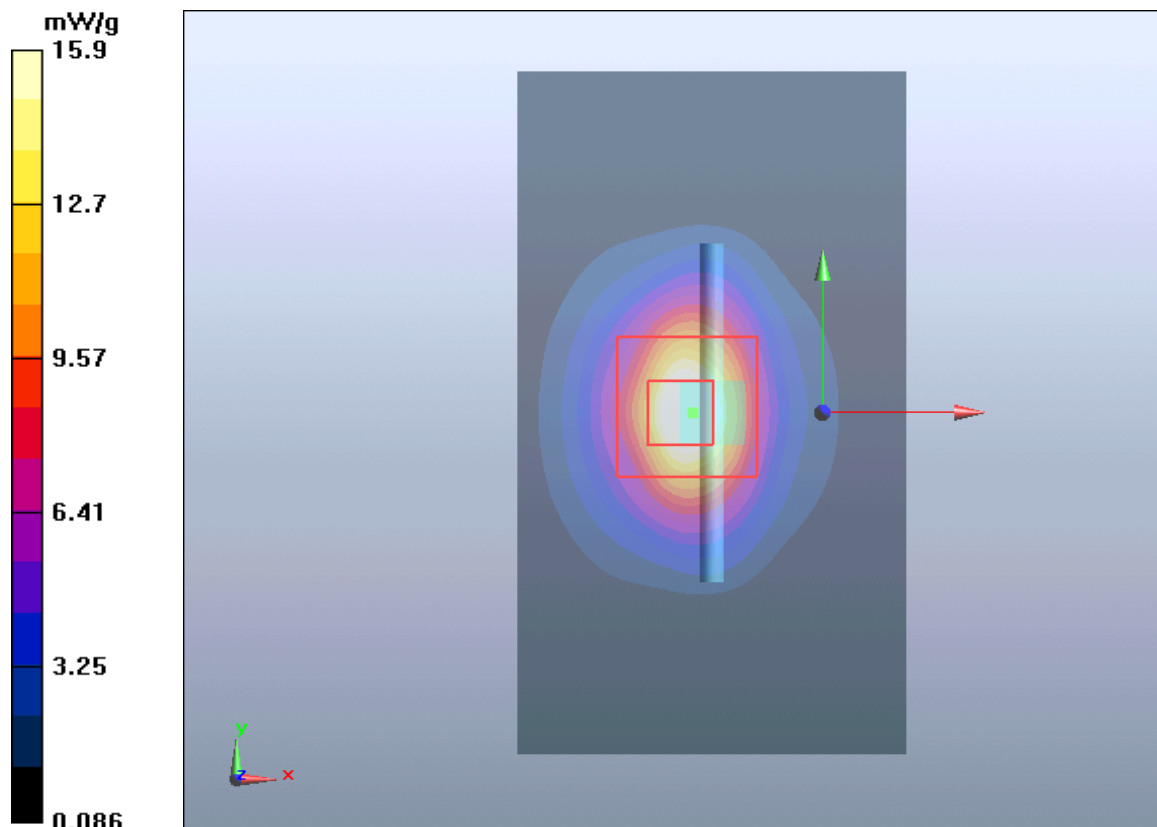
**d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

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 8 System Performance Check at 2450 MHz Body TSL**

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2**

Date: 4/24/2019

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

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.97$  S/m;  $\epsilon_r = 51.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(7.53, 7.53, 7.53); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**d=10mm, Pin=250mW/Area Scan (41x71x1):** Measurement grid: dx=12mm, dy=12mm

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

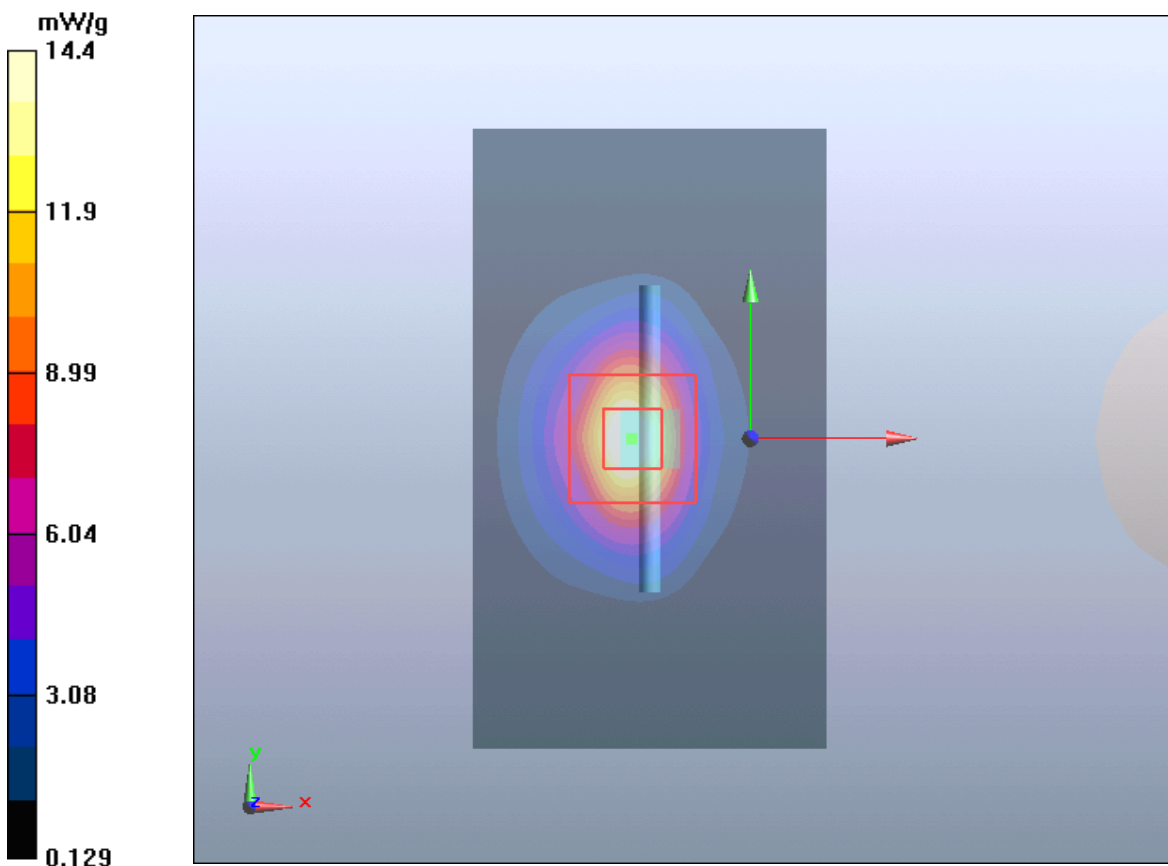
**d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

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 9 System Performance Check at 2600 MHz Head TSL**

**DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2**

Date: 4/14/2019

Communication System: CW; Frequency: 2600 MHz

Medium parameters used:  $f = 2600$  MHz;  $\sigma = 2.02$  S/m;  $\epsilon_r = 38.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.28, 7.28, 7.28); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**d=10mm, Pin=250mW/Area Scan (41x71x1):** Measurement grid:dx=12mm, dy=12mm

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

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

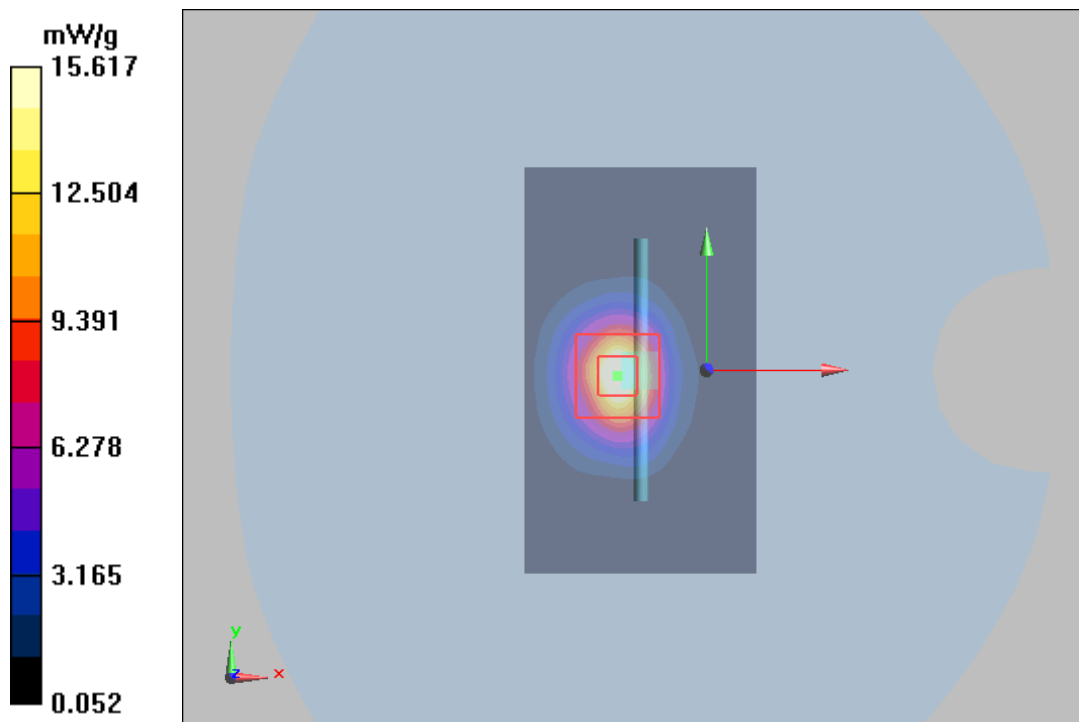
dz=5mm

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

Peak SAR (extrapolated) = 31.858 W/kg

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

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



**Plot 10 System Performance Check at 2600 MHz Body TSL****DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2**

Date: 4/14/2019

Communication System: CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 2600$  MHz;  $\sigma = 2.16$  S/m;  $\epsilon_r = 50.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(7.16, 7.16, 7.16); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**d=10mm, Pin=250mW /Area Scan (41x71x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 17.7 mW/g

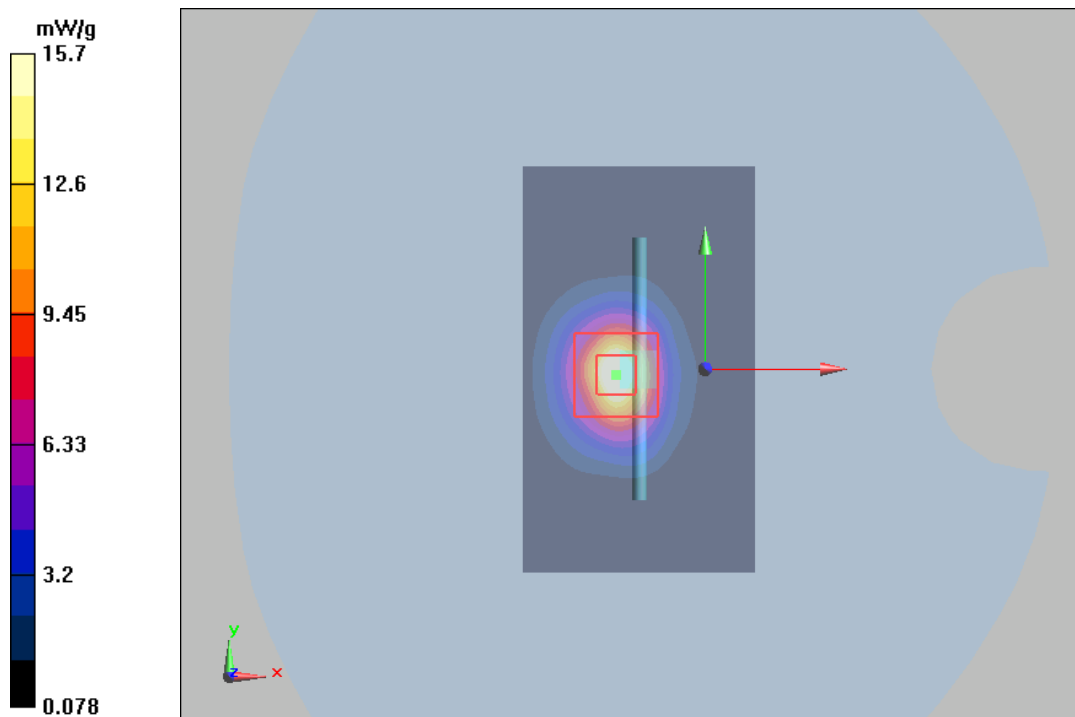
**d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 74 V/m; Power Drift = -0.0027 dB

Peak SAR (extrapolated) = 28.5 W/kg

**SAR(1 g) = 13.5 mW/g; SAR(10 g) = 5.99 mW/g**

Maximum value of SAR (measured) = 15.7 mW/g



## ANNEX C: Highest Graph Results

### Plot 11 GSM 850 Left Cheek Middle

Date: 4/12/2019

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

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.916$  S/m;  $\epsilon_r = 41.951$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(9.10, 9.10, 9.10); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Left Cheek Middle/Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.345 W/kg

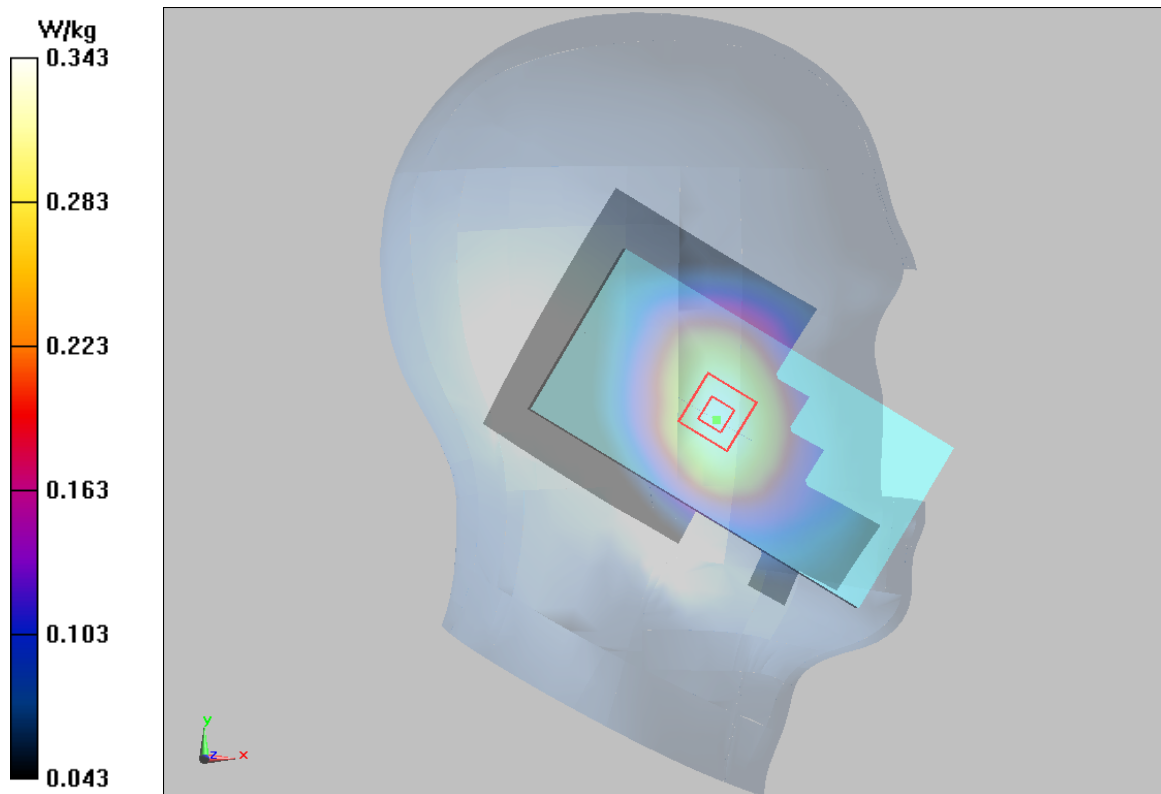
**Left Cheek Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.478 V/m; Power Drift = 0.028 dB

Peak SAR (extrapolated) = 0.399 W/kg

**SAR(1 g) = 0.326 W/kg; SAR(10 g) = 0.251 W/kg**

Maximum value of SAR (measured) = 0.343 W/kg



**Plot 12 GSM 850 Back Side Middle (Distance 15mm)**

Date: 4/11/2019

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

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.974$  S/m;  $\epsilon_r = 53.795$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(9.32, 9.32, 9.32); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Back Side Middle/Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.610 W/kg

