SAR TEST REPORT

No. I19Z60845-SEM04

For

Samsung Electronics Co., Ltd.

Multi-band GSM/WCDMA/LTE phone with Bluetooth, WLAN

Modelname: SM-T295C

With

Hardware Version: REV0.4

Software Version: T295CZCU0ASEA

FCC ID: ZCASMT295C

Issued Date:2019-7-25

TESTING
NVLAP LAB CODE 600118-0

Note:

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Test Laboratory:

CTTL, Telecommunication Technology Labs, CAICT

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REPORT HISTORY

Report Number	Revision	Issue Date	Description
I19Z60845-SEM04	Rev.0	2019-7-17	Initial creation of test report
I19Z60845-SEM04	Rev.1	2019-7-25	Update the all data for GSM1900. Update the LTE Band7 Tune up on page32. Add KDB616217 D04 SAR for laptop and tablets v01r02 on section 5. Update channel 64 and 159 probe ConvF on page 115 and 117 of test report. Remove 2300MHz dipole on section 17.

TABLE OF CONTENT

1 Test Laboratory

1.1 Testing Location

Company Name:	CTTL(Shouxiang)
Address:	No. 51 Shouxiang Science Building, Xueyuan Road, Haidian District, Beijing, P. R. China100191

1.2 Testing Environment

Temperature:	18°C~25°C,
Relative humidity:	30%~ 70%
Ground system resistance:	< 0.5 Ω
Ambient noise & Reflection:	< 0.012 W/kg

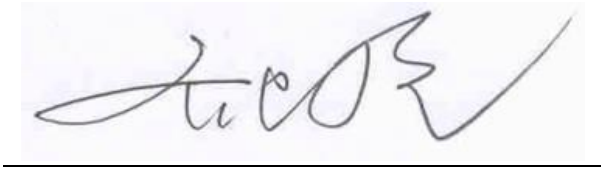
1.3 Project Data

Project Leader:	Qi Dianyuan
Test Engineer:	Lin Xiaojun
Testing Start Date:	June 7, 2019
Testing End Date:	June 11, 2019

1.4 Signature

Lin Xiaojun

(Prepared this test report)



Qi Dianyuan

(Reviewed this test report)

Lu Bingsong

Deputy Director of the laboratory

(Approved this test report)

2 Statement of Compliance

The maximum results of SAR found during testing for Samsung Electronics Co., Ltd. Multi-band GSM/WCDMA/LTE phone with Bluetooth, WLAN GSM 850,900,1800,1900 WCDMA : 1,2, 5,8 LTE : 1, 3,5,7,8,20, 28,34,38,39,40,41 mobile phone, Bluetooth 4.2, WIFI 802.11 a/b/g/n SM-T295C are as follows:

Table 2.1: HighestReported SAR(1g)

Exposure Configuration	Technology Band	Highest Reported SAR1g(W/kg)	Equipment Class
Head	GSM 850	0.30	PCE
	PCS 1900	0.36	
	UMTS FDD 5	0.40	
	UMTS FDD 2	0.31	
	CDMA BC0	0.48	
	LTE Band 5	0.37	
	LTE Band 7	0.34	
	LTE Band 41	0.17	
	WLAN 2.4 GHz	0.08	DTS
	WLAN 5 GHz	0.36	UNII
Body	GSM 850	0.56	PCE
	PCS 1900	0.65	
	UMTS FDD 5	0.58	
	UMTS FDD 2	0.64	
	CDMA BC0	0.71	
	LTE Band 5	0.59	
	LTE Band 7	0.75	
	LTE Band 41	0.66	
	WLAN 2.4 GHz	0.79	DTS
	WLAN 5 GHz	0.79	UNI

The SAR values found for the Mobile Phone are below the maximum recommended levels of 1.6 W/Kg as averaged over any 1g tissue according to the ANSI C95.1-1992.

For body operation, this device has been tested and meets FCC RF exposure guidelines when used with any accessory that contains no metal and which provides a minimum separation distance of 0/4/9/14/19/29 mm between this device and the body of the user. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.

The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output.

The measurement together with the test system set-up is described in annex C of this test report. A detailed description of the equipment under test can be found in chapter 4 of this test report. The highestreported SAR value is obtained at the case of **(Table 2.1),** and the values are**:0.79W/kg(1g).**

Table 2.2: The sum of reported SAR values for main antenna and WiFi

	Position	Main antenna	WiFi	Sum
Highest reported SAR value for Head	Right hand, Touch cheek	0.48	0.36	**0.84**
Highest reported SAR value for Body	Rear	0.75	0.79	**1.54**

Table 2.3: The sum of reported SAR values for main antenna and BT

	Position	Main antenna	BT	Sum
Maximum reported SAR value for Head	Right hand, Touch cheek	0.48	0.19	**0.67**
Maximum reported SAR value for Body	Rear	0.75	0.19	**0.94**

[1] - Estimated SAR for Bluetooth (see the table 13.3)

According to the above tables, the highest sum of reported SAR values is **1.54 W/kg (1g)**. The detail for simultaneous transmission consideration isdescribed in chapter 13.

3 Client Information

3.1 Applicant Information

Company Name:	Samsung Electronics Co., Ltd.
Address/Post:	R5, A Tower 23Floor B-3,(Maetan dong) 129,Samsung-ro,Yeongtong-gu, Suwon-Si, Gyeonggi-do 16677, Korea
Contact Person:	Kang Kuiho
E-mail:	kangmiao@samsung.com
Telephone:	/
Fax:	/

3.2 Manufacturer Information

Company Name:	Jiaxing Yongrui Electron Technology Co., Ltd.
Address/Post:	NO.777 Yazhong Road, Daqiao Town, Nanhu District, Jiaxing City ,Zhejiang
Contact Person:	/
E-mail:	/
Telephone:	/
Fax:	/

4 Equipment Under Test (EUT) and Ancillary Equipment (AE)

4.1 About EUT

Description:	Multi-band GSM/WCDMA/LTE phone with Bluetooth, WLAN GSM 850,900,1800,1900 WCDMA : 1,2, 5,8 LTE : 1, 3,5,7,8,20, 28,34,38,39,40,41 mobile phone, Bluetooth 4.2, WIFI 802.11 a/b/g/n
Model name:	SM-T295C
Operating mode(s):	GSM 850/900/1800/1900, UMTS FDD 1/2/5/8, CDMA BC0,BT, Wi-Fi LTE Band 1/3/5/7/8/20/28/34/38/39/40/41
Tested Tx Frequency:	825 – 848.8 MHz (GSM 850)
	1850.2 – 1910 MHz (GSM 1900)
	826.4–846.6 MHz (WCDMA 850 Band V)
	1852.4–1907.6 MHz (WCDMA1900 Band II)
	824.7 – 848.3 MHz (LTE Band 5)
	2502.5 – 2567.5 MHz (LTE Band 7)
	2535 – 2655 MHz (LTE Band41)
	2412 – 2462 MHz (Wi-Fi 2.4G)
	5150-5825 MHz(Wi-Fi 5G)
GPRS/EGPRSMultislot Class:	12
GPRS capability Class:	B
Test device Production information:	Production unit
Device type:	Portable device
Antenna type:	Integrated antenna
Hotspot mode:	Support

4.2Internal Identification of EUT used during the test

EUT ID*	IMEI	HW	SW Version
EUT1	356221100010588	REV0.4	T295CZCU0ASEA
EUT2	356221100013160	REV0.4	T295CZCU0ASEA
EUT3	356221100011073	REV0.4	T295CZCU0ASEA
EUT4	356221100013384	REV0.4	T295CZCU0ASEA
EUT5	356221100017872	REV0.4	T295CZCU0ASEA
EUT6	356221100012675	REV0.4	T295CZCU0ASEA

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

Note: It is performed to test SAR with the EUT1-4 and conducted power with the EUT5&6.

4.3 Internal Identification of AE used during the test

AE ID*	Description	Model	SN	Manufacturer
AE1	Battery	SWD-WT-N8	/	Sunwoda Electronic Co., Ltd .
AE2	Battery	SCUD-WT-N8	/	SCUD(Fujian) Electronic Co., Ltd.
AE3	Headset	GH59-15054A	/	WATA

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

5 TEST METHODOLOGY

5.1 Applicable Limit Regulations

ANSI C95.1–1992:IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

It specifies the maximum exposure limit of **1.6 W/kg** as averaged over any 1 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.

5.2 Applicable Measurement Standards

IEEE 1528–2013: Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.

KDB447498 D01: General RF Exposure Guidance v06: Mobile and Portable Devices RF Exposure ProceduresandEquipment Authorization Policies.

KDB648474 D04 Handset SAR v01r03: SAR Evaluation Considerations for Wireless Handsets.

KDB941225 D01 SAR test for 3G devices v03r01: SAR Measurement Procedures for 3G Devices

KDB616217 D04 SAR for laptop and tablets v01r02: SAR Evaluation Considerations For LAPTOP, NOTEBOOK, NETBOOK And TABLET COMPUTERS.

KDB941225 D05 SAR for LTE Devices v02r05: SAR Evaluation Considerations for LTE Devices

KDB941225 D06 Hotspot Mode SAR v02r01: SAR Evaluation Procedures for Portable Devices withWireless Router Capabilities

KDB248227 D01 802.11 Wi-Fi SAR v02r02: SAR GUIDANCE FOR IEEE 802.11 (Wi-Fi) TRANSMITTERS

KDB865664 D01SAR measurement 100 MHz to 6 GHz v01r04:SAR Measurement Requirements for 100 MHz to 6 GHz.

KDB865664 D02RF Exposure Reporting v01r02:RF Exposure Compliance Reporting and Documentation Considerations

6 Specific Absorption Rate(SAR)

6.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

6.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

$$SAR = \frac{d}{dt}\left(\frac{dW}{dm}\right) = \frac{d}{dt}\left(\frac{dW}{\rho dv}\right)$$

SAR is expressed in units of Watts per kilogram (W/kg)
SAR measurement can be either related to the temperature elevation in tissue by

$$SAR = c\left(\frac{\delta T}{\delta t}\right)$$

Where: C is the specific head capacity, δT is the temperature rise and δt is the exposure duration, or related to the electrical field in the tissue by

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

Where: σ is the conductivity of the tissue, ρ is the mass density of tissue and E is the RMS electrical field strength.

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

7 Tissue Simulating Liquids

7.1 Targets for tissue simulating liquid

Table 7.1: Targets for tissue simulating liquid

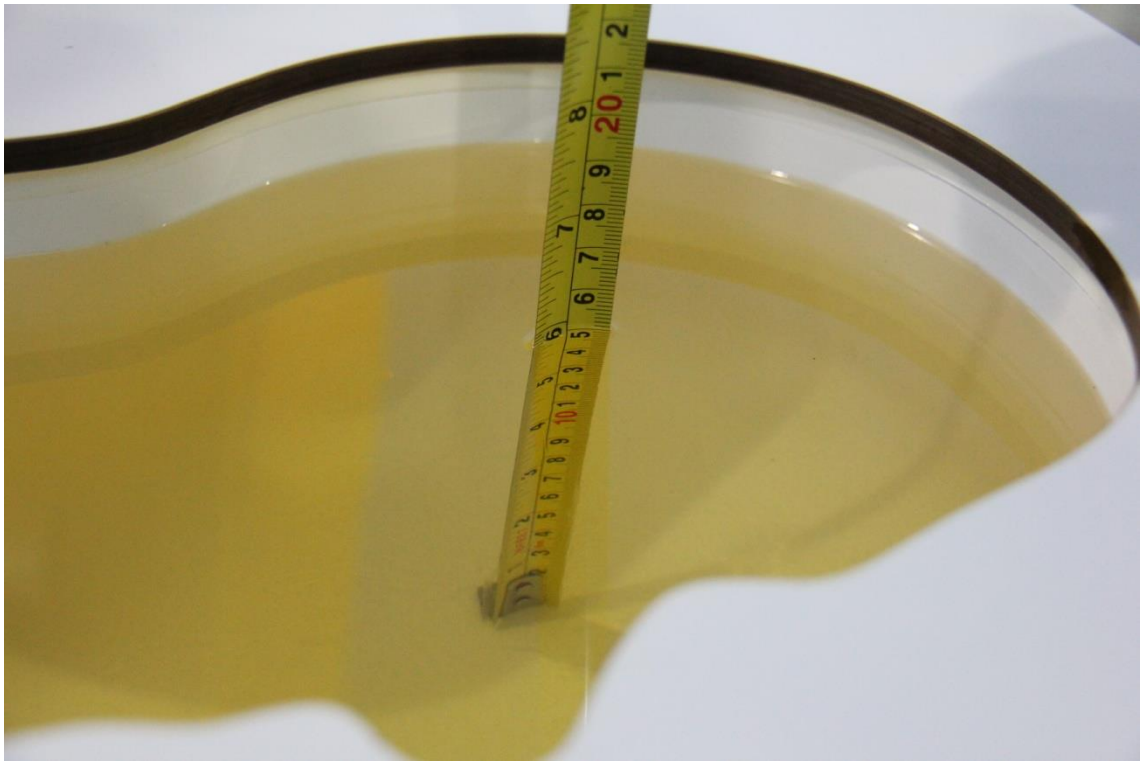
Frequency(MHz)	Liquid Type	Conductivity(σ)	± 5% Range	Permittivity(ε)	± 5% Range
835	Head	0.90	0.86～0.95	41.5	39.4～43.6
835	Body	0.97	0.92～1.02	55.2	52.4～58.0
1900	Head	1.40	1.33～1.47	40.0	38.0～42.0
1900	Body	1.52	1.44～1.60	53.3	50.6～56.0
2450	Head	1.80	1.71～1.89	39.2	37.2～41.2
2450	Body	1.95	1.85～2.05	52.7	50.1～55.3
2600	Head	1.96	1.86～2.06	39.01	37.1～41.0
2600	Body	2.16	2.05～2.27	52.5	49.9～55.1
5250	Head	4.71	4.47～4.95	35.93	34.13～37.73
5250	Body	5.36	5.09～5.63	48.9	46.46～51.35
5600	Head	5.07	4.82～5.32	35.53	33.75～37.31
5600	Body	5.77	5.48～6.06	48.5	46.08～50.92
5750	Head	5.22	4.96～5.48	35.36	33.59～37.13
5750	Body	5.94	5.64～6.24	48.3	45.89～50.72

7.2 Dielectric Performance

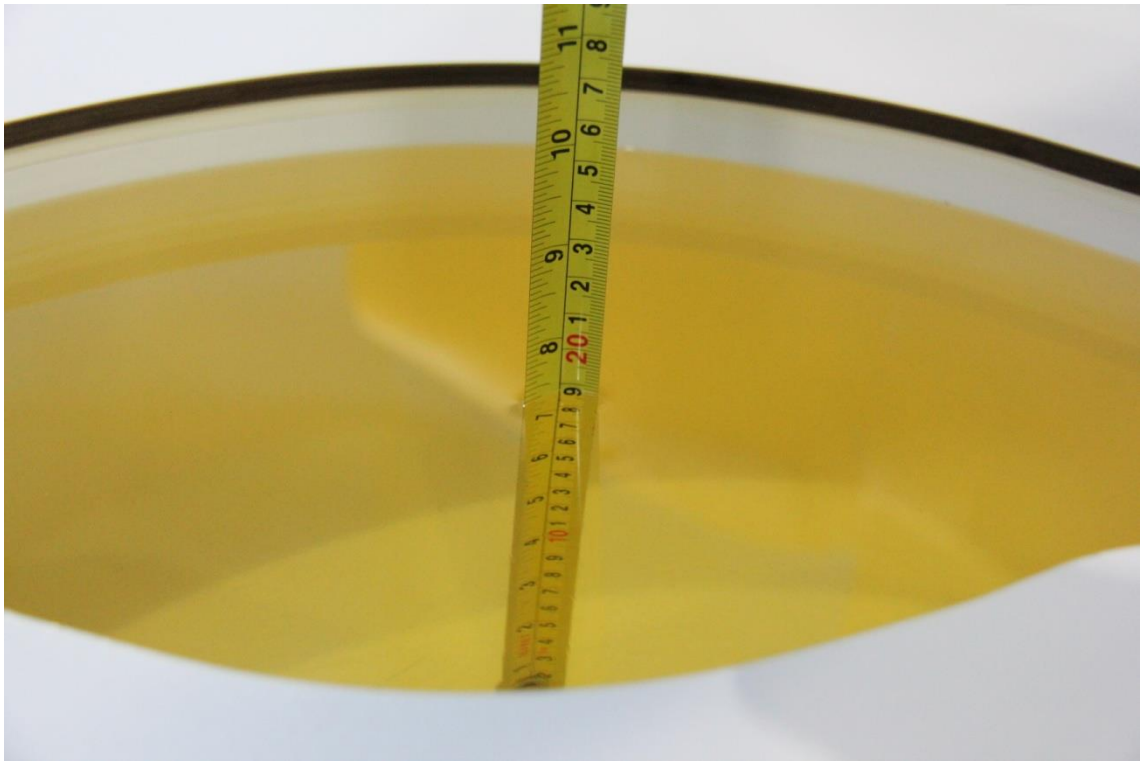
Table 7.2: Dielectric Performance of Tissue Simulating Liquid

Measurement Date (yyyy-mm-dd)	Type	Frequency	Permittivity ε	Drift (%)	Conductivity σ (S/m)	Drift (%)
2019-6-7	Head	835 MHz	41.6	0.24	0.887	-1.44
	Body	835 MHz	55.16	-0.07	0.958	-1.24
2019-6-8	Head	1900 MHz	40.3	0.75	1.392	-0.57
	Body	1900 MHz	52.81	-0.92	1.535	0.99
2019-6-9	Head	2450 MHz	39.36	0.41	1.820	1.11
	Body	2450 MHz	52.29	-0.78	1.986	1.85
2019-6-10	Head	2600 MHz	38.27	-1.90	1.955	0.26
	Body	2600 MHz	51.3	-2.29	2.180	0.93
2019-6-11	Head	5250MHz	35.51	-1.17	4.679	-0.66
	Body	5250 MHz	49.16	0.53	5.391	0.58
	Head	5600 MHz	35.93	1.13	5.123	1.05
	Body	5600 MHz	48.3	-0.41	5.756	-0.24
	Head	5750 MHz	35.41	0.14	5.264	0.84
	Body	5750 MHz	48.19	-0.23	5.922	-0.30

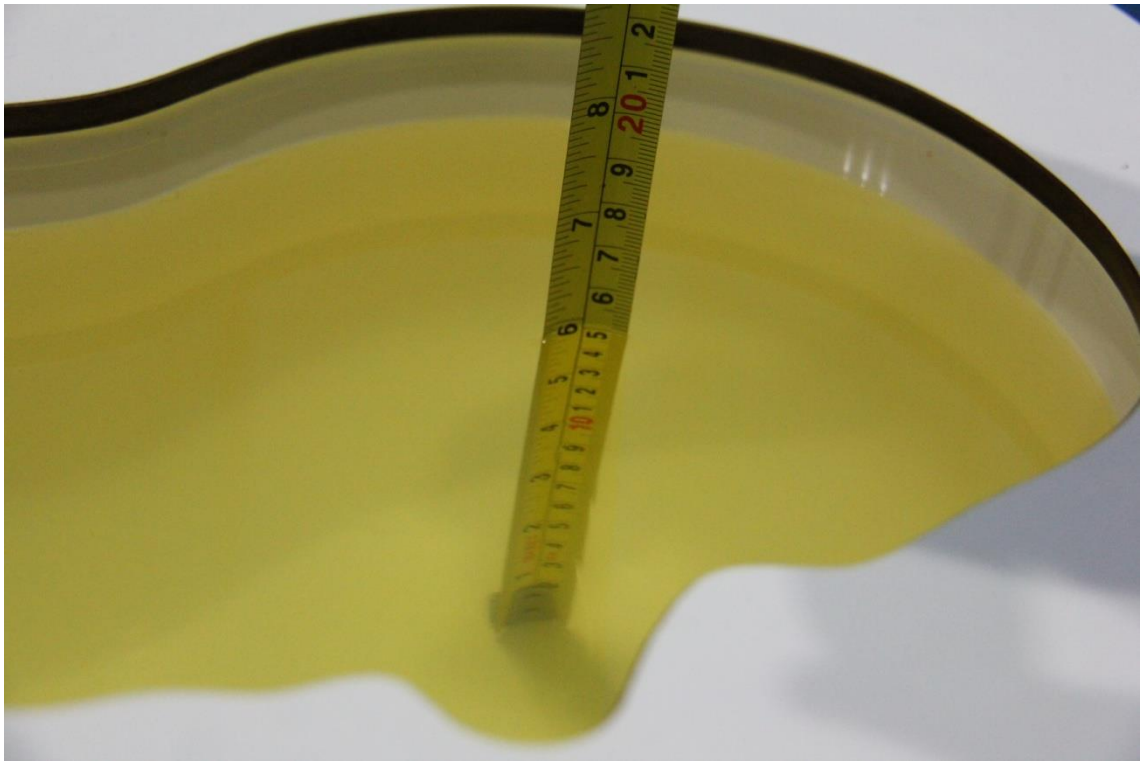
Note: The liquid temperature is 22.0℃



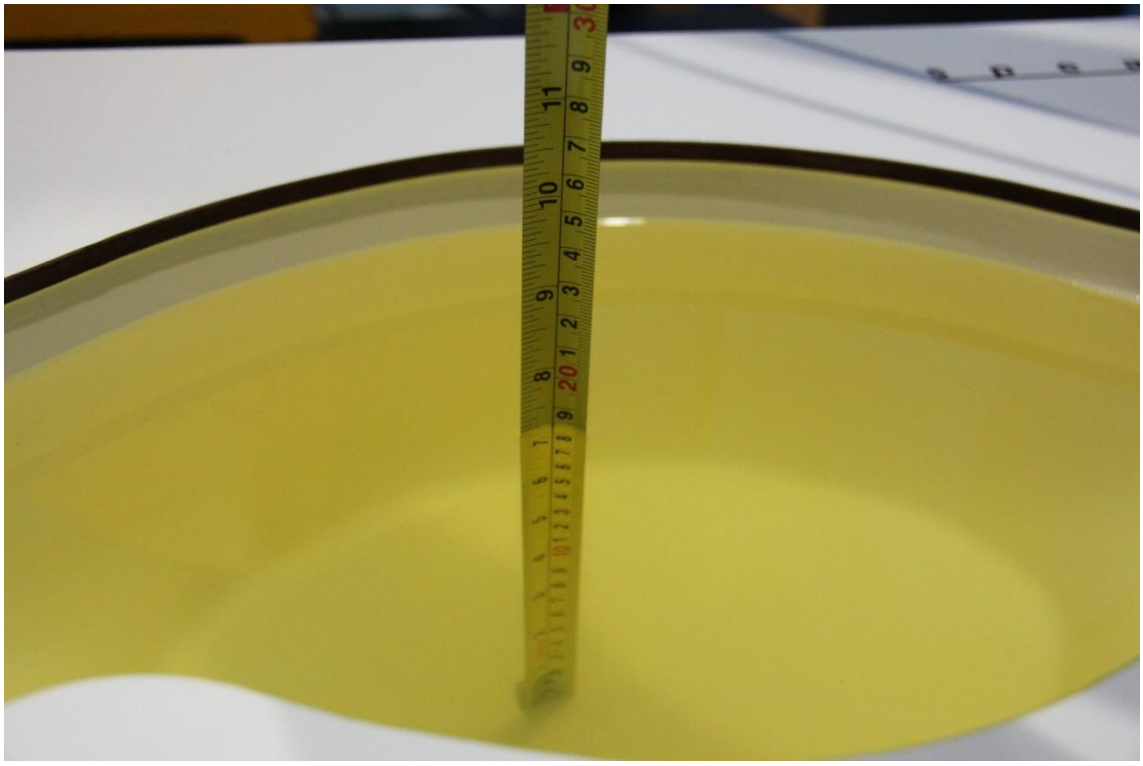
Picture 7-1 Liquid depth in the Head Phantom (835 MHz)



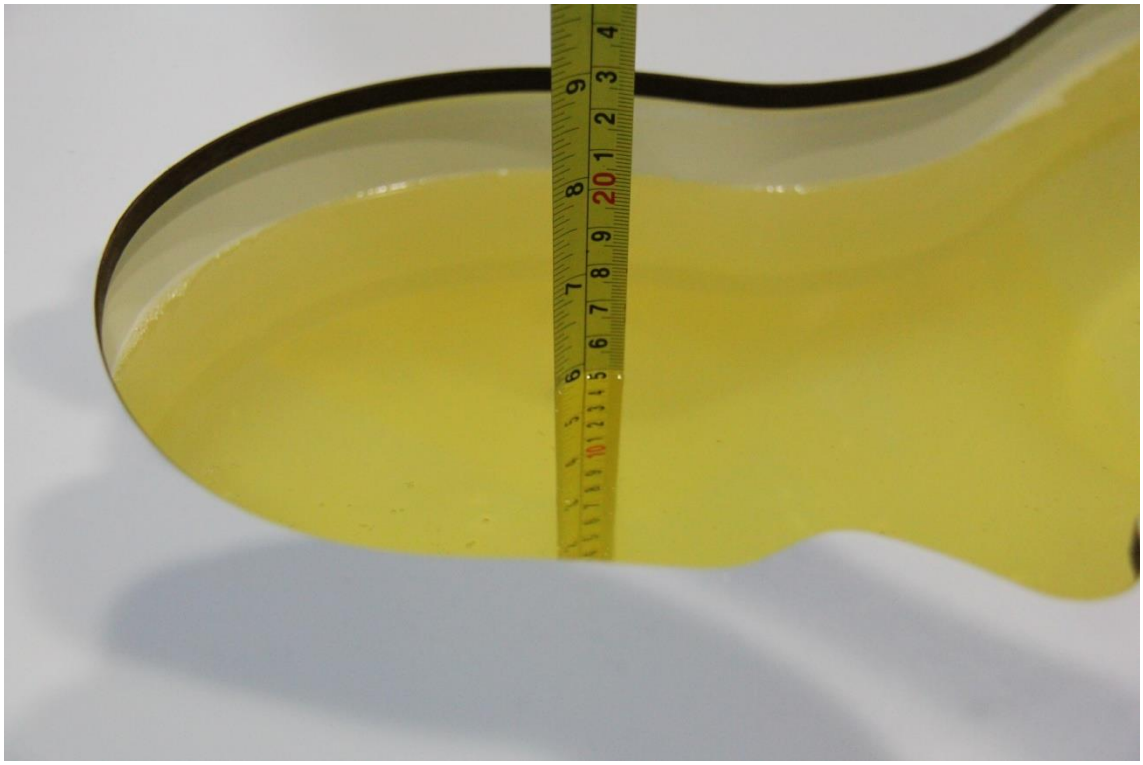
Picture 7-2 Liquid depth in the Flat Phantom (835 MHz)



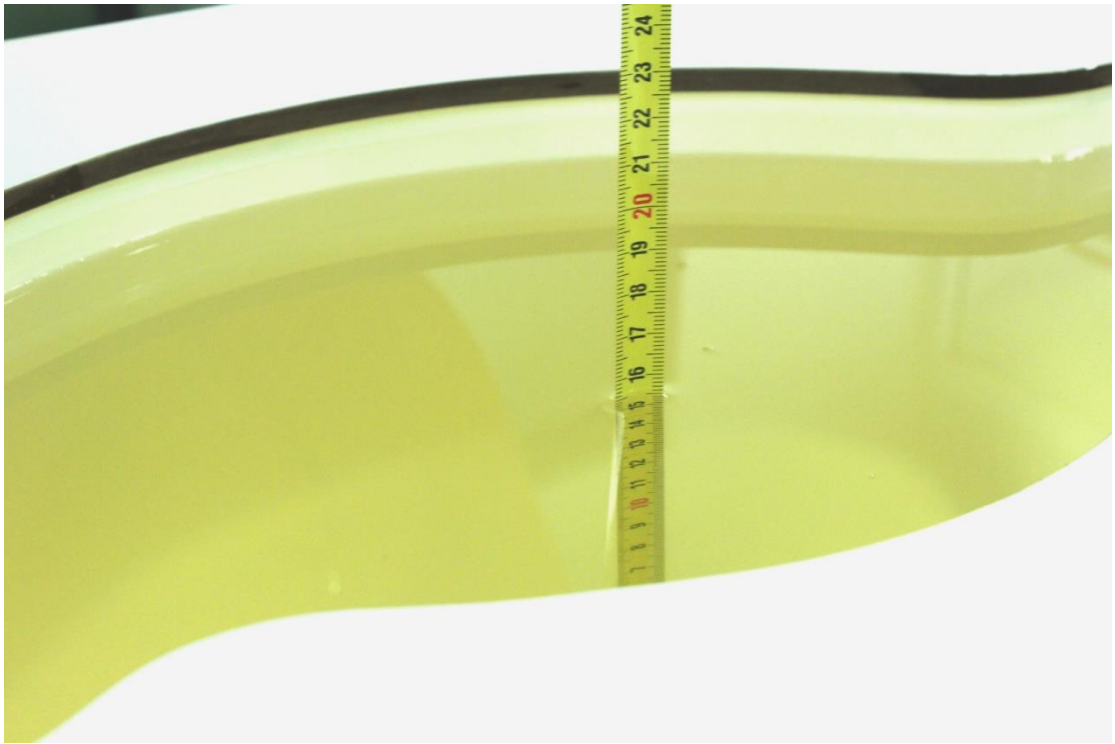
Picture 7-3 Liquid depth in the Head Phantom (1900 MHz)



Picture 7-4 Liquid depth in the Flat Phantom (1900MHz)

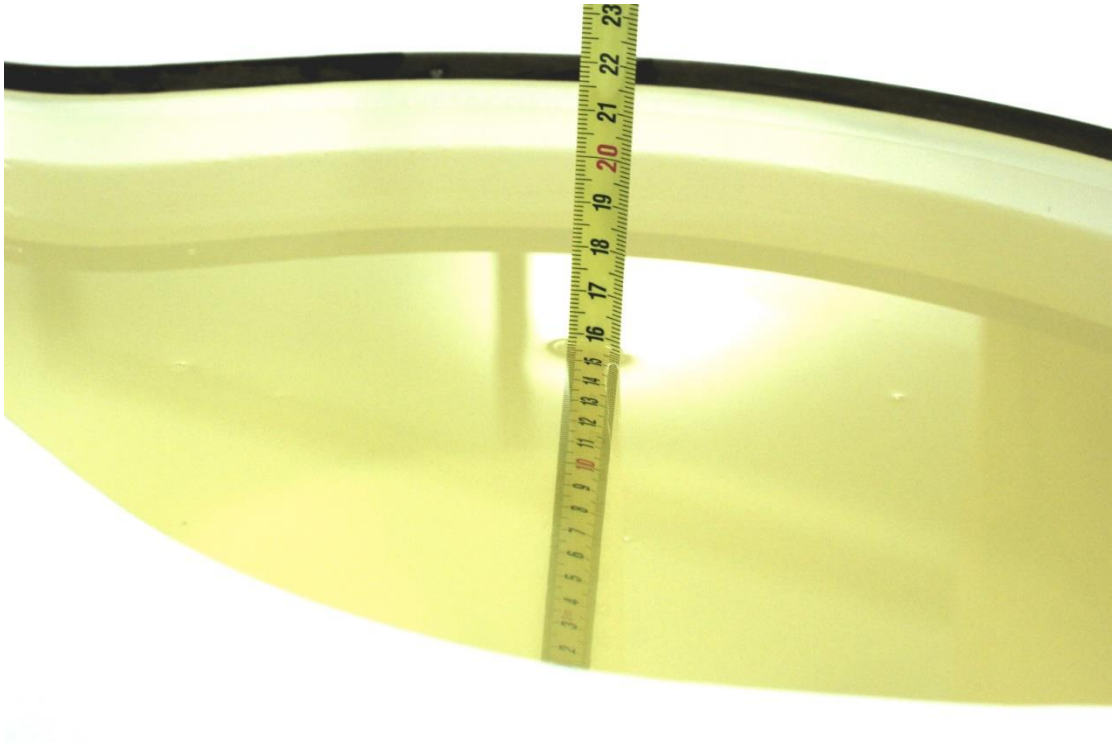


Picture 7-5 Liquid depth in the Head Phantom (2450MHz)

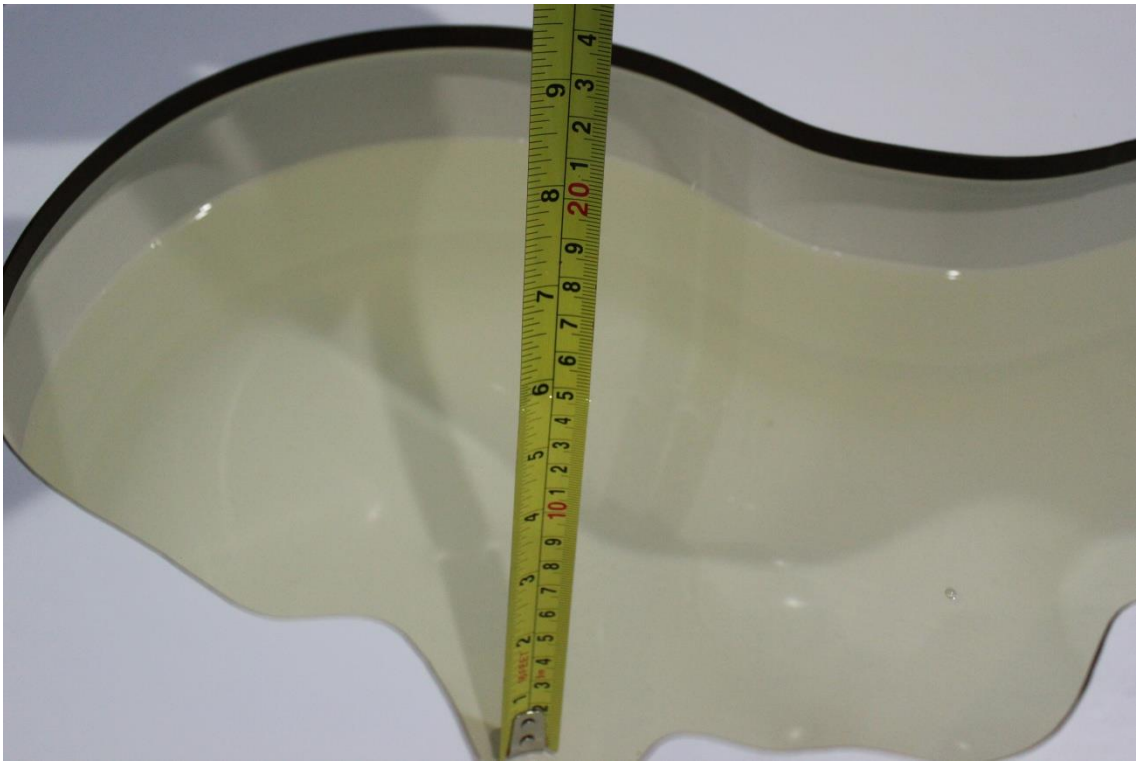


Picture 7-6 Liquid depth in the Flat Phantom (2450MHz)

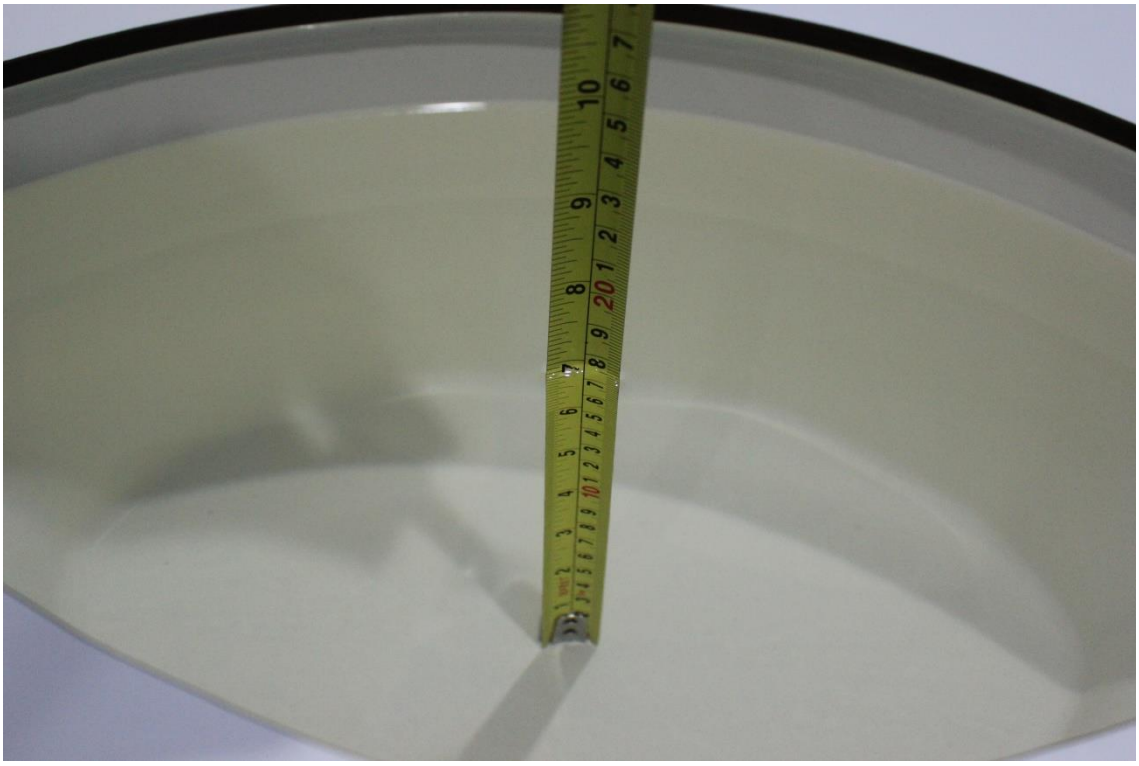
Picture 7-7 Liquid depth in the HeadPhantom (2600 MHz Head)



Picture 7-8 Liquid depth in the Flat Phantom (2600MHz)



Picture 7-9 Liquid depth in the Head Phantom (5GHz)

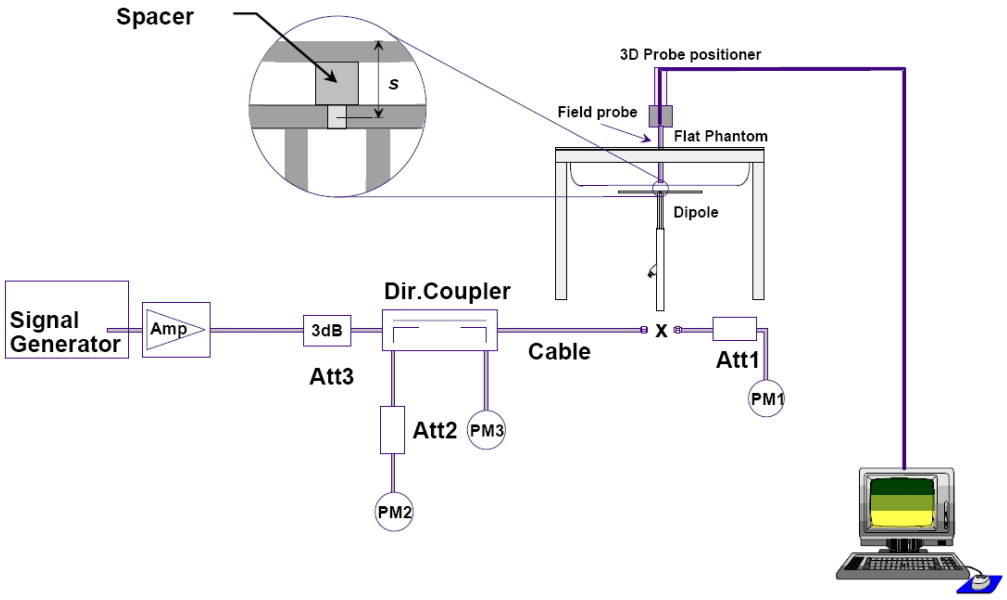


Picture 7-10 Liquid depth in the Flat Phantom (5GHz)

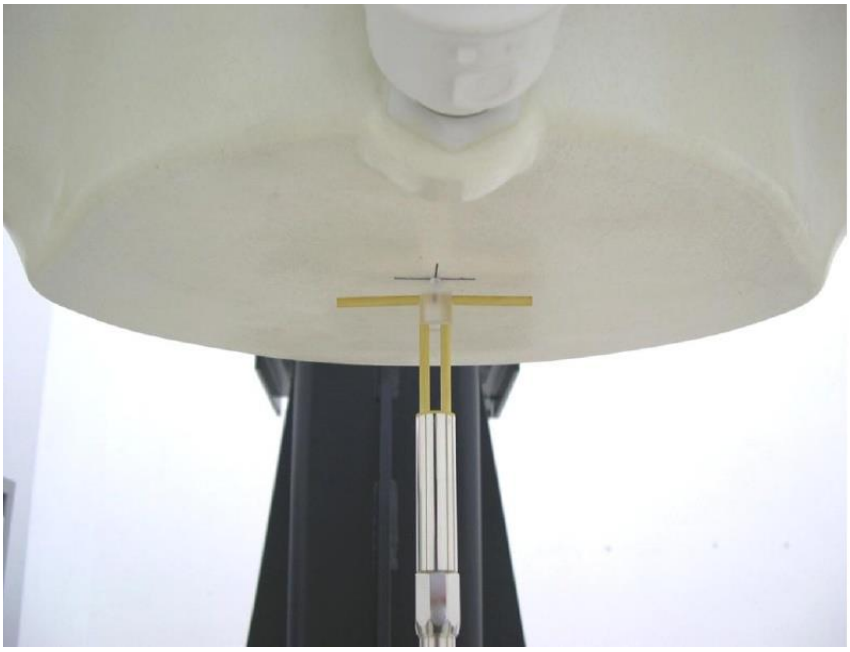
8 System verification

8.1 System Setup

In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The equipment setup is shown below:



Picture 8.1 System Setup for System Evaluation



Picture 8.2 Photo of Dipole Setup

8.2System Verification

SAR system verification is required to confirm measurement accuracy, according to the tissue dielectricmedia, probe calibration points and other system operating parameters required for measuring the SAR ofa test device. The system verification must be performed for each frequency band and within the validrange of each probe calibration point required for testing the device.

The system verification results are required that the area scan estimated 1-g SAR is within 3% of the zoom scan 1-g SAR. The details are presented in annex B.

Table 8.1: System Verification of Head

Measurement Date (yyyy-mm-dd)	Frequency	Target value (W/kg)		Measured value(W/kg)		Deviation	
		10 g Average	1 g Average	10 g Average	1 g Average	10 g Average	1 g Average
2019-6-7	835 MHz	6.06	9.40	6.0	9.2	-1.65%	-1.70%
2019-6-8	1900 MHz	21.3	40.4	21.0	40.0	-1.60%	-0.99%
2019-6-9	2450 MHz	24.2	51.7	23.8	51.2	-1.49%	-0.97%
2019-6-10	2600 MHz	24.9	55.4	25.4	56.8	2.01%	2.53%
2019-6-11	5250 MHz	23.1	80.0	22.7	79.1	-1.73%	-1.13%
	5600 MHz	24.0	83.7	23.7	82.9	-1.25%	-0.96%
	5750 MHz	23.0	79.5	23.5	81.1	2.17%	2.01%

Table 8.2: System Verification of Body

Measurement Date (yyyy-mm-dd)	Frequency	Target value (W/kg)		Measured value (W/kg)		Deviation	
		10 g Average	1 g Average	10 g Average	1 g Average	10 g Average	1 g Average
2019-6-7	835 MHz	6.28	9.53	6.36	9.64	1.27%	1.15%
2019-6-8	1900 MHz	21.4	40.4	22.04	41.60	2.99%	2.97%
2019-6-9	2450 MHz	24.1	51.3	23.64	50.80	-1.91%	-0.97%
2019-6-10	2600 MHz	24.5	54.1	25.16	55.60	2.69%	2.77%
2019-6-11	5250 MHz	21.2	75.7	20.80	73.80	-1.89%	-2.51%
	5600 MHz	22.1	78.6	22.50	79.70	1.81%	1.40%
	5750 MHz	21.4	76.9	20.80	75.30	-2.80%	-2.08%

9 Measurement Procedures

9.1 Tests to be performed

In order to determine the highest value of the peak spatial-average SAR of a handset, alldevice positions, configurations and operational modes shall be tested for each frequencyband according to steps 1 to 3 below. A flowchart of the test process is shown in picture 9.1.

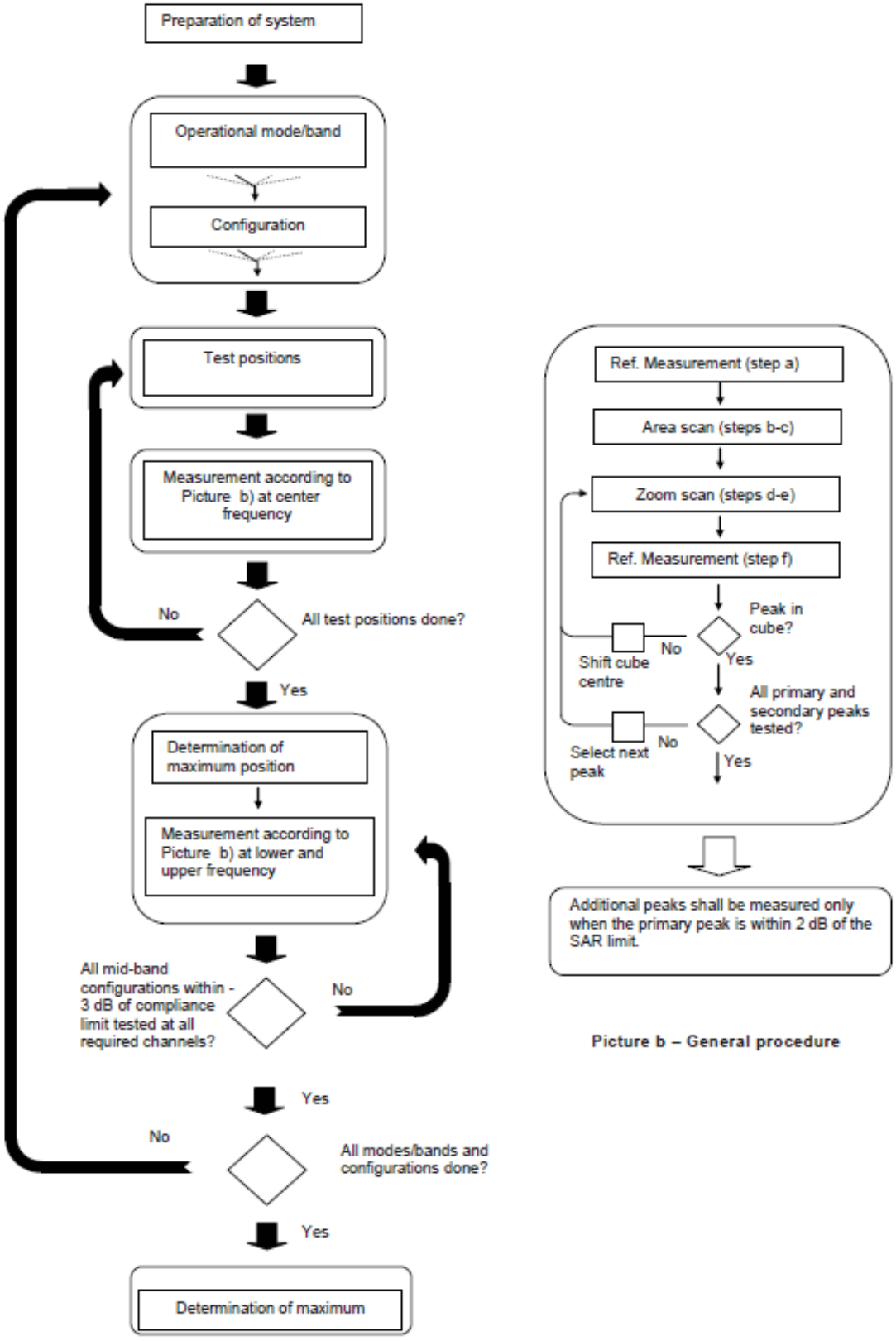
Step 1: The tests described in 9.2 shall be performed at the channel that is closest to the centre of the transmit frequency band (f_c) for:

a) all device positions (cheek and tilt, for both left and right sides of the SAM phantom, asdescribed in annex D),
b) all configurations for each device position in a), e.g., antenna extended and retracted, and
c) all operational modes, e.g., analogue and digital, for each device position in a) andconfiguration in b) in each frequency band.

If more than three frequencies need to be tested according to 11.1 (i.e., $N_c > 3$), then allfrequencies, configurations and modes shall be tested for all of the above test conditions.

Step 2: For the condition providing highest peak spatial-average SAR determined in Step 1,perform all tests described in 9.2 at all other test frequencies, i.e., lowest and highest frequencies. In addition, for all other conditions (device position, configuration and operational mode) where the peak spatial-average SAR value determined in Step 1 is within3 dB of the applicable SAR limit, it is recommended that all other test frequencies shall betested as well.

Step 3: Examine all data to determine the highest value of the peak spatial-average SARfound in Steps 1 to 2.



Picture a – Tests to be performed

Picture b – General procedure

Picture 9.1Block diagram of the tests to be performed

9.2General Measurement Procedure

The area and zoom scan resolutions specified in the table below must be applied to the SAR measurements andfully documented in SAR reports to qualify for TCB approval. Probe boundary effect error compensation isrequired for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Boththe probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundaryeffect errors are minimized and the higher fields closest to the phantom surface can be correctly measured andextrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms mustbe verified by the test laboratory for the scan resolutions used in the SAR measurements, according to thereference distribution functions specified in IEEE Std 1528-2003. The results should be documented as part of thesystem validation records and may be requested to support test results when all the measurement parameters in thefollowing table are not satisfied.

<table>
<tr><td colspan="3"></td><td>≤ 3 GHz</td><td>> 3 GHz</td></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">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.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">≤ 1.5·$\Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
* When zoom scan is required and the <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

9.3 WCDMA Measurement Procedures for SAR

The following procedures are applicable to WCDMA handsets operating under 3GPP Release99, Release 5 and Release 6. The default test configuration is to measure SAR with an established radio link between the DUT and a communication test set using a 12.2kbps RMC (reference measurement channel) configured in Test Loop Mode 1. SAR is selectively confirmed for other physical channel configurations (DPCCH &DPDCH$_n$), HSDPA and HSPA (HSUPA/HSDPA) modes according to output power, exposure conditions and device operating capabilities. Both uplink and downlink should be configured with the same RMC or AMR, when required. SAR for Release 5 HSDPA and Release 6 HSPA are measured using the applicable FRC (fixed reference channel) and E-DCH reference channel configurations. Maximum output power is verified according to applicable versions of 3GPP TS 34.121 and SAR must be measured according to these maximum output conditions. When Maximum Power Reduction (MPR) is not implemented according to Cubic Metric (CM) requirements for Release 6 HSPA, the following procedures do not apply.

For Release 5 HSDPA Data Devices:

Sub-test	β_c	β_d	β_d （SF）	β_c/β_d	β_{hs}	CM/dB
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15	15/15	64	12/15	24/25	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

For Release 6 HSPA Data Devices

Sub-test	β_c	β_d	β_d （SF）	β_c/β_d	β_{hs}	β_{ec}	β_{ed}	β_{ed} （SF）	β_{ed} （codes）	CM (dB)	MPR (dB)	AG Index	E-TFCI
1	11/15	15/15	64	11/15	22/15	209/225	1039/225	4	1	1.5	1.5	20	75
2	6/15	15/15	64	6/15	12/15	12/15	12/15	4	1	1.5	1.5	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1}:47/15 β_{ed2}:47/15	4	2	1.5	1.5	15	92
4	2/15	15/15	64	2/15	4/15	4/15	56/75	4	1	1.5	1.5	17	71
5	15/15	15/15	64	15/15	24/15	30/15	134/15	4	1	1.5	1.5	21	81

Rel.8 DC-HSDPA (Cat 24)

SAR test exclusion for Rel.8 DC-HSDPA must satisfy the SAR test exclusion requirements of Rel.5 HSDPA. SAR test exclusion for DC-HSDPA devices is determined by power measurements according to the H-Set 12, Fixed Reference Channel (FRC) configuration in Table C.8.1.12 of 3GPP TS 34.121-1. A primary and a secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to qualify for SAR test exclusion.

9.4 SAR Measurement for LTE

SAR tests for LTE are performed with a base station simulator, Rohde &Rchwarz CMW500. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. All powers were measured with the CMW 500.
It is performed for conducted power and SAR based on the KDB941225 D05.
SAR is evaluated separately according to the following procedures for the different test positions in each exposure condition – head, body, body-worn accessories and other use conditions.The procedures in the following subsections are applied separately to test each LTE frequency band.

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 among RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel.When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.
2) QPSK with 50% RB allocation
   The procedures required for 1 RB allocation in 1) are applied to measure the SAR for QPSK with 50% RB allocation.
3) QPSK with 100% RB allocation
   For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation in 1) and 2) are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.

TDD test:

TDD testing is performed using guidance from FCC KDB 941225 D05v02r05 and the SAR test guidance provided in April 2013 TCB works hop notes.TDD is tested at the highest duty factor using UL-DL configuration 0 with special subframe configuration 6 and applying the FDD LTE procedures in KDB 941225 D05v02r05.SAR testing is performed using the extended cyclic prefix listed in 3GPP TS 36.211.

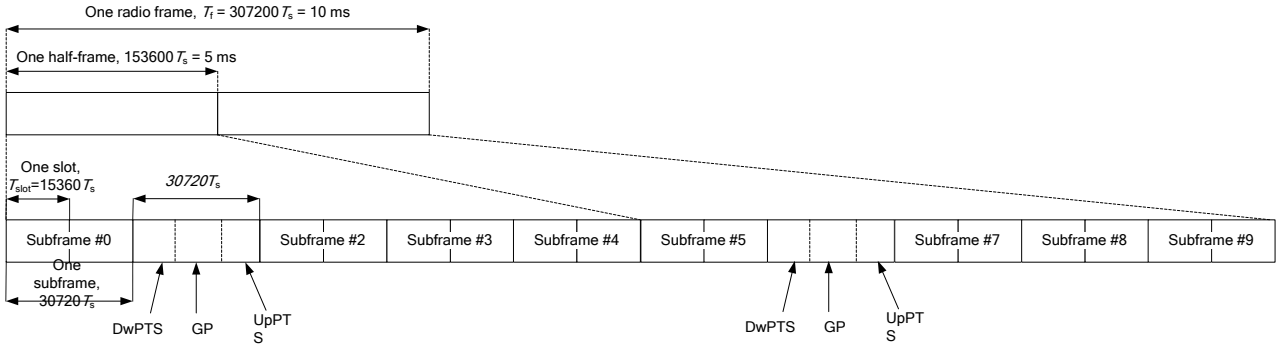


Figure 9.2: Frame structure type 2 (for 5 ms switch-point periodicity)

Table 9.1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS)

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-	-	-
9	$13168 \cdot T_s$			-	-	-

Table 9.2: Uplink-downlink configurations

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

Duty factor is calculated by:

Duty factor=uplink frame*6+UpPTS*2/one frame length

= (30720.T_s * 6+5120. T_s*2)/307200.T_s

=0.633

According to the KDB 447498 D01, SAR should be evaluated at more than 3 frequencies for devices supporting transmit bands wider than 100MHz. Oct.2014 FCC-TCB conference notes (Dec. 2014 rev.) specifies the 5 test channels to use for 3GPP band 41 SARevaluation.

9.5 Bluetooth & Wi-Fi Measurement Procedures for SAR

Normal network operating configurations are not suitable for measuring the SAR of 802.11 transmitters in general. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure that the results are consistent and reliable.

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in a test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

9.6 Power Drift

To control the output power stability during the SAR test, DASY4 system calculates the power drift by measuring the E-field at the same location at the beginning and at the end of the measurement for each test position. These drift values can be found in section14 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

10 Area Scan Based 1-g SAR

10.1Requirement of KDB

According to the KDB447498 D01 v05, when the implementation is based the specific polynomial fit algorithm as presented at the 29th Bioelectromagnetics Society meeting (2007) and the estimated 1-gSAR is ≤ 1.2 W/kg, a zoom scan measurement is not required provided it is also not needed for any otherpurpose; for example, if the peak SAR location required for simultaneous transmission SAR testexclusion can be determined accurately by the SAR system or manually to discriminate betweendistinctive peaks and scattered noisy SAR distributions from area scans.

There must not be any warning or alert messages due to various measurement concernsidentified by the SAR system; for example, noise in measurements, peaks too close to scan boundary,peaks are too sharp, spatial resolution and uncertainty issues etc. The SAR system verification must alsodemonstrate that the area scan estimated 1-g SAR is within 3% of the zoom scan 1-g SAR (See Annex B). When all theSAR results for each exposure condition in a frequency band and wireless mode are based on estimated 1-g SAR, the 1-g SAR for the highest SAR configuration must be determined by a zoom scan.

10.2Fast SAR Algorithms

The approach is based on the area scan measurement applying a frequencydependent attenuation parameter. This attenuation parameter was empirically determined byanalyzing a large number of phones. The MOTOROLA FAST SAR was developed and validatedby the MOTOROLA Research Group in Ft. Lauderdale.

In the initial study, an approximation algorithm based on Linear fit was developed. The accuracyof the algorithm has been demonstrated across a broad frequency range (136-2450 MHz)and for both 1- and 10-g averaged SAR using a sample of 264 SAR measurements from 55wireless handsets. For the sample size studied, the root-mean-squared errors of the algorithmmare 1.2% and 5.8% for 1- and 10-g averaged SAR, respectively. The paper describing thealgorithm in detail is expected to be published in August 2004 within the Special Issue ofTransactions on MTT.

In the second step, the same research group optimized the fitting algorithm to an Polynomial fit whereby the frequency validity was extended to cover the range 30-6000MHz. Details ofthis study can be found in the BEMS 2007 Proceedings.

Both algorithms are implemented in DASY software.

11 Conducted Output Power

There are two sets of tune-up power, Normal power and Low power, for all bands by proximity sensor. The detail of proximity sensor is presented in annex I.

11.1 GSM Measurement result

During the process of testing, the EUT was controlled via Agilent Digital Radio Communication tester (E5515C) to ensure the maximum power transmission and proper modulation. This result contains conducted output power for the EUT. In all cases, the measured peak output power should be greater and within 5% than EMI measurement.

Table 11.1-1: The conducted power measurement results for GSM/GPRS/EGPRS – Normal power

GSM 850	Measured Power (dBm)			Tune up	calculation	Averaged Power (dBm)		
Speech (GMSK)	251	190	128		/	251	190	128
1 Txslot	32.70	32.65	32.53	**33.5**	/	/	/	/
GSM 850	Measured Power (dBm)				calculation	Averaged Power (dBm)		
GPRS (GMSK)	251	190	128			251	190	128
1 Txslot	32.81	32.68	32.85	**33.5**	-9.03	23.78	23.65	23.82
2 Txslots	31.31	31.18	31.01	**31.5**	-6.02	**25.29**	**25.16**	**24.99**
3Txslots	28.62	28.65	28.47	**29.5**	-4.26	24.36	24.39	24.21
4 Txslots	27.58	27.54	27.35	**28.5**	-3.01	24.57	24.53	24.34
GSM 850	Measured Power (dBm)				calculation	Averaged Power (dBm)		
EGPRS (GMSK)	251	190	128			251	190	128
1 Txslot	32.70	32.58	32.78	**33.5**	-9.03	23.67	23.55	23.75
2 Txslots	31.24	31.11	30.97	**31.5**	-6.02	**25.22**	**25.09**	**24.95**
3Txslots	28.74	28.60	28.46	**29.5**	-4.26	24.48	24.34	24.20
4 Txslots	27.55	27.49	27.35	**28.5**	-3.01	24.54	24.48	24.34
GSM 850	Measured Power (dBm)				calculation	Averaged Power (dBm)		
EGPRS (8PSK)	251	190	128			251	190	128
1 Txslot	26.32	26.37	26.35	**27**	-9.03	17.29	17.34	17.32
2 Txslots	23.59	23.58	23.67	**24.5**	-6.02	17.57	17.56	17.65
3Txslots	23.31	23.23	23.27	**23.5**	-4.26	19.05	18.97	19.01
4 Txslots	20.96	20.89	20.63	**21.5**	-3.01	17.95	17.88	17.62
PCS1900	Measured Power (dBm)			Tune up	calculation	Averaged Power (dBm)		
Speech (GMSK)	810	661	512			810	661	512
1 Txslot	29.85	29.88	30.02	**30.5**		/	/	/
PCS1900	Measured Power (dBm)				calculation	Averaged Power (dBm)		
GPRS (GMSK)	810	661	512			810	661	512
1 Txslot	30.00	29.99	29.99	**30.5**	-9.03	20.97	20.96	20.96
2 Txslots	28.50	28.57	28.46	**29**	-6.02	**22.48**	**22.55**	**22.44**
3Txslots	26.53	26.50	26.37	**27**	-4.26	22.27	22.24	22.11
4 Txslots	24.98	24.79	24.73	**25.5**	-3.01	21.97	21.78	21.72
PCS1900	Measured Power (dBm)				calculation	Averaged Power (dBm)		
EGPRS (GMSK)	810	661	512			810	661	512

1 Txslot	29.88	29.79	30.08	**30.5**	-9.03	20.85	20.76	21.05
2 Txslots	28.60	28.48	28.38	**29**	-6.02	**22.58**	**22.46**	**22.36**
3Txslots	26.66	26.58	26.32	**27**	-4.26	22.40	22.32	22.06
4 Txslots	25.05	24.96	24.80	**25.5**	-3.01	22.04	21.95	21.79
PCS1900	Measured Power (dBm)				calculation	Averaged Power (dBm)		
EGPRS (8PSK)	810	661	512			810	661	512
1 Txslot	24.26	24.31	24.22	**26**	-9.03	15.23	15.28	15.19
2 Txslots	22.60	22.74	22.66	**23.5**	-6.02	16.58	16.72	16.64
3Txslots	23.27	23.37	23.28	**23**	-4.26	19.01	19.11	19.02
4 Txslots	19.62	19.74	19.76	**21**	-3.01	16.61	16.73	16.75

Table 11.1-2: The conducted power measurement results for GSM/GPRS/EGPRS – Low power

GSM 850	Measured Power (dBm)			Tune up	calculation	Averaged Power (dBm)		
Speech (GMSK)	251	190	128			251	190	128
1 Txslot	24.60	24.55	24.20	**25.5**	/	/	/	/
GSM 850	Measured Power (dBm)				calculation	Averaged Power (dBm)		
GPRS (GMSK)	251	190	128			251	190	128
1 Txslot	24.61	24.56	24.10	**25.5**	-9.03	15.58	15.53	15.07
2 Txslots	21.97	22.22	21.81	**23.5**	-6.02	**15.95**	**16.20**	**15.79**
3Txslots	19.62	19.73	19.52	**21.5**	-4.26	15.36	15.47	15.26
4 Txslots	18.57	18.55	18.54	**20.5**	-3.01	15.56	15.54	15.53
GSM 850	Measured Power (dBm)				calculation	Averaged Power (dBm)		
EGPRS (GMSK)	251	190	128			251	190	128
1 Txslot	24.63	24.78	24.21	**25.5**	-9.03	15.60	15.75	15.18
2 Txslots	22.09	22.24	21.85	**23.5**	-6.02	**16.07**	**16.22**	**15.83**
3Txslots	20.01	20.02	19.64	**21.5**	-4.26	15.75	15.76	15.38
4 Txslots	18.93	19.10	18.62	**20.5**	-3.01	15.92	16.09	15.61
GSM 850	Measured Power (dBm)				calculation	Averaged Power (dBm)		
EGPRS (8PSK)	251	190	128			251	190	128
1 Txslot	23.93	24.09	23.78	**25**	-9.03	14.90	15.06	14.75
2 Txslots	21.67	21.61	21.35	**22.5**	-6.02	15.65	15.59	15.33
3Txslots	19.59	19.78	19.53	**21.5**	-4.26	15.33	15.52	15.27
4 Txslots	18.59	18.73	18.37	**19.5**	-3.01	15.58	15.72	15.36
PCS1900	Measured Power (dBm)			Tune up	calculation	Averaged Power (dBm)		
Speech (GMSK)	810	661	512			810	661	512
1 Txslot	21.28	21.48	20.79	**21.5**		/	/	/
PCS1900	Measured Power (dBm)				calculation	Averaged Power (dBm)		
GPRS (GMSK)	810	661	512			810	661	512
1 Txslot	21.10	21.41	20.55	**21.5**	-9.03	12.07	12.38	11.52
2 Txslots	17.69	17.70	17.16	**18**	-6.02	11.67	11.68	11.14
3Txslots	16.47	16.60	15.92	**17**	-4.26	12.21	12.34	11.66
4 Txslots	16.23	16.38	15.70	**16.5**	-3.01	**13.22**	**13.37**	**12.69**
PCS1900	Measured Power (dBm)				calculation	Averaged Power (dBm)		

EGPRS (GMSK)	810	661	512			810	661	512
1 Txslot	21.13	21.43	20.54	**21.5**	-9.03	12.10	12.40	11.51
2 Txslots	17.40	17.62	16.80	**18**	-6.02	11.38	11.60	10.78
3Txslots	16.39	16.61	15.80	**17**	-4.26	12.13	12.35	11.54
4 Txslots	16.15	16.38	15.66	**16.5**	-3.01	**13.14**	**13.37**	**12.65**
PCS1900	Measured Power (dBm)				calculation	Averaged Power (dBm)		
EGPRS (8PSK)	810	661	512			810	661	512
1 Txslot	18.72	18.55	17.91	**19.5**	-9.03	9.69	9.52	8.88
2 Txslots	16.21	16.29	15.63	**17**	-6.02	10.19	10.27	9.61
3Txslots	15.76	15.72	15.14	**16.5**	-4.26	11.50	11.46	10.88
4 Txslots	13.54	13.66	12.87	**14.5**	-3.01	10.53	10.65	9.86

NOTES:

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

1TX-slot = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB

2TX-slots = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB

3TX-slots = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB

4TX-slots = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB

According to the conducted power as above, the body measurements are performed with 2Txslots for GSM850(Normal power), 2Txslots for GSM1900 (Normal power)and 2Txslots (Low power) for GSM850, 4Txslot (Low power) for GSM1900.