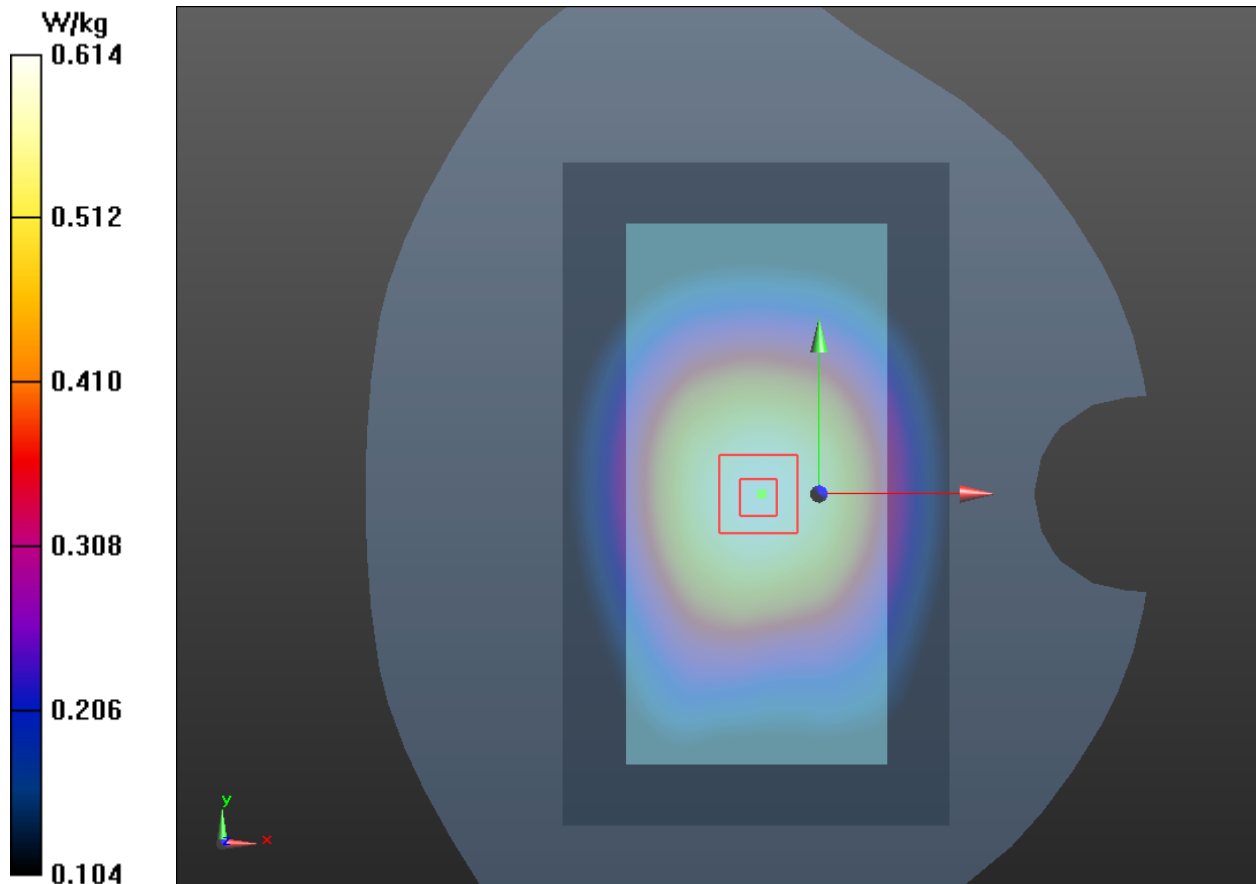
**Back Side Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 25.04 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.725 W/kg

**SAR(1 g) = 0.585 W/kg; SAR(10 g) = 0.448 W/kg**

Maximum value of SAR (measured) = 0.614 W/kg



**Plot 13 GSM 850 GPRS (4Txslots) Back Side Middle (Distance 10mm)**

Date: 4/11/2019

Communication System: UID 0, GPRS 4TX (0); Frequency: 836.6 MHz; Duty Cycle: 1:2.07491

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.974$  S/m;  $\epsilon_r = 53.795$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(9.32, 9.32, 9.32); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Back Side Middle /Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.592 W/kg

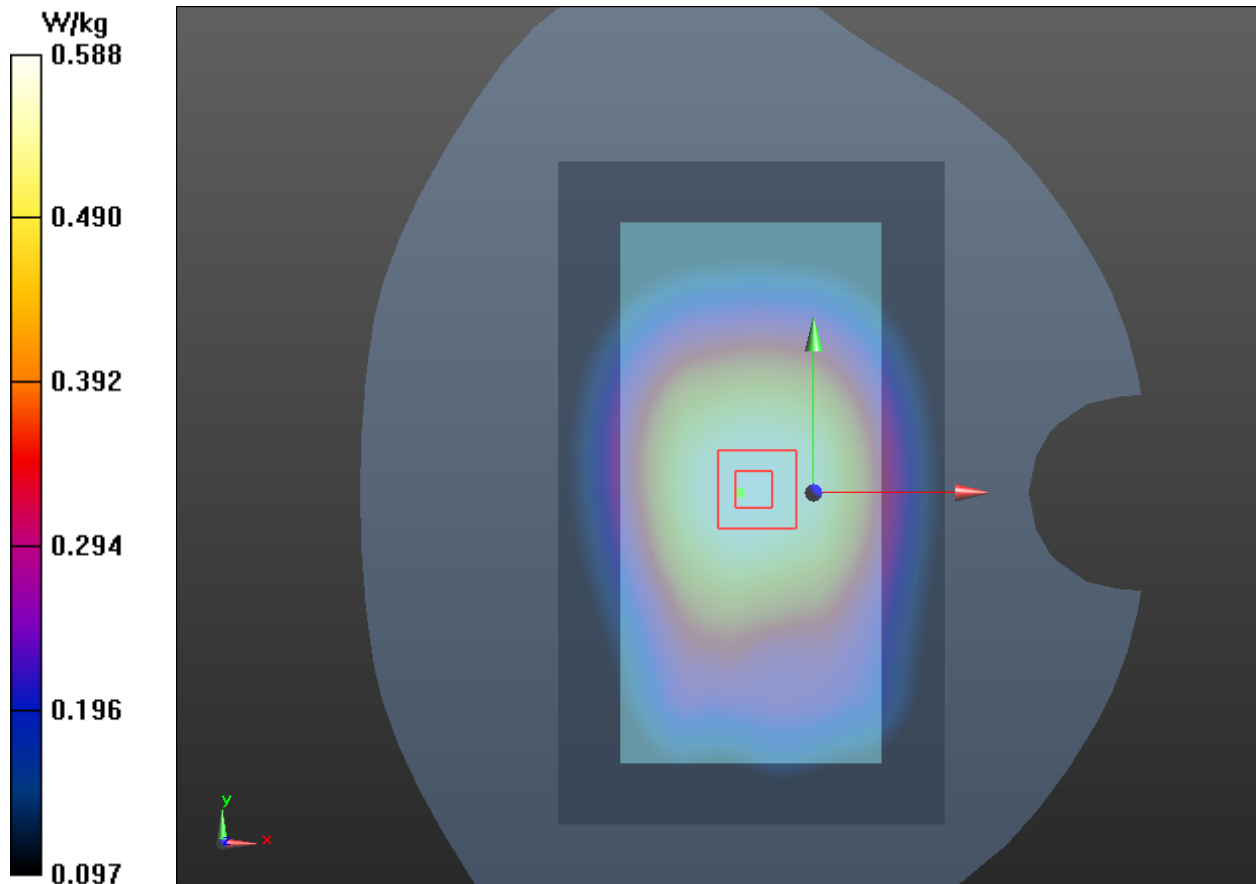
**Back Side Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 24.80 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.686 W/kg

**SAR(1 g) = 0.567 W/kg; SAR(10 g) = 0.445 W/kg**

Maximum value of SAR (measured) = 0.588 W/kg



**Plot 14 GSM 1900 Left Cheek Middle**

Date: 4/24/2019

Communication System: UID 0, GSM 1900 (0); Frequency: 1880 MHz; Duty Cycle: 1:8.30042

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.393$  S/m;  $\epsilon_r = 38.344$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(7.96, 7.96, 7.96); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Left Cheek Middle/Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.329 W/kg

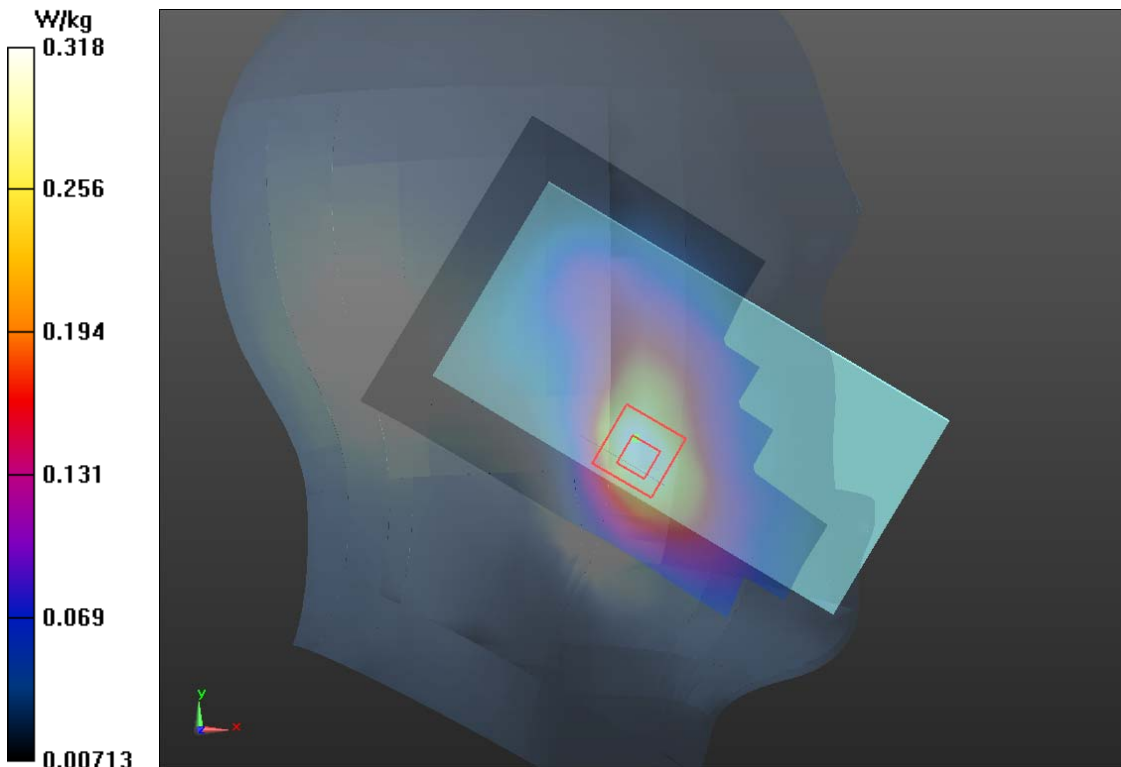
**Left Cheek Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.408 V/m; Power Drift = 0.090 dB

Peak SAR (extrapolated) = 0.456 W/kg

**SAR(1 g) = 0.300 W/kg; SAR(10 g) = 0.185 W/kg**

Maximum value of SAR (measured) = 0.318 W/kg





**Plot 15 GSM 1900 Front Side Middle (Distance 15mm)**

Date: 4/15/2019

Communication System: UID 0, GSM 1900 (0); Frequency: 1880 MHz; Duty Cycle: 1:8.30042

Medium parameters used:  $f = 1880 \text{ MHz}$ ;  $\sigma = 1.489 \text{ S/m}$ ;  $\epsilon_r = 52.896$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $22.3 \text{ }^\circ\text{C}$       Liquid Temperature:  $21.5 \text{ }^\circ\text{C}$

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.70, 7.70, 7.70); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Front Side Middle/Area Scan (71x121x1):** Interpolated grid:  $dx=15 \text{ mm}$ ,  $dy=15 \text{ mm}$

Maximum value of SAR (interpolated) =  $0.176 \text{ W/kg}$

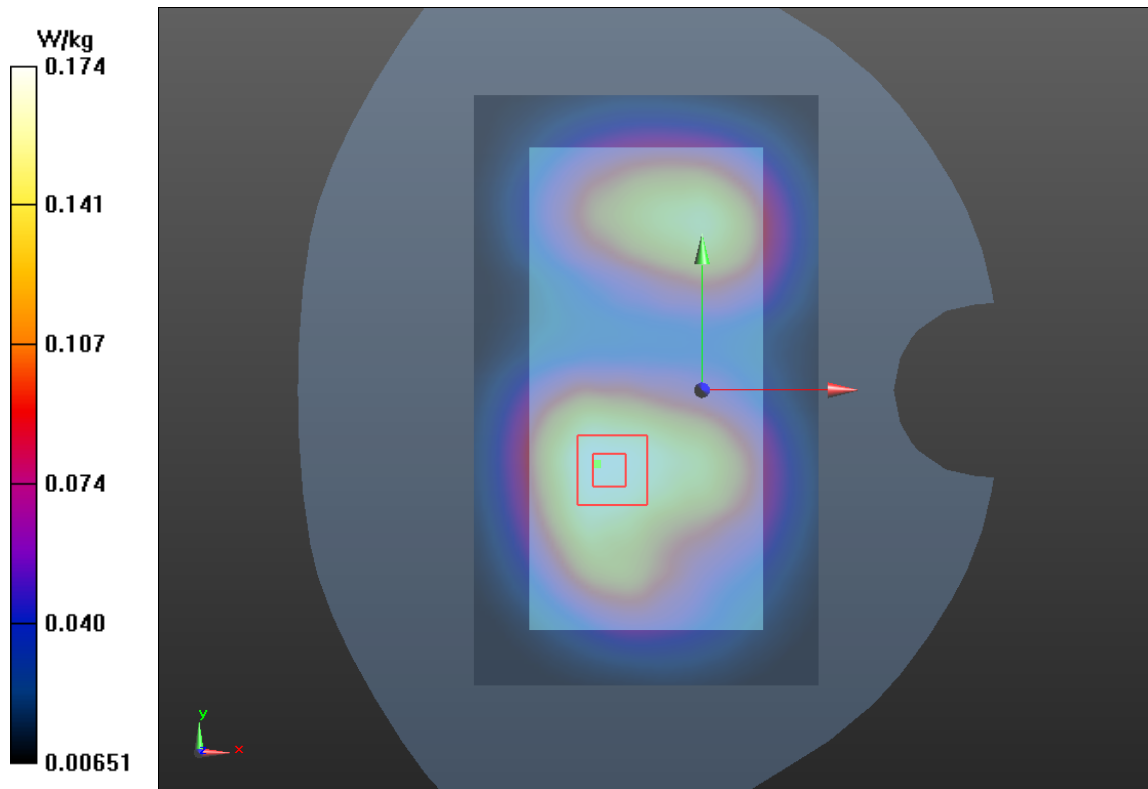
**Front Side Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $7.591 \text{ V/m}$ ; Power Drift =  $0.060 \text{ dB}$

Peak SAR (extrapolated) =  $0.249 \text{ W/kg}$

**SAR(1 g) =  $0.165 \text{ W/kg}$ ; SAR(10 g) =  $0.108 \text{ W/kg}$**

Maximum value of SAR (measured) =  $0.174 \text{ W/kg}$



**Plot 16 GSM 1900 GPRS (4Txslots) Front Side Middle (Distance 10mm)**

Date: 4/15/2019

Communication System: UID 0, GPRS 4TX (0); Frequency: 1880 MHz; Duty Cycle: 1:2.07491

Medium parameters used:  $f = 1880 \text{ MHz}$ ;  $\sigma = 1.489 \text{ S/m}$ ;  $\epsilon_r = 52.896$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $22.3 \text{ }^\circ\text{C}$       Liquid Temperature:  $21.5 \text{ }^\circ\text{C}$

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.70, 7.70, 7.70); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Front Side Middle /Area Scan (71x121x1):** Interpolated grid:  $dx=15 \text{ mm}$ ,  $dy=15 \text{ mm}$