11.2 CDMA Measurement result

Table 11.2-1: The conducted Power for CDMA – Normal power

Mode	CDMA BC0			
	777(848.31MHz)	384(836.52MHz)	1013(824.7MHz)	Tune up
SO55/RC3	24.80	24.78	24.73	**25**
SO55/RC1	24.88	24.81	24.72	**25**
SO32/RC3(FCH only)	24.80	24.77	24.75	**25**
SO32/RC3(FCH+SCH$_n$)	24.64	24.71	24.74	**25**
EVDO Rev.0	24.56	24.50	24.54	**25**
EVDO Rev.A	24.69	24.57	24.68	**25**

Table 11.2-2: The conducted Power for CDMA– Low power

Mode	CDMA BC0			
	777(848.31MHz)	384(836.52MHz)	1013(824.7MHz)	Tune up
SO55/RC3	18.24	18.61	18.51	**19**
SO55/RC1	18.21	18.65	18.52	**19**
SO32/RC3(FCH only)	18.23	18.58	18.50	**19**
SO32/RC3(FCH+SCH$_n$)	18.17	18.57	18.46	**19**
EVDO Rev.0	18.26	18.27	18.41	**19**
EVDO Rev.A	18.23	18.36	18.44	**19**

11.3WCDMA Measurement result

Table 11.3-1: The conducted Power for WCDMA – Normal power

Item	band	FDDV result			
	ARFCN	4233(846.6MHz)	4183(836.6MHz)	4132(826.4MHz)	Tune up
WCDMA	\	23.60	23.66	23.67	24
HSUPA	1	22.45	22.37	22.46	23.3
	2	21.36	21.08	21.06	22.8
	3	21.37	21.12	21.22	22.6
	4	21.61	21.40	21.39	23.3
	5	22.51	22.53	22.55	23.8
DC-HSDPA	1	22.53	22.54	22.52	24
	2	22.48	22.50	22.56	24
	3	21.90	21.91	21.99	23.5
	4	21.98	21.97	21.96	23.6
Item	band	FDDII result			
	ARFCN	9538(1907.6MHz)	9400(1880MHz)	9262(1852.4MHz)	
WCDMA	\	23.93	23.87	23.73	24
HSUPA	1	22.26	22.23	22.34	23
	2	21.36	21.33	21.29	22.6
	3	21.46	21.38	21.33	22.1
	4	21.75	21.76	21.97	22.6
	5	23.01	22.87	22.81	23.4
DC-HSDPA	1	22.95	22.86	22.80	23.5
	2	22.92	22.88	22.79	23.5
	3	22.40	22.26	22.24	23
	4	22.42	22.31	22.28	23

Table 11.3-2: The conducted Power for WCDMA – Low power

Item	band	FDDV result			
	ARFCN	4233(846.6MHz)	4183(836.6MHz)	4132(826.4MHz)	
WCDMA	\	16.74	16.71	16.74	18
HSUPA	1	15.63	15.58	15.51	17.3
	2	14.94	14.89	14.87	16.8
	3	14.70	14.65	14.61	16.6
	4	15.51	15.46	15.31	17.3
	5	15.87	15.92	15.85	17.8
DC-HSDPA	1	16.08	16.17	16.17	18
	2	16.02	16.13	16.14	18
	3	15.54	15.55	15.57	17.5
	4	15.47	15.64	15.65	17.4
Item	band	FDDII result			
	ARFCN	9538(1907.6MHz)	9400(1880MHz)	9262(1852.4MHz)	
WCDMA	\	10.44	10.54	10.25	12

HSUPA	**1**	9.85	9.86	9.83	**11.8**
	2	8.71	8.77	8.69	**10.6**
	3	8.86	8.88	8.88	**10.8**
	4	9.16	9.22	8.92	**10.8**
	5	9.79	9.87	9.60	**11.6**
DC-HSDPA	**1**	9.68	9.79	9.51	**11.5**
	2	9.53	9.65	9.56	**11.5**
	3	9.07	9.18	9.09	**11**
	4	9.08	9.19	9.08	**11**

11.4 LTE Measurement result

Table 11.4-1: Tune up for LTE

Band	Tune up (dBm)	
	Normal power	Low power
Band 5	24	18.5
Band 7	24	12.5 for High/Middle channel
Band 7	24	13 for Low channel
Band 41	24	13.7 for High channel
Band 41	24	15 for other channels
Band 41	24	15.2 for Low channel

Table 11.4-2:Maximum Power Reduction (MPR) for LTE

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]						MPR (dB)
	1.4 MHz	3 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

Table 11.4-3: The conducted Power for LTE – Normal power

Band 5					
Bandwidth (MHz)	RB allocation RB offset (Start RB)	Frequency (MHz)	QPSK Actual output power (dBm)	16QAM Actual output power (dBm)	64QAM Actual output power (dBm)
1.4 MHz	1RB High (5)	848.3	23.78	22.83	21.89
		836.5	23.84	22.67	21.96
		824.7	23.68	22.83	21.70
	1RB Middle (3)	848.3	23.81	22.81	21.91
		836.5	23.86	22.61	21.68
		824.7	23.88	22.58	21.93
	1RB Low (0)	848.3	23.83	22.86	21.76
		836.5	23.78	22.71	21.68
		824.7	23.69	22.59	21.82

	3RB High (3)	848.3	23.90	22.83	21.85
		836.5	23.84	22.60	21.99
		824.7	23.91	22.49	21.62
	3RB Middle (1)	848.3	23.85	22.59	21.91
		836.5	23.91	22.52	21.62
		824.7	23.91	22.48	21.98
	3RB Low (0)	848.3	23.77	22.81	21.79
		836.5	23.84	22.38	21.66
		824.7	23.91	22.54	21.92
	6RB (0)	848.3	22.80	21.82	20.86
		836.5	22.79	21.76	20.90
		824.7	22.77	21.59	20.92
3 MHz	1RB High (14)	847.5	23.90	22.87	21.93
		836.5	23.98	22.83	21.92
		825.5	23.87	22.85	21.72
	1RB Middle (7)	847.5	23.89	22.81	21.92
		836.5	23.92	22.90	21.72
		825.5	23.89	22.99	21.99
	1RB Low (0)	847.5	23.89	22.86	21.80
		836.5	23.84	22.99	21.72
		825.5	23.63	22.92	21.88
	8RB High (7)	847.5	22.89	21.98	20.90
		836.5	22.93	21.97	20.93
		825.5	22.88	21.54	21.00
	8RB Middle (4)	847.5	22.93	21.93	20.96
		836.5	22.93	21.90	20.93
		825.5	22.83	21.91	20.92
	8RB Low (0)	847.5	22.82	21.94	20.94
		836.5	22.85	21.91	20.93
		825.5	22.97	21.86	20.94
	15RB (0)	847.5	22.99	21.94	20.91
		836.5	22.96	21.79	21.00
		825.5	22.96	21.65	20.89
5 MHz	1RB High (24)	846.5	23.96	22.88	21.88
		836.5	23.61	22.61	21.93
		826.5	23.55	22.34	21.63
	1RB Middle (12)	846.5	23.96	22.65	21.95
		836.5	23.63	22.37	21.71
		826.5	23.89	22.57	21.94
	1RB Low (0)	846.5	23.98	22.54	21.86
		836.5	23.57	22.32	21.70
		826.5	23.79	22.36	21.89
	12RB High (13)	846.5	22.90	21.89	20.88
		836.5	22.86	21.65	20.96
		826.5	22.79	21.67	20.96
	12RB Middle (6)	846.5	23.00	21.80	20.92
		836.5	22.89	21.79	20.94
		826.5	22.86	21.90	20.88

	12RB Low (0)	846.5	22.91	21.91	20.98
		836.5	22.81	21.74	20.99
		826.5	22.96	21.79	20.93
	25RB (0)	846.5	22.96	21.75	20.97
		836.5	22.86	21.74	20.98
		826.5	22.87	21.81	20.90
10 MHz	1RB High (49)	844.0	23.92	22.83	21.91
		836.5	23.69	22.85	21.92
		829.0	23.79	22.81	21.69
	1RB Middle (24)	844.0	23.97	22.88	21.98
		836.5	23.98	22.84	21.70
		829.0	23.99	22.48	21.97
	1RB Low (0)	844.0	23.49	22.83	21.84
		836.5	23.88	22.84	21.72
		829.0	23.69	22.90	21.87
	25RB High (25)	844.0	22.95	21.91	20.93
		836.5	22.86	21.88	20.94
		829.0	22.88	21.87	20.99
	25RB Middle (12)	844.0	22.86	21.93	20.93
		836.5	22.88	21.90	20.94
		829.0	22.95	21.80	20.95
	25RB Low (0)	844.0	22.95	21.91	20.95
		836.5	22.96	21.75	20.96
		829.0	22.90	21.88	21.00
	50RB (0)	844.0	22.94	21.97	20.94
		836.5	22.86	21.76	20.97
		829.0	22.90	21.85	20.90

Band 7					
Bandwidth (MHz)	RB allocation RB offset (Start RB)	Frequency (MHz)	QPSK Actual output power (dBm)	16QAM Actual output power (dBm)	64QAM Actual output power (dBm)
5 MHz	1RB High (24)	2567.5	23.18	22.00	21.74
		2535	23.49	22.09	21.66
		2502.5	23.31	22.47	21.94
	1RB Middle (12)	2567.5	23.44	22.20	21.81
		2535	23.65	22.20	21.78
		2502.5	23.62	22.58	21.90
	1RB Low (0)	2567.5	23.21	22.06	21.77
		2535	23.50	22.23	21.72
		2502.5	23.27	22.34	21.45
	12RB High (13)	2567.5	22.28	21.40	20.57
		2535	22.50	21.57	20.57
		2502.5	22.51	21.36	20.64
	12RB Middle (6)	2567.5	22.41	21.48	20.97
		2535	22.65	21.70	20.85
		2502.5	22.59	21.36	20.75

	12RB Low (0)	2567.5	22.34	21.40	20.93
		2535	22.53	21.59	20.84
		2502.5	22.50	21.38	20.74
	25RB (0)	2567.5	22.29	21.34	20.72
		2535	22.58	21.57	20.91
		2502.5	22.51	21.49	20.79
10 MHz	1RB High (49)	2565	23.57	22.68	21.71
		2535	23.49	22.23	21.67
		2505	23.44	22.55	21.93
	1RB Middle (24)	2565	23.75	22.91	21.89
		2535	23.80	22.10	21.69
		2505	23.55	22.75	21.92
	1RB Low (0)	2565	23.90	22.70	21.86
		2535	23.46	22.82	21.71
		2505	23.80	22.41	21.54
	25RB High (25)	2565	22.44	21.48	20.58
		2535	22.67	21.71	20.58
		2505	22.54	21.79	20.66
	25RB Middle (12)	2565	22.50	21.57	20.95
		2535	22.64	21.74	20.75
		2505	22.50	21.75	20.75
	25RB Low (0)	2565	22.46	21.44	20.89
		2535	22.50	21.61	20.89
		2505	22.38	21.45	20.68
	50RB (0)	2565	22.45	21.52	20.69
		2535	22.58	21.76	20.97
		2505	22.52	21.44	20.82
15 MHz	1RB High (74)	2562.5	23.55	22.38	21.73
		2535	23.36	22.87	21.66
		2507.5	23.41	22.67	21.89
	1RB Middle (37)	2562.5	23.62	22.99	21.81
		2535	23.56	22.83	21.72
		2507.5	23.43	22.93	21.90
	1RB Low (0)	2562.5	23.62	22.63	21.79
		2535	23.24	22.91	21.78
		2507.5	23.54	22.76	21.47
	36RB High (38)	2562.5	22.49	21.44	20.55
		2535	22.45	21.56	20.64
		2507.5	22.54	21.47	20.60
	36RB Middle (19)	2562.5	22.56	21.56	20.88
		2535	22.49	21.62	20.74
		2507.5	22.24	21.39	20.66
	36RB Low (0)	2562.5	22.52	21.36	20.92
		2535	22.34	21.50	20.93
		2507.5	22.30	21.34	20.71
	75RB (0)	2562.5	22.49	21.48	20.67
		2535	22.35	21.50	20.91
		2507.5	22.37	21.42	20.82
20 MHz	1RB	2560	23.80	22.78	21.78

	High (99)	2535	23.72	22.67	21.69
		2510	23.45	22.20	21.94
	1RB Middle (50)	2560	23.98	22.84	21.88
		2535	23.74	22.92	21.75
		2510	23.67	22.73	21.90
	1RB Low (0)	2560	23.79	22.44	21.82
		2535	23.65	22.52	21.76
		2510	23.30	22.28	21.51
	50RB High (50)	2560	22.65	21.45	20.59
		2535	22.75	21.64	20.63
		2510	22.65	21.65	20.62
	50RB Middle (25)	2560	22.85	21.84	20.95
		2535	22.73	21.68	20.81
		2510	22.64	21.72	20.73
	50RB Low (0)	2560	22.69	21.67	20.96
		2535	22.71	21.57	20.91
		2510	22.53	21.64	20.71
	100RB (0)	2560	22.70	21.62	20.72
		2535	22.68	21.66	20.98
		2510	22.68	21.62	20.79

Band41					
Bandwidth (MHz)	RB allocation RB offset (Start RB)	Frequency (MHz)	QPSK Actual output power (dBm)	16QAM Actual output power (dBm)	64QAM Actual output power (dBm)
5MHz	1RB High (24)	2652.5	22.83	21.73	20.19
		2613.5	22.64	22.13	20.25
		2575.5	23.32	21.34	20.31
		2537.5	23.03	21.89	20.91
	1RB Middle (12)	2652.5	23.08	21.96	20.23
		2613.5	23.05	22.29	20.29
		2575.5	23.45	21.83	20.54
		2537.5	23.56	22.25	21.03
	1RB Low (0)	2652.5	22.97	21.66	20.23
		2613.5	22.67	21.70	20.68
		2575.5	23.32	21.58	20.38
		2537.5	23.32	22.06	20.55
	12RB High (13)	2652.5	22.00	20.94	19.90
		2613.5	21.85	20.98	20.01
		2575.5	22.23	21.15	19.99
		2537.5	22.10	21.17	20.32
	12RB Middle (6)	2652.5	22.20	21.06	19.95
		2613.5	21.95	21.08	20.06
		2575.5	22.40	21.33	20.15
		2537.5	22.26	21.22	20.26
	12RB Low (0)	2652.5	22.02	20.97	19.95
		2613.5	21.97	21.09	20.04

		2575.5	22.31	21.35	20.07
		2537.5	22.29	21.20	20.25
	25RB (0)	2652.5	22.02	20.76	20.17
		2613.5	21.94	20.89	20.27
		2575.5	22.31	21.30	20.31
		2537.5	22.20	21.02	20.34
10MHz	1RB High (49)	2650	22.90	21.37	20.13
		2612	22.92	22.75	20.41
		2576	23.16	22.48	20.30
		2540	22.98	21.52	20.62
	1RB Middle (24)	2650	22.89	21.40	20.44
		2612	23.12	22.88	20.49
		2576	23.18	22.69	20.45
		2540	22.91	21.54	20.79
	1RB Low (0)	2650	22.85	21.23	20.37
		2612	22.80	22.19	20.31
		2576	23.27	22.45	20.48
		2540	22.92	21.53	20.55
	25RB High (25)	2650	22.03	20.78	20.23
		2612	21.90	20.80	20.26
		2576	22.17	21.23	20.10
		2540	22.02	21.09	20.17
	25RB Middle (12)	2650	21.97	21.02	20.28
		2612	21.96	20.95	20.45
		2576	22.41	21.47	20.18
		2540	22.32	21.33	20.30
	25RB Low (0)	2650	21.91	20.90	20.24
		2612	21.83	20.93	20.23
		2576	22.36	21.41	20.30
		2540	22.27	21.10	20.25
	50RB (0)	2650	22.02	20.98	19.92
		2612	21.82	20.97	20.05
		2576	22.26	21.15	20.18
		2540	22.11	21.03	20.14
15MHz	1RB High (74)	2647.5	22.86	21.31	20.36
		2612.5	22.89	22.01	20.33
		2577.5	22.99	22.31	20.25
		2542.5	22.83	21.55	20.60
	1RB Middle (37)	2647.5	22.94	21.47	20.40
		2612.5	22.99	22.28	21.00
		2577.5	23.38	22.50	20.44
		2542.5	23.01	21.70	20.70
	1RB Low (0)	2647.5	22.87	21.43	20.45
		2612.5	22.68	21.58	20.30
		2577.5	23.05	22.53	20.49
		2542.5	22.98	21.50	20.61
	36RB High (38)	2647.5	22.11	21.03	20.13
		2612.5	21.83	20.81	19.92
		2577.5	22.13	21.14	20.03

		2542.5	21.98	21.02	20.23
	36RB Middle (19)	2647.5	22.04	21.05	20.16
		2612.5	21.87	20.96	20.02
		2577.5	22.25	21.12	20.11
		2542.5	22.15	21.15	20.11
	36RB Low (0)	2647.5	22.02	21.03	20.01
		2612.5	21.83	20.82	20.06
		2577.5	22.27	21.14	20.07
		2542.5	22.18	21.19	20.14
	75RB (0)	2647.5	22.05	21.07	19.94
		2612.5	21.82	20.96	20.08
		2577.5	22.23	21.20	20.02
		2542.5	22.04	20.97	20.10
20MHz	1RB High (99)	2645	23.18	22.17	20.12
		2611	23.05	21.55	20.30
		2578	22.85	21.38	20.32
		2545	23.20	22.44	20.59
	1RB Middle (50)	2645	23.43	22.37	20.47
		2611	23.38	22.21	20.31
		2578	23.41	21.65	20.60
		2545	23.38	22.43	20.83
	1RB Low (0)	2645	23.25	22.31	20.49
		2611	22.94	21.74	20.33
		2578	22.72	21.55	20.49
		2545	23.21	22.52	20.68
	50RB High (50)	2645	22.05	21.14	20.13
		2611	22.05	20.87	19.98
		2578	22.20	21.08	19.88
		2545	22.02	21.13	20.18
	50RB Middle (25)	2645	21.90	21.20	20.23
		2611	21.97	21.01	20.28
		2578	22.23	21.18	20.17
		2545	22.14	21.15	20.21
	50RB Low (0)	2645	21.91	21.01	20.14
		2611	21.79	20.91	20.11
		2578	22.20	21.24	20.16
		2545	22.13	21.13	20.31
	100RB (0)	2645	22.10	21.03	20.16
		2611	21.87	20.90	20.13
		2578	22.31	21.23	20.16
		2545	22.01	21.05	20.16

Table 11.4-3: The conducted Power for LTE – Low power

Band 5					
Bandwidth (MHz)	RB allocation RB offset (Start RB)	Frequency (MHz)	QPSK Actual output power (dBm)	16QAM Actual output power (dBm)	64QAM Actual output power (dBm)
1.4 MHz	1RB High (5)	848.3	17.18	16.18	15.22
		836.5	17.02	15.95	15.15
		824.7	17.22	15.90	15.15
	1RB Middle (3)	848.3	17.49	16.29	15.42
		836.5	17.03	15.87	15.34
		824.7	17.40	16.14	15.56
	1RB Low (0)	848.3	17.24	16.16	15.19
		836.5	16.73	15.83	15.38
		824.7	17.11	16.52	14.95
	3RB High (3)	848.3	17.23	15.85	15.26
		836.5	16.98	15.66	15.10
		824.7	17.36	15.94	15.13
	3RB Middle (1)	848.3	17.28	15.93	15.37
		836.5	16.97	15.66	15.30
		824.7	17.32	16.10	15.51
	3RB Low (0)	848.3	17.17	16.12	15.15
		836.5	17.09	15.60	15.44
		824.7	17.33	16.17	14.98
	6RB (0)	848.3	16.16	15.22	13.55
		836.5	16.01	14.83	13.50
		824.7	16.28	15.13	13.52
3 MHz	1RB High (14)	847.5	17.02	15.77	15.19
		836.5	17.17	15.92	15.15
		825.5	17.38	16.13	15.14
	1RB Middle (7)	847.5	17.31	15.99	15.37
		836.5	17.26	16.07	15.37
		825.5	17.49	16.22	15.51
	1RB Low (0)	847.5	17.15	15.90	15.16
		836.5	17.08	15.99	15.41
		825.5	17.32	16.08	14.95
	8RB High (7)	847.5	16.30	15.08	13.72
		836.5	16.09	14.80	13.59
		825.5	16.43	14.97	13.54
	8RB Middle (4)	847.5	16.27	15.13	13.71
		836.5	16.06	14.79	13.85
		825.5	16.40	14.93	13.83
	8RB Low (0)	847.5	16.27	14.95	13.54
		836.5	16.06	14.68	13.65
		825.5	16.31	15.07	13.53
	15RB (0)	847.5	16.24	15.09	13.55
		836.5	16.03	14.97	13.51
		825.5	16.35	15.19	13.51

5 MHz	1RB High (24)	846.5	16.90	16.23	15.20
		836.5	17.09	15.73	15.14
		826.5	17.05	16.07	15.14
	1RB Middle (12)	846.5	17.29	16.48	15.41
		836.5	17.22	15.63	15.34
		826.5	17.50	15.71	15.49
	1RB Low (0)	846.5	17.00	16.17	15.15
		836.5	17.06	15.55	15.37
		826.5	17.17	15.69	14.95
	12RB High (13)	846.5	16.18	15.10	13.73
		836.5	16.11	14.80	13.50
		826.5	16.25	15.19	13.56
	12RB Middle (6)	846.5	16.15	15.03	13.69
		836.5	16.15	14.93	13.82
		826.5	16.27	15.37	13.82
	12RB Low (0)	846.5	16.14	14.94	13.52
		836.5	16.11	14.96	13.63
		826.5	16.23	15.13	13.59
	25RB (0)	846.5	16.12	15.27	13.53
		836.5	16.10	15.07	13.51
		826.5	16.26	15.31	13.52
10 MHz	1RB High (49)	844.0	17.46	16.22	15.23
		836.5	17.02	15.56	15.13
		829.0	17.23	16.07	15.18
	1RB Middle (24)	844.0	17.51	16.43	15.42
		836.5	17.08	15.85	15.35
		829.0	17.64	16.61	15.53
	1RB Low (0)	844.0	17.40	16.17	15.16
		836.5	17.05	16.23	15.41
		829.0	17.22	15.96	14.96
	25RB High (25)	844.0	16.28	15.14	13.71
		836.5	16.21	15.17	13.53
		829.0	16.33	15.27	13.57
	25RB Middle (12)	844.0	16.23	15.07	13.71
		836.5	16.11	15.13	13.83
		829.0	16.36	15.27	13.83
	25RB Low (0)	844.0	16.13	15.05	13.52
		836.5	16.10	15.13	13.66
		829.0	16.29	15.11	13.57
	50RB (0)	844.0	16.13	15.04	13.55
		836.5	16.14	15.09	13.52
		829.0	16.37	15.23	13.51

Band 7					
Bandwidth (MHz)	RB allocation RB offset (Start RB)	Frequency (MHz)	QPSK Actual output power (dBm)	16QAM Actual output power (dBm)	64QAM Actual output power (dBm)
5 MHz	1RB High (24)	2567.5	11.05	10.10	8.50
		2535	11.14	10.70	8.74
		2502.5	11.86	10.90	9.48
	1RB Middle (12)	2567.5	11.46	10.52	9.89
		2535	11.33	10.89	9.25
		2502.5	11.85	10.85	10.55
	1RB Low (0)	2567.5	11.40	10.48	8.90
		2535	11.27	10.83	8.74
		2502.5	11.52	10.54	9.34
	12RB High (13)	2567.5	10.35	9.46	8.11
		2535	10.39	9.54	8.00
		2502.5	10.92	9.94	9.10
	12RB Middle (6)	2567.5	10.54	9.66	8.63
		2535	10.56	9.71	8.21
		2502.5	10.89	9.90	9.31
	12RB Low (0)	2567.5	10.55	9.67	8.60
		2535	10.51	9.65	8.01
		2502.5	10.75	9.78	8.38
	25RB (0)	2567.5	10.46	9.50	8.39
		2535	10.49	9.54	7.98
		2502.5	10.82	9.74	8.88
10 MHz	1RB High (49)	2565	10.57	9.63	8.52
		2535	10.56	9.61	8.74
		2505	11.45	10.32	9.49
	1RB Middle (24)	2565	11.66	10.94	9.90
		2535	11.34	10.40	9.23
		2505	11.89	10.79	10.56
	1RB Low (0)	2565	11.01	10.30	8.89
		2535	10.51	9.57	8.72
		2505	11.07	10.08	9.37
	25RB High (25)	2565	10.31	9.29	8.14
		2535	10.20	9.28	7.99
		2505	10.93	9.90	9.09
	25RB Middle (12)	2565	10.69	9.69	8.62
		2535	10.48	9.55	8.23
		2505	11.00	9.97	9.31
	25RB Low (0)	2565	10.44	9.43	8.63
		2535	10.32	9.39	8.04
		2505	10.60	9.56	8.38
	50RB (0)	2565	10.30	9.27	8.38
		2535	10.24	9.25	7.96
		2505	10.81	9.74	8.90
15 MHz	1RB High (74)	2562.5	10.55	9.52	8.59
		2535	10.92	10.25	8.74

		2507.5	11.93	11.26	9.46
	1RB Middle (37)	2562.5	11.80	10.67	9.91
		2535	11.39	10.72	9.23
		2507.5	12.11	11.44	10.53
	1RB Low (0)	2562.5	11.16	10.03	8.90
		2535	11.08	10.41	8.72
		2507.5	11.01	10.23	9.36
	36RB High (38)	2562.5	10.50	9.45	8.11
		2535	10.30	9.30	7.98
		2507.5	11.19	10.12	9.08
	36RB Middle (19)	2562.5	10.77	9.71	8.64
		2535	10.55	9.56	8.21
		2507.5	11.36	10.29	9.30
	36RB Low (0)	2562.5	10.72	9.66	8.61
		2535	10.47	9.48	8.01
		2507.5	10.73	9.65	8.38
	75RB (0)	2562.5	10.52	9.48	8.40
		2535	10.35	9.33	7.96
		2507.5	11.10	10.05	8.90
20 MHz	1RB High (99)	2560	10.58	9.52	8.51
		2535	10.58	9.84	8.77
		2510	11.25	10.66	9.49
	1RB Middle (50)	2560	11.67	11.28	9.89
		2535	11.22	10.67	9.24
		2510	12.39	11.41	10.54
	1RB Low (0)	2560	10.59	9.89	8.91
		2535	10.55	10.00	8.73
		2510	11.01	10.02	9.35
	50RB High (50)	2560	10.06	9.11	8.13
		2535	10.02	9.04	8.00
		2510	11.08	10.04	9.09
	50RB Middle (25)	2560	10.59	9.64	8.64
		2535	10.38	9.38	8.23
		2510	11.17	10.15	9.30
	50RB Low (0)	2560	10.47	9.52	8.62
		2535	10.20	9.21	8.03
		2510	10.56	9.53	8.40
	100RB (0)	2560	10.31	9.37	8.39
		2535	10.09	9.09	7.98
		2510	10.88	9.87	8.90

Band41					
Bandwidth (MHz)	RB allocation RB offset (Start RB)	Frequency (MHz)	QPSK Actual output power (dBm)	16QAM Actual output power (dBm)	64QAM Actual output power (dBm)
5MHz	1RB High (24)	2652.5	13.05	12.28	9.98
		2613.5	13.46	12.83	11.01
		2575.5	14.28	13.41	11.13
		2537.5	14.28	13.51	11.63
	1RB Middle (12)	2652.5	13.16	12.41	10.08
		2613.5	13.79	13.14	11.22
		2575.5	14.49	13.64	11.45
		2537.5	14.57	13.81	11.93
	1RB Low (0)	2652.5	12.77	12.01	9.82
		2613.5	13.64	12.97	10.95
		2575.5	14.17	13.32	11.18
		2537.5	14.1	13.34	11.35
	12RB High (13)	2652.5	12.25	11.22	9.58
		2613.5	12.6	11.64	10.43
		2575.5	13.35	12.35	10.71
		2537.5	14.14	13.09	11.07
	12RB Middle (6)	2652.5	12.35	11.32	9.62
		2613.5	12.78	11.83	10.58
		2575.5	13.42	12.43	10.8
		2537.5	14.12	13.18	11.14
	12RB Low (0)	2652.5	12.14	11.11	9.4
		2613.5	12.68	11.72	10.44
		2575.5	13.32	12.32	10.75
		2537.5	14.13	13.08	11
	25RB (0)	2652.5	12.23	11.24	9.45
		2613.5	12.67	11.63	10.48
		2575.5	13.31	12.27	10.72
		2537.5	14.11	13.1	11.02
10MHz	1RB High (49)	2650	12.36	11.68	9.89
		2612	13.11	12.19	11.02
		2576	13.52	13.02	11
		2540	13.21	12.57	11.48
	1RB Middle (24)	2650	13.17	12.5	9.92
		2612	13.76	12.99	11.12
		2576	14.36	13.87	11.4
		2540	14.58	13.92	11.92
	1RB Low (0)	2650	12.21	11.54	9.05
		2612	13.24	12.18	11.08
		2576	13.37	12.87	11.06
		2540	13.48	12.82	11.35
	25RB High (25)	2650	12.04	11.06	9.36
		2612	12.46	11.43	10.29
		2576	13.1	12.09	10.45

		2540	13.66	12.68	10.8
	25RB Middle (12)	2650	12.2	11.21	9.45
		2612	12.68	11.65	10.45
		2576	13.3	12.3	10.1
		2540	14.08	13.09	11.11
	25RB Low (0)	2650	11.81	10.82	9.07
		2612	12.51	11.47	10.2
		2576	13.11	12.1	10.6
		2540	13.92	12.91	10.87
	50RB (0)	2650	11.93	10.94	9.17
		2612	12.41	11.4	10.14
		2576	13.03	12.05	10.41
		2540	13.77	12.79	10.73
15MHz	1RB High (74)	2647.5	12.37	11.85	9.86
		2612.5	13.28	12.22	11.06
		2577.5	13.56	12.77	11.08
		2542.5	13.22	12.7	11.31
	1RB Middle (37)	2647.5	13.11	12.58	10.04
		2612.5	13.75	13.04	11.11
		2577.5	14.31	13.53	11.4
		2542.5	14.23	13.7	12.32
	1RB Low (0)	2647.5	11.98	11.45	9.98
		2612.5	13.21	12.49	11.12
		2577.5	13.5	12.72	11.15
		2542.5	13.46	12.91	11.61
	36RB High (38)	2647.5	12.01	11.01	9.2
		2612.5	12.39	11.38	10.09
		2577.5	13.18	12.13	10.41
		2542.5	13.42	12.39	11.2
	36RB Middle (19)	2647.5	12.11	11.1	9.29
		2612.5	12.68	11.68	10.42
		2577.5	13.29	12.25	10.74
		2542.5	13.87	12.85	11.67
	36RB Low (0)	2647.5	11.7	10.68	8.93
		2612.5	12.5	11.5	10.12
		2577.5	13.07	12.04	10.55
		2542.5	13.86	12.83	11.62
	75RB (0)	2647.5	11.88	10.85	9.12
		2612.5	12.44	11.39	10.2
		2577.5	13.16	12.13	10.58
		2542.5	13.51	12.49	11.33
20MHz	1RB High (99)	2645	12.39	11.28	9.92
		2611	13.08	12.12	11.24
		2578	13.22	12.59	11.25
		2545	13.68	12.89	11.32
	1RB Middle (50)	2645	13.27	12.34	9.99
		2611	13.85	12.98	11.17
		2578	14.44	13.78	11.49
		2545	13.96	13.19	12.2

	1RB Low (0)	2645	12.1	10.93	9.89
		2611	13.05	12.07	11.02
		2578	13.07	12.43	11.25
		2545	13.87	12.33	11.23
	50RB High (50)	2645	12.05	10.71	9.05
		2611	12.24	11.2	10.12
		2578	13.05	12.08	10.42
		2545	13.57	12.18	11.3
	50RB Middle (25)	2645	12.12	10.95	9.3
		2611	12.71	11.67	10.47
		2578	13.26	12.3	10.81
		2545	13.52	12.41	11.53
	50RB Low (0)	2645	11.65	10.34	8.8
		2611	12.56	11.52	10.18
		2578	12.85	11.89	10.54
		2545	13.89	12.6	11.68
	100RB (0)	2645	11.86	10.54	8.94
		2611	12.4	11.36	10.15
		2578	12.9	11.88	10.49
		2545	13.65	12.3	11.4

11.5 Wi-Fi and BT Measurement result

The maximum output power of BT is **5.07** dBm,
The maximum tune up of BT is **6.5** dBm.

The average conducted power for Wi-Fi is as following:

NormalPower

802.11b (dBm)

Channel\data rate	1Mbps	2Mbps	5.5Mbps	11Mbps
11	/	/	17.52	/
6	17.58	17.55	17.68	17.62
1	/	/	17.64	/
Tune up	**18.5**	**18.5**	**18.5**	**18.5**

802.11g (dBm)

Channel\data rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
11	16.44	/	/	/	/	/	/	/
6	16.80	16.35	15.89	15.41	14.92	14.46	13.95	13.94
1	16.76	/	/	/	/	/	/	/
Tune up	**17.5**	**17**	**17**	**16**	**15.5**	**15**	**14.5**	**14.5**

802.11n (dBm) - HT20 (2.4G)

Channel\data rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
11	15.63	/	/	/	/	/	/	/
6	15.93	15.48	15.47	14.95	14.94	14.48	14.46	13.98
1	15.92	/	/	/	/	/	/	/
Tune up	**16.5**	**16**	**16**	**15.5**	**15.5**	**15**	**15**	**14.5**

802.11a (dBm)

Channel\data rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
36	16.43	16.04	16.02	15.51	15.48	15.07	15.03	14.41
40	16.35	/	/	/	/	/	/	/
44	16.05	/	/	/	/	/	/	/
48	15.92	/	/	/	/	/	/	/
52	15.85	/	/	/	/	/	/	/
56	15.98	/	/	/	/	/	/	/
60	16.59	/	/	/	/	/	/	/
64	16.99	16.54	16.49	16.02	15.97	15.42	15.42	14.91
Tune up	**17.5**	**17**	**16.5**	**16.5**	**16.5**	**15.5**	**15.5**	**15**
100	16.95	/	/	/	/	/	/	/
104	17.13	/	/	/	/	/	/	/
108	16.88	/	/	/	/	/	/	/
112	16.63	/	/	/	/	/	/	/
116	16.56	/	/	/	/	/	/	/
120	16.59	/	/	/	/	/	/	/
124	16.91	/	/	/	/	/	/	/
128	17.11	/	/	/	/	/	/	/
132	17.23	16.61	16.60	16.09	16.04	15.66	15.65	15.63
136	16.94	/	/	/	/	/	/	/
140	16.61	/	/	/	/	/	/	/
144	16.15	/	/	/	/	/	/	/
Tune up	**17.5**	**17**	**17**	**16.5**	**16.5**	**16**	**16**	**16**
151	12.05	/	/	/	/	/	/	/
159	12.29	12.27	12.25	12.23	12.16	12.13	12.12	12.01
Tune up	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**

LowPower

802.11b (dBm)

Channel\data rate	1Mbps	2Mbps	5.5Mbps	11Mbps
11	8.15	/	8.19	/
6	8.49	8.50	8.55	8.54
1	8.13	/	8.49	/
Tune up	9	9	9	9

802.11g (dBm)

Channel\data rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
11	8.00	/	/	/	/	/	/	/
6	8.11	/	/	/	/	/	/	/
1	8.16	8.13	8.12	8.13	8.10	8.08	8.06	8.05
Tune up	9	9	9	9	9	9	9	9

802.11n (dBm) - HT20 (2.4G)

Channel\data rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
11	8.08	/	/	/	/	/	/	/
6	8.16	/	/	/	/	/	/	/
1	8.22	8.21	8.20	8.17	8.15	8.13	8.12	8.11
Tune up	9	9	9	9	9	9	9	9

802.11a (dBm)

Channel\data rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
36	12.91	/	/	/	/	/	/	/
40	13.49	/	/	/	/	/	/	/
44	13.86	13.70	13.72	13.71	13.69	13.63	13.62	13.60
48	13.68	/	/	/	/	/	/	/
52	12.53	/	/	/	/	/	/	/
56	12.66	/	/	/	/	/	/	/
60	13.33	/	/	/	/	/	/	/
64	13.55	13.53	13.51	13.52	13.47	13.45	13.46	13.43
100	13.60	/	/	/	/	/	/	/
104	13.70	13.65	13.68	13.63	13.58	13.57	13.55	13.56
108	13.29	/	/	/	/	/	/	/
112	13.22	/	/	/	/	/	/	/
116	13.11	/	/	/	/	/	/	/
120	13.13	/	/	/	/	/	/	/
124	13.40	/	/	/	/	/	/	/
128	13.55	/	/	/	/	/	/	/
132	13.65	/	/	/	/	/	/	/

136	13.33	/	/	/	/	/	/	/
140	13.14	/	/	/	/	/	/	/
144	12.56	/	/	/	/	/	/	/
Tune up	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**
151	12.41	12.32	12.39	12.25	12.23	12.19	12.26	12.26
159	12.30	/	/	/	/	/	/	/
Tune up	**13.5**	**13.5**	**13.5**	**13.5**	**13.5**	**13.5**	**13.5**	**13.5**

12 Simultaneous TX SAR Considerations

12.1 Introduction

The following procedures adopted from “FCC SAR Considerations for Cell Phones with Multiple Transmitters” are applicable to handsets with built-in unlicensed transmitters such as 802.11 a/b/g and Bluetooth devices which may simultaneously transmit with the licensed transmitter.
For this device, the BT and Wi-Fi can transmit simultaneous with other transmitters.

12.2 Transmit Antenna Separation Distances

Picture 12.1 Antenna Locations

12.3 SAR Measurement Positions

According to the KDB941225 D06 Hot Spot SAR v01, the edges with less than 2.5 cm distance to the antennas need to be tested for SAR.

SAR measurement positions						
Mode	Front	Rear	Left edge	Right edge	Top edge	Bottom edge
Main antenna	No	Yes	Yes	No	Yes	No
WLAN	No	Yes	No	Yes	Yes	No

12.4Standalone SAR Test Exclusion Considerations

Standalone 1-g head or bodySAR evaluation by measurement or numerical simulation is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied. The 1-g SAR test exclusion threshold for 100 MHz to 6 GHz at test separation distances≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR, where

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

Table 12.1: Standalone SAR test exclusion considerations

Band/Mode	F(GHz)	Position	SAR test exclusion threshold(mW)	RF output power		SAR test exclusion
				dBm	mW	
Bluetooth	2.441	Head	9.60	6.5	4.47	Yes
		Body	19.20	6.5	4.47	Yes
2.4GHz WLAN	2.45	Head	9.58	18.5	70.79	No
		Body	19.17	18.5	70.79	No
5GHz WLAN	5.25	Head	6.55	17.5	56.23	No
		Body	13.09	17.5	56.23	No
	5.6	Head	6.34	17.5	56.23	No
		Body	12.68	17.5	56.23	No
	5.75	Head	6.26	17.5	56.23	No
		Body	12.51	17.5	56.23	No

13 Evaluation of Simultaneous

Table 13.1: The sum of reported SAR values for main antenna and WiFi

	Position	Main antenna	WiFi	Sum
Highest reported SAR value for Head	Right hand, Touch cheek	0.48	0.36	**0.84**
Highest reported SAR value for Body	Rear	0.75	0.79	**1.54**

Note1: we have evaluated and chose the highest value of WiFi 2.4G and 5G in the above table.

Table 13.2: The sum of reported SAR values for main antenna and BT

	Position	Main antenna	BT	Sum
Maximum reported SAR value for Head	Right hand, Touch cheek	0.48	0.19	**0.67**
Maximum reported SAR value for Body	Rear	0.75	0.19	**0.94**

[1] - Estimated SAR for Bluetooth (see the table 13.3)

Table 13.3: Estimated SAR for Bluetooth

Mode/Band	F (GHz)	Position	Distance (mm)	Upper limit of power *		Estimated$_{1g}$ (W/kg)
				dBm	mW	
Bluetooth	2.441	Head	< 5	6.5	4.47	0.19
Bluetooth	2.441	Body	< 5	6.5	4.47	0.19

* - Maximum possible output power declared by manufacturer

When standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:
(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance,mm)]·[√f(GHz)/x] W/kg for test separation distances ≤ 50 mm;
where x = 7.5 for 1-g SAR.
When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion

Conclusion:
According to the above tables, the sum of reported SAR values is<1.6W/kg. So the simultaneous transmission SAR with volume scans is not required.

14 SAR Test Result

It is determined by user manual for the distance between the EUT and the phantom bottom. The distance is 0/4/9/14/19/29 mm and just applied to the condition of body worn accessory. It is performed for all SAR measurements with area scan based 1-g SAR estimation (Fast SAR). A zoom scan measurement is added when the estimated 1-gSAR is the highest measured SAR in each exposure configuration, wireless mode and frequency band combination or more than 1.2W/kg.

The calculated SAR is obtained by the following formula:

$$\text{Reported SAR} = \text{Measured SAR} \times 10^{(P_{Target}-P_{Measured})/10}$$

WhereP_{Target} is the power of manufacturing upper limit;

$P_{Measured}$ is the measured power in chapter 11.

Table 14.1: Duty Cycle

Mode	Duty Cycle
Speech for GSM850/1900	1:8.3
GPRS&EGPRS for GSM850 – Normal power	1:4
GPRS&EGPRS for GSM850 – Low power	1:4
GPRS&EGPRS for GSM1900 – Normal power	1:4
GPRS&EGPRS for GSM1900 – Low power	1:2
WCDMA&LTE FDD	1:1
LTE TDD	1:1.58

We'll perform the head measurement in all bands with the primary battery and SIM card depending on the evaluation of multi-batteries and multi-SIM cardsand retest on highest value point with other batteries and SIM cards. Then, repeat the measurement in the Body test.

Table 14.2: The evaluation of multi-batteries for Head Test

Frequency		Side	Test Position	Battery Type	SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.					
848.8	251	Right	Touch	B1	0.300	0.03
848.8	251	Right	Touch	B2	0.290	0.07

Note: According to the values in the above table, the battery of **B1**is the primarybattery.
We'll perform the head measurement with this battery and retest on highest value point with others.

Table 14.3: The evaluation of multi-batteries for Body Test

Frequency		Test Position	Spacing (mm)	Battery Type	SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.					
848.8	251	Rear	0	B1	0.560	0.19
836.4	4182	Rear	0	B2	0.540	-0.08

Note: According to the values in the above table, the battery of **B1** is the primary battery.
We'll perform the body measurement with this battery and retest on highest value point with others.

14.1SAR results for Fast SAR

Note:

B1: SWD-WT-N8 of Sunwoda Electronic Co., Ltd .

B2: SCUD-WT-N8 of SCUD(Fujian) Electronic Co., Ltd.

Table 14.1-1: SAR Values (GSM 850 MHz Band - Head)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C											
Frequency		Side	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
190	836.6	Left	Touch	/	24.55	25.50	0.059	**0.07**	0.097	**0.12**	0.03
190	836.6	Left	Tilt	/	24.55	25.50	0.057	**0.07**	0.088	**0.11**	0.06
251	848.8	Right	Touch	Fig.1	24.60	25.50	0.136	**0.17**	0.241	**0.30**	0.03
190	836.6	Right	Touch	/	24.55	25.50	0.115	**0.14**	0.197	**0.24**	0.11
128	824.2	Right	Touch	/	24.20	25.50	0.096	**0.13**	0.167	**0.23**	-0.02
190	836.6	Right	Tilt	/	24.55	25.50	0.101	**0.13**	0.186	**0.23**	0.10
251	848.8	Right	Touch	B2	24.60	25.50	0.128	**0.16**	0.236	**0.29**	0.07

Table 14.1-2: SAR Values (GSM 850 MHz Band - Body)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C											
Frequency		Mode (number of timeslots)	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
190	836.6	GPRS (2)	Top	Note1	31.18	31.5	0.059	**0.06**	0.079	**0.09**	-0.08
190	836.6	GPRS (2)	Rear	Note2	31.18	31.5	0.163	**0.17**	0.216	**0.23**	0.06
190	836.6	GPRS (2)	Left	Note3	31.18	31.5	0.098	**0.11**	0.134	**0.14**	0.02
190	836.6	GPRS (2)	Top	/	22.22	23.5	0.096	**0.13**	0.149	**0.20**	-0.12
251	848.8	GPRS (2)	Rear	Fig.2	21.97	23.5	0.219	**0.31**	0.399	**0.57**	0.19
190	836.6	GPRS (2)	Rear	/	22.22	23.5	0.168	**0.23**	0.301	**0.40**	-0.08
128	824.2	GPRS (2)	Rear	/	21.81	23.5	0.136	**0.20**	0.239	**0.35**	-0.13
190	836.6	GPRS (2)	Left	/	22.22	23.5	0.039	**0.05**	0.063	**0.09**	0.09
251	848.8	EGPRS (2)	Rear	/	22.09	23.5	0.211	**0.29**	0.384	**0.53**	0.10
251	848.8	GPRS (2)	Rear	B2	21.97	23.5	0.209	**0.30**	0.383	**0.54**	-0.08

Note: The distance between the EUT and the phantom bottom is 0mm

Note1: The distance between the EUT and the phantom bottom is 29mm

Note2: The distance between the EUT and the phantom bottom is 19mm

Note3: The distance between the EUT and the phantom bottom is 14mm

Table 14.1-3: SAR Values(GSM 1900 MHz Band - Head)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C											
Frequency		Side	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
661	1880	Left	Touch	/	21.48	21.5	0.060	**0.06**	0.123	**0.12**	0.06
661	1880	Left	Tilt	/	21.48	21.5	0.064	**0.06**	0.132	**0.13**	-0.06
661	1880	Right	Touch	/	21.48	21.5	0.125	**0.13**	0.262	**0.26**	0.13
810	1909.8	Right	Tilt	Fig.3	21.28	21.5	0.155	**0.16**	0.344	**0.36**	0.15
661	1880	Right	Tilt	/	21.48	21.5	0.139	**0.14**	0.302	**0.30**	0.04
512	1850.2	Right	Tilt	/	20.79	21.5	0.099	**0.12**	0.214	**0.25**	-0.11
810	1909.8	Right	Tilt	B2	21.28	21.5	0.149	**0.16**	0.340	**0.36**	0.06

Table 14.1-4: SAR Values (GSM 1900 MHz Band - Body)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C											
Frequency		Mode (number of timeslots)	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
661	1880	GPRS (2)	Top	Note2	28.57	29.00	0.088	**0.10**	0.162	**0.18**	0.03
661	1880	GPRS (2)	Rear	Note3	28.57	29.00	0.194	**0.21**	0.388	**0.43**	0.05
661	1880	GPRS (2)	Left	Note4	28.57	29.00	0.167	**0.18**	0.308	**0.34**	0.12
661	1880	GPRS (4)	Top	/	21.48	21.5	0.146	**0.15**	0.375	**0.38**	0.10
810	1909.8	GPRS (4)	Rear	Fig.4	16.23	16.50	0.255	**0.27**	0.608	**0.65**	0.04
661	1880	GPRS (4)	Rear	/	16.38	16.50	0.233	**0.24**	0.604	**0.62**	0.05
512	1850.2	GPRS (4)	Rear	/	15.70	16.50	0.168	**0.20**	0.417	**0.50**	-0.03
661	1880	GPRS (4)	Left	/	16.38	16.50	0.057	**0.06**	0.135	**0.14**	-0.11
810	1909.8	EGPRS (4)	Rear	/	16.23	16.50	0.254	**0.27**	0.602	**0.64**	-0.01
810	1909.8	GPRS (4)	Rear	B2	16.23	16.50	0.241	**0.26**	0.601	**0.64**	0.03

Note: The distance between the EUT and the phantom bottom is 0mm

Note1: The distance between the EUT and the phantom bottom is 29mm

Note2: The distance between the EUT and the phantom bottom is 19mm

Note3: The distance between the EUT and the phantom bottom is 14mm

Table 14.1-5: SAR Values (WCDMA 850 MHz Band - Head)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C											
Frequency		Side	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
4182	836.4	Left	Touch	/	16.71	18.00	0.116	**0.16**	0.201	**0.27**	0.01
4182	836.4	Left	Tilt	/	16.71	18.00	0.100	**0.14**	0.166	**0.22**	0.01
4233	846.6	Right	Touch	/	16.74	18.00	0.156	**0.21**	0.275	**0.37**	0.04
4182	836.4	Right	Touch	/	16.71	18.00	0.163	**0.22**	0.283	**0.38**	0.12
4132	826.4	Right	Touch	Fig.5	16.74	18.00	0.169	**0.23**	0.298	**0.40**	0.17
4182	836.4	Right	Tilt	/	16.71	18.00	0.116	**0.16**	0.209	**0.28**	0.02
4132	826.4	Right	Touch	B2	16.74	18.00	0.161	**0.22**	0.293	**0.39**	0.19

Table 14.1-6: SAR Values (WCDMA 850 MHz Band - Body)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C										
Frequency		Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz									
4182	836.4	Top	Note2	23.66	24.00	0.059	**0.06**	0.077	**0.08**	0.01
4182	836.4	Rear	Note3	23.66	24.00	0.155	**0.17**	0.199	**0.22**	0.13
4182	836.4	Left	Note4	23.66	24.00	0.092	**0.10**	0.123	**0.13**	-0.05
4182	836.4	Top	/	16.71	18.00	0.123	**0.17**	0.183	**0.25**	-0.06
4233	846.6	Rear	/	16.74	18.00	0.201	**0.27**	0.363	**0.49**	-0.04
4183	836.6	Rear	Fig.6	16.71	18.00	0.234	**0.31**	0.428	**0.58**	0.05
4132	826.4	Rear	/	16.74	18.00	0.217	**0.29**	0.389	**0.52**	-0.10
4182	836.4	Left	/	16.71	18.00	0.063	**0.09**	0.100	**0.13**	-0.05
4182	836.4	Rear	B2	16.71	18.00	0.226	**0.30**	0.357	**0.48**	0.16

Note: The distance between the EUT and the phantom bottom is 0mm

Note1: The distance between the EUT and the phantom bottom is 29mm

Note2: The distance between the EUT and the phantom bottom is 19mm

Note3: The distance between the EUT and the phantom bottom is 14mm

Table 14.1-7: SAR Values(WCDMA 1900 MHz Band - Head)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C											
Frequency		Side	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
9400	1880	Left	Touch	/	10.54	12.00	0.042	**0.06**	0.080	**0.11**	-0.03
9400	1880	Left	Tilt	/	10.54	12.00	0.046	**0.06**	0.098	**0.14**	0.11
9400	1880	Right	Touch	/	10.54	12.00	0.093	**0.13**	0.207	**0.29**	-0.05
9538	1907.6	Right	Tilt	/	10.44	12.00	0.098	**0.14**	0.210	**0.30**	0.05
9400	1880	Right	Tilt	Fig.7	10.54	12.00	0.096	**0.13**	0.218	**0.31**	0.09
9262	1852.4	Right	Tilt	/	10.25	12.00	0.082	**0.12**	0.171	**0.26**	0.12
9400	1880	Right	Tilt	/	10.54	12.00	0.088	**0.12**	0.209	**0.29**	0.15

Table 14.1-8: SAR Values (WCDMA 1900 MHz Band - Body)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C										
Frequency		Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz									
9400	1880	Top	Note2	23.87	24.00	0.166	**0.17**	0.286	**0.29**	-0.11
9400	1880	Rear	Note3	23.87	24.00	0.220	**0.23**	0.406	**0.42**	-0.04
9400	1880	Left	Note4	23.87	24.00	0.084	**0.09**	0.152	**0.16**	-0.04
9400	1880	Top	/	10.54	12.00	0.087	**0.12**	0.223	**0.31**	-0.09
9538	1907.6	Rear	/	10.44	12.00	0.181	**0.26**	0.443	**0.63**	-0.05
9400	1880	Rear	Fig.8	10.54	12.00	0.191	**0.27**	0.457	**0.64**	-0.19
9262	1852.4	Rear	/	10.25	12.00	0.188	**0.28**	0.420	**0.63**	0.08
9538	1907.6	Left	/	10.54	12.00	0.035	**0.05**	0.076	**0.11**	-0.10
9400	1880	Rear	B2	10.54	12.00	0.186	**0.26**	0.451	**0.63**	0.07

Note: The distance between the EUT and the phantom bottom is 0mm

Note1: The distance between the EUT and the phantom bottom is 29mm

Note2: The distance between the EUT and the phantom bottom is 19mm

Note3: The distance between the EUT and the phantom bottom is 14mm

Table 14.1-9: SAR Values (CDMA BC0 MHz Band - Head)

Ambient Temperature: 22.5°C Liquid Temperature: 22.0°C											
Frequency		Side	Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
384	836.52	Left	Touch	/	18.61	19.00	0.139	**0.15**	0.187	**0.20**	-0.12
384	836.52	Left	Tilt	/	18.61	19.00	0.107	**0.12**	0.158	**0.17**	-0.04
777	848.31	Right	Touch	/	18.24	19.00	0.226	**0.27**	0.382	**0.46**	-0.05
384	836.52	Right	Touch	Fig.9	18.61	19.00	0.249	**0.27**	0.440	**0.48**	0.04
1013	824.7	Right	Touch	/	18.51	19.00	0.246	**0.28**	0.419	**0.47**	-0.01
384	836.52	Right	Tilt	/	18.61	19.00	0.179	**0.20**	0.318	**0.35**	0.06
384	836.52	Right	Touch	B2	18.61	19.00	0.241	**0.26**	0.433	**0.47**	0.12

Table 14.1-10: SAR Values (CDMA BC0 MHz Band - Body)

Ambient Temperature: 22.5°C Liquid Temperature: 22.0°C										
Frequency		Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz									
384	836.52	Top	Note2	24.77	25.00	0.051	**0.05**	0.065	**0.07**	0.00
384	836.52	Rear	Note3	24.77	25.00	0.164	**0.17**	0.217	**0.23**	0.02
384	836.52	Left	Note4	24.77	25.00	0.059	**0.06**	0.082	**0.09**	0.02
384	836.52	Top	/	18.58	19.00	0.136	**0.15**	0.217	**0.24**	0.08
777	848.31	Rear	/	18.23	19.00	0.317	**0.38**	0.555	**0.66**	-0.02
384	836.52	Rear	Fig.10	18.58	19.00	0.349	**0.38**	0.642	**0.71**	0.11
1013	824.7	Rear	/	18.50	19.00	0.342	**0.38**	0.597	**0.67**	-0.01
384	836.52	Left	/	18.58	19.00	0.128	**0.14**	0.228	**0.25**	-0.10
384	836.52	Rear	B2	18.58	19.00	0.345	**0.38**	0.633	**0.70**	0.02

Note: The distance between the EUT and the phantom bottom is 0mm

Note1: The distance between the EUT and the phantom bottom is 29mm

Note2: The distance between the EUT and the phantom bottom is 19mm

Note3: The distance between the EUT and the phantom bottom is 14mm

Table 14.1-11: SAR Values(LTE Band5 - Head)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C												
Frequency		Mode	Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g)(W/kg)	Power Drift (dB)
Ch.	MHz											
20450	829	1RB_Mid	Left	Touch	/	17.64	18.50	0.075	**0.09**	0.099	**0.12**	0.07
20450	829	1RB_Mid	Left	Tilt	/	17.64	18.50	0.071	**0.09**	0.097	**0.12**	0.00
20450	829	1RB_Mid	Right	Touch	Fig.11	17.64	18.50	0.173	**0.21**	0.304	**0.37**	0.14
20450	829	1RB_Mid	Right	Tilt	/	17.64	18.50	0.071	**0.09**	0.142	**0.17**	0.08
20450	829	25RB_ Mid	Left	Touch	/	16.36	18.50	0.105	**0.17**	0.133	**0.22**	-0.07
20450	829	25RB_ Mid	Left	Tilt	/	16.36	17.50	0.068	**0.09**	0.088	**0.11**	0.10
20450	829	25RB_ Mid	Right	Touch	/	16.36	17.50	0.123	**0.16**	0.197	**0.26**	-0.08
20450	829	25RB_ Mid	Right	Tilt	/	16.36	17.50	0.128	**0.17**	0.222	**0.29**	-0.02
20450	829	1RB_Mid	Right	Touch	B2	17.64	18.50	0.168	**0.20**	0.298	**0.36**	0.04

Note1: The LTE mode is QPSK_10MHz.

Table 14.1-12: SAR Values (LTE Band5-Body)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C											
Frequency		Mode	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-upPo wer (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
20450	829	1RB_Mid	Top	Note2	23.99	24.00	0.075	**0.08**	0.098	**0.10**	0.06
20450	829	1RB_Mid	Rear	Note3	23.99	24.00	0.209	**0.21**	0.280	**0.28**	0.01
20450	829	1RB_Mid	Left	Note4	23.99	24.00	0.094	**0.09**	0.135	**0.14**	-0.07
20525	836.5	25RB_Low	Top	Note2	22.96	23.00	0.054	**0.05**	0.073	**0.07**	-0.03
20525	836.5	25RB_Low	Rear	Note3	22.96	23.00	0.162	**0.16**	0.218	**0.22**	-0.08
20525	836.5	25RB_Low	Left	Note4	22.96	23.00	0.078	**0.08**	0.111	**0.11**	-0.04
20450	829	1RB_Mid	Top	/	17.64	18.50	0.166	**0.20**	0.257	**0.31**	0.10
20450	829	1RB_Mid	Rear	Fig.12	17.64	18.50	0.265	**0.32**	0.483	**0.59**	0.13
20450	829	1RB_Mid	Left	/	17.64	18.50	0.106	**0.13**	0.192	**0.23**	-0.06
20450	829	25RB_Low	Top	/	16.36	17.50	0.115	**0.15**	0.184	**0.24**	-0.02
20450	829	25RB_Low	Rear	/	16.36	17.50	0.218	**0.28**	0.396	**0.52**	0.11
20450	829	25RB_Low	Left	/	16.36	17.50	0.083	**0.11**	0.144	**0.19**	-0.12
20450	829	1RB_Mid	Rear	B2	17.64	18.50	0.258	**0.31**	0.478	**0.58**	0.19

Note: The distance between the EUT and the phantom bottom is 0mm

Note1: The distance between the EUT and the phantom bottom is 29mm

Note2: The distance between the EUT and the phantom bottom is 19mm

Note3: The distance between the EUT and the phantom bottom is 14mm

Table 14.1-13: SAR Values(LTE Band7 - Head)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C												
Frequency		Mode	Side	Test Position	Figure No./ Note	Conduct Power (dBm)	tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz											
20850	2510	1RB_Mid	Left	Touch	/	12.39	13.00	0.037	**0.04**	0.085	**0.10**	0.13
20850	2510	1RB_Mid	Left	Tilt	/	12.39	13.00	0.038	**0.04**	0.088	**0.10**	0.10
20850	2510	1RB_Mid	Right	Touch	/	12.39	13.00	0.086	**0.10**	0.164	**0.19**	0.01
20850	2510	1RB_Mid	Right	Tilt	/	12.39	13.00	0.049	**0.06**	0.111	**0.13**	-0.07
20850	2510	50RB_ Mid	Left	Touch	/	11.17	12.00	0.041	**0.05**	0.093	**0.11**	-0.07
20850	2510	50RB_ Mid	Left	Tilt	/	11.17	12.00	0.056	**0.07**	0.130	**0.16**	-0.11
20850	2510	50RB_ Mid	Right	Touch	/	11.17	12.00	0.110	**0.13**	0.205	**0.25**	-0.13
20850	2510	50RB_ Mid	Right	Tilt	Fig.13	11.17	12.00	0.123	**0.15**	0.281	**0.34**	0.03
20850	2510	50RB_ Mid	Right	Tilt	B2	11.17	12.00	0.118	**0.14**	0.272	**0.33**	0.07

Note1: The LTE mode is QPSK_20MHz.

Table 14.1-14: SAR Values (LTE Band7 - Body)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C											
Frequency		Mode	Test Position	Figure No./Note	Conduct Power (dBm)	tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
21350	2560	1RB_Mid	Top	Note2	23.98	24.00	0.096	**0.10**	0.176	**0.18**	-0.08
21350	2560	1RB_Mid	Rear	Note3	23.98	24.00	0.134	**0.13**	0.256	**0.26**	0.11
21350	2560	1RB_ Mid	Left	Note4	23.98	24.00	0.232	**0.23**	0.444	**0.45**	0.04
21350	2560	50RB_Mid	Top	Note2	22.85	23.00	0.076	**0.08**	0.139	**0.14**	-0.10
21350	2560	50RB_Mid	Rear	Note3	22.85	23.00	0.104	**0.11**	0.198	**0.21**	-0.02
21350	2560	50RB_Mid	Left	Note4	22.85	23.00	0.179	**0.19**	0.342	**0.35**	0.07
20850	2510	1RB_Mid	Top	/	12.39	13.00	0.209	**0.24**	0.453	**0.52**	0.07
20850	2510	1RB_Mid	Rear	Fig.14	12.39	13.00	0.269	**0.31**	0.652	**0.75**	0.07
20850	2510	1RB_ Mid	Left	/	12.39	13.00	0.191	**0.22**	0.388	**0.45**	0.06
20850	2510	50RB_Mid	Top	/	11.17	12.00	0.163	**0.20**	0.352	**0.43**	-0.11
20850	2510	50RB_Mid	Rear	/	11.17	12.00	0.248	**0.30**	0.616	**0.75**	0.08
20850	2510	50RB_Mid	Left	/	11.17	12.00	0.131	**0.16**	0.273	**0.33**	-0.03
20850	2510	1RB_ Mid	Rear	B2	12.39	13.00	0.264	**0.30**	0.599	**0.69**	0.06

Note: The distance between the EUT and the phantom bottom is 0mm

Note1: The distance between the EUT and the phantom bottom is 29mm

Note2: The distance between the EUT and the phantom bottom is 19mm

Note3: The distance between the EUT and the phantom bottom is 14mm

Table 14.1-15: SAR Values (LTE band41 - Head)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C											
Frequency		Mode	Test Position	Figure No./Note	Conduct Power (dBm)	tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
40470	2578	1RB_Mid	Touch	/	14.44	15.00	0.011	**0.01**	0.015	**0.02**	0.13
40470	2578	1RB_Mid	Tilt	/	14.44	15.00	0.013	**0.01**	0.023	**0.03**	0.10
40470	2578	1RB_ Mid	Touch	/	14.44	15.00	0.066	**0.08**	0.125	**0.14**	0.01
40470	2578	1RB_Mid	Tilt	Fig.15	14.44	15.00	0.076	**0.09**	0.149	**0.17**	0.00
40140	2545	50RB_Mid	Touch	/	13.89	15.00	0.011	**0.01**	0.014	**0.02**	-0.07
40140	2545	50RB_Mid	Tilt	/	13.89	15.00	0.011	**0.01**	0.015	**0.02**	-0.11
40140	2545	50RB_Mid	Touch	/	13.89	15.00	0.053	**0.07**	0.102	**0.13**	-0.13
40140	2545	50RB_Mid	Tilt	/	13.89	15.00	0.056	**0.07**	0.109	**0.14**	0.03
40470	2578	1RB_ Mid	Tilt	B2	14.44	15.00	0.071	**0.08**	0.138	**0.16**	0.07

Note1: The LTE mode is QPSK_20MHz.

Table 14.1-26: SAR Values (LTE band41 - Body)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C											
Frequency		Mode	Test Position	Figure No./Note	Conduct Power (dBm)	tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
41140	2645	1RB_Mid	Top	Note2	23.43	24.00	0.065	**0.07**	0.131	**0.15**	-0.08
41140	2645	1RB_Mid	Rear	Note3	23.43	24.00	0.085	**0.10**	0.165	**0.19**	0.11
41140	2645	1RB_ Mid	Left	Note4	23.43	24.00	0.069	**0.08**	0.136	**0.16**	0.04
40470	2578	50RB_Mid	Top	Note2	22.23	23.00	0.054	**0.06**	0.109	**0.13**	-0.10
40470	2578	50RB_Mid	Rear	Note3	22.23	23.00	0.070	**0.08**	0.134	**0.16**	-0.02
40470	2578	50RB_Mid	Left	Note4	22.23	23.00	0.048	**0.06**	0.092	**0.11**	0.07
40470	2578	1RB_Mid	Top	/	14.44	15.00	0.124	**0.14**	0.313	**0.36**	0.07
40470	2578	1RB_Mid	Rear	Fig.16	14.44	15.00	0.237	**0.27**	0.580	**0.66**	0.08
40470	2578	1RB_ Mid	Left	/	14.44	15.00	0.097	**0.11**	0.244	**0.28**	0.06
40140	2545	50RB_Mid	Top	/	13.89	15.00	0.101	**0.13**	0.273	**0.35**	-0.11
40140	2545	50RB_Mid	Rear	/	13.89	15.00	0.186	**0.24**	0.469	**0.61**	0.08
40140	2545	50RB_Mid	Left	/	13.89	15.00	0.098	**0.13**	0.236	**0.30**	-0.03
20850	2510	1RB_ Mid	Rear	B2	12.39	13.00	0.221	**0.25**	0.563	**0.65**	0.06

Note: The distance between the EUT and the phantom bottom is 0mm

Note1: The distance between the EUT and the phantom bottom is 29mm

Note2: The distance between the EUT and the phantom bottom is 19mm

Note3: The distance between the EUT and the phantom bottom is 14mm

14.2SAR results for Standard procedure

There is zoom scan measurement to beadded for the highest measured SAR in each exposure configuration/band.

Table 14.2-1: SAR Values (GSM 850 MHz Band - Head)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C											
Frequency		Side	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
251	848.8	Right	Touch	Fig.1	24.60	25.50	0.136	**0.17**	0.241	**0.30**	0.03

Table 14.2-2: SAR Values (GSM 850 MHz Band - Body)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C											
Frequency		Mode (number of timeslots)	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
251	848.8	GPRS (2)	Rear	Fig.2	21.97	23.5	0.219	**0.31**	0.399	**0.57**	0.19

Table 14.2-3: SAR Values(GSM 1900 MHz Band - Head)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C											
Frequency		Side	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
810	1909.8	Right	Tilt	Fig.3	21.28	21.5	0.155	0.16	0.344	**0.36**	0.15

Table 14.2-4: SAR Values (GSM 1900 MHz Band - Body)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C											
Frequency		Mode (number of timeslots)	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
810	1909.8	GPRS (4)	Rear	Fig.4	16.23	16.50	0.255	**0.27**	0.608	**0.65**	0.04

Table 14.2-5: SAR Values (WCDMA 850 MHz Band - Head)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C											
Frequency		Side	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
4132	826.4	Right	Touch	Fig.5	16.74	18.00	0.169	**0.23**	0.298	**0.40**	0.17

Table 14.2-6: SAR Values (WCDMA 850 MHz Band - Body)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C										
Frequency		Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz									
4183	836.6	Rear	Fig.6	16.71	18.00	0.234	**0.31**	0.428	**0.58**	0.05

Table 14.2-7: SAR Values (WCDMA 1900 MHz Band - Head)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C											
Frequency		Side	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
9400	1880	Right	Tilt	Fig.7	10.54	12.00	0.096	**0.13**	0.218	**0.31**	0.09

Table 14.2-8: SAR Values (WCDMA 1900 MHz Band - Body)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C										
Frequency		Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz									
9400	1880	Rear	Fig.8	10.54	12.00	0.191	**0.27**	0.457	**0.64**	-0.19

Table 14.2-9: SAR Values (CDMA BC0 MHz Band - Head)

Ambient Temperature: 22.5°C Liquid Temperature: 22.0°C											
Frequency		Side	Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
384	836.52	Right	Touch	Fig.9	18.61	19.00	0.249	**0.27**	0.440	**0.48**	0.04

Table 14.2-10: SAR Values (CDMA BC0 MHz Band - Body)

Ambient Temperature: 22.5°C Liquid Temperature: 22.0°C										
Frequency		Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz									
384	836.52	Rear	Fig.10	18.58	19.00	0.349	**0.38**	0.642	**0.71**	0.11

Table 14.2-11: SAR Values (LTE Band5 - Head)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C												
Frequency		Mode	Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g)(W/kg)	Power Drift (dB)
Ch.	MHz											
20450	829	1RB_Mid	Right	Touch	Fig.11	17.64	18.50	0.173	**0.21**	0.304	**0.37**	0.14

Note1: The LTE mode is QPSK_10MHz.

Table 14.2-12: SAR Values (LTE Band5 -Body)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C											
Frequency		Mode	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-upPower (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
20450	829	1RB_Mid	Rear	Fig.12	17.64	18.50	0.265	**0.32**	0.483	**0.59**	0.13

Note1: The LTE mode is QPSK_10MHz.

Table 14.2-13: SAR Values(LTE Band7 - Head)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C												
Frequency		Mode	Side	Test Position	Figure No./ Note	Conduct Power (dBm)	tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz											
20850	2510	50RB_ Mid	Right	Tilt	Fig.13	11.17	12.00	0.123	**0.15**	0.281	**0.34**	0.03

Note1: The LTE mode is QPSK_20MHz.

Table 14.2-14: SAR Values (LTE Band7 - Body)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C											
Frequency		Mode	Test Position	Figure No./Note	Conduct Power (dBm)	tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
20850	2510	1RB_Mid	Rear	Fig.14	12.39	13.00	0.269	**0.31**	0.652	**0.75**	0.07

Note1: The LTE mode is QPSK_20MHz.

Table 14.2-15: SAR Values(LTE Band41 - Head)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C											
Frequency		Mode	Test Position	Figure No./Note	Conduct Power (dBm)	tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
40470	2578	1RB_Mid	Tilt	Fig.15	14.44	15.00	0.076	**0.09**	0.149	**0.17**	0.00

Note1: The LTE mode is QPSK_20MHz.

Table 14.2-16: SAR Values (LTE Band41 – Body)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C											
Frequency		Mode	Test Position	Figure No./Note	Conduct Power (dBm)	tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
40470	2578	1RB_Mid	Rear	Fig.16	14.44	15.00	0.237	**0.27**	0.580	**0.66**	0.08

Note: The LTE mode is QPSK_20MHz.

14.3WLAN Evaluation for 2.4G

According to the KDB248227 D01, SAR is measured for 2.4GHz 802.11b DSSS using the initial test position procedure.

Head Evaluation

Table 14.3-1: SAR Values(WLAN - Head)– 802.11b (Fast SAR)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C											
Frequency		Side	Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-upPower (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g)(W/kg)	Power Drift (dB)
MHz	Ch.										
2437	6	Left	Touch	/	8.55	9.00	0.028	**0.03**	0.069	**0.08**	0.01
2437	6	Left	Tilt	/	8.55	9.00	0.023	**0.03**	0.059	**0.07**	0.09
2437	6	Right	Touch	/	8.55	9.00	0.013	**0.01**	0.024	**0.03**	0.06
2437	6	Right	Tilt	/	8.55	9.00	0.011	**0.01**	0.021	**0.02**	0.07
2437	6	Left	Touch	B2	8.55	9.00	0.023	**0.03**	0.060	**0.07**	-0.07

As shown above table, the initial test position for head is “Left Touch”. So the head SAR of WLAN is presented as below:

Table 14.3-2: SAR Values(WLAN - Head)– 802.11b (Full SAR)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C											
Frequency		Side	Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-upPower (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g)(W/kg)	Power Drift (dB)
MHz	Ch.										
2437	6	Left	Touch	Fig.17	8.55	9.00	0.034	**0.04**	0.072	**0.08**	0.07

Note1: When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest estimated 1-g SAR conditions determined by area scans, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg.
Note2: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. The scaled reported SAR is presented as below.

Table 14.3-3: SAR Values (WLAN - Head) – 802.11b (Scaled Reported SAR)

Ambient Temperature: 22.9°C Liquid Temperature: 22.5°C							
Frequency		Side	Test Position	Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
MHz	Ch.						
2437	6	Left	Touch	96.13%	100%	**0.08**	**0.08**

SAR is not required for OFDM because the 802.11b adjusted SAR ≤ 1.2 W/kg.

Body Evaluation

Table 14.3-4: SAR Values(WLAN - Body)– 802.11b (Fast SAR)

Ambient Temperature: 22.9℃ Liquid Temperature: 22.5℃										
Frequency		Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g)(W/kg)	Power Drift (dB)
MHz	Ch.									
2437	6	Rear	Note1	17.68	18.50	0.273	**0.33**	0.595	**0.72**	0.15
2437	6	Top	Note2	17.68	18.50	0.193	**0.23**	0.420	**0.51**	0.09
2437	6	Right	/	17.68	18.50	0.098	**0.12**	0.197	**0.24**	0.04
2437	6	Rear	/	8.55	9.00	0.218	**0.24**	0.690	**0.77**	0.01
2437	6	Top	/	8.55	9.00	0.034	**0.04**	0.079	**0.09**	0.13
2437	6	Rear	B2	17.68	18.50	0.270	**0.33**	0.593	**0.72**	0.07

Note: The distance between the EUT and the phantom bottom is 0mm

Note1: The distance between the EUT and the phantom bottom is 9mm

Note2: The distance between the EUT and the phantom bottom is 4mm

As shown above table, the initial test position for body is “Rear”. So the body SAR of WLAN is presented as below:

Table 14.3-5: SAR Values(WLAN - Body)– 802.11b (Full SAR)

Ambient Temperature: 22.9℃ Liquid Temperature: 22.5℃										
Frequency		Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-upPower (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g)(W/kg)	Power Drift (dB)
MHz	Ch.									
2437	6	Rear	/	8.55	9.00	0.218	**0.24**	0.677	**0.75**	0.01
2437	6	Rear	Note1/ Fig.18	17.68	18.50	0.276	**0.33**	0.633	**0.76**	0.15

Note1: When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest estimated 1-g SAR conditions determined by area scans, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg.