Maximum value of SAR (interpolated) =  $0.169 \text{ W/kg}$

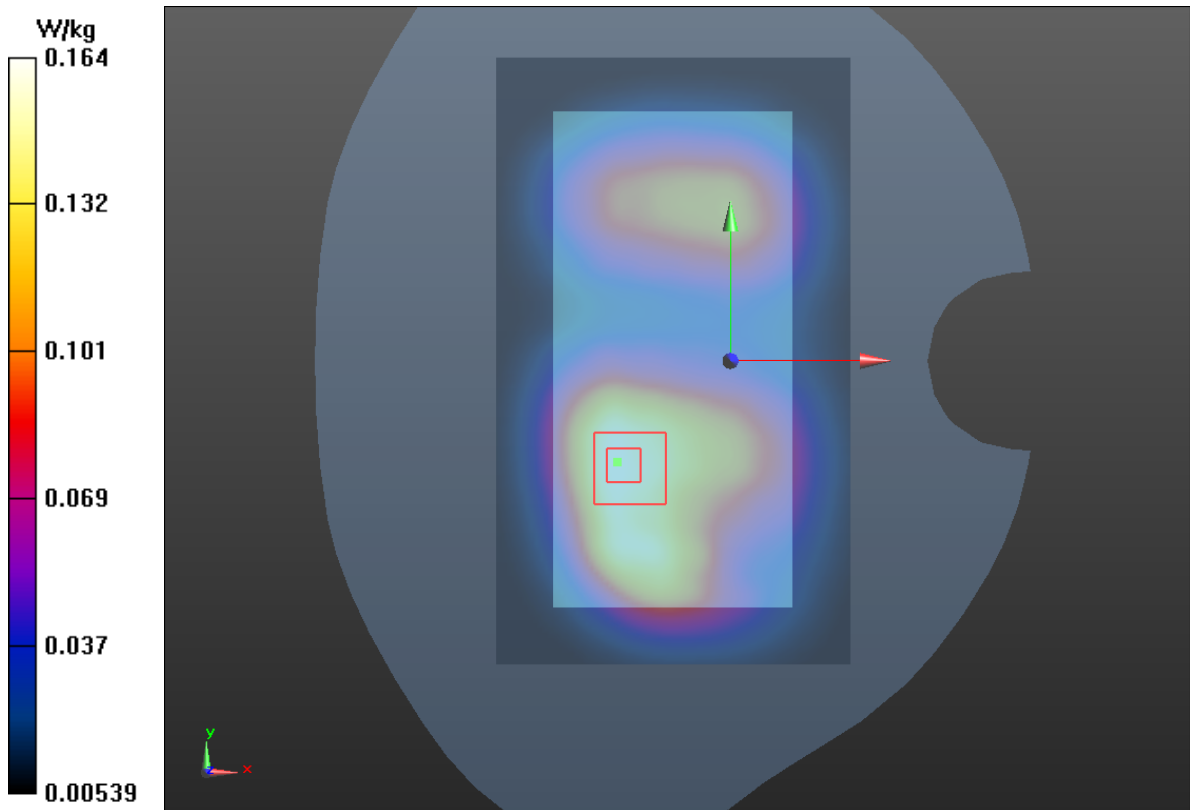
**Front Side Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $6.069 \text{ V/m}$ ; Power Drift =  $0.060 \text{ dB}$

Peak SAR (extrapolated) =  $0.236 \text{ W/kg}$

**SAR(1 g) =  $0.162 \text{ W/kg}$ ; SAR(10 g) =  $0.100 \text{ W/kg}$**

Maximum value of SAR (measured) =  $0.164 \text{ W/kg}$



## Plot 17 UMTS Band II Left Cheek Middle

Date: 4/24/2019

Communication System: UID 0, WCDMA II (0); Frequency: 1880 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.393$  S/m;  $\epsilon_r = 38.344$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(7.96, 7.96, 7.96); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Left Cheek Middle/Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

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

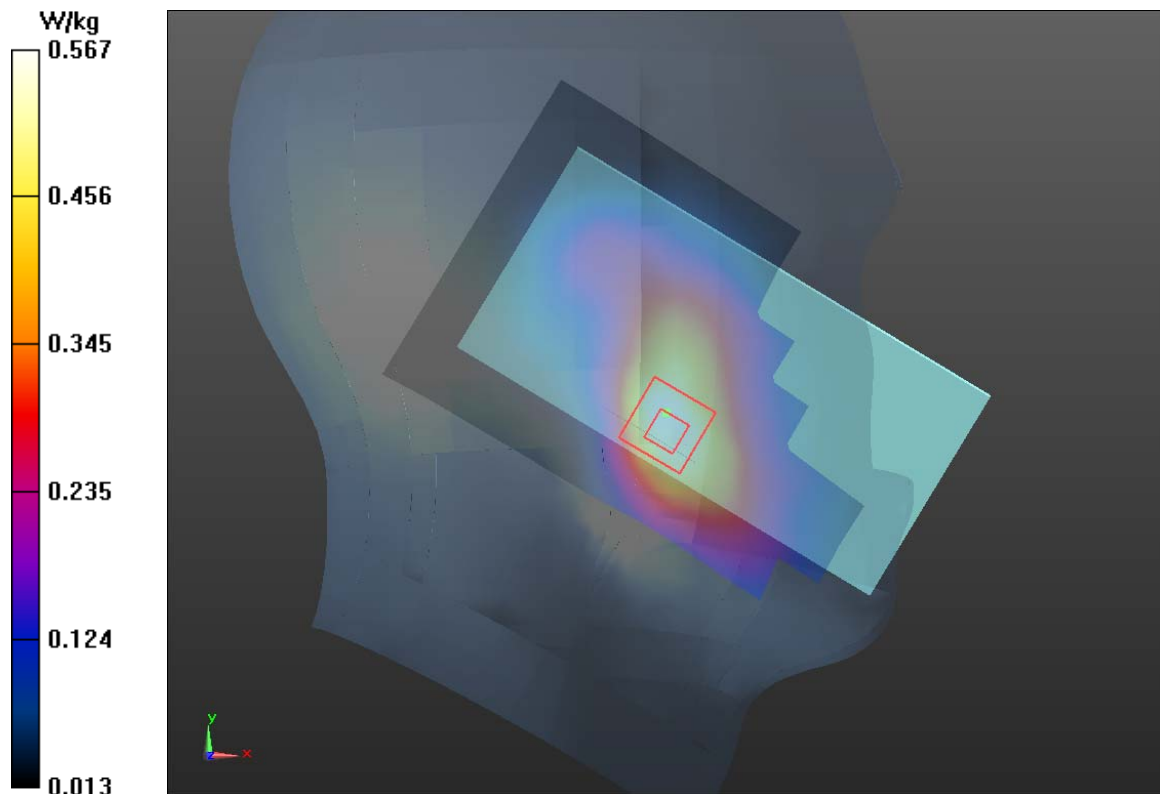
**Left Cheek Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.852 V/m; Power Drift = -0.060 dB

Peak SAR (extrapolated) = 0.810 W/kg

**SAR(1 g) = 0.542 W/kg; SAR(10 g) = 0.340 W/kg**

Maximum value of SAR (measured) = 0.567 W/kg



**Plot 18 UMTS Band II Front Side Middle (Distance 15mm)**

Date: 4/15/2019

Communication System: UID 0, WCDMA II (0); Frequency: 1880 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.489$  S/m;  $\epsilon_r = 52.896$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(7.70, 7.70, 7.70); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Front Side Middle /Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.355 W/kg

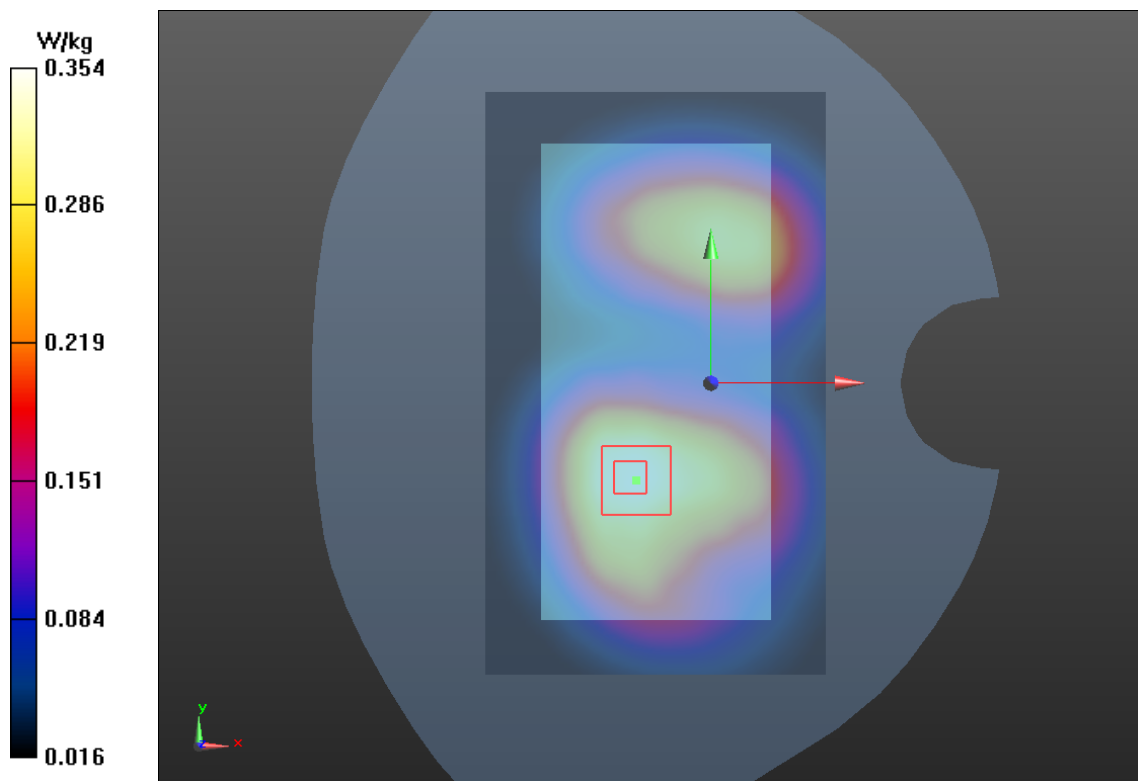
**Front Side Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.090 V/m; Power Drift = 0.040 dB

Peak SAR (extrapolated) = 0.504 W/kg

**SAR(1 g) = 0.332 W/kg; SAR(10 g) = 0.217 W/kg**

Maximum value of SAR (measured) = 0.354 W/kg



**Plot 19 UMTS Band II Front Side Middle (Distance 10mm)**

Date: 4/15/2019

Communication System: UID 0, WCDMA II (0); Frequency: 1880 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1880 \text{ MHz}$ ;  $\sigma = 1.489 \text{ S/m}$ ;  $\epsilon_r = 52.896$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $22.3 \text{ }^\circ\text{C}$       Liquid Temperature:  $21.5 \text{ }^\circ\text{C}$

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.70, 7.70, 7.70); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Front Side Middle/Area Scan (71x121x1):** Interpolated grid:  $dx=15 \text{ mm}$ ,  $dy=15 \text{ mm}$

Maximum value of SAR (interpolated) =  $0.253 \text{ W/kg}$

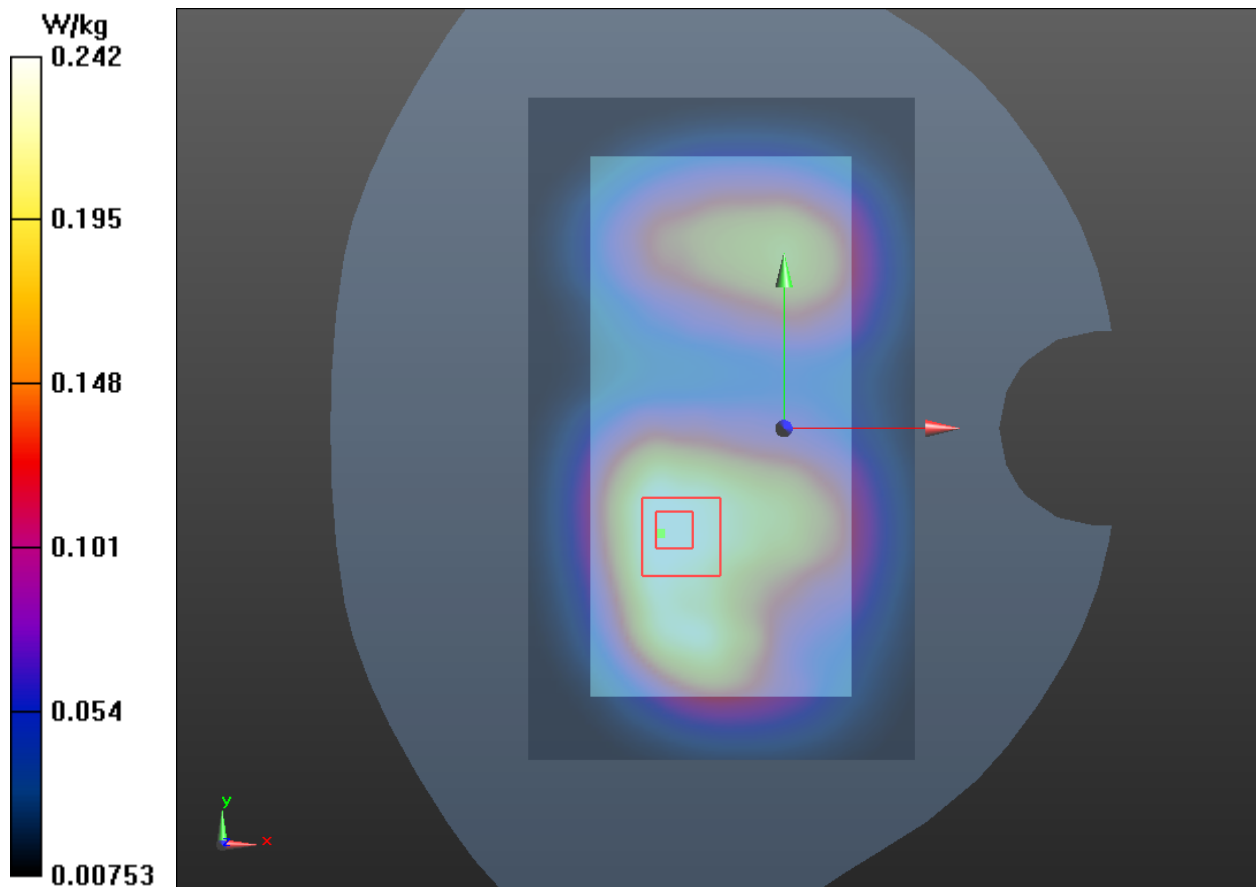
**Front Side Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $8.295 \text{ V/m}$ ; Power Drift =  $0.090 \text{ dB}$

Peak SAR (extrapolated) =  $0.349 \text{ W/kg}$

**SAR(1 g) =  $0.229 \text{ W/kg}$ ; SAR(10 g) =  $0.151 \text{ W/kg}$**

Maximum value of SAR (measured) =  $0.242 \text{ W/kg}$



## Plot 20 UMTS Band IV Left Cheek Middle

Date: 4/16/2019

Communication System: UID 0, WCDMA IV (0); Frequency: 1732.6 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1732.6$  MHz;  $\sigma = 1.293$  S/m;  $\epsilon_r = 38.782$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(8.19, 8.19, 8.19); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Left Cheek Middle/Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.218 W/kg

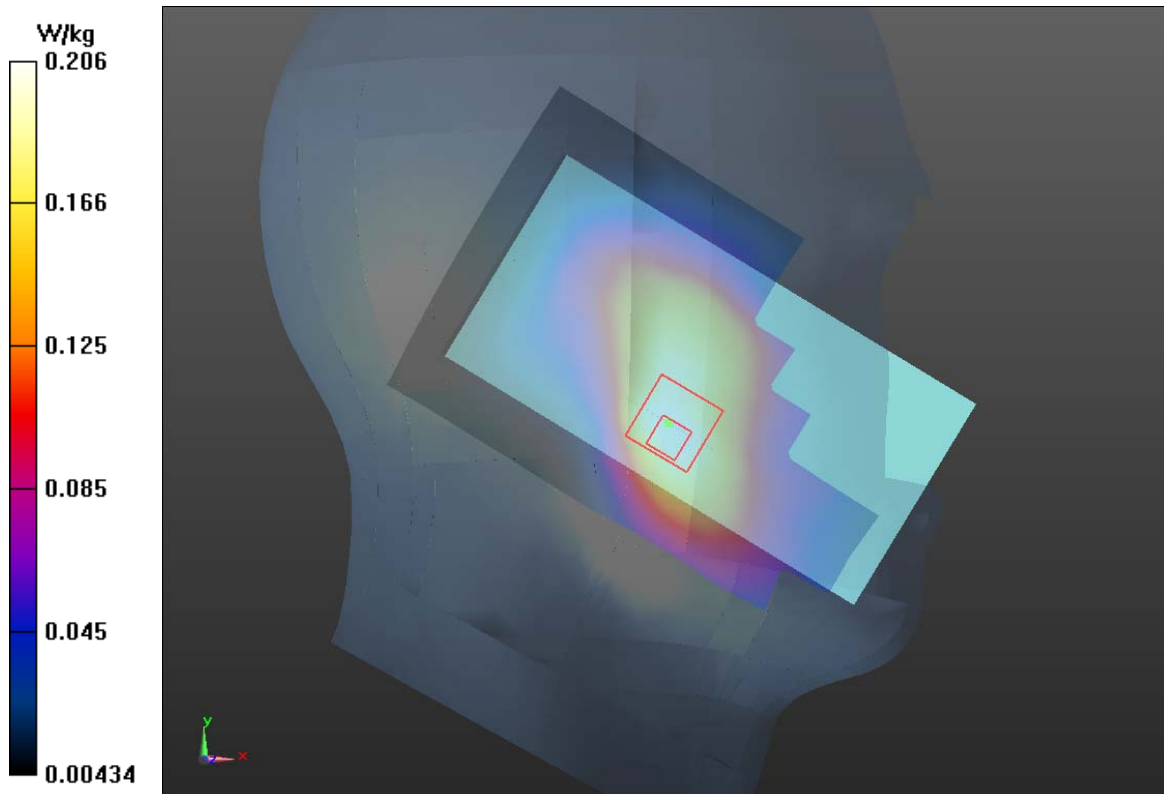
**Left Cheek Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.835 V/m; Power Drift = 0.052 dB