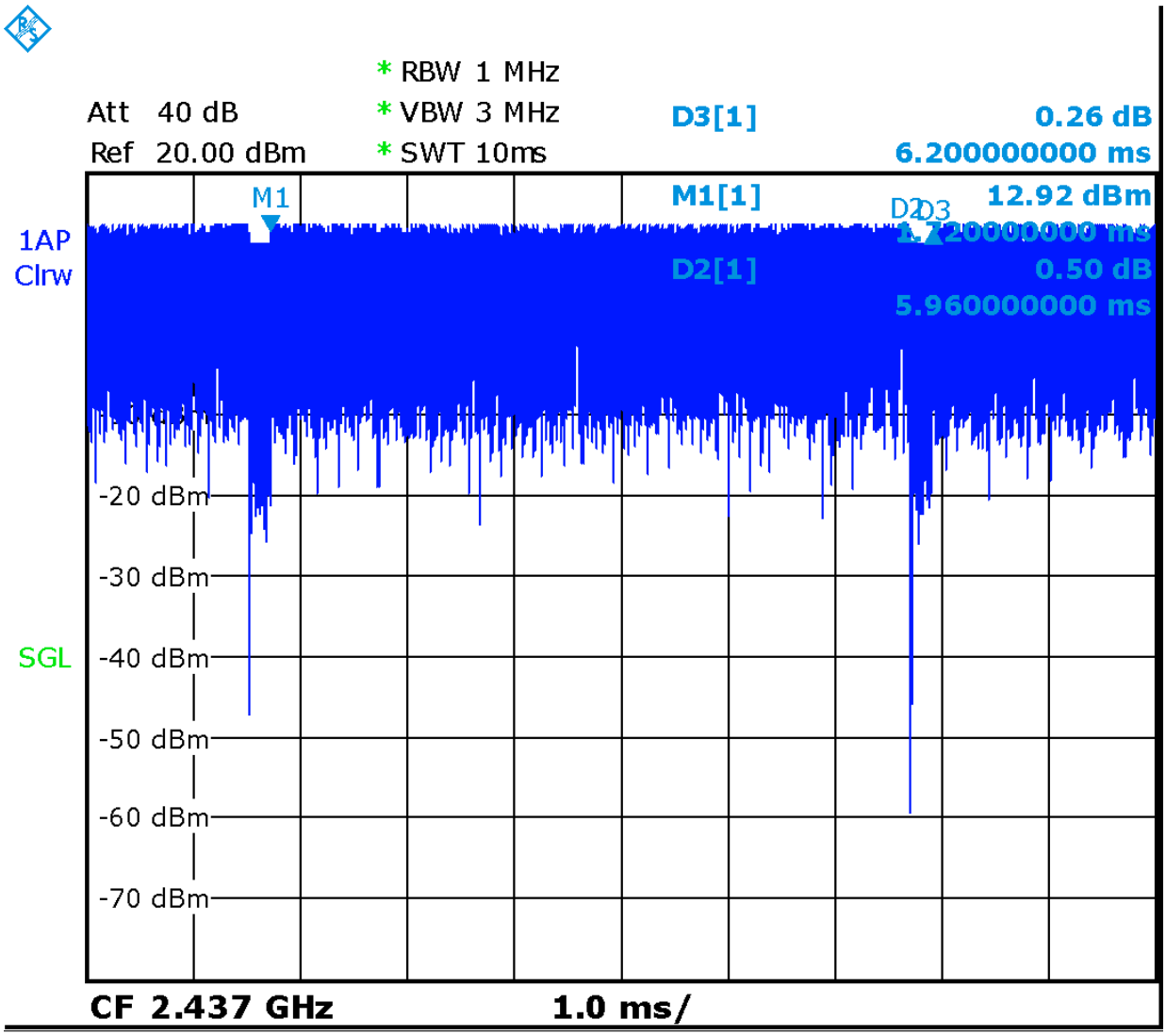
Note2: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. The scaled reported SAR is presented as below.

Table 14.3-6: SAR Values (WLAN - Body) – 802.11b (Scaled Reported SAR)

Ambient Temperature: 22.9℃ Liquid Temperature: 22.5℃						
Frequency		Test Position	Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
MHz	Ch.					
2437	6	Rear	96.13%	100%	**0.76**	**0.79**

SAR is not required for OFDM because the 802.11b adjusted SAR ≤ 1.2 W/kg.



Picture 14.1Duty factor plot for CH6

14.4 WLAN Evaluation For 5G

Table 14.4-1: OFDM mode specified maximum output power of WLAN antenna

802.11 mode	a	g	n	
Ch. BW(MHz)	20	20	20	40
U-NII-1	X		X	X
U-NII-2A	X		X	X
U-NII-2C	X		X	X
U-NII-3	X		X	X
§ 15.247 (5.8 GHz)				
X: maximum(conducted) output power(mW), including tolerance, specified for production units				

Table 14.4-2: Maximum output power specified of WLAN antenna for Normal Power

802.11 mode	a	g	n	
Ch. BW(MHz)	20	20	20	40
U-NII-1	56		45	28
U-NII-2A	56		45	28
U-NII-2C	56		50	35
U-NII-3	25		25	25
§ 15.247 (5.8 GHz)				
● The maximum output power specified for production units is the same for all channels, modulations and data rates in each channel bandwidth configuration of the 802.11a/g/n/ac modes. ● The blue highlighted cells represent highest output configurations in each standalone or aggregated frequency band, with tune-up tolerance included.				

Table 14.4-3: Maximum output power specified of WLAN antenna for Low Power

802.11 mode	a	g	n	
Ch. BW(MHz)	20	20	20	40
U-NII-1	25		25	22
U-NII-2A	25		25	22
U-NII-2C	25		25	22
U-NII-3	22		22	22
§ 15.247 (5.8 GHz)				
● The maximum output power specified for production units is the same for all channels, modulations and data rates in each channel bandwidth configuration of the 802.11a/g/n/ac modes. ● The blue highlighted cells represent highest output configurations in each standalone or aggregated frequency band, with tune-up tolerance included.				

Table 14.4-4: Maximum output power measured of WLAN antenna, for the applicable OFDM configurations according to the default power measurement procedures for selection initial test configurations Normal Power

802.11 mode	a	n	
BW(MHz)	**20**	**20**	**40**
U-NII-1	36/40/44/48 **44/43/40/39**	36/40/44/48 Lower power	38/46 Lower power
U-NII-2A	52/56/60/64 **38/40/46/50**	52/56/60/64 Lower power	54/62 Lower power
U-NII-2C	100/104/108/112 **50/52/49/46** 116/128/132/140/144 **45/51/53/46/41**	100/104/108/112 116/132/136/140 Lower power	102/110/134 Lower power
U-NII-3	149/153/157/161/165 Lower power	149/153/157/161 /165 Lower power	151/159 **16/17**
● Channels with measured maximum power within 0.25dB are considered to have the same measured output. Channels selected for initial test configuration are highlighted in yellow.			

Table 14.4-5: Maximum output power measured of WLAN antenna, for the applicable OFDM configurations according to the default power measurement procedures for selection initial test configurations Low Power

802.11 mode	a	n	
BW(MHz)	**20**	**20**	**40**
U-NII-1	36/40/44/48 **20/22/24/23**	36/40/44/48 Lower power	38/46 Lower power
U-NII-2A	52/56/60/64 **18/18/22/23**	52/56/60/64 Lower power	54/62 Lower power
U-NII-2C	100/104/108/112 **23/23/21/21** 116/128/136/140/144 **20/23/22/21/18**	100/104/108/112 116/132/136/140 Lower power	102/110/134 Lower power
U-NII-3	149/153/157/161/165 Lower power	149/153/157/161 /165 Lower power	151/159 **17/17**
● Channels with measured maximum power within 0.25dB are considered to have the same measured output. Channels selected for initial test configuration are highlighted in yellow.			

Table 14.4-6: Reported SAR of initial test configuration for Head

802.11 mode	a	n	
BW(MHz)	**20**	**20**	**40**
U-NII-1	36/40/44/48	36/40/44/48	38/46
U-NII-2A	52/56/60/64 **0.36**	52/56/60/64	54/62
U-NII-2C	100/104/108/112/116/120/124/128/132/136/140/144 **0.24**	100/104/108/112 116/132/136/140	102/110/118/126/134
U-NII-3	149/153/157/161/165	149/153/157/161/165	151/159 **0.31**
U-NII-1 and U-NII-2A bands have the same specified maximum output and tolerance; SAR is measured for U-NII-2A band first. Adjusted SAR of U-NII-2A band is ≤ 1.2W/kg, SAR is not required for U-NII-1 band. Highest measured output power channel tested initially are in yellow highlight.			

Table 14.4-7: Reported SAR of initial test configuration for Body

802.11 mode	a	n	
BW(MHz)	**20**	**20**	**40**
U-NII-1	36/40/44/48	36/40/44/48	38/46
U-NII-2A	52/56/60/64 **0.42**	52/56/60/64	54/62
U-NII-2C	100/104/108/112/116/120/124/128/132/136/140/144 **0.25**	100/104/108/112 116/132/136/140	102/110/118/126/134
U-NII-3	149/153/157/161/165	149/153/157/161/165	151/159 **0.79**
U-NII-1 and U-NII-2A bands have the same specified maximum output and tolerance; SAR is measured for U-NII-2A band first. Adjusted SAR of U-NII-2A band is ≤ 1.2W/kg, SAR is not required for U-NII-1 band. Highest measured output power channel tested initially are in yellow highlight.			

Table 14.4-8: SAR Values(WLAN - Head)– 802.11a 6Mbps

Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-upPower (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g)(W/kg)	Power Drift (dB)
MHz	Ch.										
64	5320	Left	Touch	/	13.55	14.00	0.096	**0.11**	0.262	**0.29**	0.08
64	5320	Left	Tilt	/	13.55	14.00	0.092	**0.10**	0.260	**0.29**	-0.05
64	5320	Right	Touch	Fig.17	13.55	14.00	0.126	**0.14**	0.323	**0.36**	0.05
64	5320	Right	Tilt	/	13.55	14.00	0.100	**0.11**	0.295	**0.33**	0.13
128	5640	Left	Touch	/	13.55	14.00	0.082	**0.09**	0.188	**0.21**	0.04
128	5640	Left	Tilt	/	13.55	14.00	0.067	**0.07**	0.172	**0.19**	-0.08
128	5640	Right	Touch	/	13.55	14.00	0.092	**0.10**	0.214	**0.24**	0.05
128	5640	Right	Tilt	/	13.55	14.00	0.073	**0.08**	0.195	**0.22**	0.15
159	5795	Left	Touch	/	12.30	13.50	0.096	**0.13**	0.232	**0.31**	0.06
159	5795	Left	Tilt	/	12.30	13.50	0.092	**0.12**	0.230	**0.30**	0.19
159	5795	Right	Touch	/	12.30	13.50	0.090	**0.12**	0.225	**0.30**	0.03
159	5795	Right	Tilt	/	12.30	13.50	0.077	**0.10**	0.190	**0.25**	0.01
64	5320	Right	Touch	B2	13.55	14.00	0.121	**0.13**	0.318	**0.35**	-0.06

Table 14.4-9: SAR Values (WLAN - Body)– 802.11a

Frequency		Test Position	Figure No.	Conducted Power (dBm)	Max. tune-upPower (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g)(W/kg)	Power Drift (dB)
MHz	Ch.									
64	5320	Rear	Note1	16.99	17.50	0.004	**0.00**	0.028	**0.03**	-0.10
64	5320	Top	Note2	16.99	17.50	0.043	**0.05**	0.148	**0.17**	0.05
64	5320	Right	/	16.99	17.50	0.005	**0.01**	0.014	**0.02**	0.00
64	5320	Rear	/	13.55	14.00	0.071	**0.08**	0.375	**0.42**	0.00
64	5320	Top	/	13.55	14.00	0.063	**0.07**	0.282	**0.31**	-0.04
132	5660	Rear	Note1	17.23	17.50	0.011	**0.01**	0.034	**0.04**	0.10
132	5660	Top	Note2	17.23	17.50	0.021	**0.02**	0.089	**0.09**	0.06
132	5660	Right	/	17.23	17.50	0.002	**0.00**	0.008	**0.01**	-0.01
128	5640	Rear	/	13.55	14.00	0.035	**0.04**	0.225	**0.25**	0.00
128	5640	Top	/	13.55	14.00	0.017	**0.02**	0.122	**0.14**	-0.10
159	5795	Rear	Note1	12.29	14.00	0.019	**0.03**	0.045	**0.07**	0.01
159	5795	Top	Note2	12.29	14.00	0.039	**0.06**	0.112	**0.17**	-0.12
159	5795	Right	/	12.29	14.00	0.010	**0.01**	0.022	**0.03**	-0.07
159	5795	Rear	Fig.18	12.30	13.50	0.162	**0.21**	0.597	**0.79**	0.06
159	5795	Top	/	12.30	13.50	0.077	**0.10**	0.323	**0.43**	0.03
159	5795	Rear	B2	12.30	13.50	0.158	**0.21**	0.589	**0.78**	0.04

Note: The distance between the EUT and the phantom bottom is 0mm

Note1: The distance between the EUT and the phantom bottom is 9mm

Note2: The distance between the EUT and the phantom bottom is 4mm

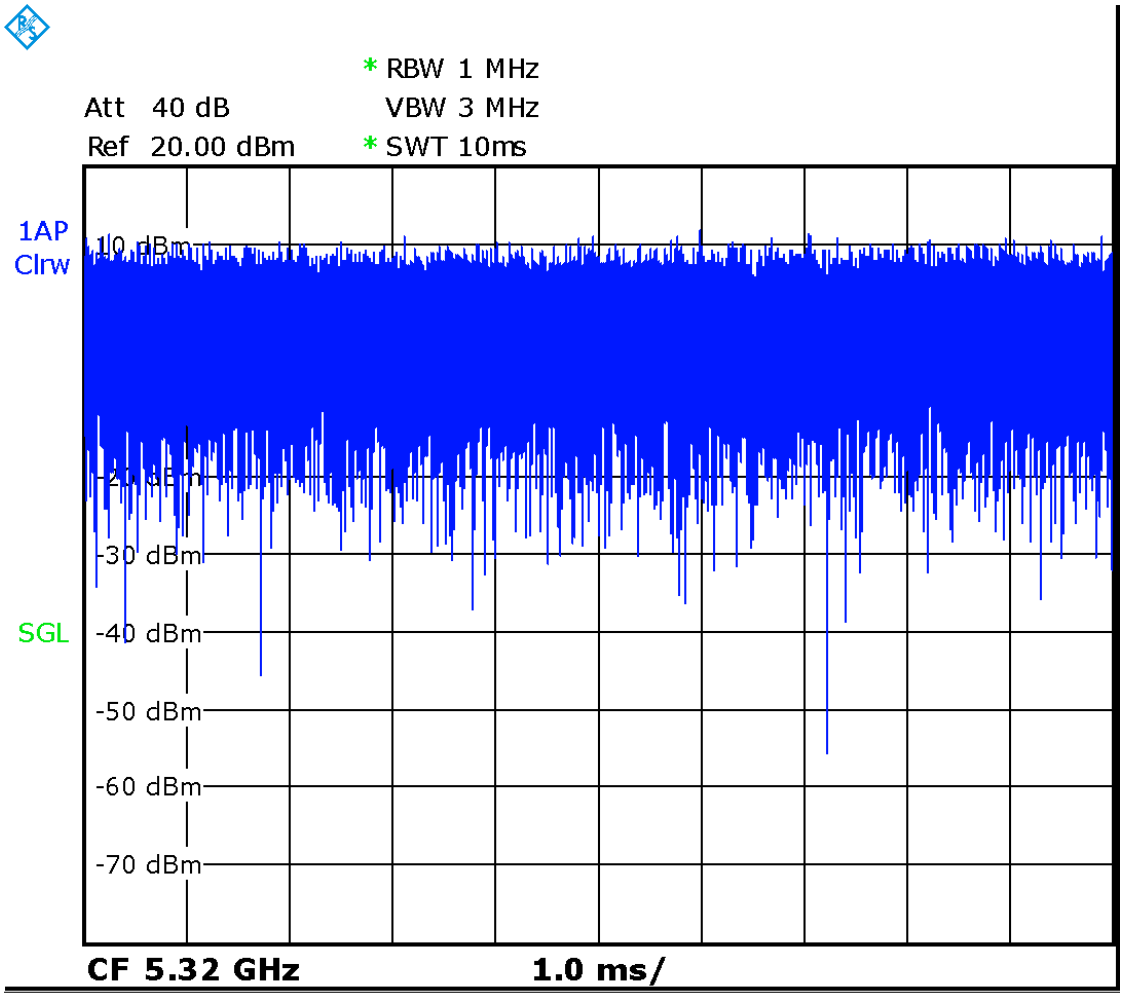
According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. The scaled reported SAR is presented as below.

Table 14.4-10: SAR Values (WLAN - Head) – 802.11a 6Mbps (Scaled Reported SAR)

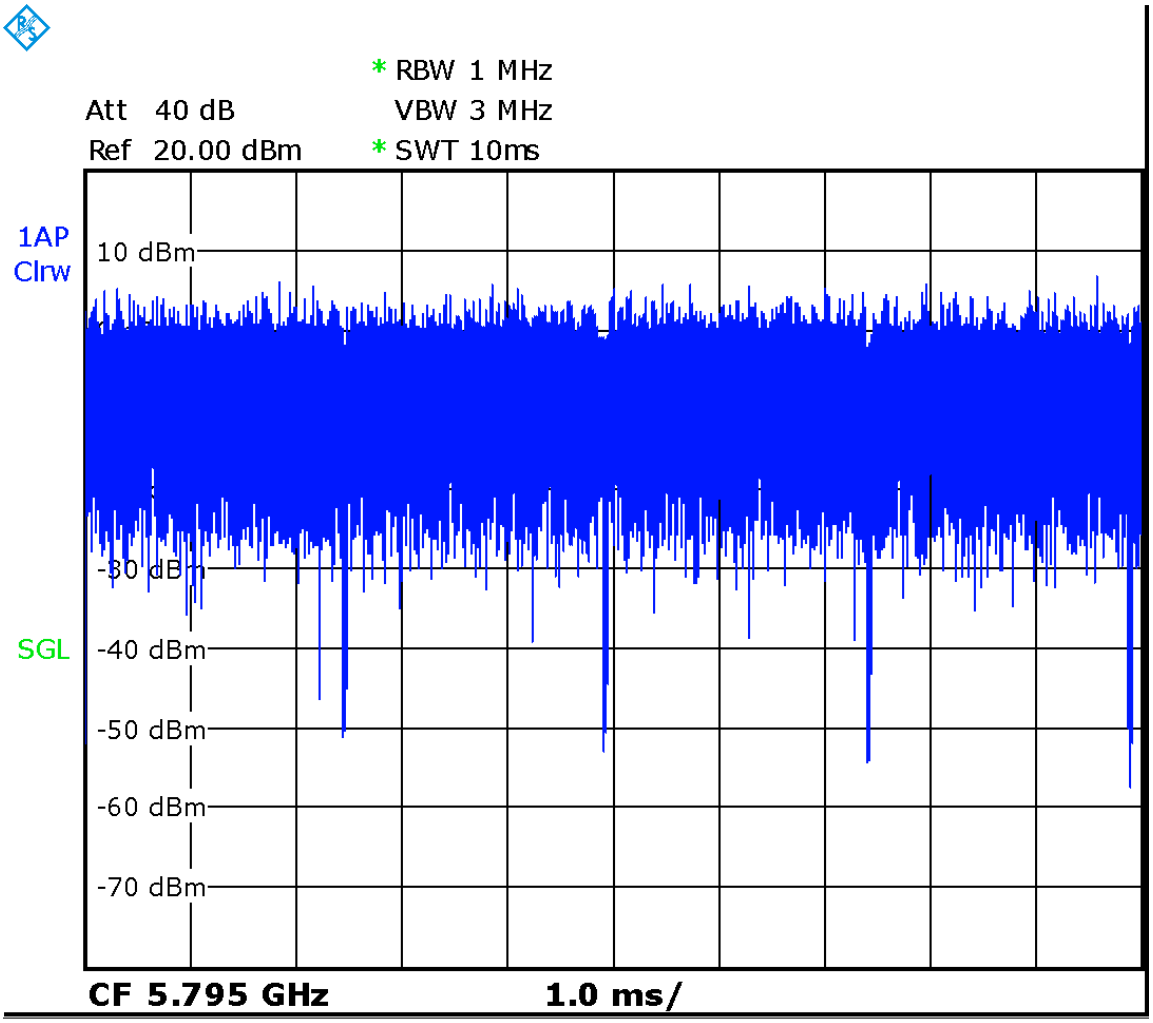
Frequency		Side	Test Position	Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
MHz	Ch.						
5320	64	Right	Touch	100%	100%	**0.36**	**0.36**

Table 14.4-11: SAR Values (WLAN - Body) – 802.11a 18Mbps (Scaled Reported SAR)

Frequency		Test Position	D (mm)	Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
MHz	Ch.						
5795	159	Rear	0	100%	100%	**0.79**	**0.79**



Picture 14.3 The plot of duty factor for U-NII-2A



Picture 14.4 The plot of duty factor for U-NII-3

15 SAR Measurement Variability

SAR measurement variability must be assessed for each frequency band, which is determined by the SARprobe calibration point and tissue-equivalent medium used for the device measurements. When both headand body tissue-equivalent media are required for SAR measurements in a frequency band, the variabilitymeasurement procedures should be applied to the tissue medium with the highest measured SAR, usingthe highest measured SAR configuration for that tissue-equivalent medium.

The following procedures are applied to determine if repeatedmeasurements are required.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps2) through 4) do not apply.

2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.

3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the originaland first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45W/kg (~ 10% from the 1-g SAR limit).

4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeatedmeasurements is > 1.20.

16 Measurement Uncertainty

16.1 Measurement Uncertainty for Normal SAR Tests (300MHz~3GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.0	N	1	1	1	6.0	6.0	∞
2	Isotropy	B	4.7	R	√3	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	1.0	R	√3	1	1	0.6	0.6	∞
4	Linearity	B	4.7	R	√3	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	N	1	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	√3	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	√3	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	√3	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	√3	1	1	0	0	∞
10	RFambient conditions-reflection	B	0	R	√3	1	1	0	0	∞
11	Probe positioned mech. restrictions	B	0.4	R	√3	1	1	0.2	0.2	∞
12	Probe positioning with respect to phantom shell	B	2.9	R	√3	1	1	1.7	1.7	∞
13	Post-processing	B	1.0	R	√3	1	1	0.6	0.6	∞
Test sample related										
14	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
15	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
16	Drift of output power	B	5.0	R	√3	1	1	2.9	2.9	∞
Phantom and set-up										
17	Phantom uncertainty	B	4.0	R	√3	1	1	2.3	2.3	∞
18	Liquid conductivity (target)	B	5.0	R	√3	0.64	0.43	1.8	1.2	∞
19	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
20	Liquid permittivity (target)	B	5.0	R	√3	0.6	0.49	1.7	1.4	∞
21	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521

Combined standard uncertainty	$u_c^{'} = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$					9.55	9.43	257
Expanded uncertainty (confidence interval of 95 %)	$u_e = 2u_c$					19.1	18.9	

16.2 Measurement Uncertainty for Normal SAR Tests (3~6GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.55	N	1	1	1	6.55	6.55	∞
2	Isotropy	B	4.7	R	√3	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	2.0	R	√3	1	1	1.2	1.2	∞
4	Linearity	B	4.7	R	√3	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	R	√3	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	√3	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	√3	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	√3	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	√3	1	1	0	0	∞
10	RFambient conditions-reflection	B	0	R	√3	1	1	0	0	∞
11	Probe positioned mech. restrictions	B	0.8	R	√3	1	1	0.5	0.5	∞
12	Probe positioning with respect to phantom shell	B	6.7	R	√3	1	1	3.9	3.9	∞
13	Post-processing	B	4.0	R	√3	1	1	2.3	2.3	∞
Test sample related										
14	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
15	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
16	Drift of output power	B	5.0	R	√3	1	1	2.9	2.9	∞
Phantom and set-up										
17	Phantom uncertainty	B	4.0	R	√3	1	1	2.3	2.3	∞
18	Liquid conductivity (target)	B	5.0	R	√3	0.64	0.43	1.8	1.2	∞
19	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
20	Liquid permittivity	B	5.0	R	√3	0.6	0.49	1.7	1.4	∞

	(target)									
21	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521
Combined standard uncertainty		$u_c^{'} = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$						10.7	10.6	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						21.4	21.1	

16.3 Measurement Uncertainty for Fast SAR Tests (300MHz~3GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.0	N	1	1	1	6.0	6.0	∞
2	Isotropy	B	4.7	R	√3	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	1.0	R	√3	1	1	0.6	0.6	∞
4	Linearity	B	4.7	R	√3	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	R	√3	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	√3	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	√3	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	√3	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	√3	1	1	0	0	∞
10	RFambient conditions-reflection	B	0	R	√3	1	1	0	0	∞
11	Probe positioned mech. Restrictions	B	0.4	R	√3	1	1	0.2	0.2	∞
12	Probe positioning with respect to phantom shell	B	2.9	R	√3	1	1	1.7	1.7	∞
13	Post-processing	B	1.0	R	√3	1	1	0.6	0.6	∞
14	Fast SAR z-Approximation	B	7.0	R	√3	1	1	4.0	4.0	∞
Test sample related										
15	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
16	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
17	Drift of output power	B	5.0	R	√3	1	1	2.9	2.9	∞
Phantom and set-up										
18	Phantom uncertainty	B	4.0	R	√3	1	1	2.3	2.3	∞

19	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
20	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
21	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
22	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521
Combined standard uncertainty		$u_c' = \sqrt{\sum_{i=1}^{22} c_i^2 u_i^2}$						10.4	10.3	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						20.8	20.6	

16.4 Measurement Uncertainty for Fast SAR Tests (3~6GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.55	N	1	1	1	6.55	6.55	∞
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	2.0	R	$\sqrt{3}$	1	1	1.2	1.2	∞
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	∞
10	RFambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	∞
11	Probe positioned mech. Restrictions	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
12	Probe positioning with respect to phantom shell	B	6.7	R	$\sqrt{3}$	1	1	3.9	3.9	∞
13	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
14	Fast SAR z-Approximation	B	14.0	R	$\sqrt{3}$	1	1	8.1	8.1	∞
Test sample related										
15	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
16	Device holder	A	3.4	N	1	1	1	3.4	3.4	5

	uncertainty									
17	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up										
18	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
19	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
20	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
21	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
22	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521
Combined standard uncertainty		$u_c' = \sqrt{\sum_{i=1}^{22} c_i^2 u_i^2}$						13.5	13.4	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						27.0	26.8	

17 MAIN TEST INSTRUMENTS

Table 17.1: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	E5071C	MY46110673	January 24, 2019	One year
02	Power meter	NRVD	102083	October 24, 2018	One year
03	Power sensor	NRV-Z5	100542		
04	Signal Generator	E4438C	MY49070393	January 4,2019	One Year
05	Amplifier	60S1G4	0331848	No Calibration Requested	
06	BTS	E5515C	MY50263375	January 17, 2019	One year
07	BTS	CMW500	159890	January 3,2019	One year
08	E-field Probe	SPEAG EX3DV4	7514	August 27,2018	One year
09	DAE	SPEAG DAE4	1525	September 18, 2018	One year
10	Dipole Validation Kit	SPEAG D835V2	4d069	July 23,2018	One year
11	Dipole Validation Kit	SPEAG D1900V2	5d101	July 24,2018	One year
12	Dipole Validation Kit	SPEAG D2450V2	853	July 24,2018	One year
13	Dipole Validation Kit	SPEAG D2600V2	1012	July 26,2018	One year
14	Dipole Validation Kit	SPEAG D5GHzV2	1060	July 19,2018	One year

END OF REPORT BODY

ANNEX A Graph Results

850 Right Cheek High

Date: 2019-6-7
Electronics: DAE4 Sn1525
Medium: Head 850 MHz
Medium parameters used: f = 848.8 MHz; σ = 0.891 mho/m; εr = 41.56; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: GSM 850Frequency: 848.8 MHz Duty Cycle: 1:8.3
Probe: EX3DV4 – SN7514ConvF(9.09, 9.09, 9.09)

Area Scan (101x161x1): Interpolated grid: dx=1.0000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.272 W/kg

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

Reference Value = 10.07 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.511 W/kg
SAR(1 g) = 0.241 W/kg; SAR(10 g) = 0.136 W/kg
Maximum value of SAR (measured) = 0.308 W/kg

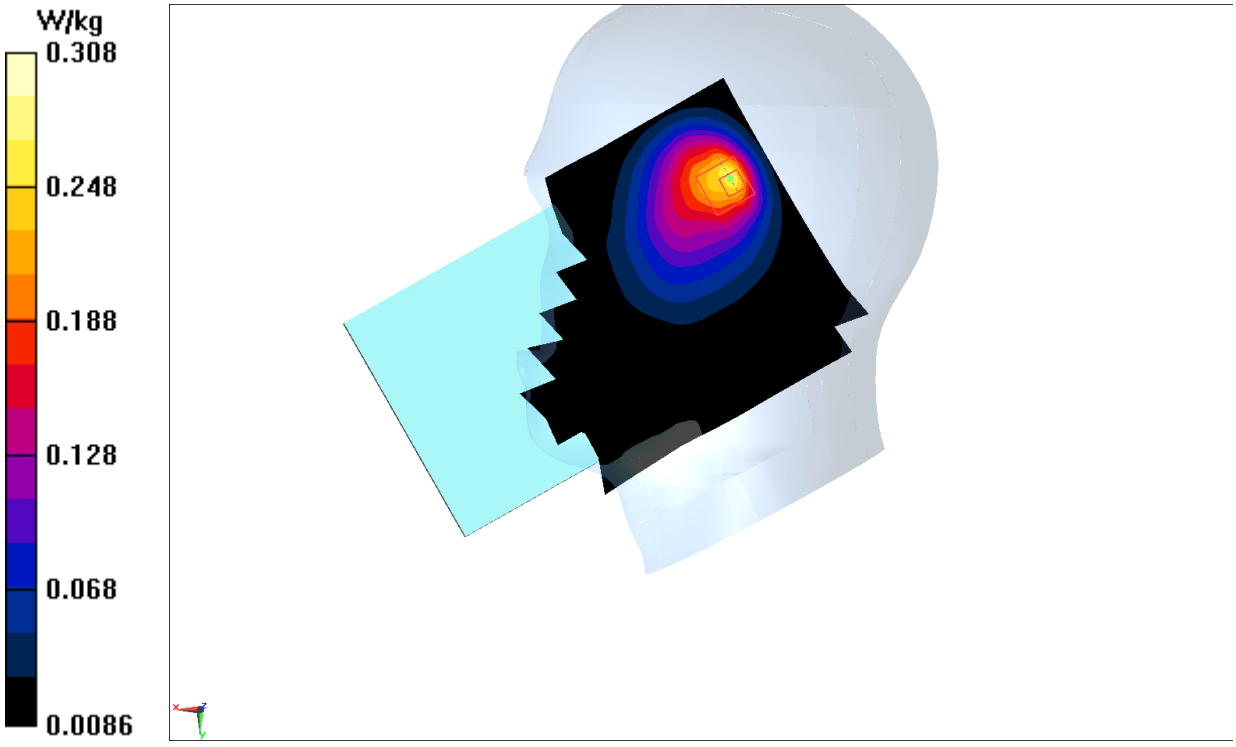


Fig.1 850MHz

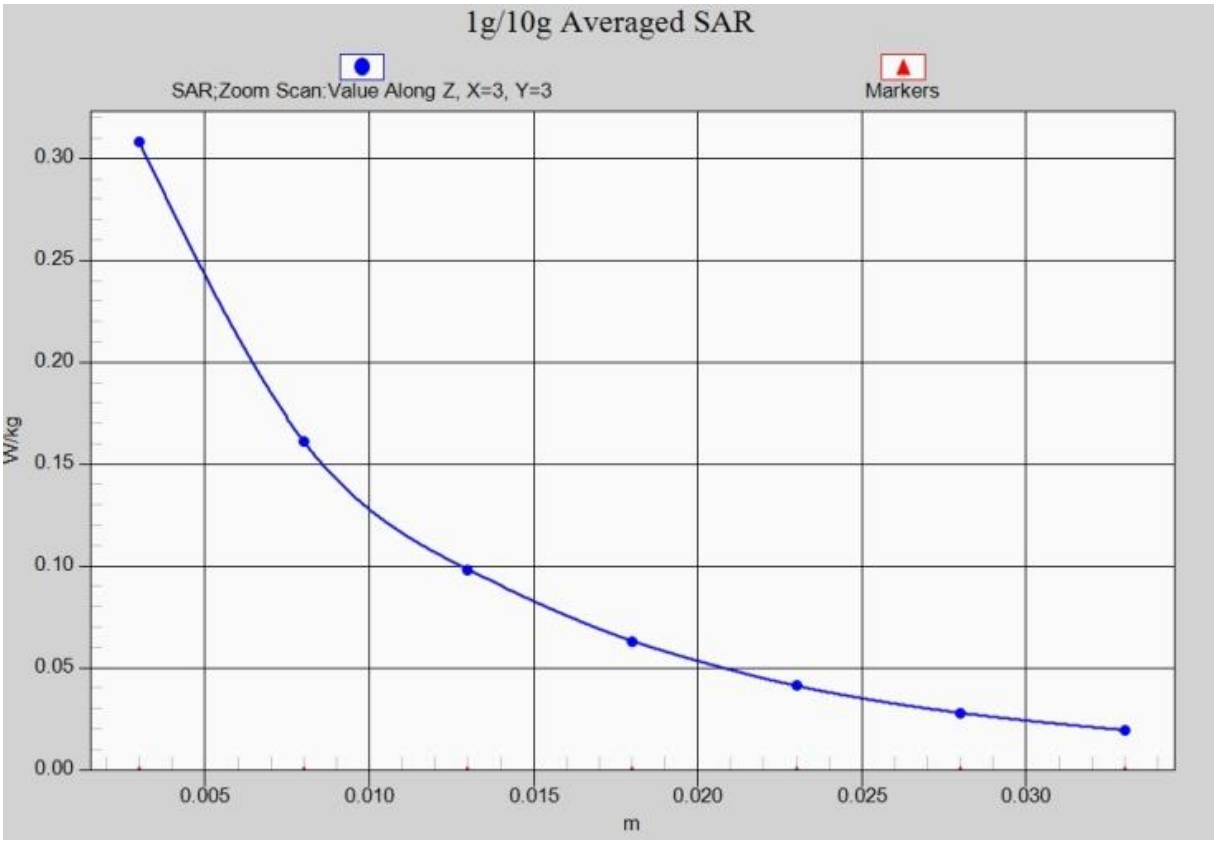


Fig. 1-1 Z-Scan at power reference point (850 MHz)

850Body RearHigh
Date: 2019-6-7
Electronics: DAE4 Sn1525
Medium: Body 850 MHz
Medium parameters used: f = 848.8 MHz; σ = 0.968 mho/m; εr = 55.12; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: GSM 850 GPRS Frequency: 848.8 MHz Duty Cycle: 1:4.2
Probe: EX3DV4 – SN7514ConvF(9.47, 9.47, 9.47)