Peak SAR (extrapolated) = 0.283 W/kg

**SAR(1 g) = 0.196 W/kg; SAR(10 g) = 0.130 W/kg**

Maximum value of SAR (measured) = 0.206 W/kg



**Plot 21 UMTS Band IV Back Side Middle(Distance 15mm)**

Date: 4/16/2019

Communication System: UID 0, WCDMA IV (0); Frequency: 1732.6 MHz;Duty Cycle: 1:1

Medium parameters used:  $f = 1732.6$  MHz;  $\sigma = 1.478$  S/m;  $\epsilon_r = 52.899$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(7.91, 7.91, 7.91); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Back Side Middle/Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.305 W/kg

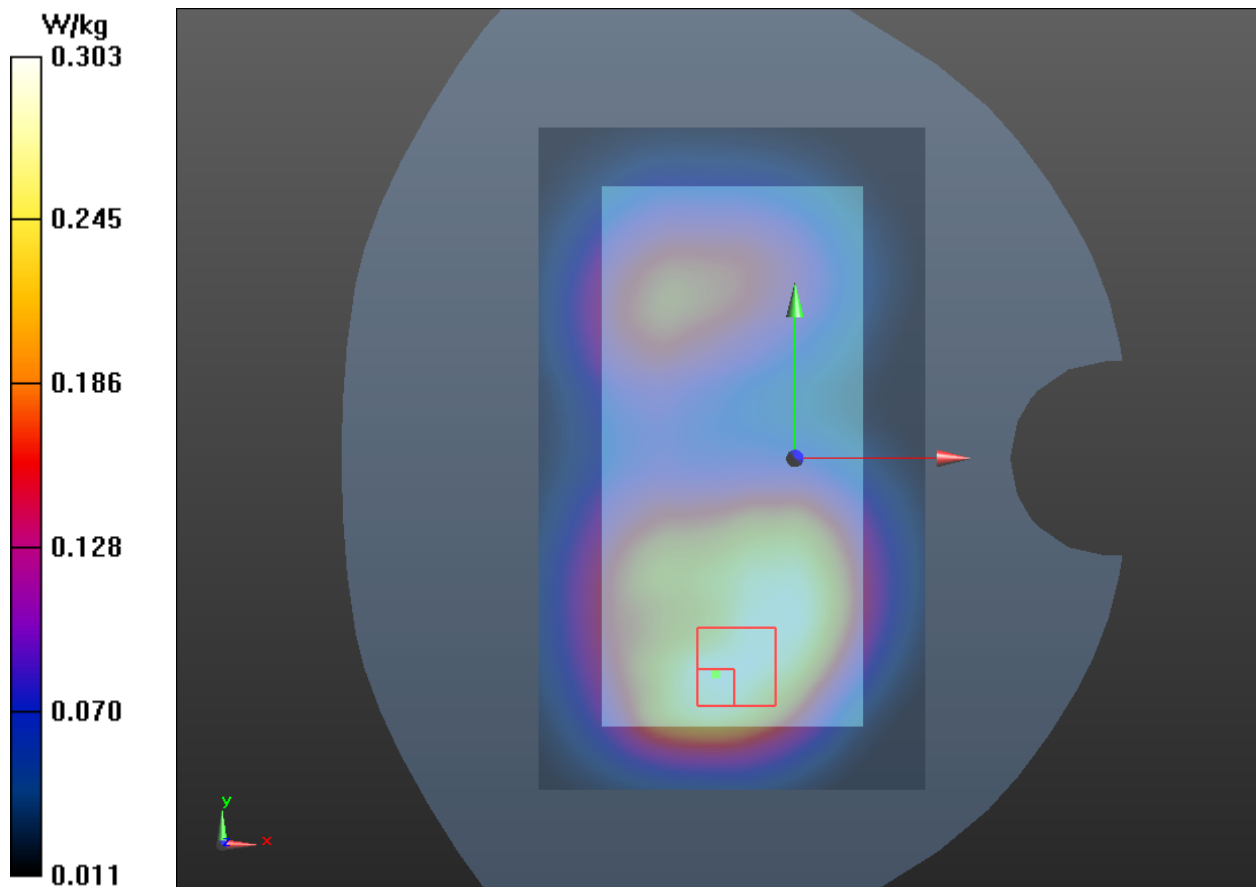
**Back Side Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.437 V/m; Power Drift = 0.046 dB

Peak SAR (extrapolated) = 0.440 W/kg

**SAR(1 g) = 0.286 W/kg; SAR(10 g) = 0.182 W/kg**

Maximum value of SAR (measured) = 0.303 W/kg



**Plot 22 UMTS Band IV Back Side Middle(Distance 10mm)**

Date: 4/16/2019

Communication System: UID 0, WCDMA IV (0); Frequency: 1732.6 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1733$  MHz;  $\sigma = 1.478$  S/m;  $\epsilon_r = 52.899$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(7.91, 7.91, 7.91); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Back Side Middle /Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

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

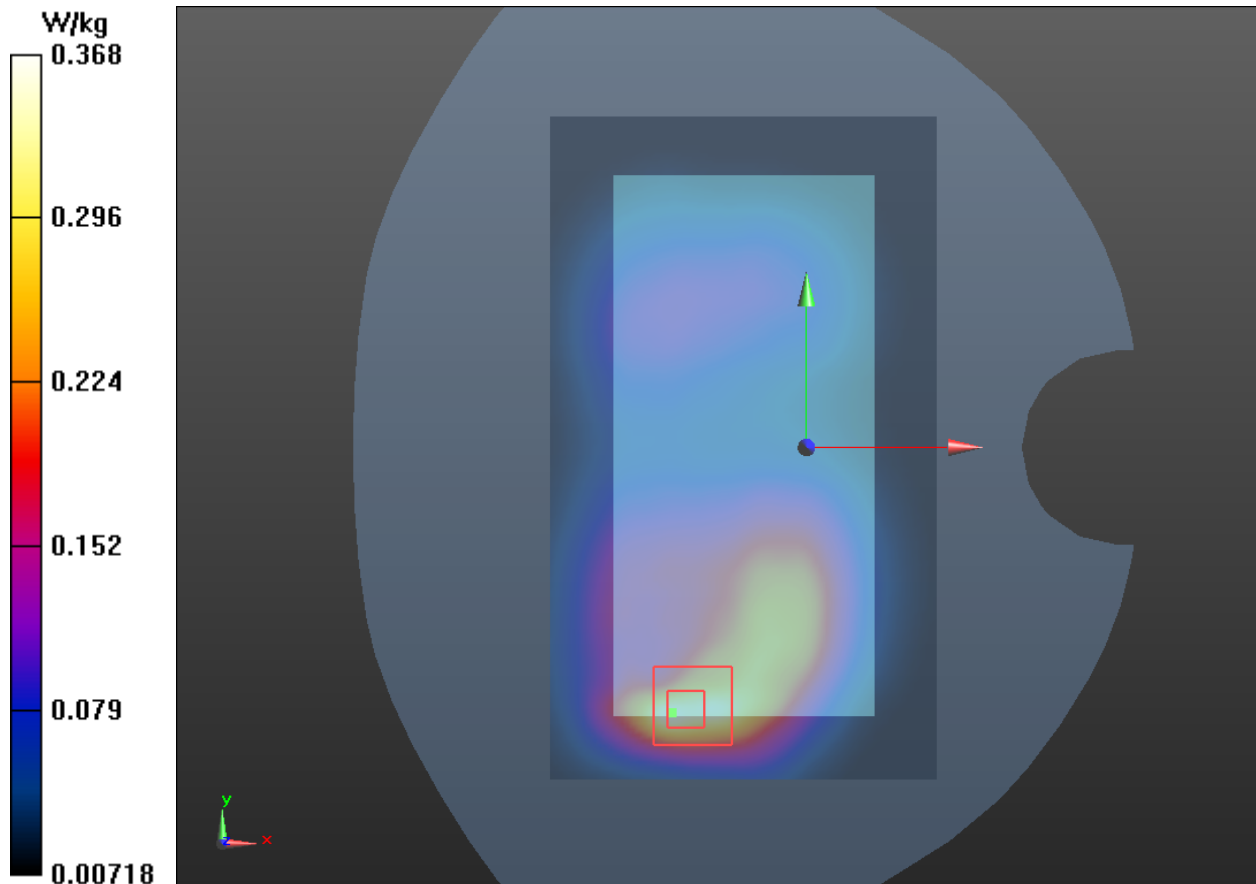
**Back Side Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.303 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.548 W/kg

**SAR(1 g) = 0.333 W/kg; SAR(10 g) = 0.189 W/kg**

Maximum value of SAR (measured) = 0.368 W/kg





**Plot 23 UMTS Band V Left Cheek Middle**

Date: 4/12/2019

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

Medium parameters used:  $f = 837 \text{ MHz}$ ;  $\sigma = 0.916 \text{ S/m}$ ;  $\epsilon_r = 41.951$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $22.3 \text{ }^\circ\text{C}$       Liquid Temperature:  $21.5 \text{ }^\circ\text{C}$

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.10, 9.10, 9.10); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Left Cheek Middle/Area Scan (71x121x1):** Interpolated grid:  $dx=15 \text{ mm}$ ,  $dy=15 \text{ mm}$

Maximum value of SAR (interpolated) =  $0.360 \text{ W/kg}$

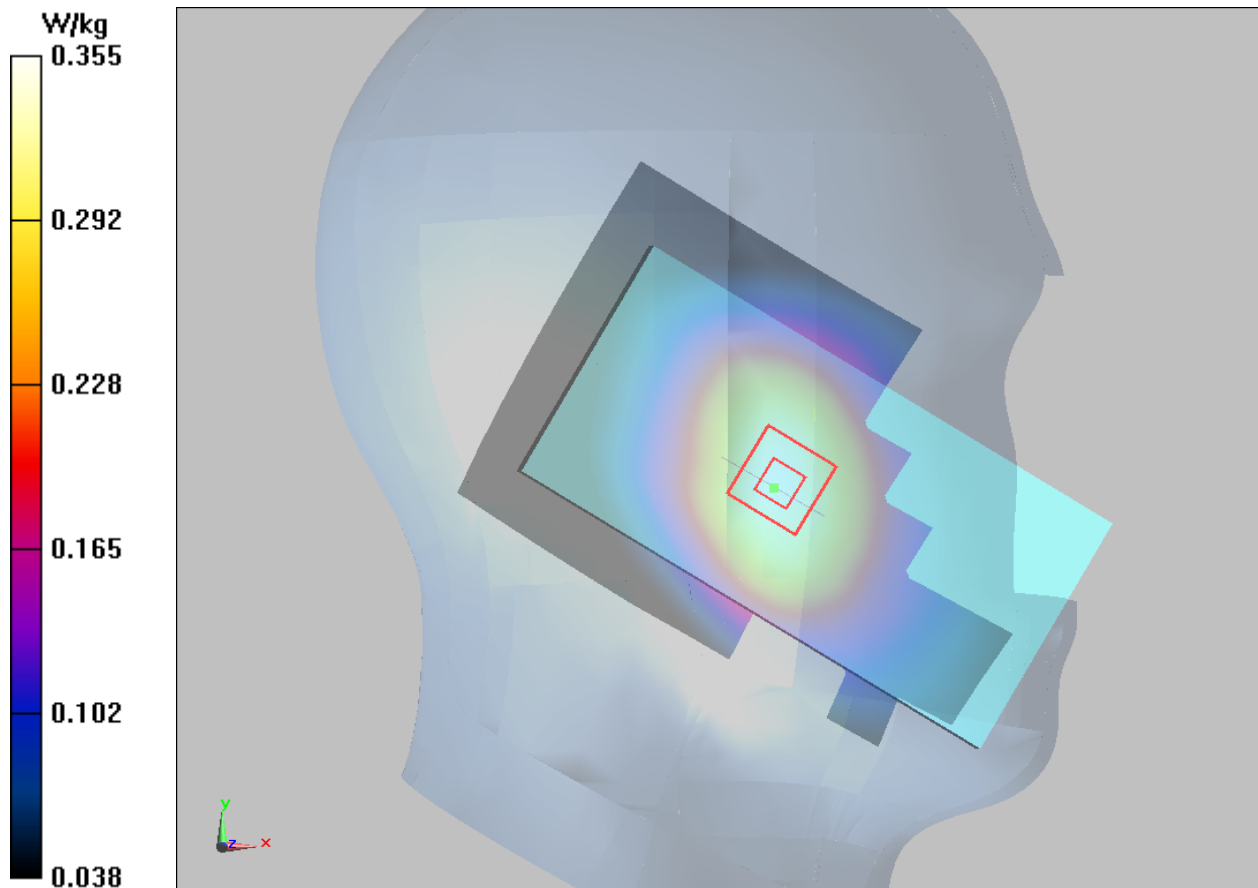
**Left Cheek Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $6.992 \text{ V/m}$ ; Power Drift =  $0.07 \text{ dB}$

Peak SAR (extrapolated) =  $0.420 \text{ W/kg}$

**SAR(1 g) =  $0.339 \text{ W/kg}$ ; SAR(10 g) =  $0.260 \text{ W/kg}$**

Maximum value of SAR (measured) =  $0.355 \text{ W/kg}$



**Plot 24 UMTS Band V Back Side Middle(Distance 15mm)**

Date: 4/11/2019

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

Medium parameters used:  $f = 837 \text{ MHz}$ ;  $\sigma = 0.974 \text{ S/m}$ ;  $\epsilon_r = 53.795$ ;  $\rho = 1000 \text{ kg/m}^3$

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(9.32, 9.32, 9.32); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Back Side Middle /Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.614 W/kg

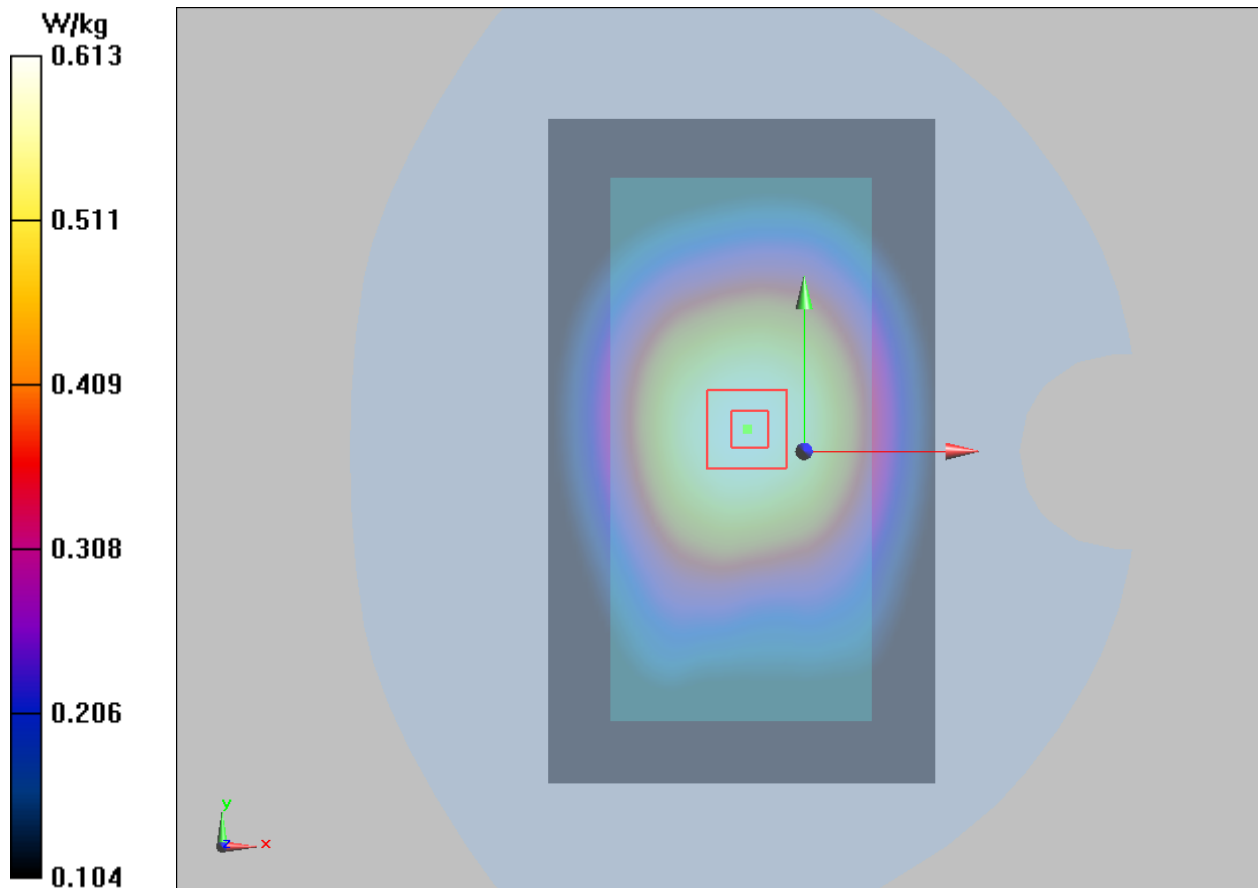
**Back Side Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 25.21 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.725 W/kg

**SAR(1 g) = 0.585 W/kg; SAR(10 g) = 0.448 W/kg**

Maximum value of SAR (measured) = 0.613 W/kg



**Plot 25 UMTS Band V Back Side Low (Distance 10mm)**

Date: 4/11/2019

Communication System: UID 0, WCDMA V (0); Frequency: 826.4 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 826.4 \text{ MHz}$ ;  $\sigma = 0.974 \text{ S/m}$ ;  $\epsilon_r = 53.795$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $22.3 \text{ }^\circ\text{C}$       Liquid Temperature:  $21.5 \text{ }^\circ\text{C}$

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.32, 9.32, 9.32); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Back Side Low /Area Scan (71x121x1):** Interpolated grid:  $dx=15 \text{ mm}$ ,  $dy=15 \text{ mm}$

Maximum value of SAR (interpolated) =  $0.673 \text{ W/kg}$

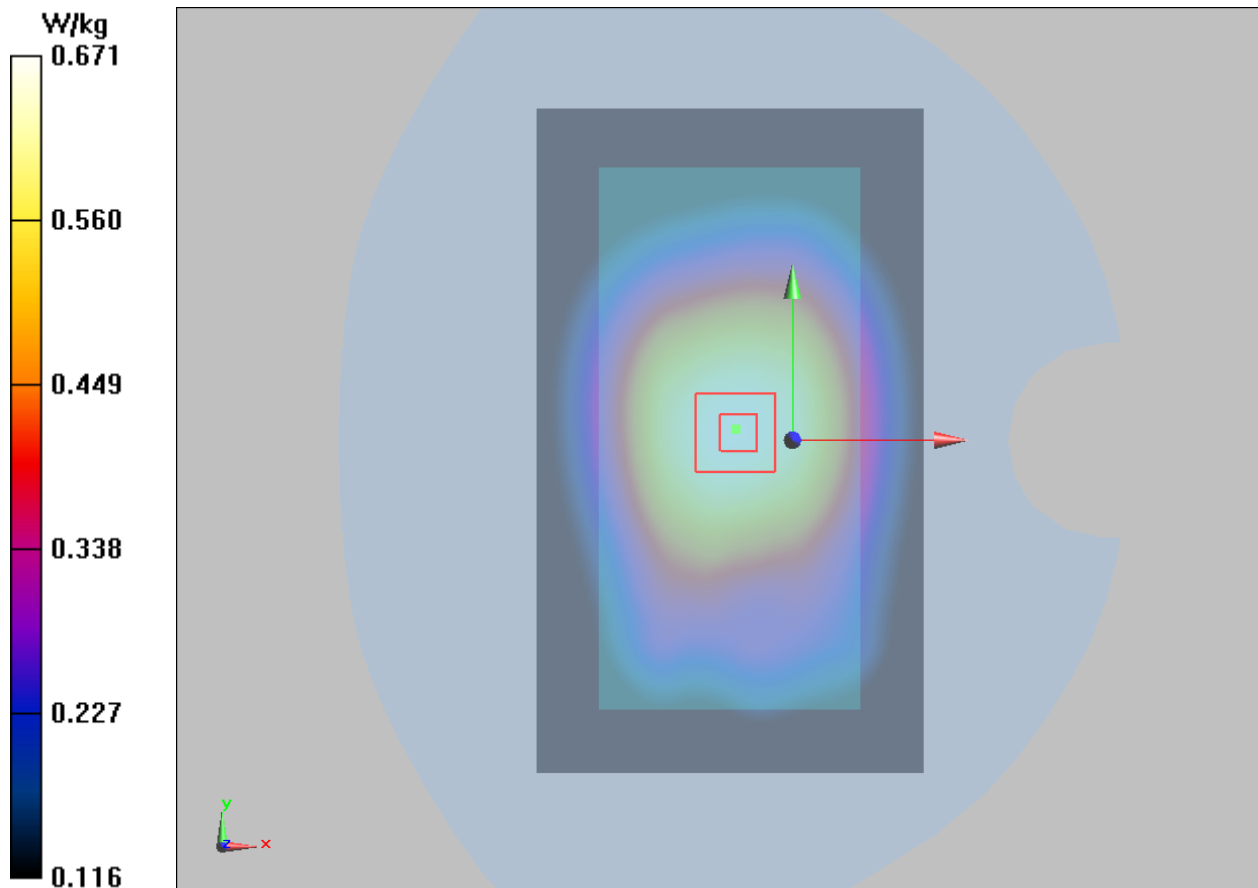
**Back Side Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $26.34 \text{ V/m}$ ; Power Drift =  $0.01 \text{ dB}$

Peak SAR (extrapolated) =  $0.787 \text{ W/kg}$

**SAR(1 g) =  $0.642 \text{ W/kg}$ ; SAR(10 g) =  $0.496 \text{ W/kg}$**

Maximum value of SAR (measured) =  $0.671 \text{ W/kg}$



**Plot 26 LTE Band 2 1RB Left Cheek Low**

Date: 4/24/2019

Communication System: UID 0, LTE (0); Frequency: 1860 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1860$  MHz;  $\sigma = 1.379$  S/m;  $\epsilon_r = 38.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(7.96, 7.96, 7.96); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Left Cheek Low/Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

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

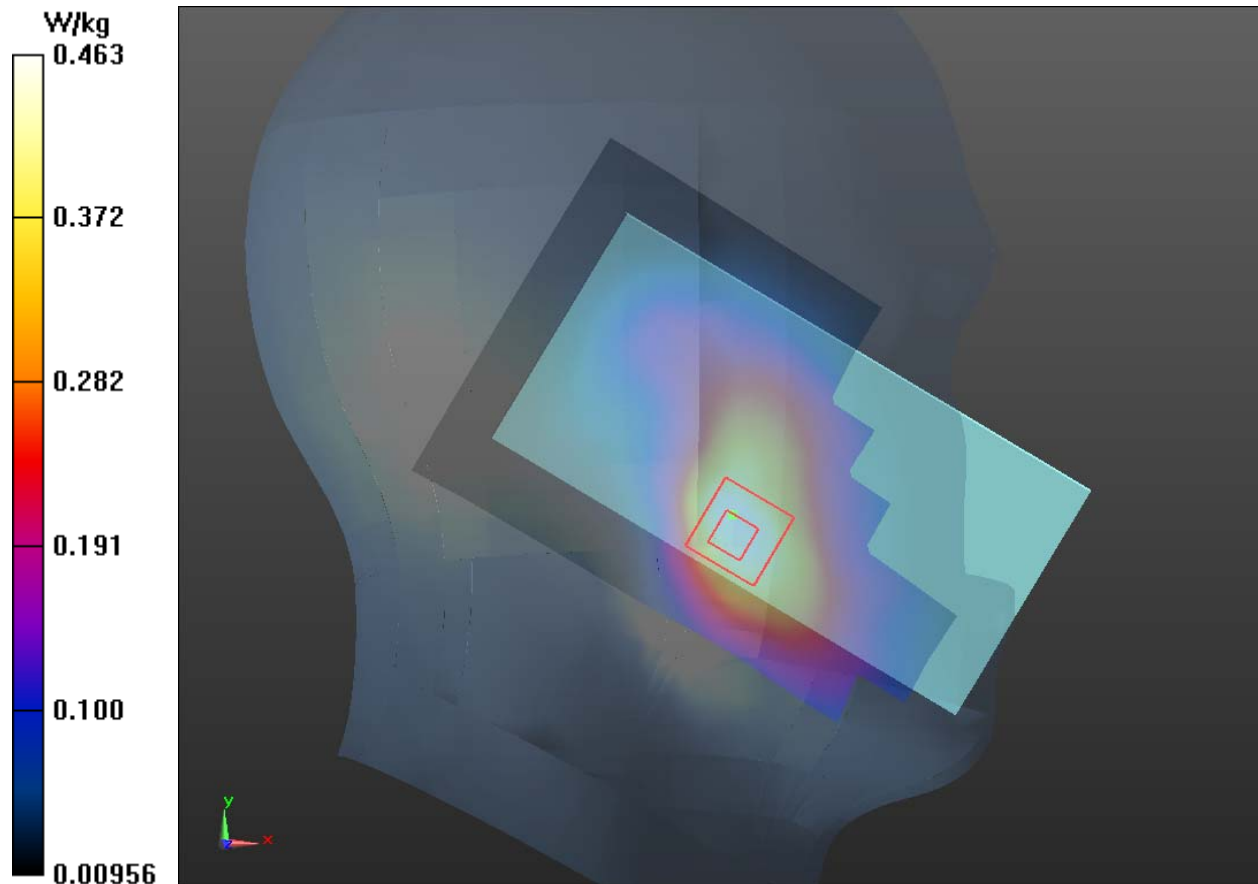
**Left Cheek Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.644 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.662 W/kg

**SAR(1 g) = 0.442 W/kg; SAR(10 g) = 0.278 W/kg**

Maximum value of SAR (measured) = 0.463 W/kg



**Plot 27 LTE Band 2 1RB Front Side Low (Distance 15mm)**

Date: 4/15/2019

Communication System: UID 0, LTE (0); Frequency: 1860 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1860$  MHz;  $\sigma = 1.474$  S/m;  $\epsilon_r = 53.034$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(7.70, 7.70, 7.70); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Front Side Low/Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.300 W/kg

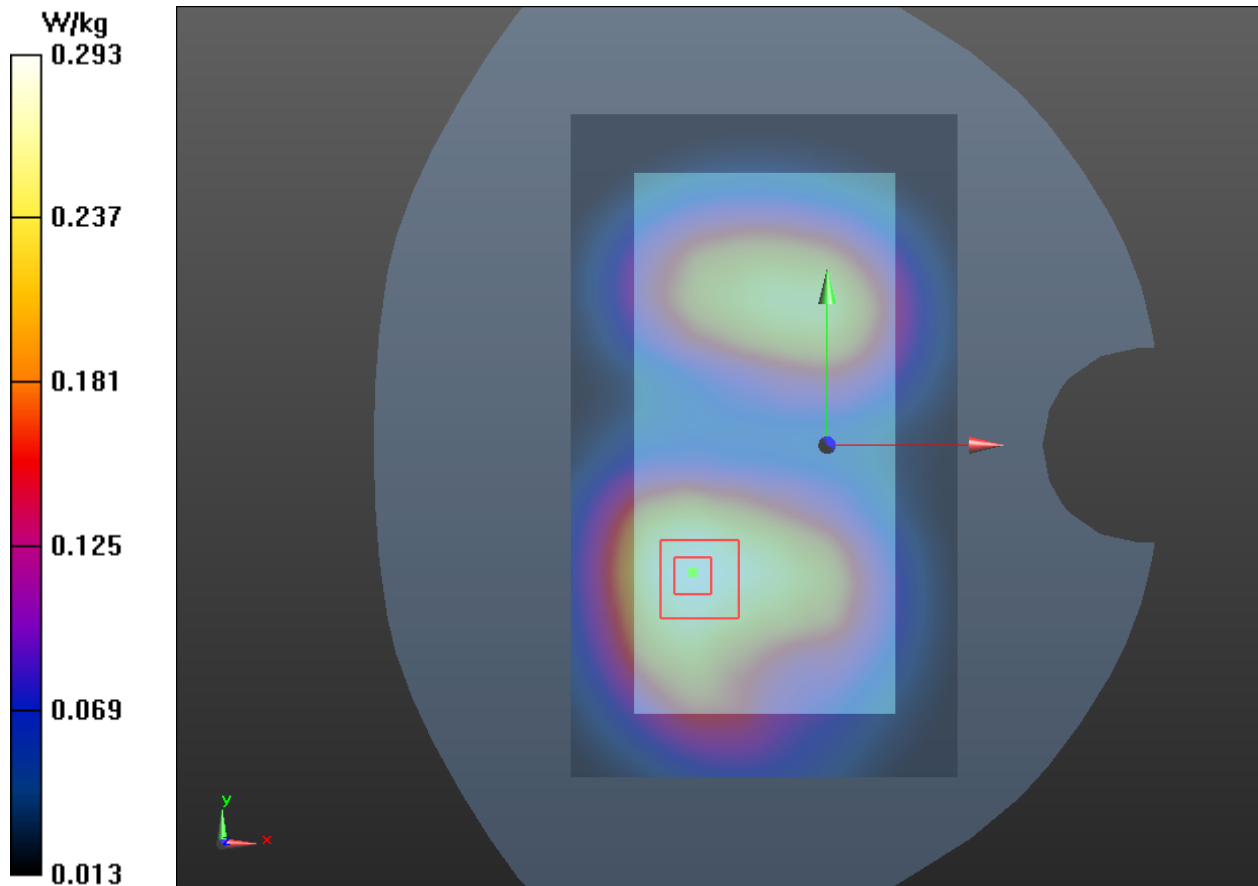
**Front Side Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.721 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.417 W/kg

**SAR(1 g) = 0.275 W/kg; SAR(10 g) = 0.180 W/kg**

Maximum value of SAR (measured) = 0.293 W/kg



**Plot 28 LTE Band 2 50%RB Back Side Middle (Distance 10mm)**

Date: 4/15/2019

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.489$  S/m;  $\epsilon_r = 52.896$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(7.70, 7.70, 7.70); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Back Side Middle/Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.265 W/kg

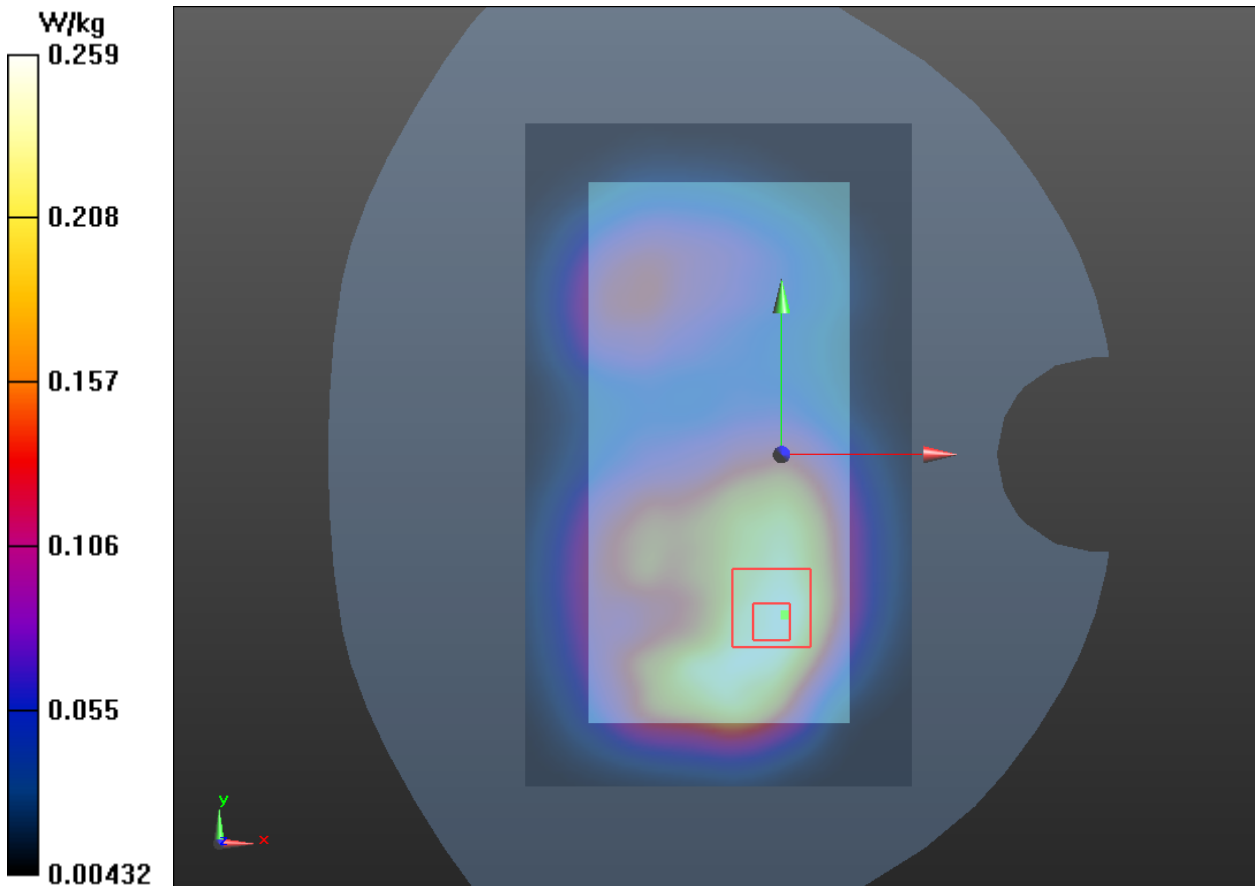
**Back Side Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.415 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.398 W/kg