Area Scan (161x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.538 W/kg

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

Reference Value = 0.7540 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.862 W/kg
SAR(1 g) = 0.399 W/kg; SAR(10 g) = 0.219 W/kg
Maximum value of SAR (measured) = 0.496 W/kg

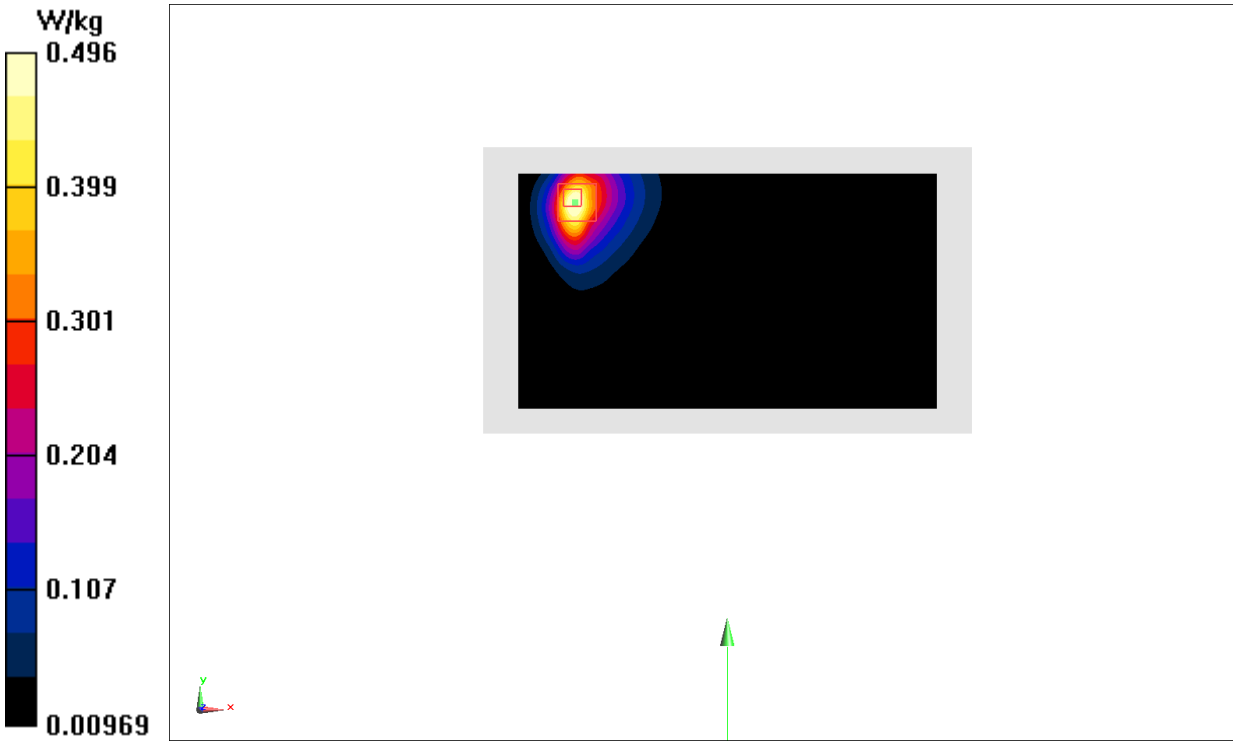


Fig.2 850 MHz

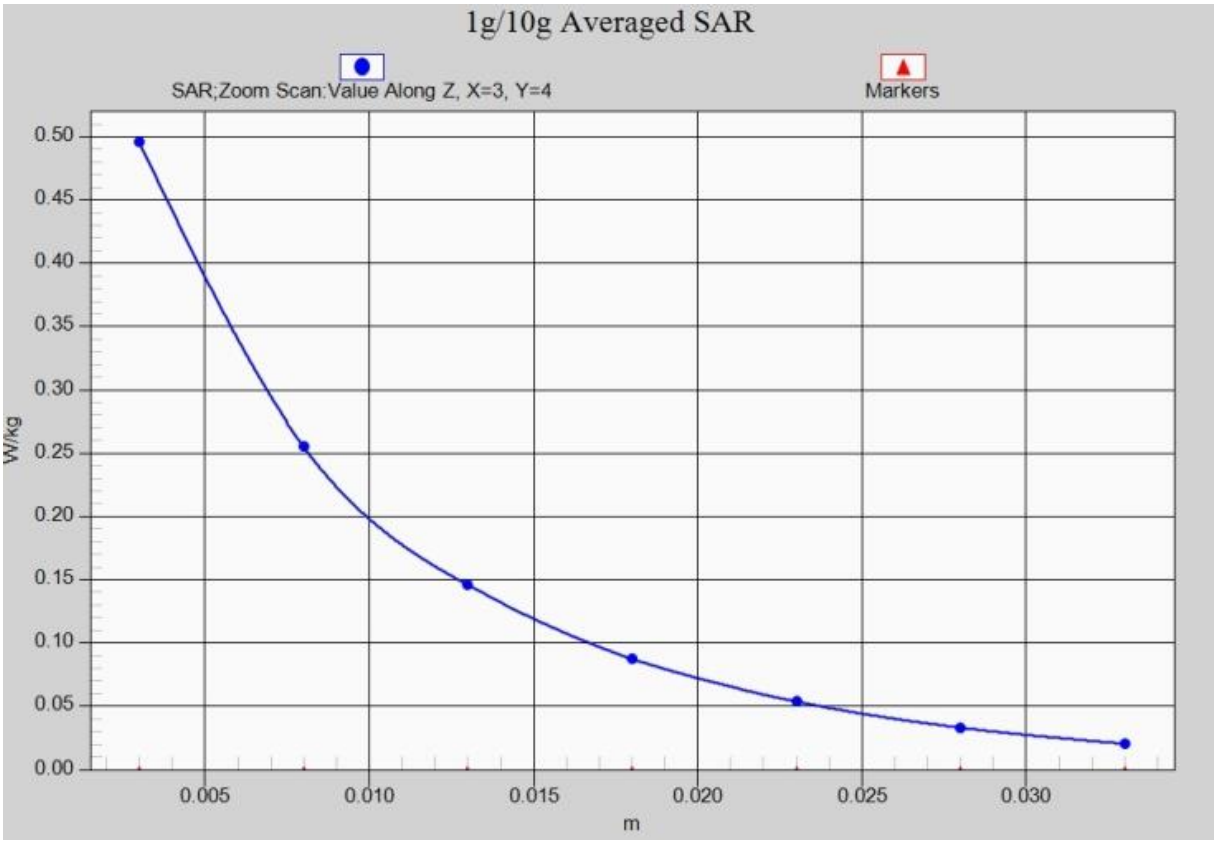


Fig. 2-1Z-Scan at power reference point (850 MHz)

1900 Right Tilt High

Date: 2019-6-8

Electronics: DAE4 Sn1525

Medium: Head 1900 MHz

Medium parameters used: f = 1909.8 MHz; σ = 1.433 mho/m; εr = 40.08; ρ = 1000 kg/m^3

Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC

Communication System: GSM 1900MHzFrequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: EX3DV4– SN7514ConvF(7.73, 7.73, 7.73)

Area Scan (111x161x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.590 W/kg

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

Reference Value = 7.680 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 0.713 W/kg

SAR(1 g) = 0.344 W/kg; SAR(10 g) = 0.155 W/kg

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

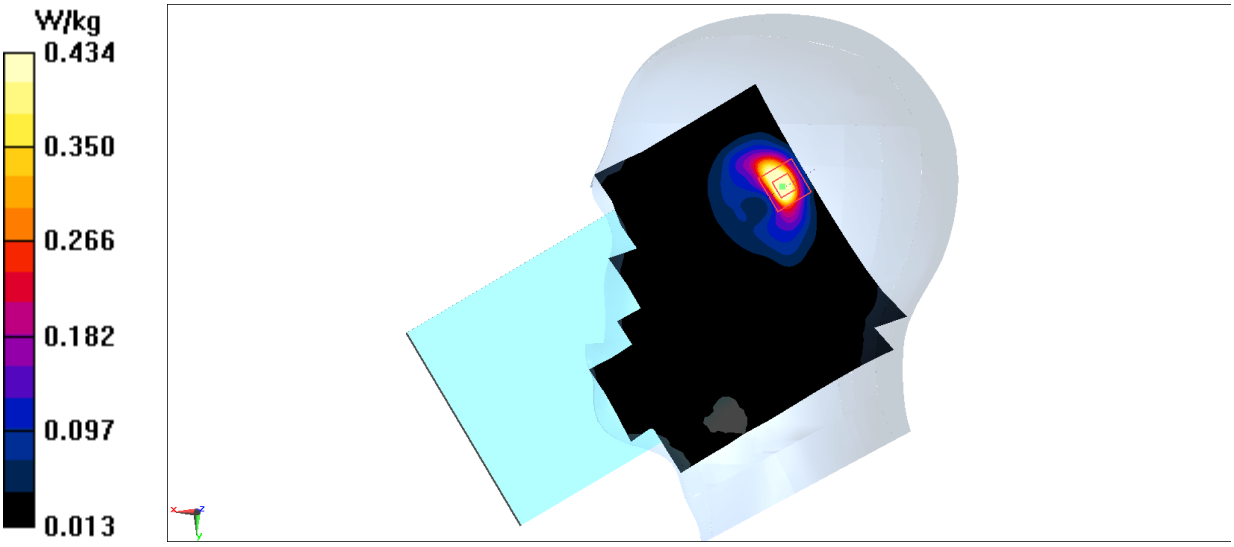


Fig.3 1900 MHz

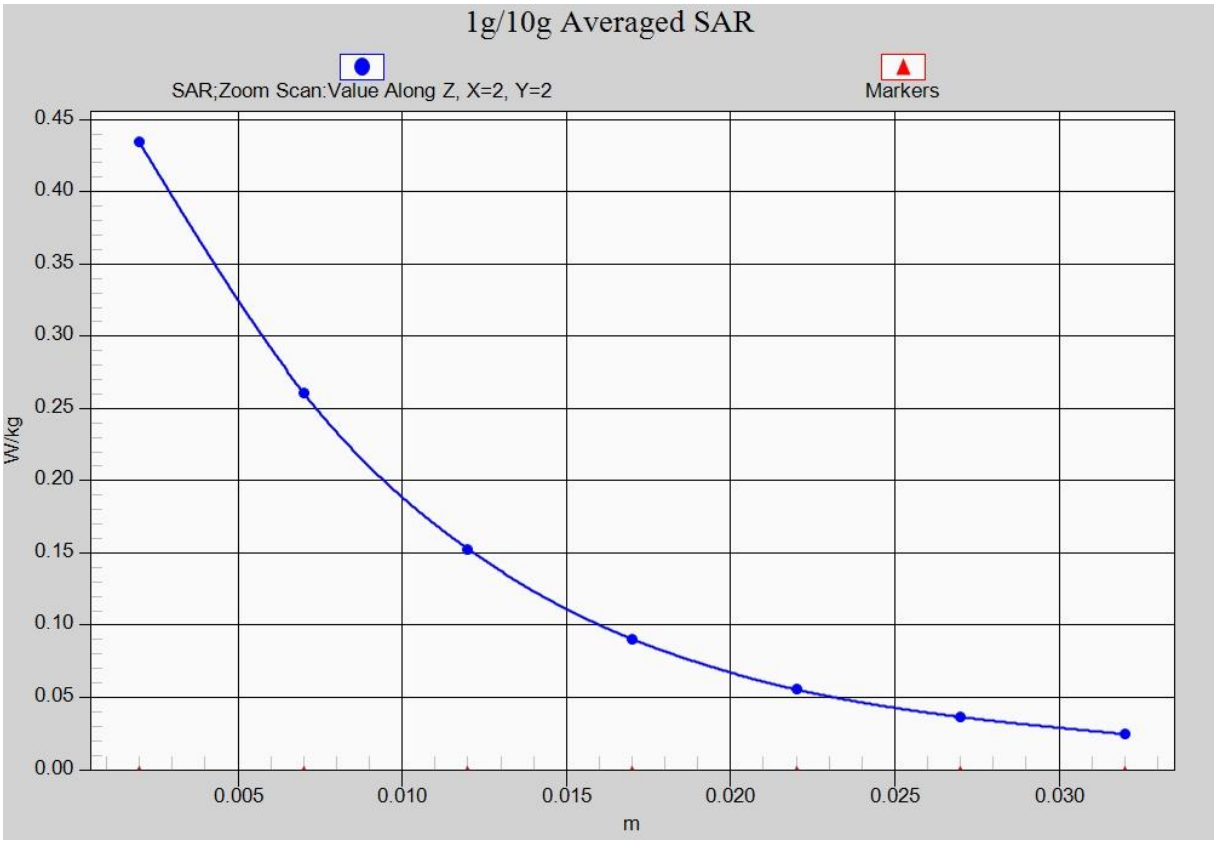


Fig. 3-1Z-Scan at power reference point (1900 MHz)

1900 Body Rear High

Date: 2019-6-8

Electronics: DAE4 Sn1525

Medium: Body 1900 MHz

Medium parameters used: f =1909.8 MHz; σ =1.578 mho/m; εr = 52.75; ρ = 1000 kg/m^3

Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC

Communication System: GSM 1900MHz GPRS Frequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: EX3DV4– SN7514ConvF(7.53, 7.53, 7.53)

Area Scan (151x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.957 W/kg

Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.913 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 1.35 W/kg

SAR(1 g) = 0.608 W/kg; SAR(10 g) = 0.255 W/kg

Maximum value of SAR (measured) = 1.09 W/kg

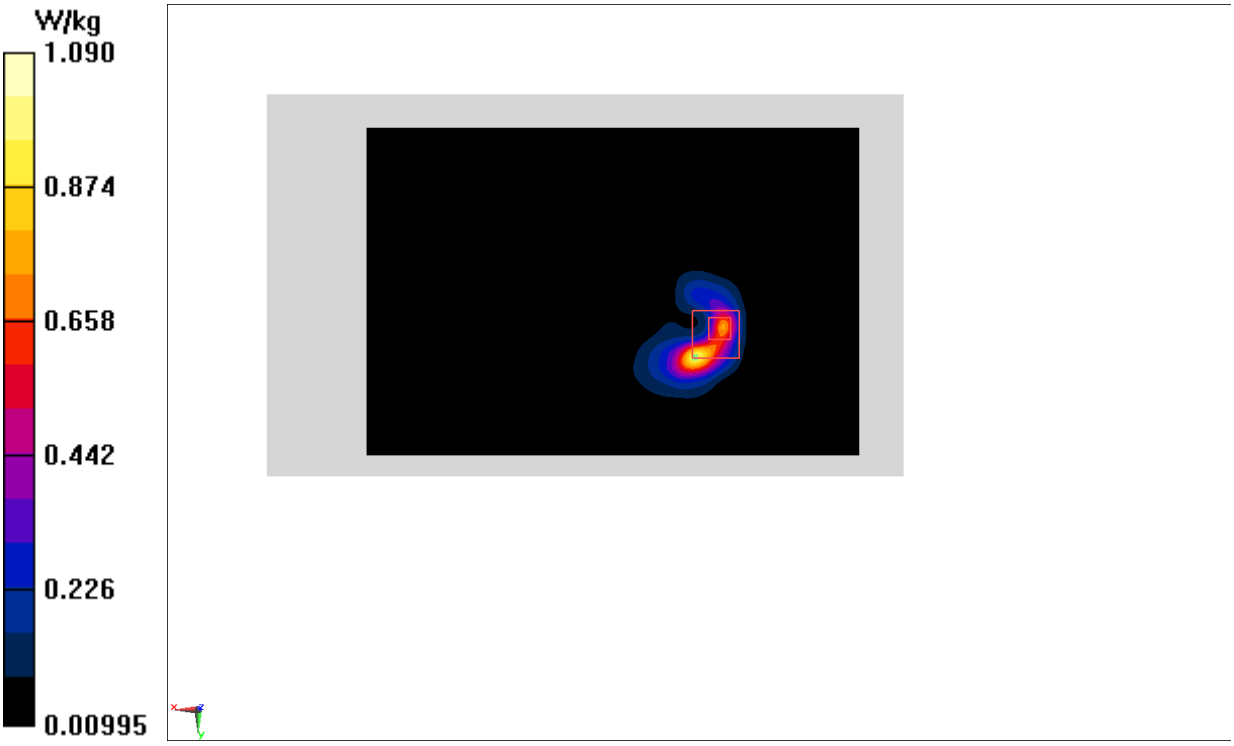


Fig.4 1900 MHz

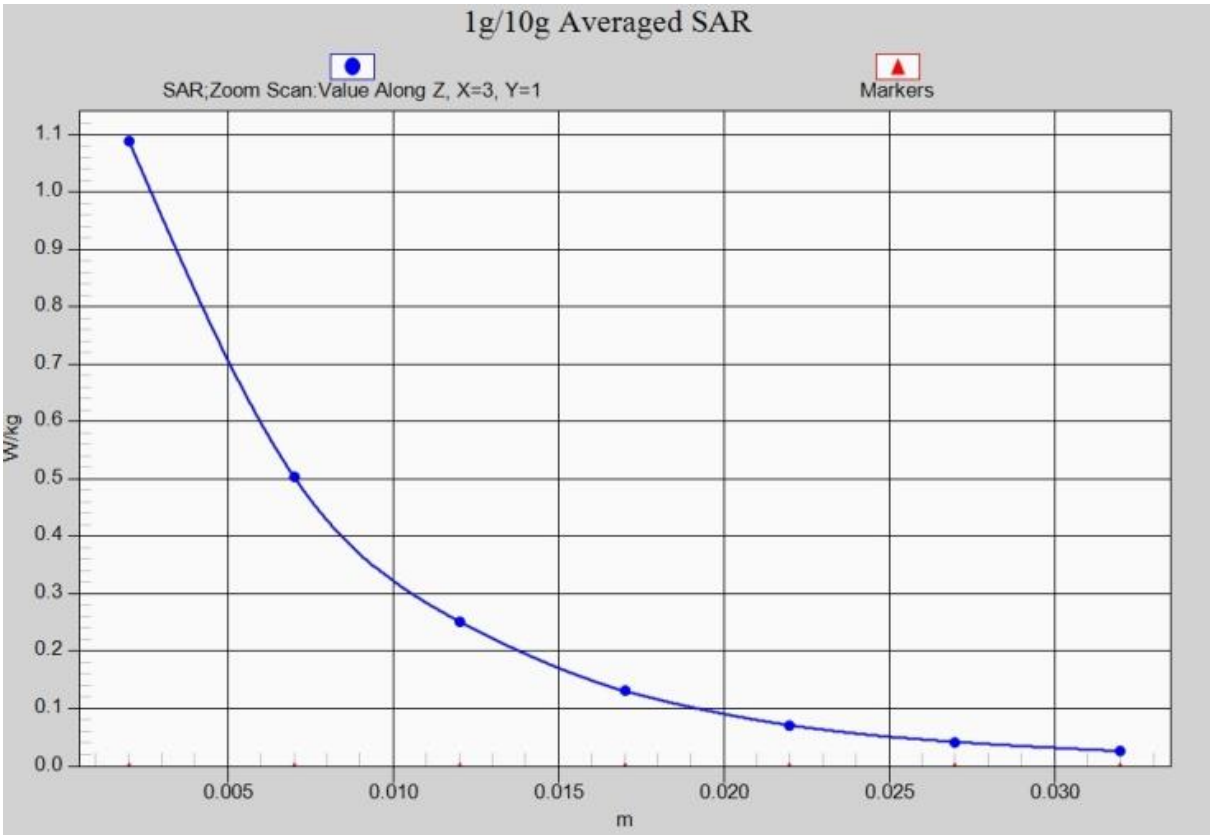


Fig. 4-1Z-Scan at power reference point (1900 MHz)

WCDMA 850 Right Cheek Low

Date: 2019-6-7

Electronics: DAE4 Sn1525

Medium: Head 850 MHz

Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.87 mho/m; εr = 41.805; ρ = 1000 kg/m^3

Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC

Communication System: WCDMA; Frequency: 826.4 MHz;Duty Cycle: 1:1

Probe: EX3DV4 – SN7514ConvF(9.09, 9.09, 9.09)

Area Scan (101x161x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.340 W/kg

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

Reference Value = 11.02 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.633 W/kg

SAR(1 g) = 0.298 W/kg; SAR(10 g) = 0.169 W/kg

Maximum value of SAR (measured) = 0.384 W/kg

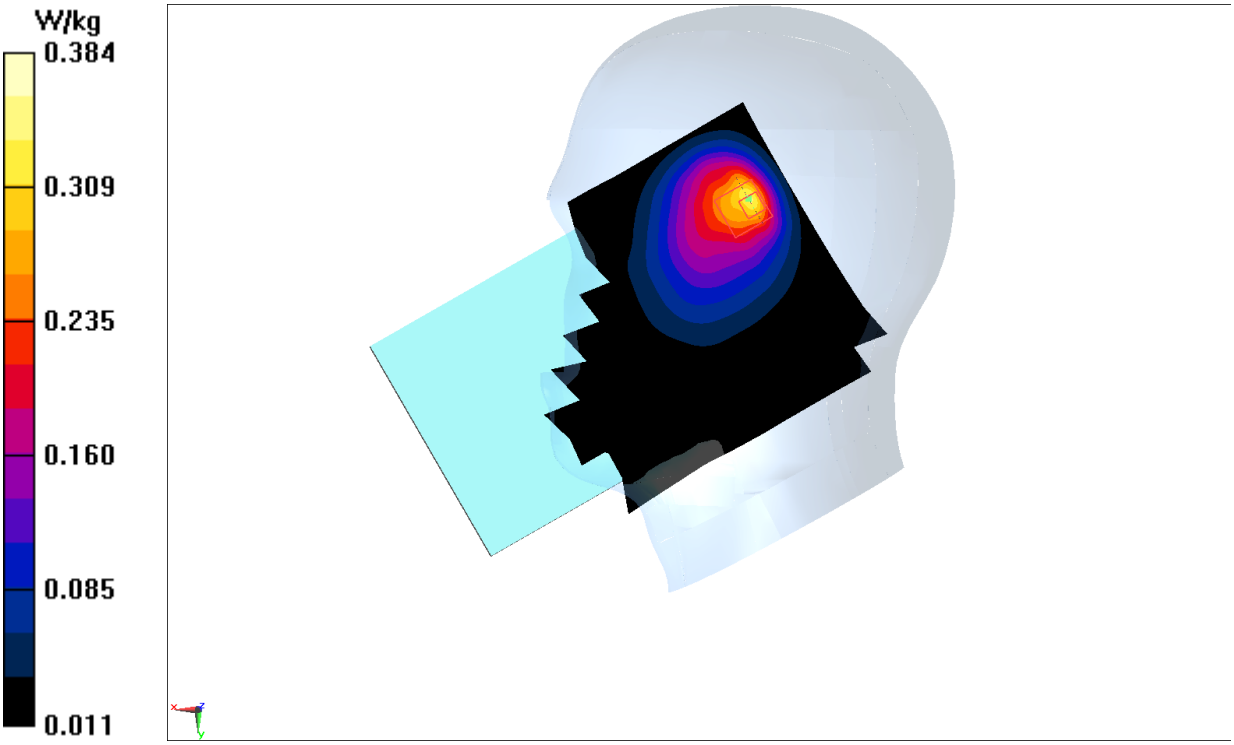


Fig.5 WCDMA 850

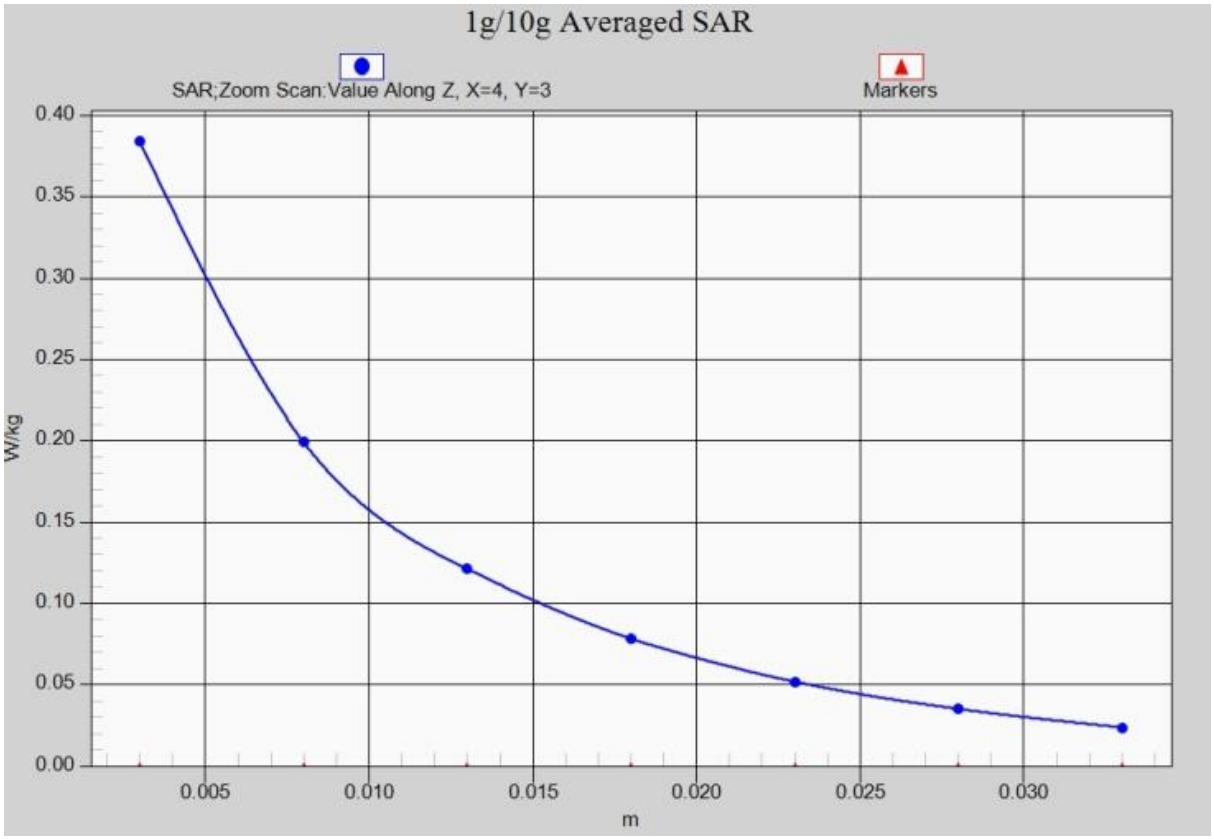


Fig. 5-1Z-Scan at power reference point (850 MHz)

WCDMA 850Body Rear Middle

Date: 2019-6-7

Electronics: DAE4 Sn1525

Medium: Body 850 MHz

Medium parameters used (interpolated): f = 836.6MHz; σ = 0.95 mho/m; εr = 55.226; ρ = 1000 kg/m^3

Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC

Communication System: WCDMA; Frequency: 836.6 MHz;Duty Cycle: 1:1

Probe: EX3DV4 – SN7514ConvF(9.47, 9.47, 9.47)

Area Scan (161x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

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

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

Reference Value = 1.085 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.908 W/kg

SAR(1 g) = 0.428 W/kg; SAR(10 g) = 0.234 W/kg

Maximum value of SAR (measured) = 0.540 W/kg

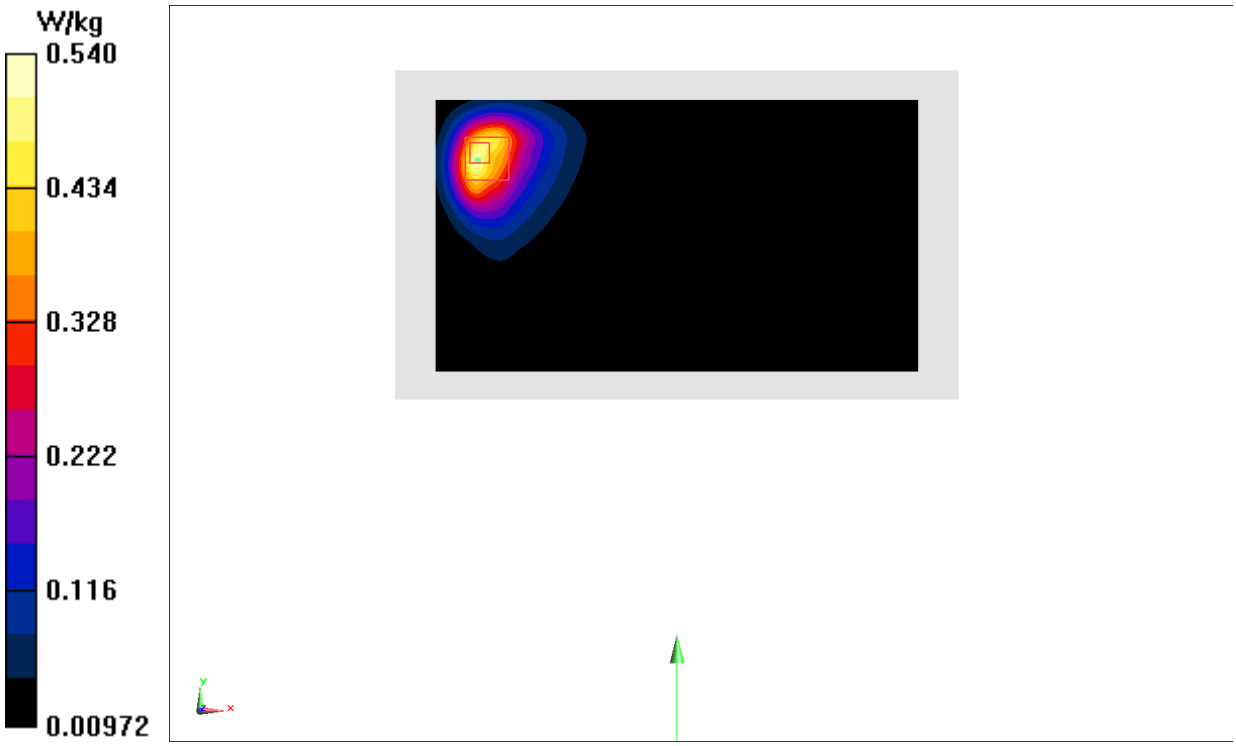


Fig.6 WCDMA 850

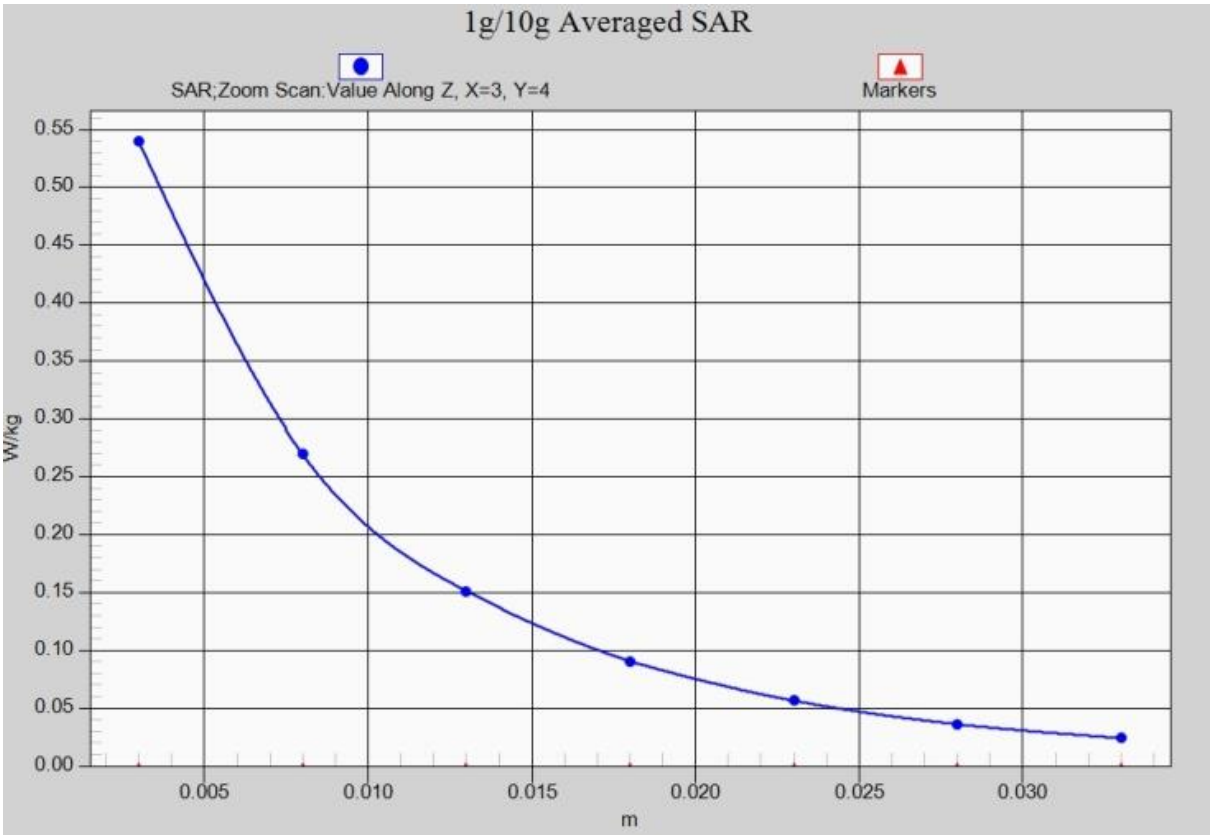


Fig. 6-1 Z-Scan at power reference point (WCDMA850)

WCDMA 1900 RightTilt Middle

Date: 2019-6-8

Electronics: DAE4 Sn1525

Medium: Head 1900 MHz

Medium parameters used (interpolated): f = 1880MHz; σ = 1.406mho/m; εr = 40.2; ρ = 1000 kg/m^3

Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC

Communication System: WCDMA 1900 Frequency: 1880MHz Duty Cycle: 1:1

Probe: EX3DV4– SN7514ConvF(7.73, 7.73, 7.73)

Area Scan (101x161x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

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

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

Reference Value = 6.426 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.460 W/kg