**SAR(1 g) = 0.243 W/kg; SAR(10 g) = 0.153 W/kg**

Maximum value of SAR (measured) = 0.259 W/kg



**Plot 29 LTE Band 4 1RB Right Cheek Low**

Date: 4/16/2019

Communication System: UID 0, LTE (0); Frequency: 1720 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1720$  MHz;  $\sigma = 1.284$  S/m;  $\epsilon_r = 38.855$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(8.19, 8.19, 8.19); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Right Cheek Low/Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.202 W/kg

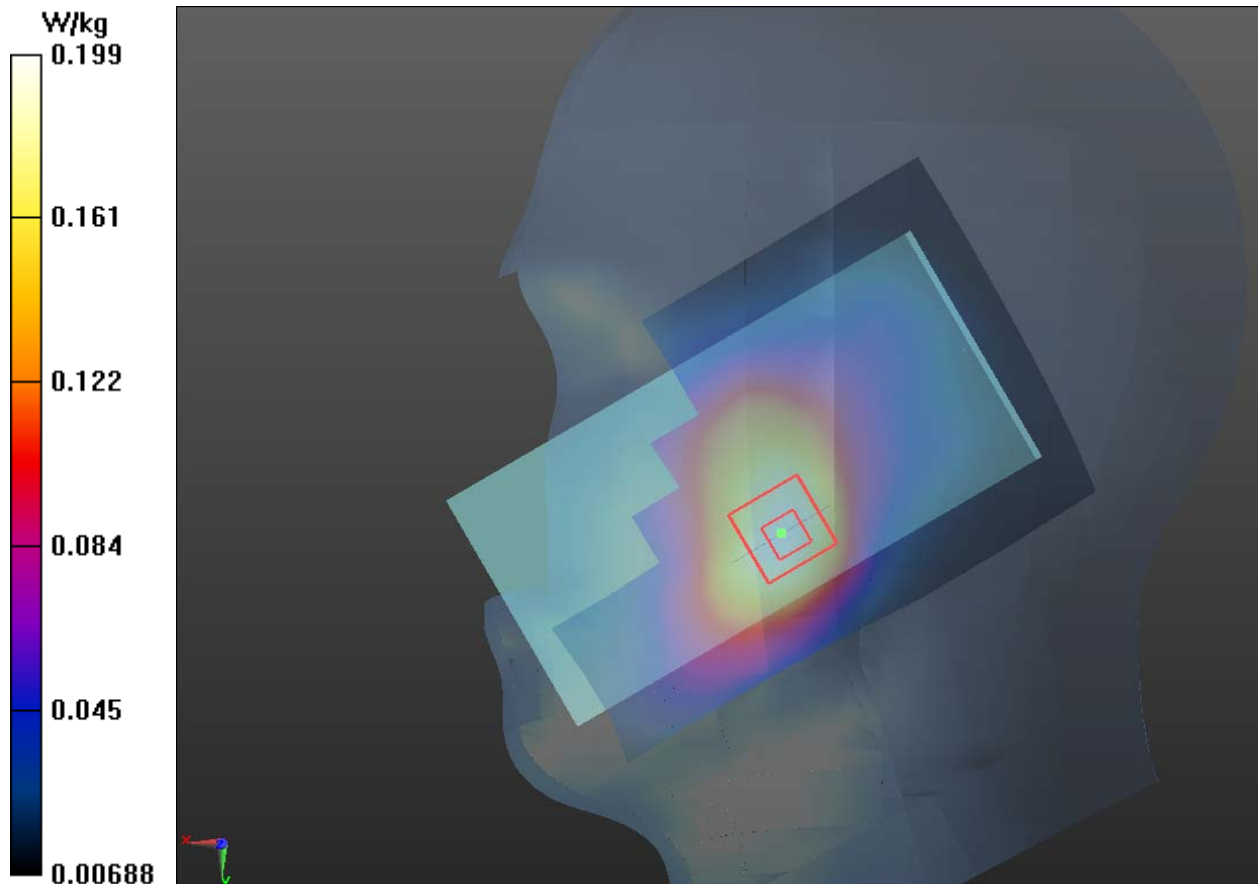
**Right Cheek Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.233 V/m; Power Drift = 0.047 dB

Peak SAR (extrapolated) = 0.265 W/kg

**SAR(1 g) = 0.187 W/kg; SAR(10 g) = 0.125 W/kg**

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



**Plot 30 LTE Band 4 1RB Back Side Low (Distance 15mm)**

Date: 4/16/2019

Communication System: UID 0, LTE (0); Frequency: 1720 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1720$  MHz;  $\sigma = 1.409$  S/m;  $\epsilon_r = 51.527$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(7.91, 7.91, 7.91); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Back Side Low/Area Scan (71x121x1):** Interpolated grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.326 W/kg

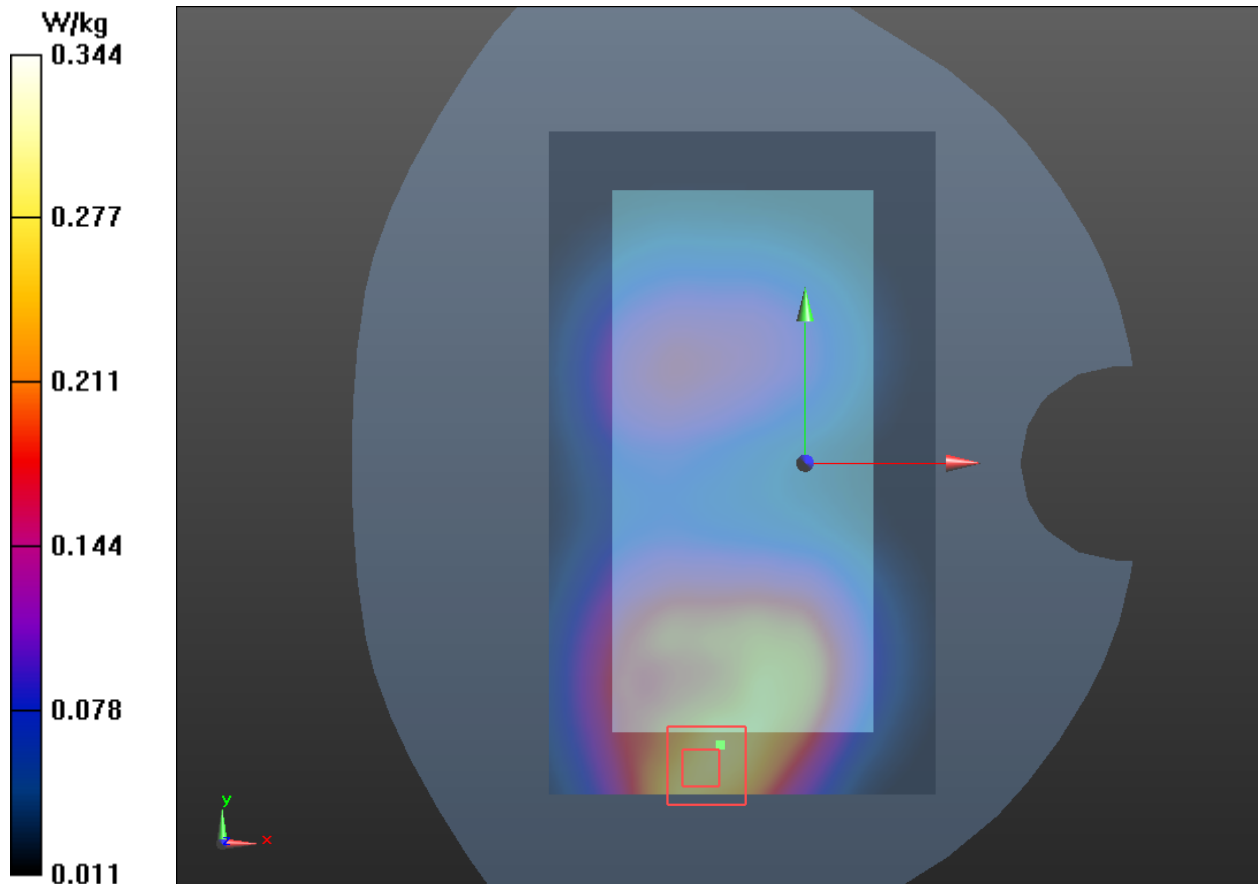
**Back Side Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.098 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.500 W/kg

**SAR(1 g) = 0.315 W/kg; SAR(10 g) = 0.189 W/kg**

Maximum value of SAR (measured) = 0.344 W/kg





**Plot 31 LTE Band 4 1RB Back Side Low (Distance 10mm)**

Date: 4/16/2019

Communication System: UID 0, LTE (0); Frequency: 1720 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1720$  MHz;  $\sigma = 1.409$  S/m;  $\epsilon_r = 51.527$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(7.91, 7.91, 7.91); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Back Side Low /Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.320 W/kg

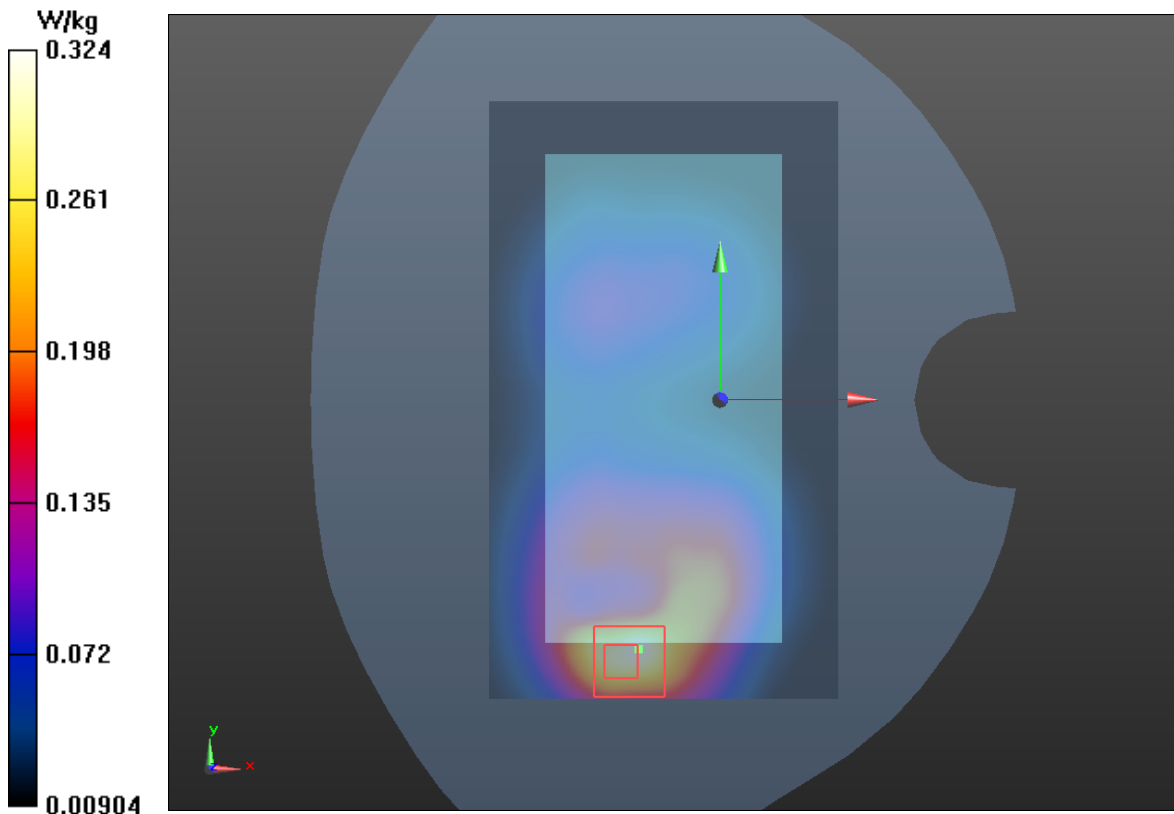
**Back Side Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.437 V/m; Power Drift = 0.024 dB

Peak SAR (extrapolated) = 0.535 W/kg

**SAR(1 g) = 0.316 W/kg; SAR(10 g) = 0.174 W/kg**

Maximum value of SAR (measured) = 0.324 W/kg



**Plot 32 LTE Band 5 1RB Left Cheek Low**

Date: 4/12/2019

Communication System: UID 0, LTE (0); Frequency: 829 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 829$  MHz;  $\sigma = 0.91$  S/m;  $\epsilon_r = 42.138$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(9.10, 9.10, 9.10); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Left Cheek Low/Area Scan (71x121x1):** Interpolated grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.329 W/kg

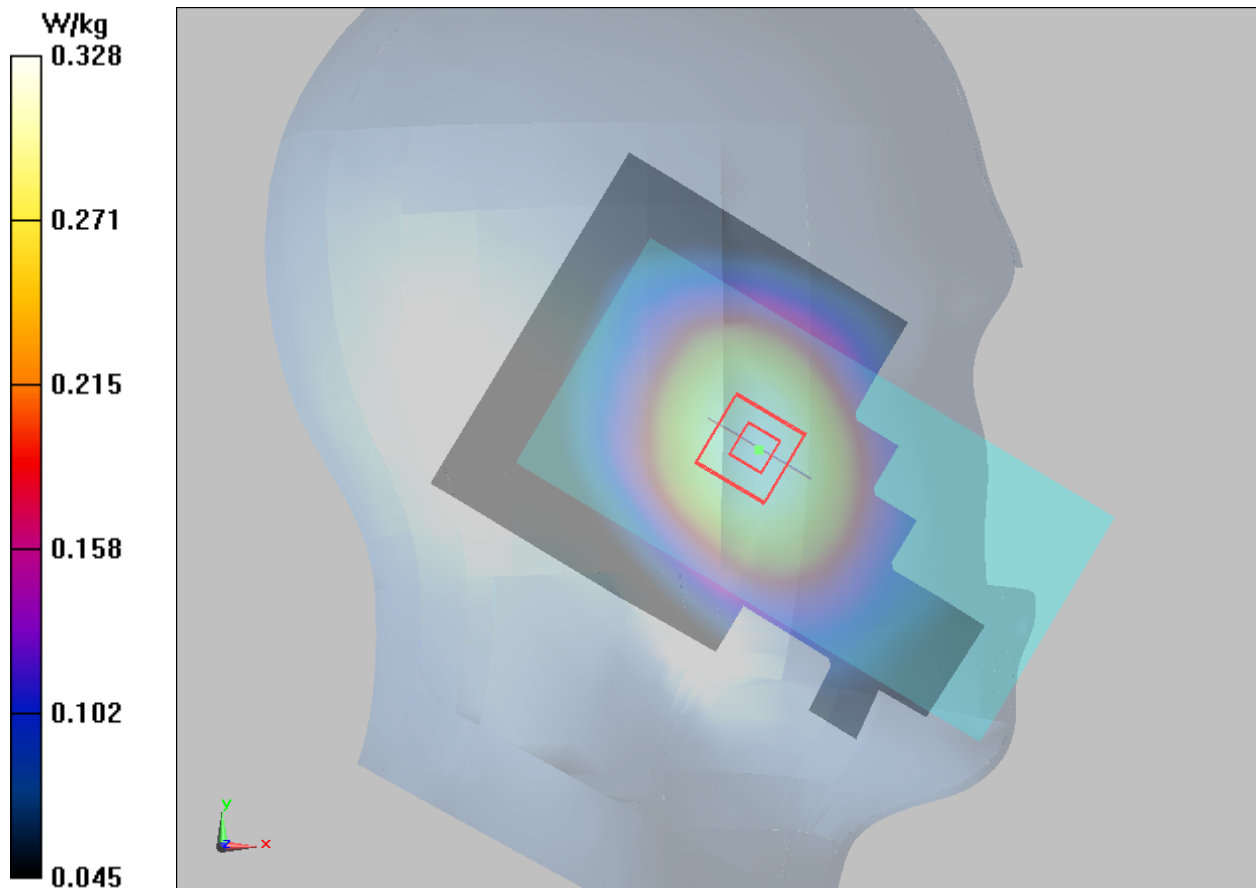
**Left Cheek Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.400 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.366 W/kg

**SAR(1 g) = 0.313 W/kg; SAR(10 g) = 0.249 W/kg**

Maximum value of SAR (measured) = 0.328 W/kg



**Plot 33 LTE Band 5 1RB Back Side Low (Distance 15mm)**

Date: 4/11/2019

Communication System: UID 0, LTE (0); Frequency: 829 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 829 \text{ MHz}$ ;  $\sigma = 0.967 \text{ S/m}$ ;  $\epsilon_r = 53.861$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $22.3 \text{ }^\circ\text{C}$       Liquid Temperature:  $21.5 \text{ }^\circ\text{C}$

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.32, 9.32, 9.32); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Back Side Low/Area Scan (71x121x1):** Interpolated grid:  $dx=15 \text{ mm}$ ,  $dy=15 \text{ mm}$

Maximum value of SAR (interpolated) =  $0.562 \text{ W/kg}$

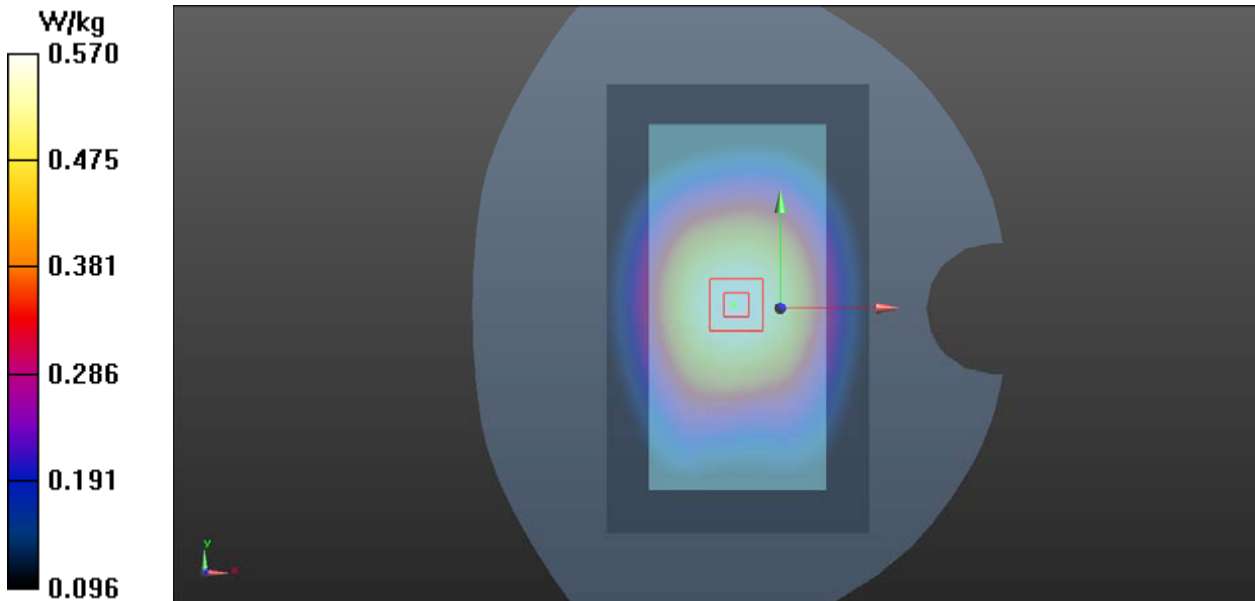
**Back Side Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $24.84 \text{ V/m}$ ; Power Drift =  $-0.09 \text{ dB}$

Peak SAR (extrapolated) =  $0.668 \text{ W/kg}$

**SAR(1 g) =  $0.543 \text{ W/kg}$ ; SAR(10 g) =  $0.416 \text{ W/kg}$**

Maximum value of SAR (measured) =  $0.570 \text{ W/kg}$



**Plot 34 LTE Band 5 1RB Back Side Low (Distance 10mm)**

Date: 4/11/2019

Communication System: UID 0, LTE (0); Frequency: 829 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 829$  MHz;  $\sigma = 0.967$  S/m;  $\epsilon_r = 53.861$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(9.32, 9.32, 9.32); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Back Side Low /Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.661 W/kg

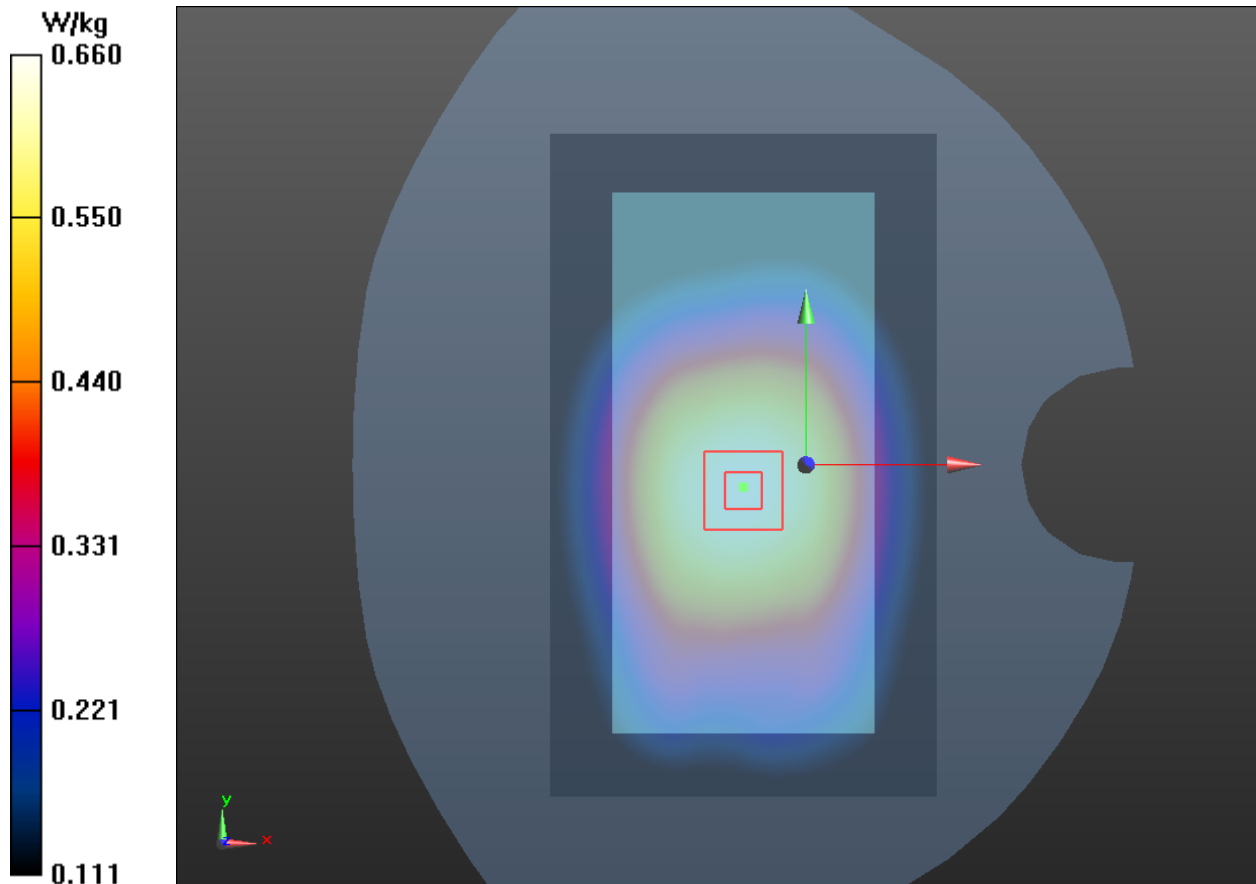
**Back Side Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 26.39 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.765 W/kg

**SAR(1 g) = 0.631 W/kg; SAR(10 g) = 0.486 W/kg**

Maximum value of SAR (measured) = 0.660 W/kg



**Plot 35 LTE Band 7 1RB Right Cheek Low**

Date: 4/14/2019

Communication System: UID 0, LTE (0); Frequency: 2510 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 2510$  MHz;  $\sigma = 1.921$  S/m;  $\epsilon_r = 38.469$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(7.28, 7.28, 7.28); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Right Cheek Low/Area Scan (91x151x1):** Interpolated grid: dx=12 mm, dy=12 mm

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

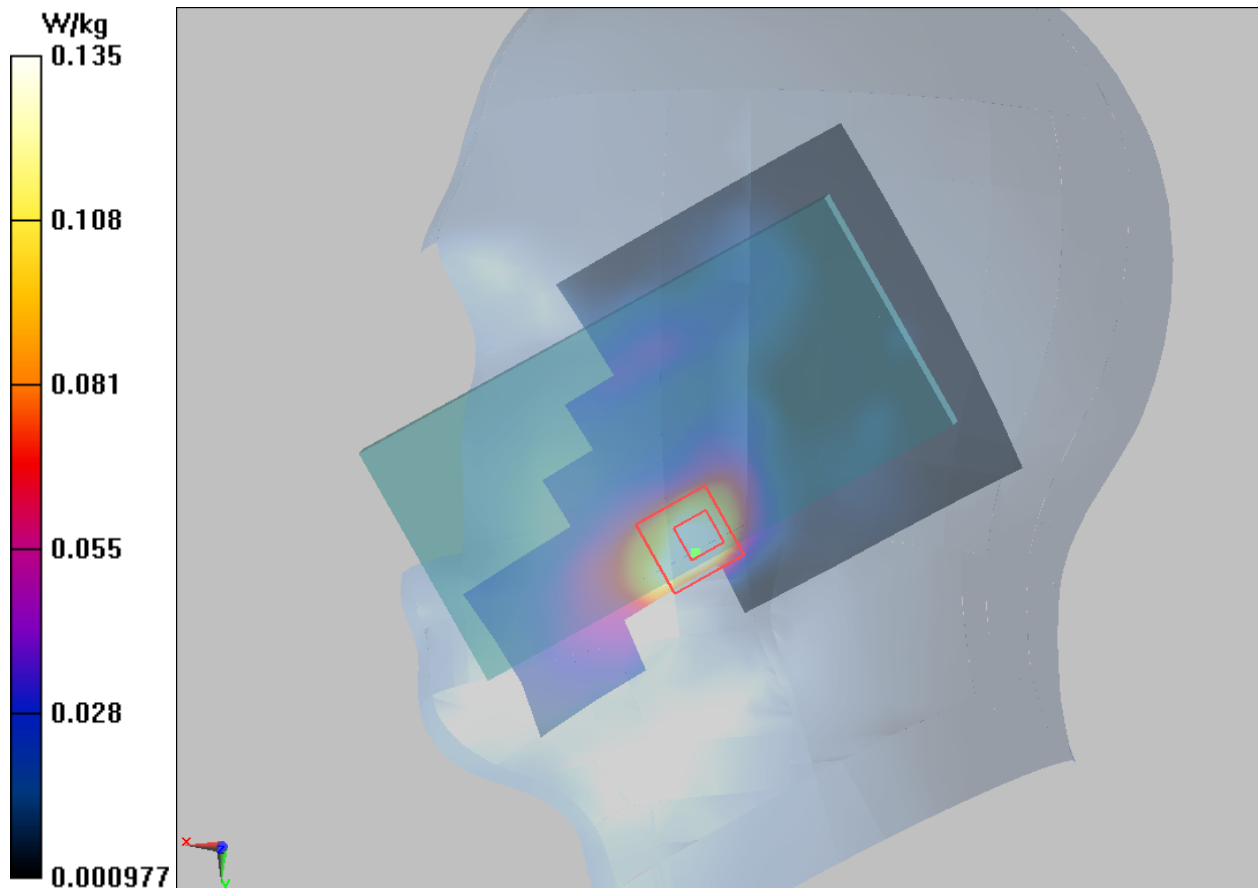
**Right Cheek Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.120 V/m; Power Drift = 0.053 dB

Peak SAR (extrapolated) = 0.260 W/kg

**SAR(1 g) = 0.127 W/kg; SAR(10 g) = 0.062 W/kg**

Maximum value of SAR (measured) = 0.135 W/kg



**Plot 36 LTE Band 7 50%RB Back Side Low (Distance 15mm)**

Date: 4/14/2019

Communication System: UID 0, LTE (0); Frequency: 2510 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 2510$  MHz;  $\sigma = 2.045$  S/m;  $\epsilon_r = 50.913$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(7.16, 7.16, 7.16); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Back Side Low/Area Scan(91x151x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 0.425 W/kg

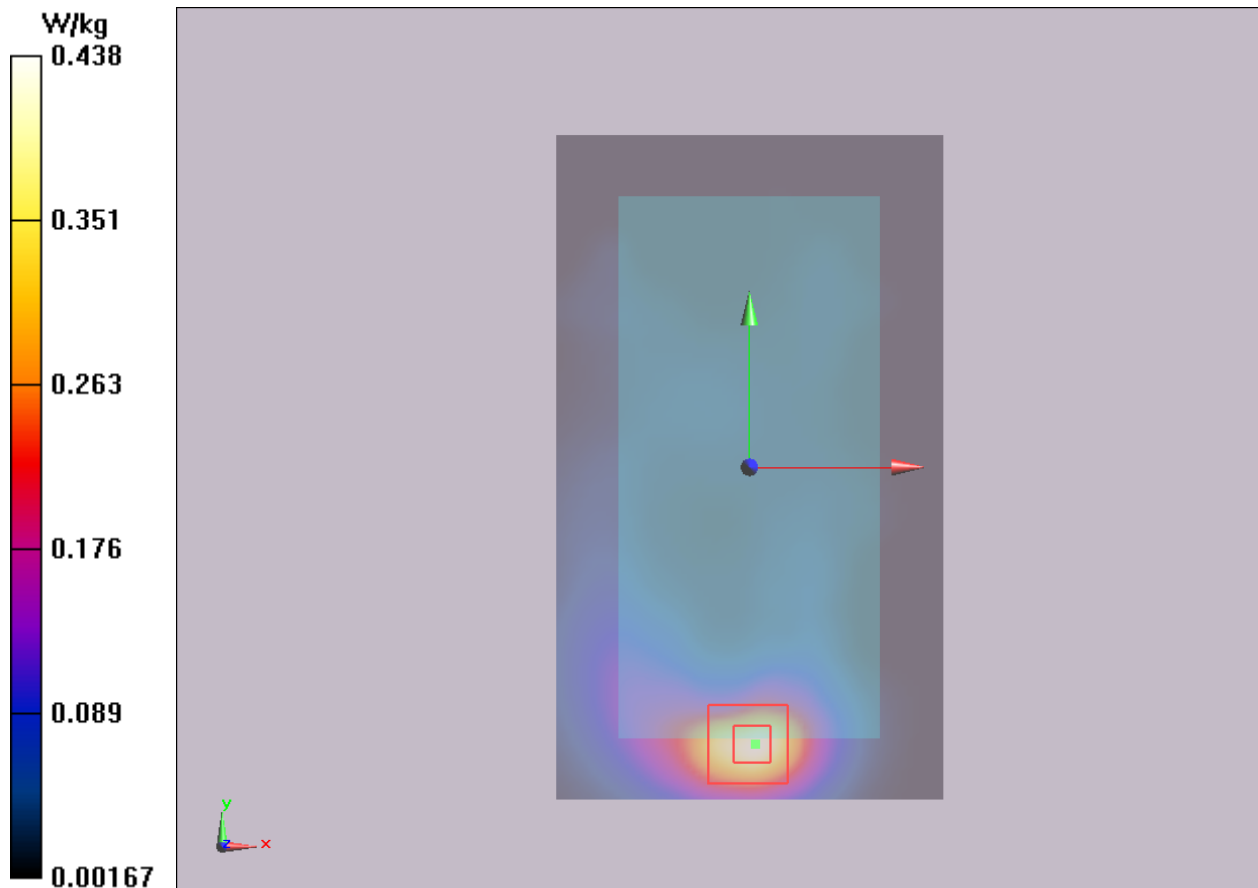
**Back Side Low/Zoom Scan(7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.161 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 0.755 W/kg