SAR(1 g) = 0.218 W/kg; SAR(10 g) = 0.096 W/kg

Maximum value of SAR (measured) = 0.291 W/kg

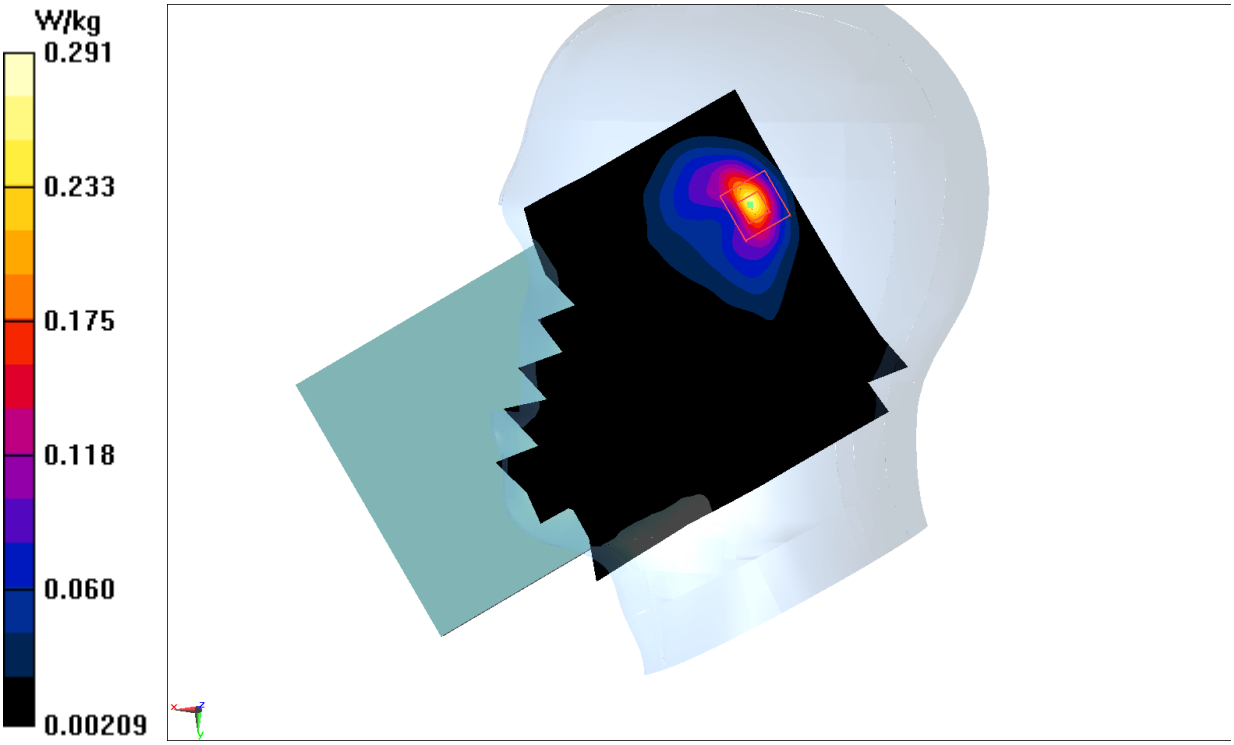


Fig.7WCDMA1900

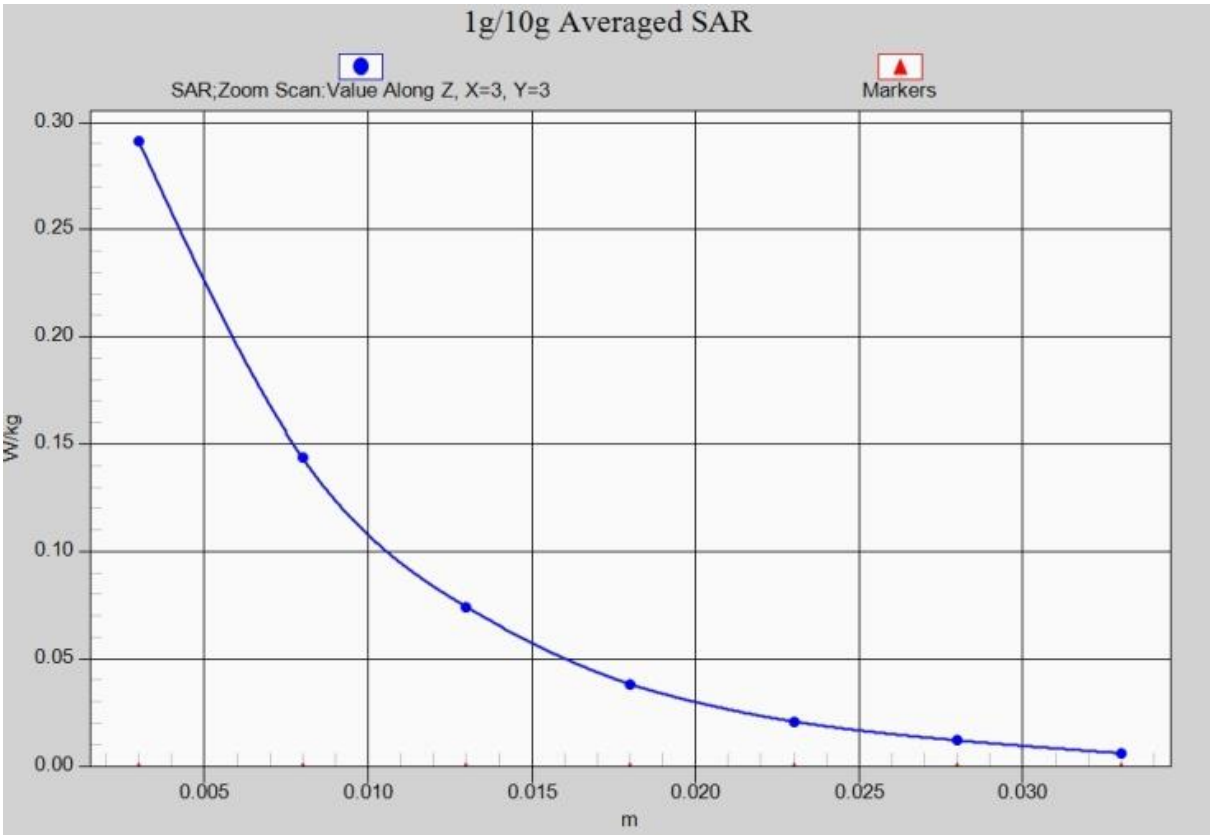


Fig. 7-1 Z-Scan at power reference point (WCDMA1900)

WCDMA 1900 Body Rear Middle

Date: 2019-6-8

Electronics: DAE4 Sn1525

Medium: Body 1900 MHz

Medium parameters used (interpolated): f = 1880 MHz; σ = 1.539 mho/m; εr = 53.1; ρ = 1000 kg/m^3

Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC

Communication System: WCDMA 1900 Frequency: 1852.4 MHz Duty Cycle: 1:1

Probe: EX3DV4– SN7514ConvF(7.53, 7.53, 7.53)

Area Scan (161x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.568 W/kg

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

Reference Value = 0.2890 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 1.16 W/kg

SAR(1 g) = 0.457 W/kg; SAR(10 g) = 0.191 W/kg

Maximum value of SAR (measured) = 0.683 W/kg

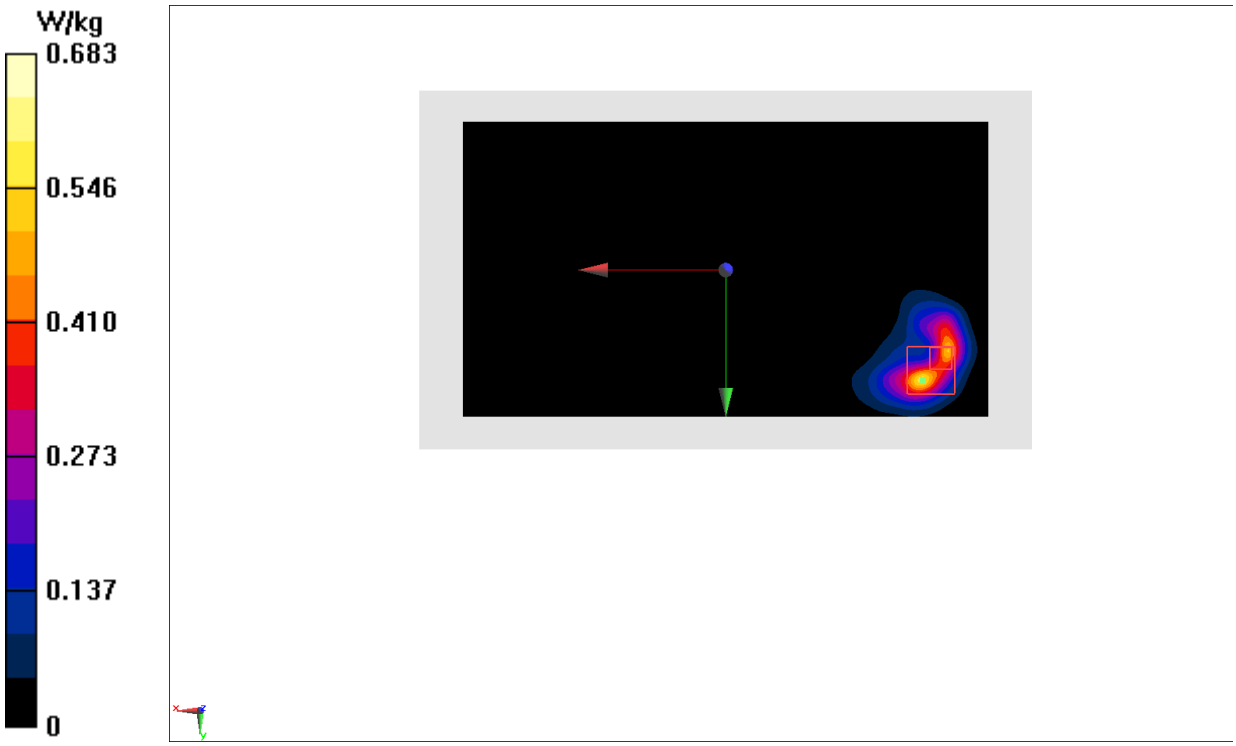


Fig.8WCDMA1900

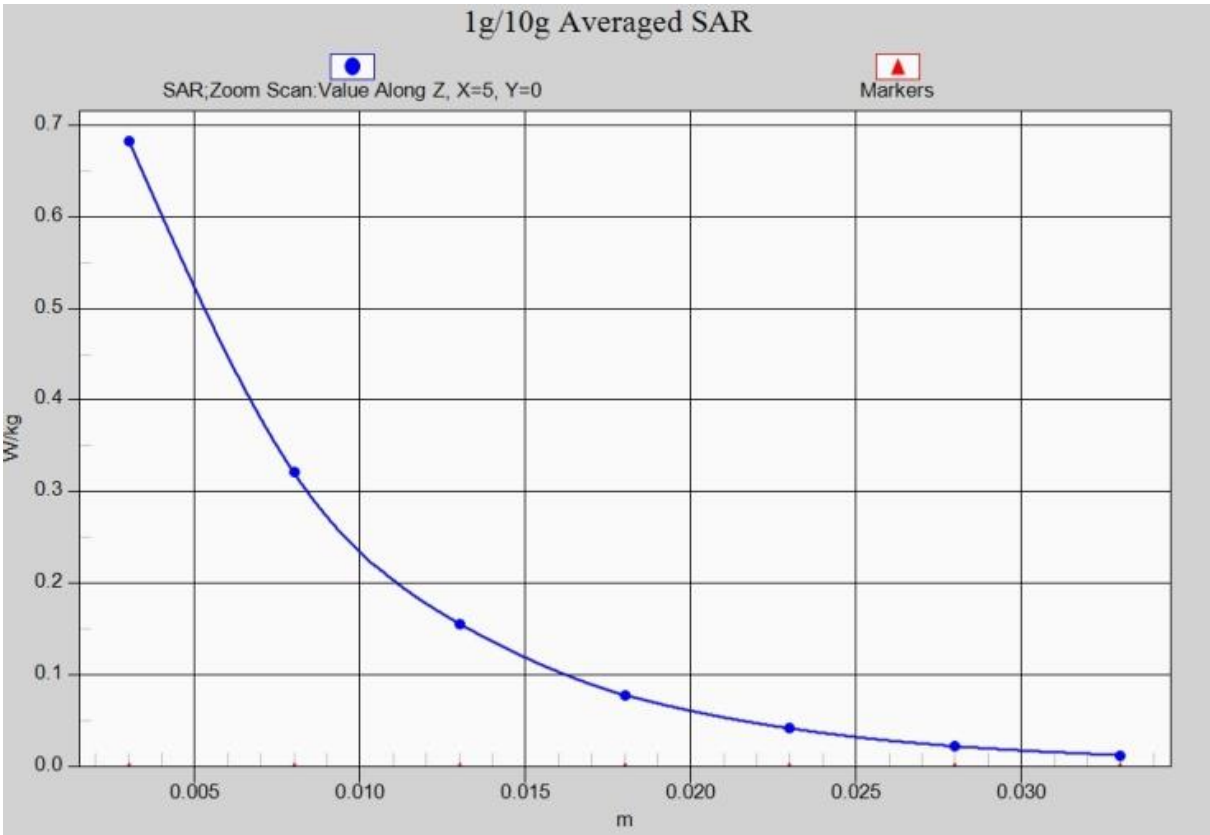


Fig. 8-1 Z-Scan at power reference point (WCDMA1900)

CDMA BC0_CH384 Right Cheek

Date: 2019-6-7

Electronics: DAE4 Sn1525

Medium: Head 835 MHz

Medium parameters used: f = 836.52 MHz; σ = 0.936 mho/m; εr = 42.11; ρ = 1000 kg/m^3

Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC

Communication System: CDMABC0 836.52 MHz Duty Cycle: 1：1

Probe: EX3DV4 – SN7514ConvF(9.09,9.09,9.09)

Area Scan (111x161x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.562 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.56 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.872 W/kg

SAR(1 g) = 0.440 W/kg; SAR(10 g) = 0.249 W/kg

Maximum value of SAR (measured) = 0.634 W/kg

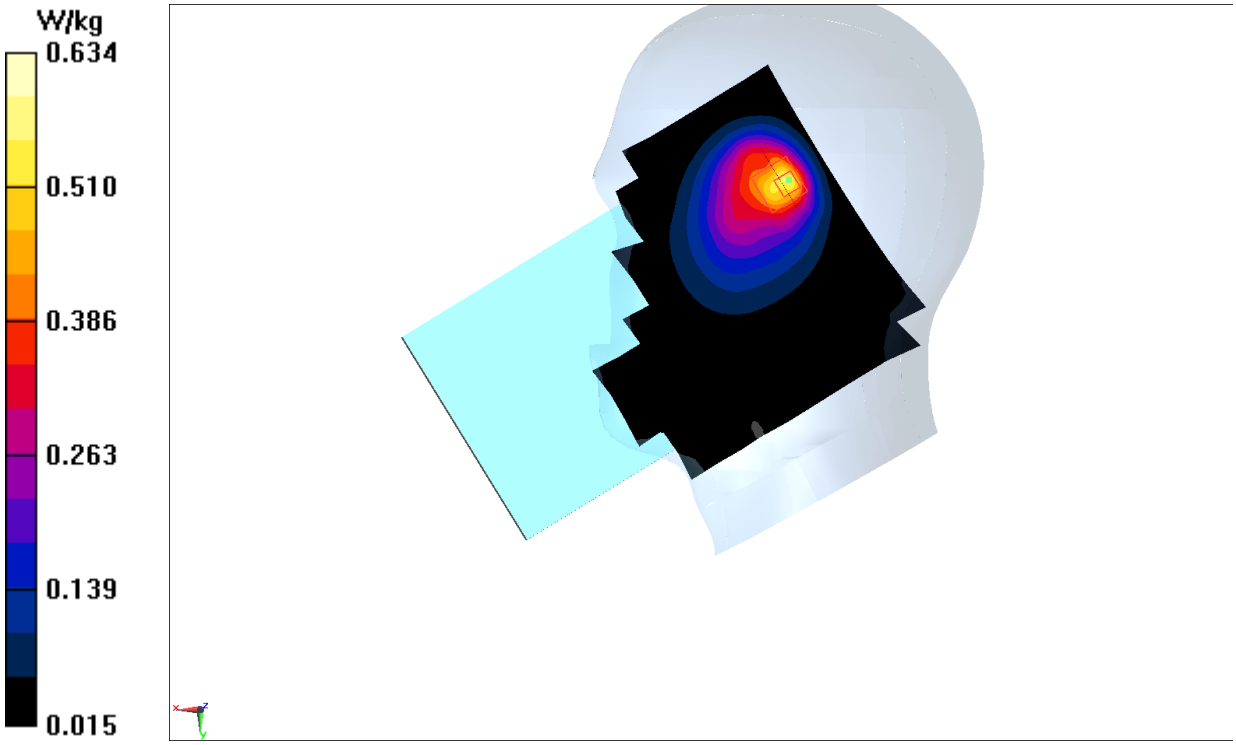


Fig.9CDMA BC0

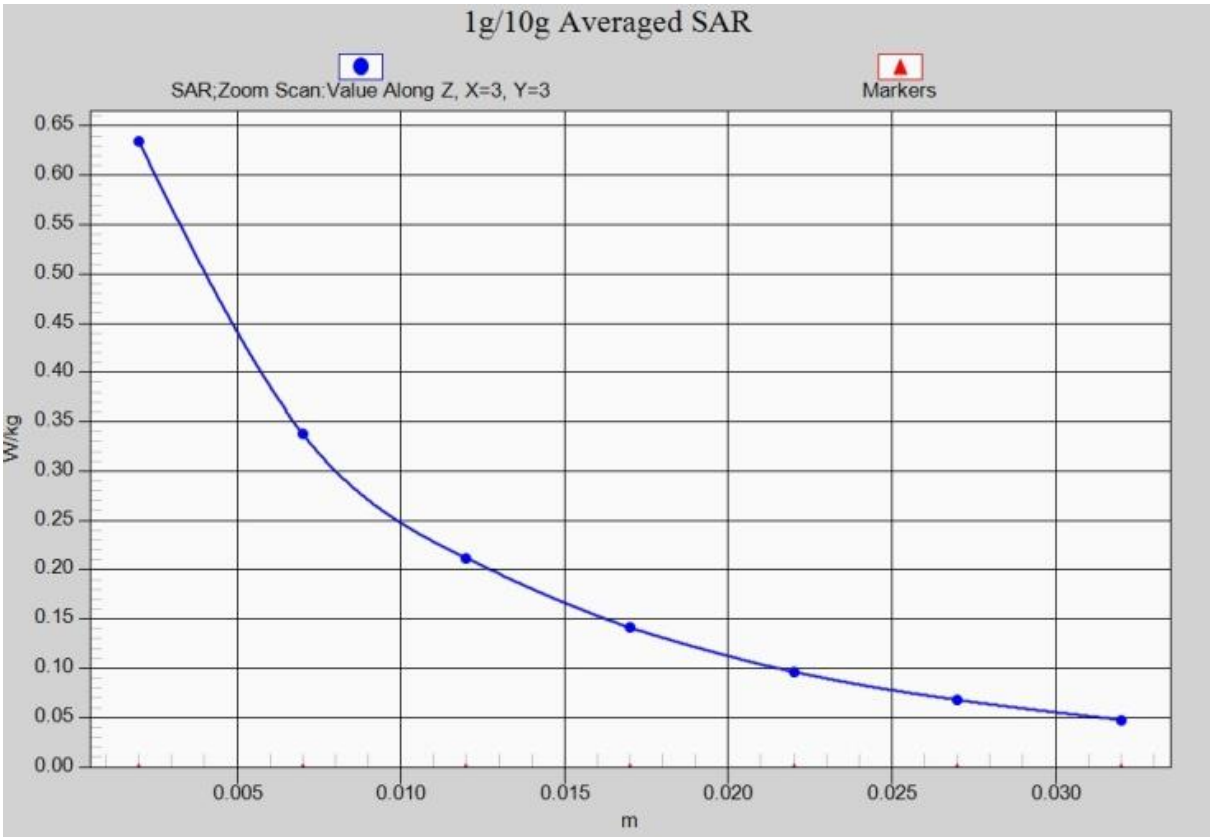


Fig. 9-1 Z-Scan at power reference point (CDMA BC0)

CDMA BC0_CH384 Rear

Date: 2019-6-7
Electronics: DAE4 Sn1525
Medium: Body835 MHz
Medium parameters used: f = 836.52 MHz; σ = 0.996 mho/m; εr = 55.98; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC, Liquid Temperature: 22.5ºC
Communication System: CDMABC0 836.52 MHz Duty Cycle: 1：1
Probe: EX3DV4 – SN7514ConvF(9.47,9.47,9.47)

0mm/Rear Mid 0mm/Area Scan (151x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.11 W/kg

0mm/Rear Mid 0mm/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.606 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 1.46 W/kg
SAR(1 g) = 0.642 W/kg; SAR(10 g) = 0.349 W/kg
Maximum value of SAR (measured) = 1.06 W/kg

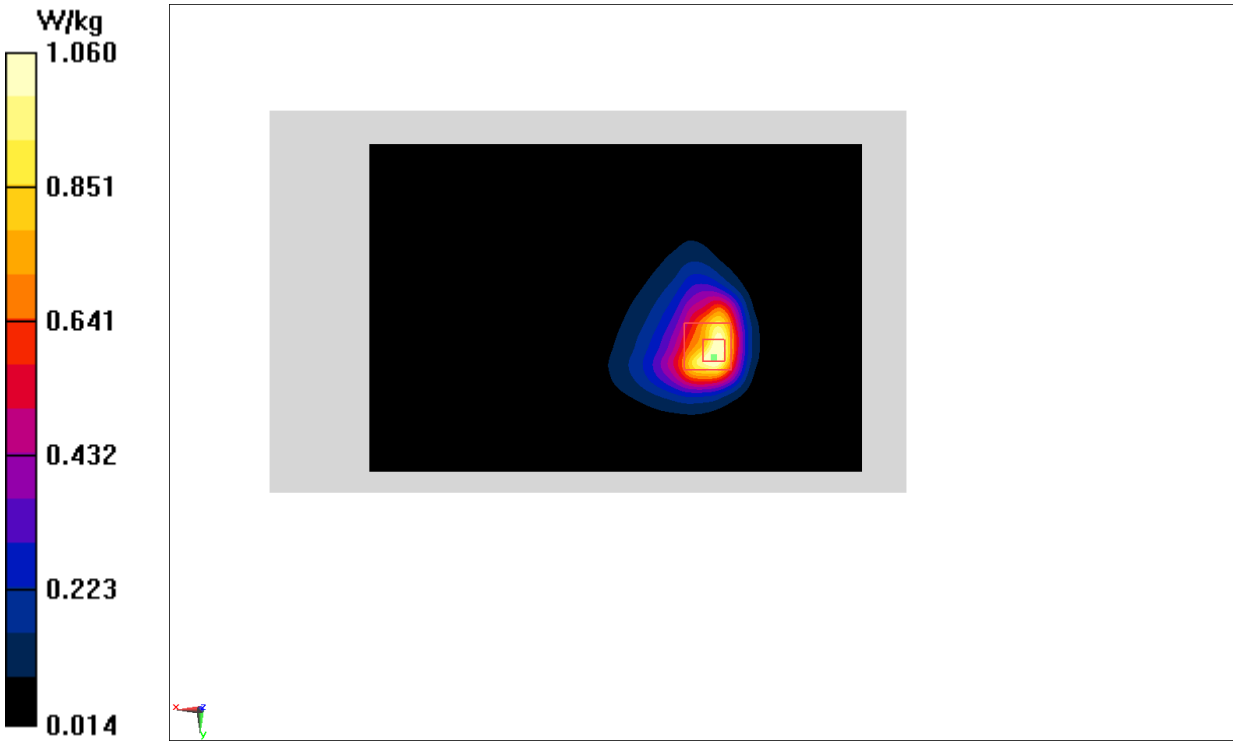


Fig.10CDMA BC0

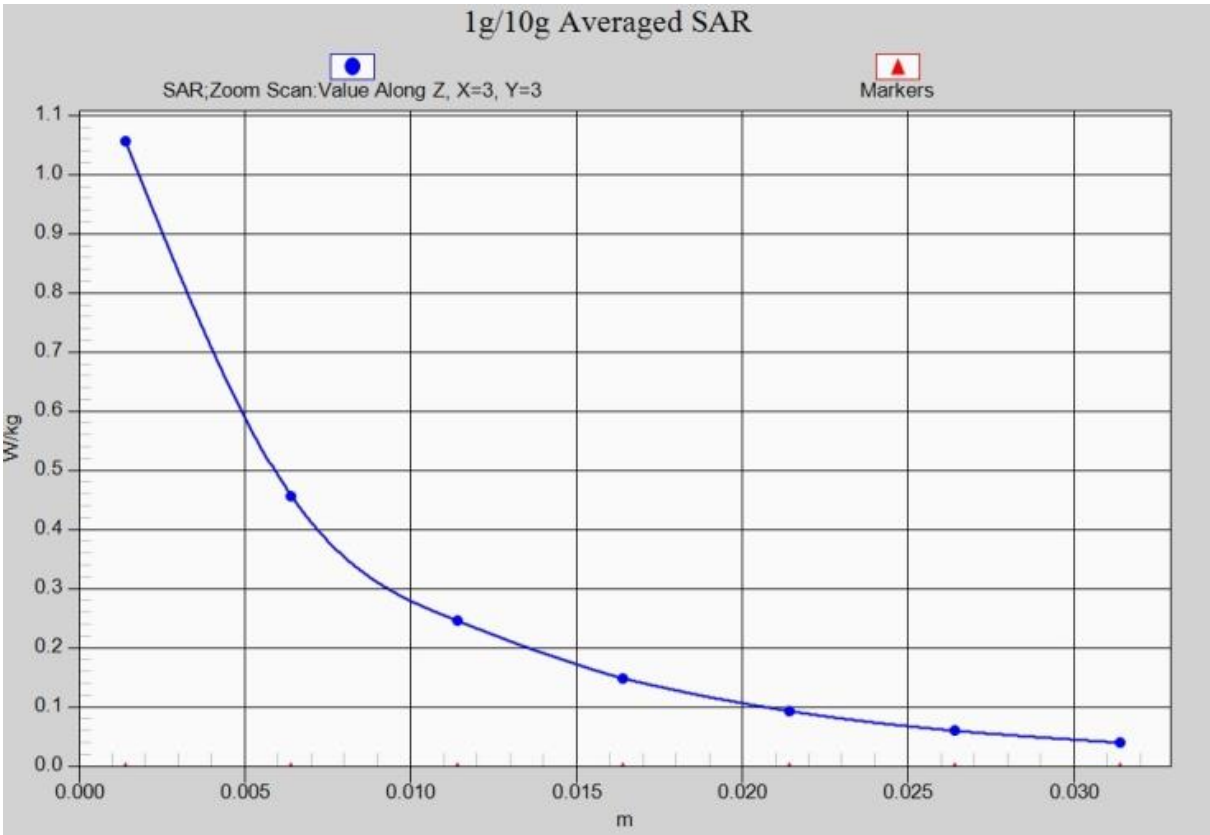


Fig. 10-1 Z-Scan at power reference point (CDMA BC0)

LTE Band5 RightCheek Low with QPSK_10M_1RB_Middle

Date: 2019-6-7
Electronics: DAE4 Sn1525
Medium: Head 850 MHz
Medium parameters used (interpolated): f = 829 MHz; σ = 0.883 mho/m; εr = 41.691; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: LTE Band5 Frequency: 829MHz Duty Cycle: 1:1
Probe: EX3DV4 - SN7514ConvF(9.09, 9.09, 9.09)

Area Scan (101x161x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.363 W/kg

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

Reference Value = 10.98 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.619 W/kg
SAR(1 g) = 0.304 W/kg; SAR(10 g) = 0.173 W/kg
Maximum value of SAR (measured) = 0.375 W/kg

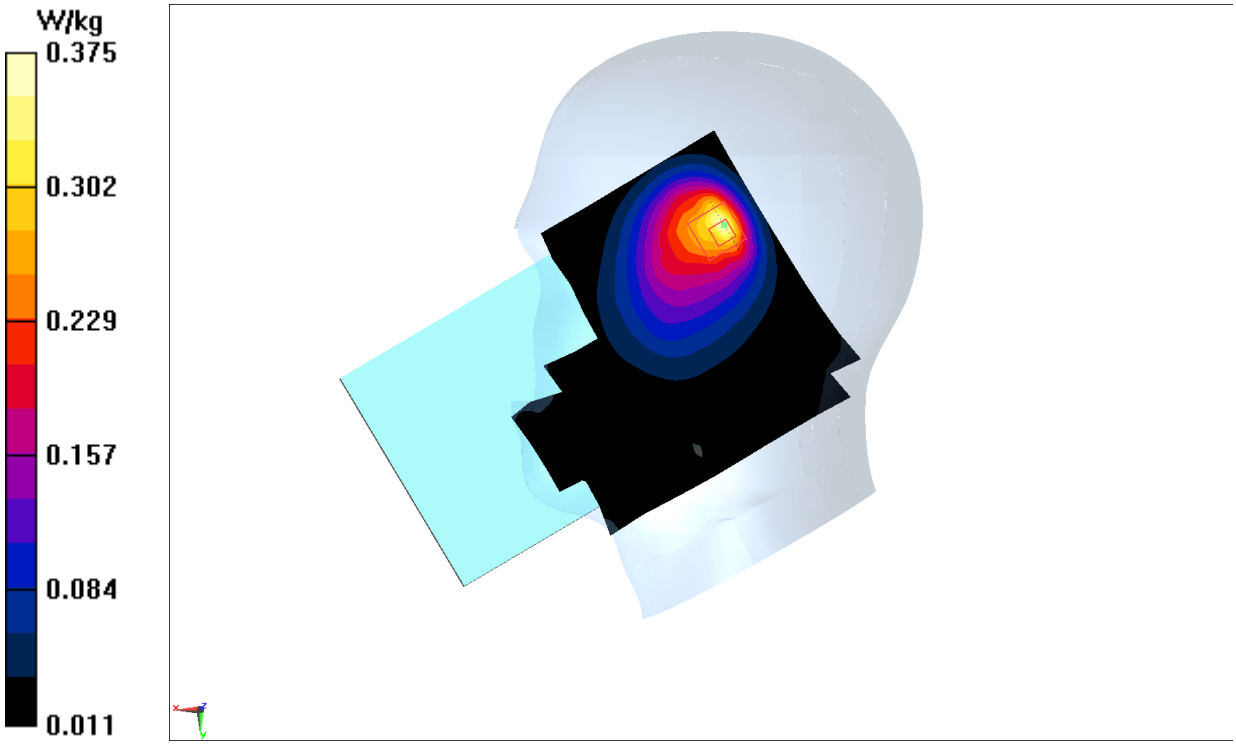


Fig.11 LTE Band5

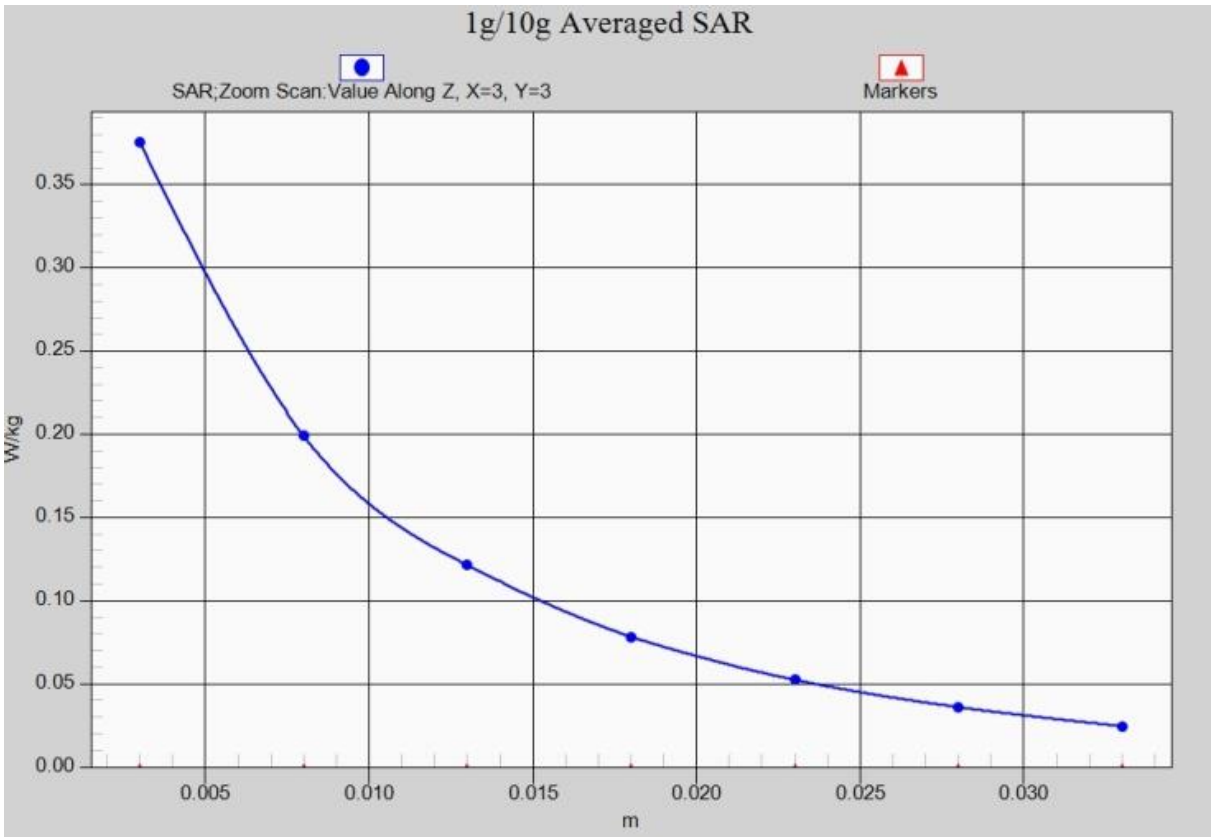


Fig. 11-1 Z-Scan at power reference point (LTE Band5)

LTE Band5 Body Rear Low with QPSK_10M_1RB_Middle

Date: 2019-6-7

Electronics: DAE4 Sn1525

Medium: Body 850 MHz

Medium parameters used (interpolated): f = 829 MHz; σ = 0.982mho/m; εr = 54.944; ρ = 1000 kg/m^3

Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC

Communication System: LTE Band5 Frequency: 829 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7514ConvF(9.47, 9.47, 9.47)