**SAR(1 g) = 0.387 W/kg; SAR(10 g) = 0.190 W/kg**

Maximum value of SAR (measured) = 0.438 W/kg



**Plot 37 LTE Band 7 50%RB Bottom Edge Low (Distance 10mm)**

Date: 4/14/2019

Communication System: UID 0, LTE (0); Frequency: 2510 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 2510$  MHz;  $\sigma = 2.045$  S/m;  $\epsilon_r = 50.913$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(7.16, 7.16, 7.16); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Bottom Edge Low/Area Scan (51x111x1):** Interpolated grid: dx=10mm, dy=10 mm

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

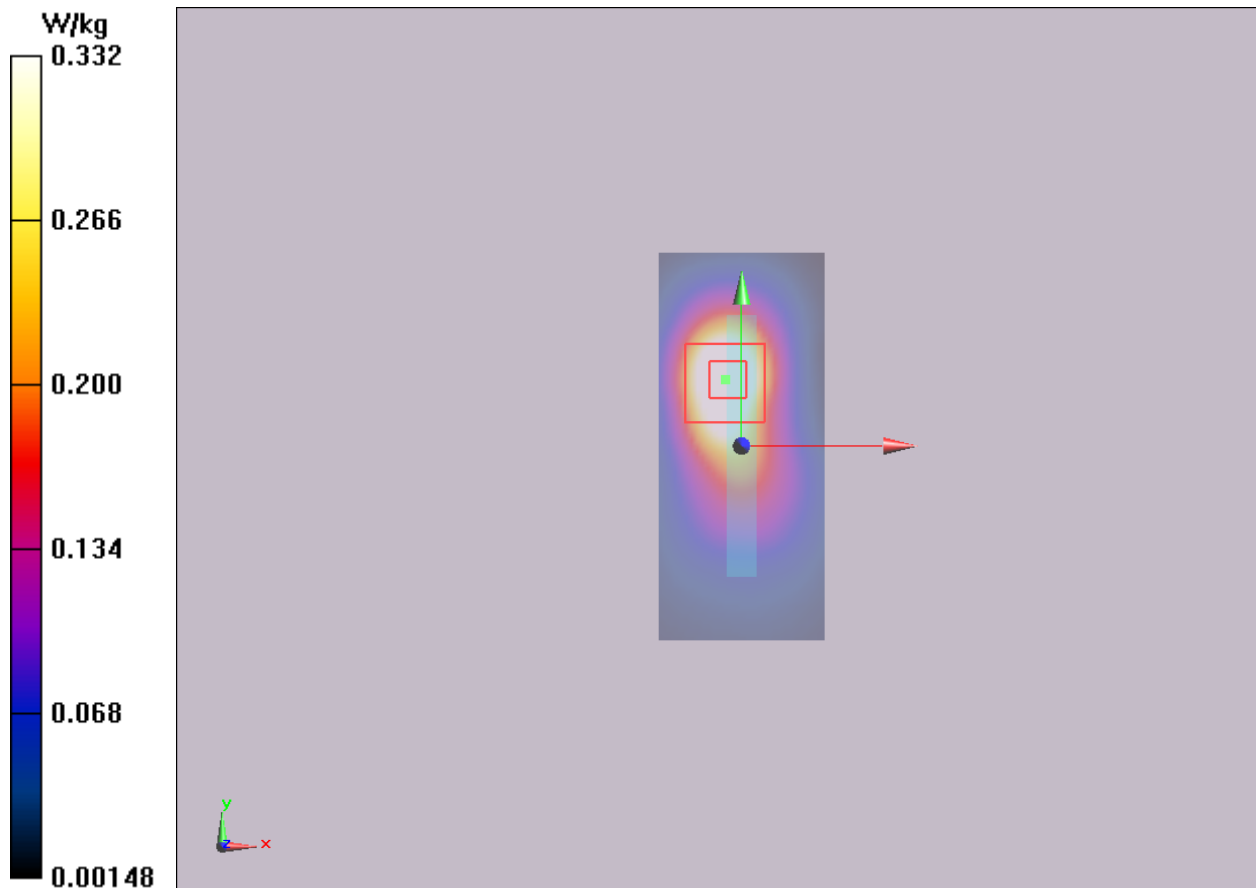
**Bottom Edge Low/Zoom Scan(7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.75 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.608 W/kg

**SAR(1 g) = 0.313 W/kg; SAR(10 g) = 0.123 W/kg**

Maximum value of SAR (measured) = 0.332 W/kg



**Plot 38 802.11b Left Cheek Middle (Battery2)**

Date: 4/24/2019

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

Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.843$  S/m;  $\epsilon_r = 38.745$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(7.57, 7.57, 7.57); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Left Cheek Middle/Area Scan (91x151x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 0.346 W/kg

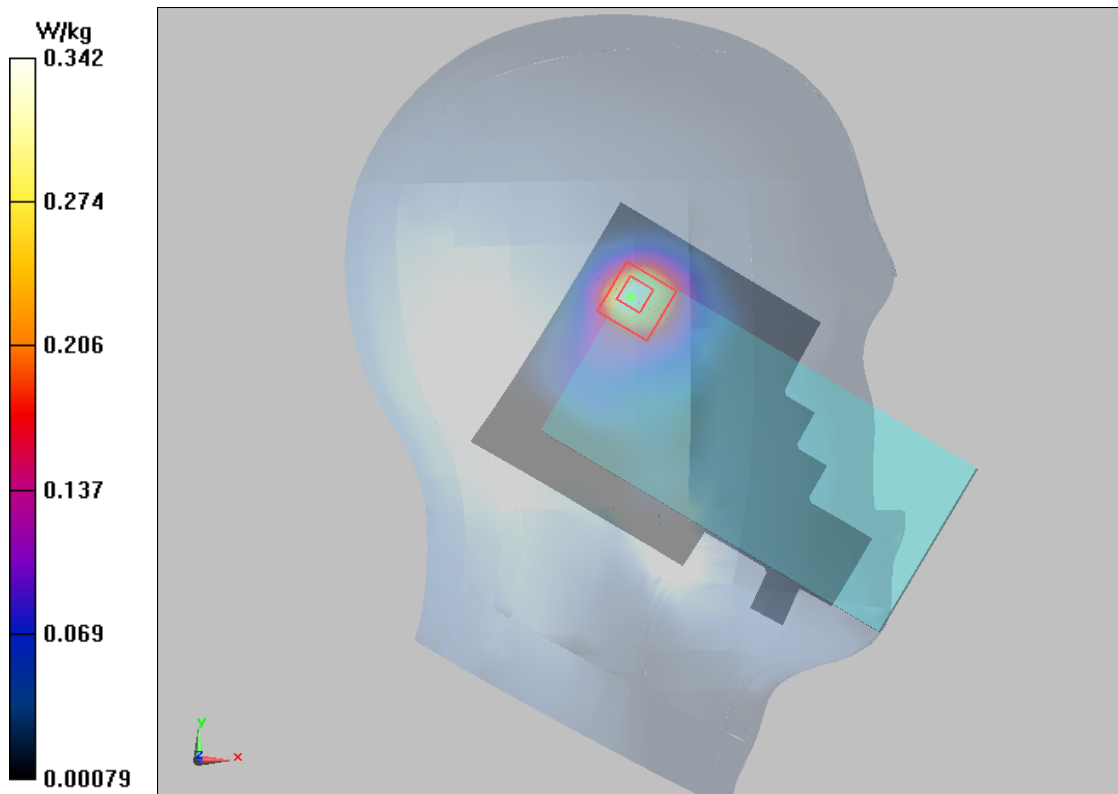
**Left Cheek Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.201 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 0.733 W/kg

**SAR(1 g) = 0.312 W/kg; SAR(10 g) = 0.140 W/kg**

Maximum value of SAR (measured) = 0.342 W/kg





**Plot 39 802.11b Back Side Low (Battery2, Distance 15mm)**

Date: 4/24/2019

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

Medium parameters used:  $f = 2412$  MHz;  $\sigma = 1.929$  S/m;  $\epsilon_r = 51.204$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(7.53, 7.53, 7.53); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Back Side Low/Area Scan (91x151x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 0.0696 W/kg

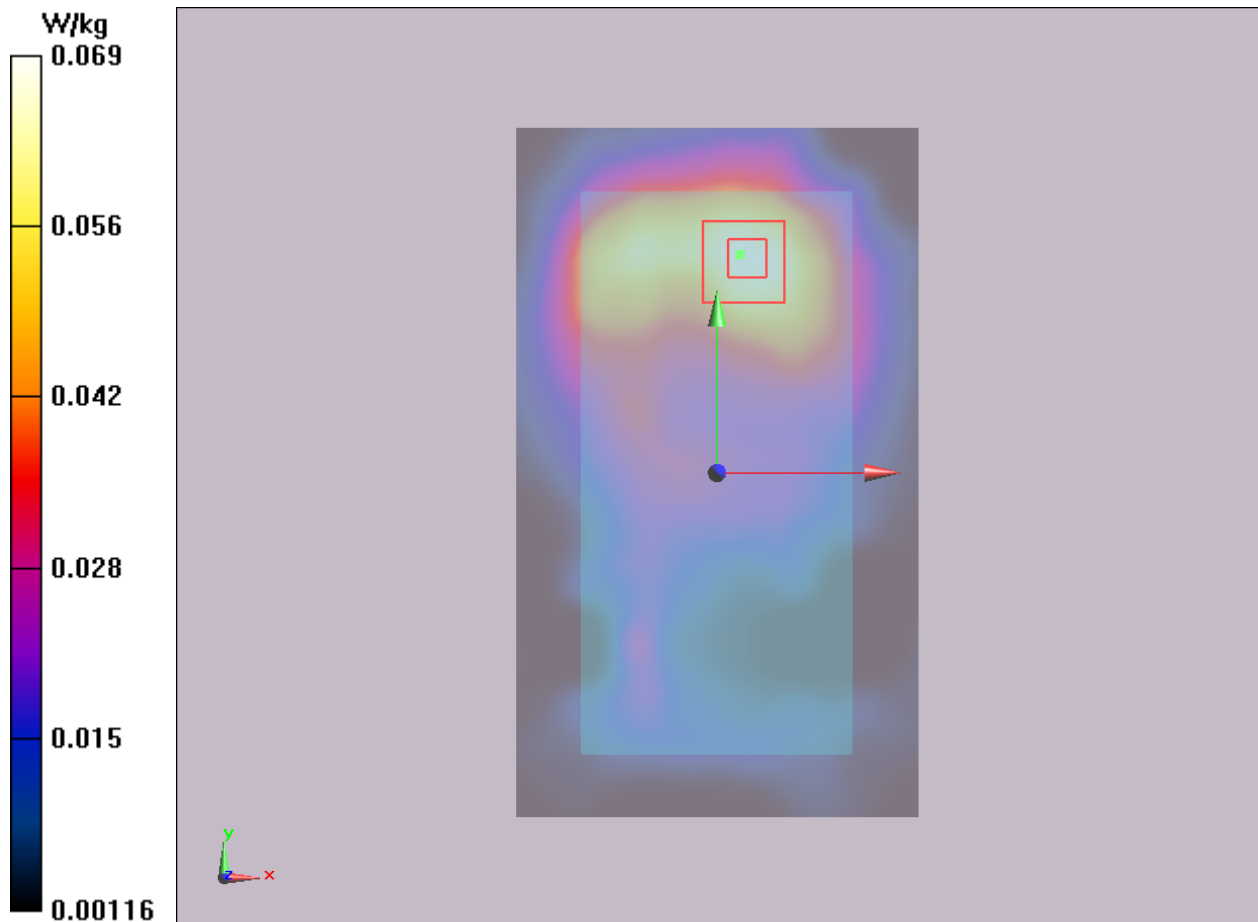
**Back Side Low/Zoom Scan(7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.832 V/m; Power Drift = 0.034 dB

Peak SAR (extrapolated) = 0.114 W/kg

**SAR(1 g) = 0.064 W/kg; SAR(10 g) = 0.037 W/kg**

Maximum value of SAR (measured) = 0.069 W/kg



**Plot 40 802.11b Back Side Low (Battery2, Distance 10mm)**

Date: 4/24/2019

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

Medium parameters used:  $f = 2412$  MHz;  $\sigma = 1.929$  S/m;  $\epsilon_r = 51.204$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(7.53, 7.53, 7.53); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Back Side Low/Area Scan (91x151x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 0.173 W/kg

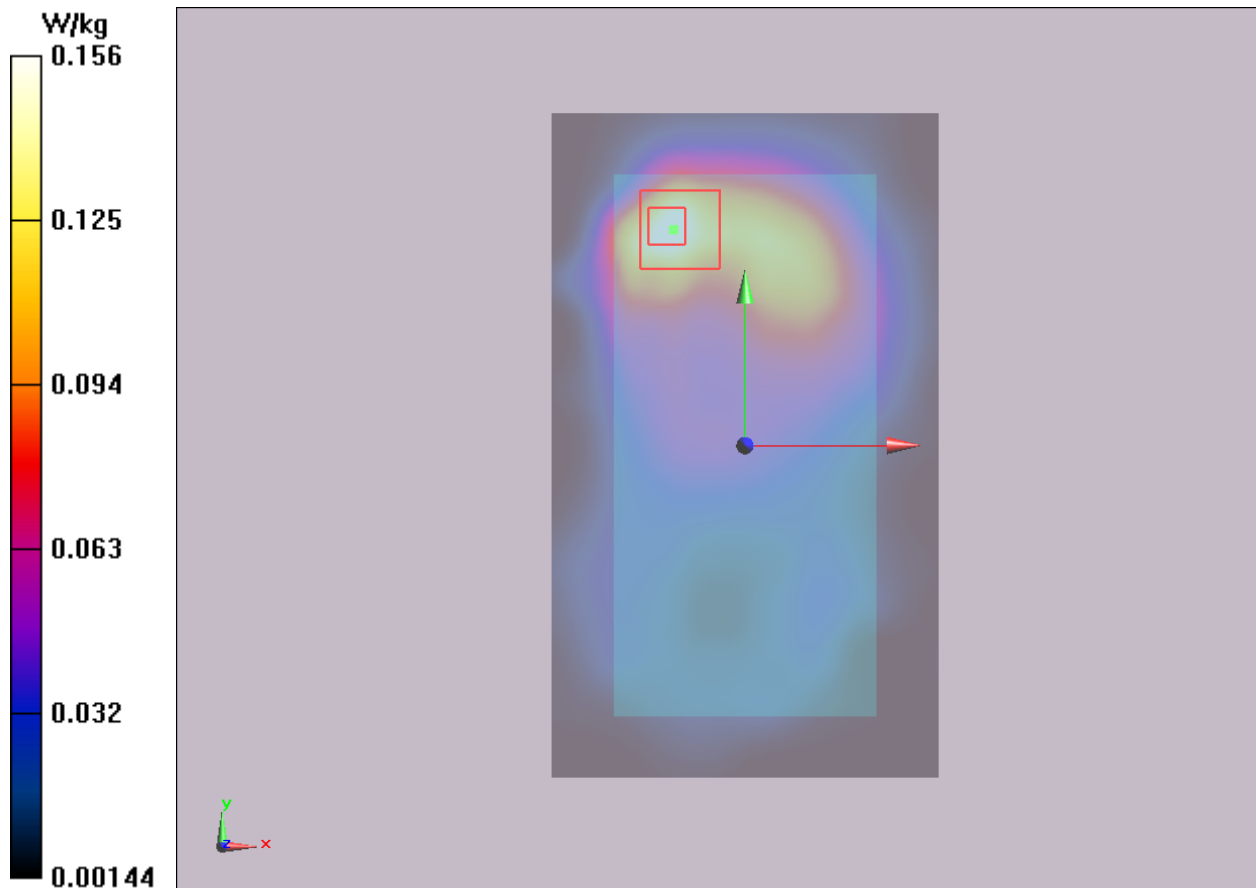
**Back Side Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.173 V/m; Power Drift = 0.026 dB

Peak SAR (extrapolated) = 0.311 W/kg

**SAR(1 g) = 0.145 W/kg; SAR(10 g) = 0.074 W/kg**

Maximum value of SAR (measured) = 0.156 W/kg



## Plot 41 Bluetooth Left Cheek Low

Date: 4/24/2019

Communication System: UID 0, BT (0); Frequency: 2402 MHz; Duty Cycle: 1:2.167

Medium parameters used:  $f = 2402$  MHz;  $\sigma = 1.806$  S/m;  $\epsilon_r = 38.877$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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(7.57, 7.57, 7.57); Calibrated: 5/29/2018;

Electronics: DAE4 SN1291; Calibrated: 12/4/2018

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

Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

**Left Cheek Low/Area Scan (91x151x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 0.156 W/kg

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

Reference Value = 3.872 V/m; Power Drift = 0.057 dB

Peak SAR (extrapolated) = 0.253 W/kg

**SAR(1 g) = 0.103 W/kg; SAR(10 g) = 0.046 W/kg**

Maximum value of SAR (measured) = 0.107 W/kg