Area Scan (161x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.659 W/kg

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

Reference Value = 0.9410 V/m; Power Drift = 1.03 dB

Peak SAR (extrapolated) = 1.04 W/kg

SAR(1 g) = 0.483 W/kg; SAR(10 g) = 0.265 W/kg

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

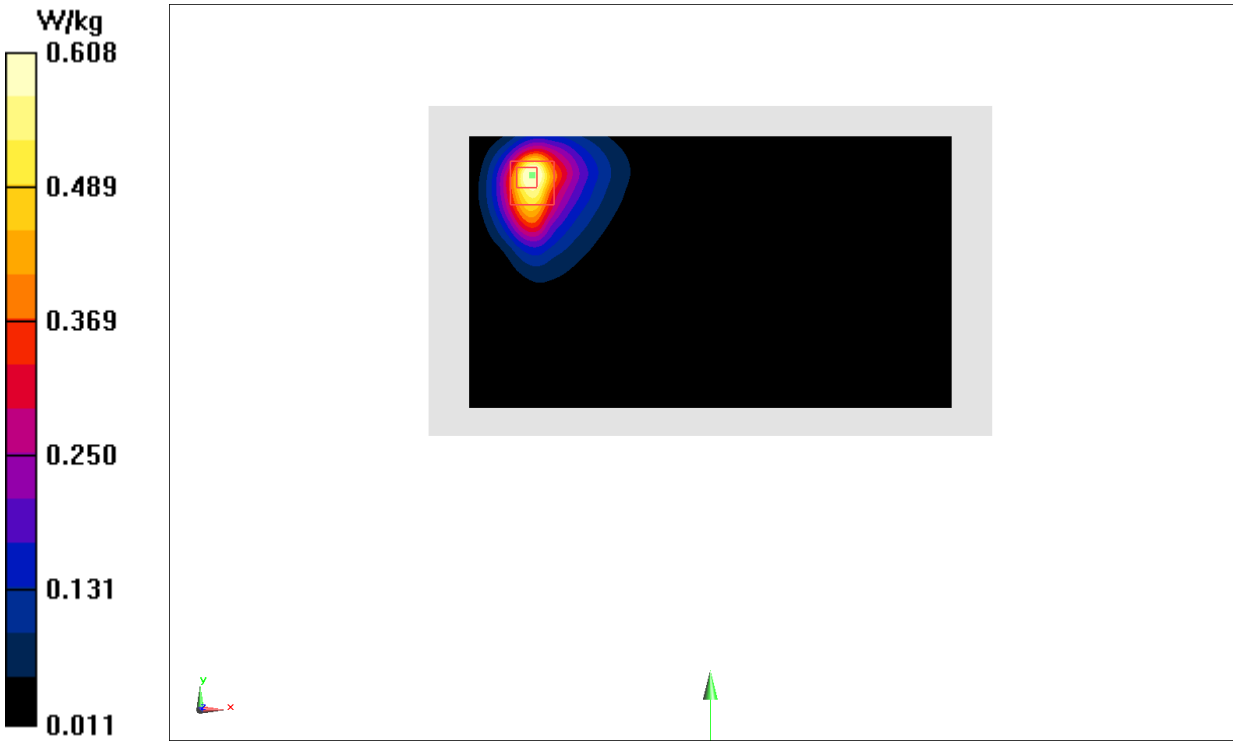


Fig.12 LTE Band5

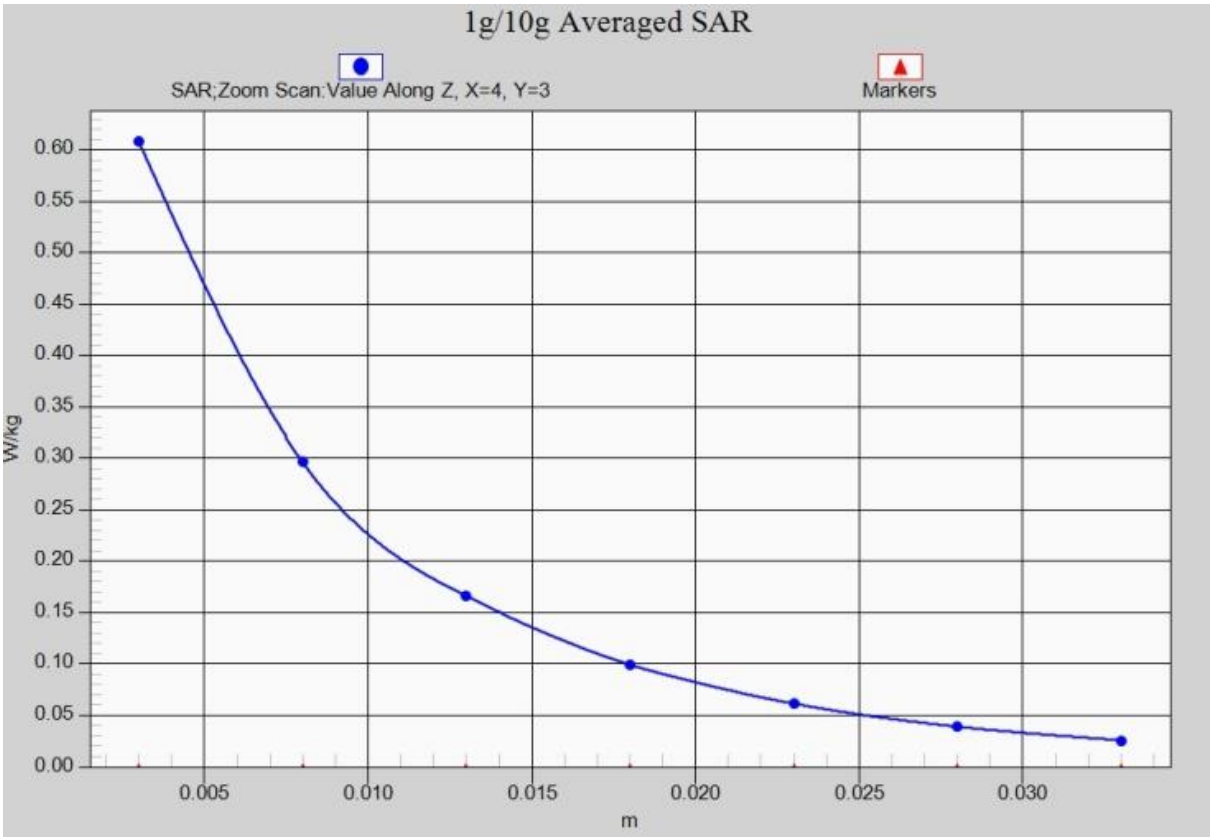


Fig. 12-1 Z-Scan at power reference point (LTE Band5)

LTE Band7Right Tilt Low with QPSK_20M_50RB_Middle
Date: 2019-6-10
Electronics: DAE4 Sn1525
Medium: Head2600 MHz
Medium parameters used: f = 2510 MHz; σ = 1.931mho/m; εr = 38.3; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: LTE Band7Frequency: 2510 MHz Duty Cycle: 1:1
Probe: EX3DV4– SN7514ConvF(6.92, 6.92, 6.92)

Area Scan (141x201x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

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

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

Reference Value = 1.315 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.613 W/kg
SAR(1 g) = 0.281 W/kg; SAR(10 g) = 0.123 W/kg
Maximum value of SAR (measured) = 0.435 W/kg

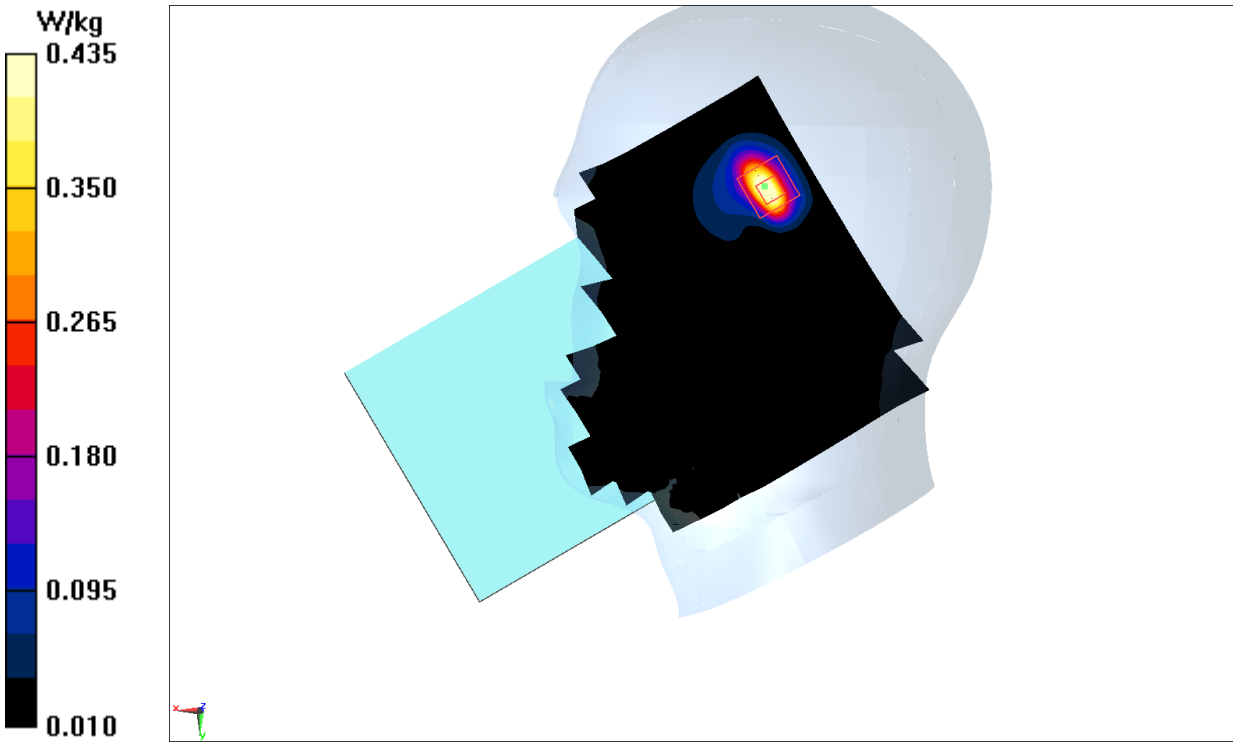


Fig.13 LTE Band7

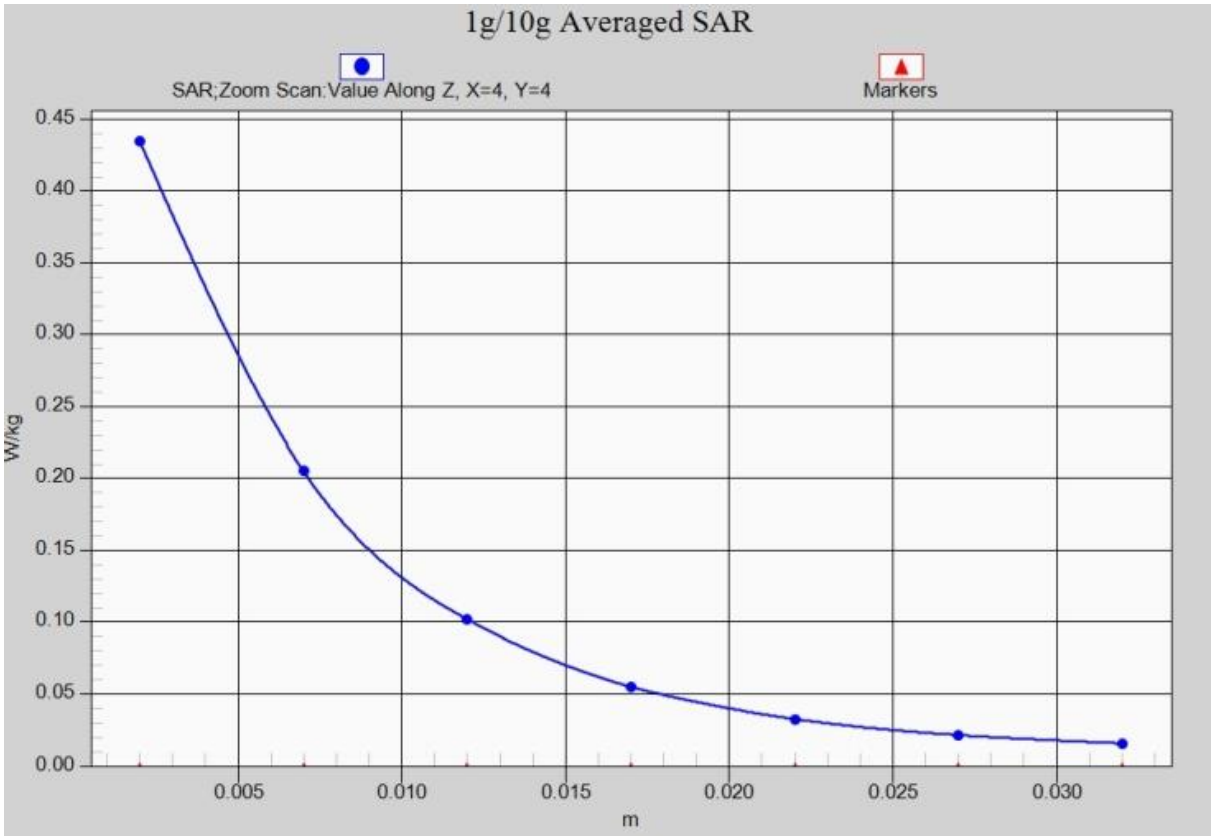


Fig. 13-1 Z-Scan at power reference point (LTE Band7)

LTE Band7 Body Rear Low with QPSK_20M_1RB_Middle

Date: 2019-6-10
Electronics: DAE4 Sn1525
Medium: Body2600 MHz
Medium parameters used: f = 2510 MHz; σ = 2.129 mho/m; εr = 51.28; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: LTE Band7 Frequency: 2510MHz Duty Cycle: 1:1
Probe: EX3DV4– SN7514ConvF(7.06, 7.06, 7.06)

Area Scan (151x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.51 W/kg

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

Reference Value = 0.4200 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.81 W/kg
SAR(1 g) = 0.652 W/kg; SAR(10 g) = 0.269 W/kg
Maximum value of SAR (measured) = 1.23 W/kg

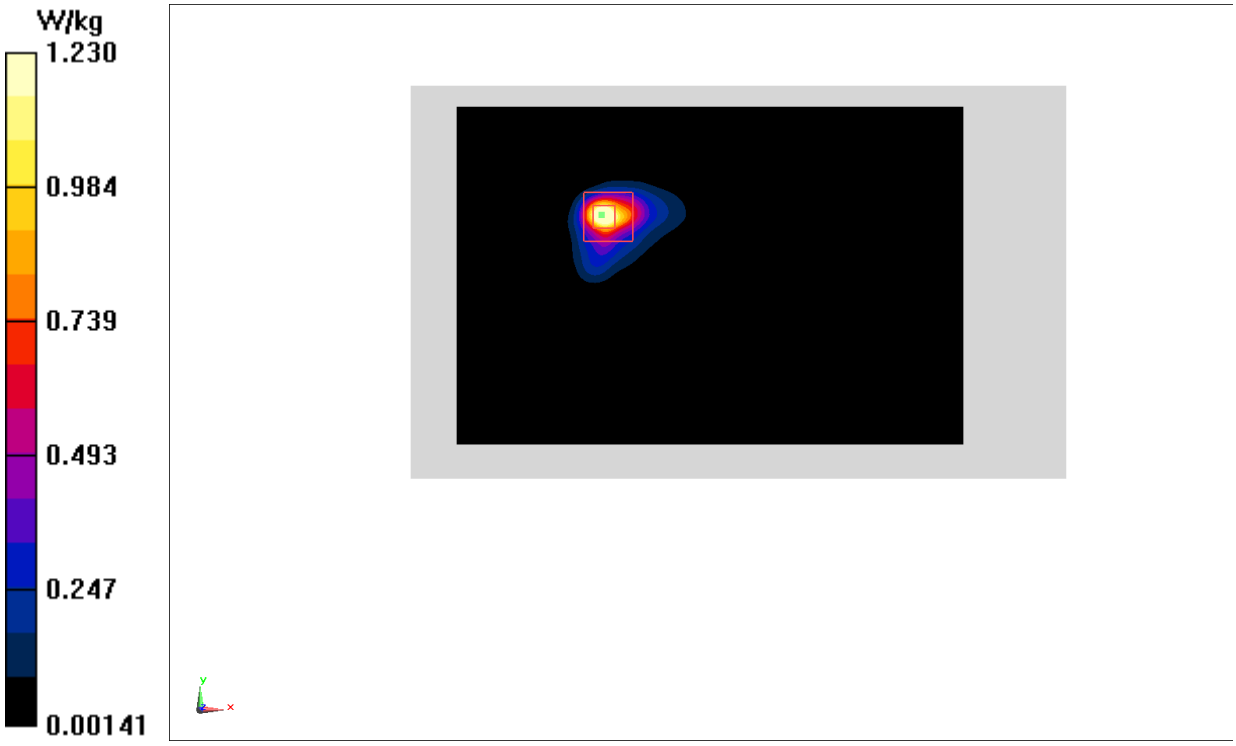


Fig.14 LTE Band7

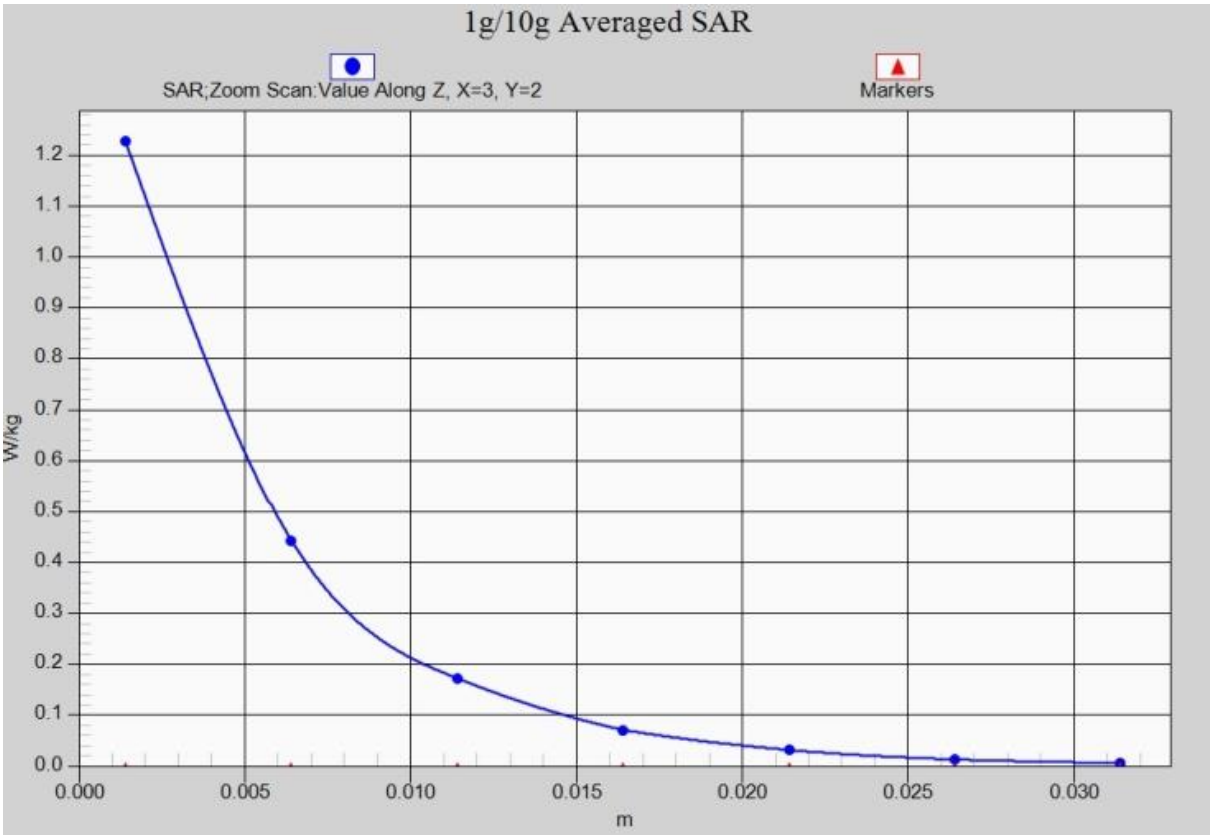


Fig. 14-1 Z-Scan at power reference point (LTE Band7)

LTE Band41Right Tilt with QPSK_20M_1RB_Middle

Date: 2019-6-11
Electronics: DAE4 Sn1525
Medium: Head2600 MHz
Medium parameters used: f = 2578 MHz; σ = 1.916 mho/m; εr = 38.28; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: LTE Band38 Frequency: 2578 MHz Duty Cycle: 1:1.58
Probe: EX3DV4– SN7514ConvF(6.92, 6.92, 6.92)

Area Scan (141x161x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.252 W/kg

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

Reference Value = 0 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.303 W/kg
SAR(1 g) = 0.149 W/kg; SAR(10 g) = 0.076 W/kg
Maximum value of SAR (measured) = 0.236 W/kg

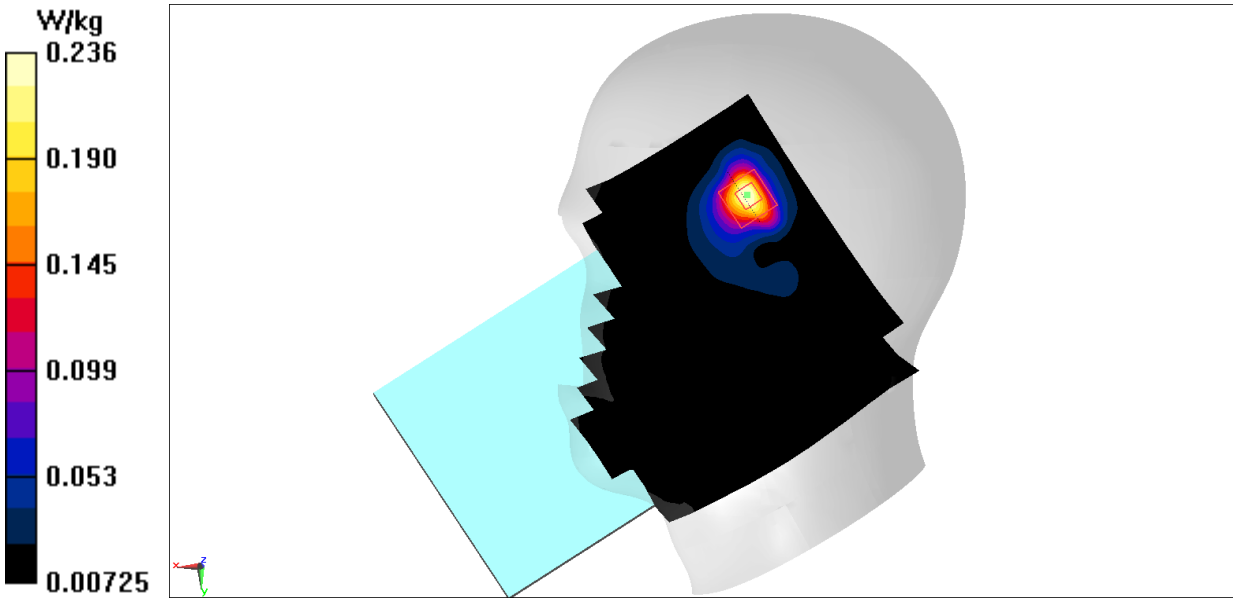


Fig.15 LTE Band 41

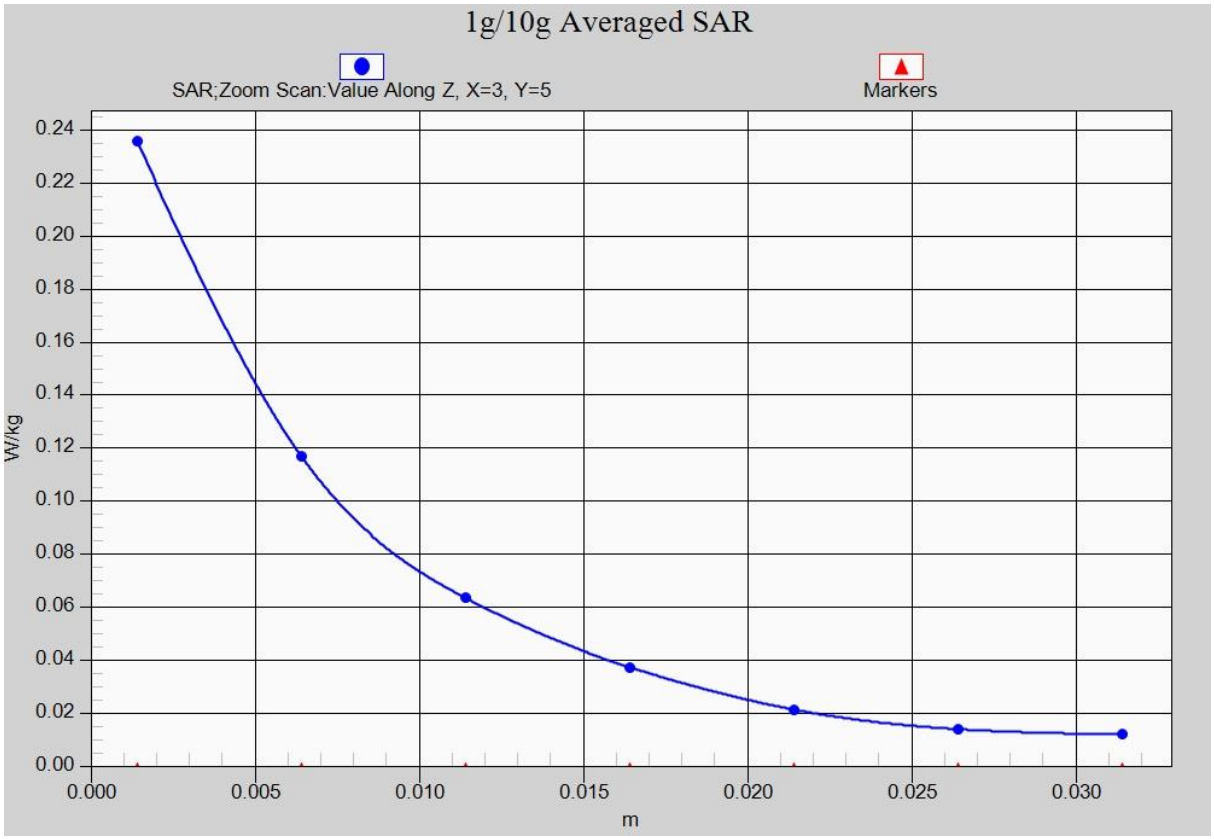


Fig. 15-1 Z-Scan at power reference point (LTE Band 38)

LTE Band 41Body Rear with QPSK_20M_1RB_Middle

Date: 2019-6-11
Electronics: DAE4 Sn1525
Medium: Body2600 MHz
Medium parameters used: f = 2578 MHz; σ = 2.166 mho/m; εr = 51.233; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: LTE Band38 Frequency: 2578 MHz Duty Cycle: 1:1.58
Probe: EX3DV4– SN7514ConvF(7.06, 7.06, 7.06)

Area Scan (211x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.25 W/kg

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

Reference Value = 0.1870 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 1.70 W/kg
SAR(1 g) = 0.580 W/kg; SAR(10 g) = 0.237 W/kg
Maximum value of SAR (measured) = 1.21 W/kg

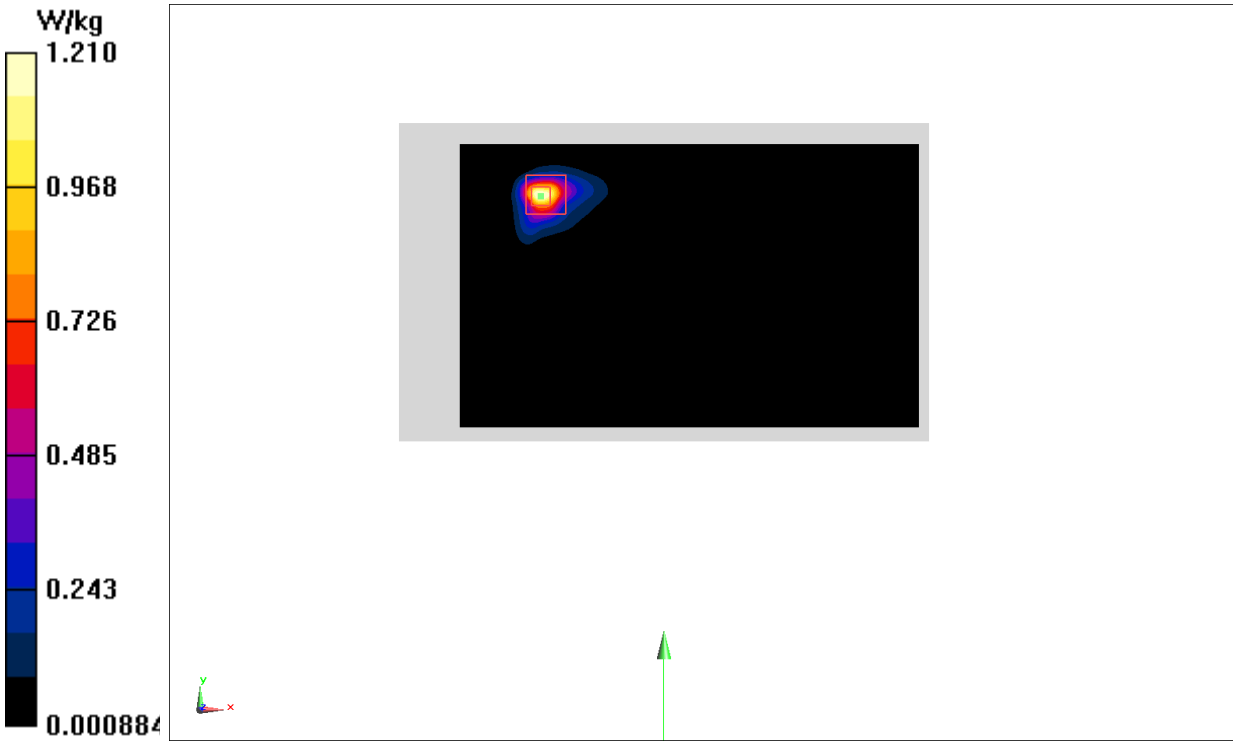


Fig.16 LTE Band 41

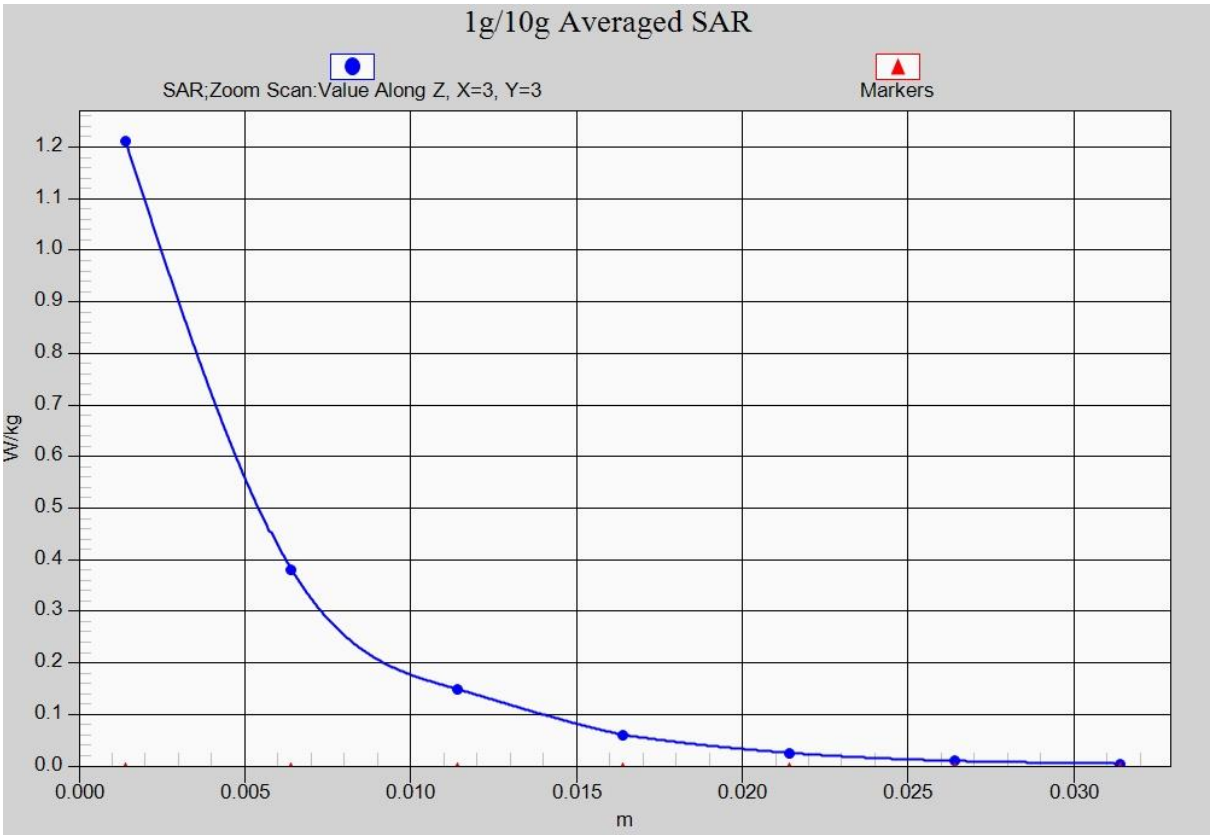


Fig. 16-1 Z-Scan at power reference point (LTE Band 38)

Wifi 802.11b Left Cheek Channel 6

Date: 2019-6-9

Electronics: DAE4 Sn1525

Medium: Head 2450 MHz

Medium parameters used (interpolated): f = 2437 MHz; σ = 1.808 mho/m; ε_r = 39.42; ρ = 1000 kg/m^3

Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC

Communication System: WLan 2450 Frequency: 2437 MHz Duty Cycle: 1:1

Probe: EX3DV4– SN7514ConvF(6.95, 6.95, 6.95)

Area Scan (141x201x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.129 W/kg

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

Reference Value = 2.337 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.177 W/kg

SAR(1 g) = 0.072 W/kg; SAR(10 g) = 0.034 W/kg

Maximum value of SAR (measured) = 0.117 W/kg

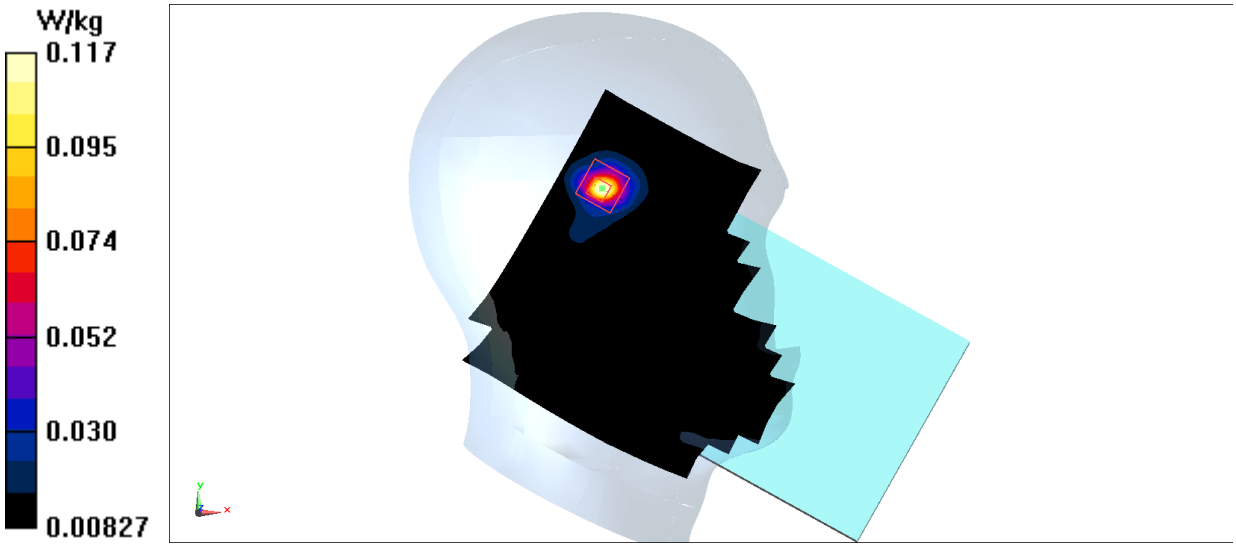


Fig.17 2450 MHz

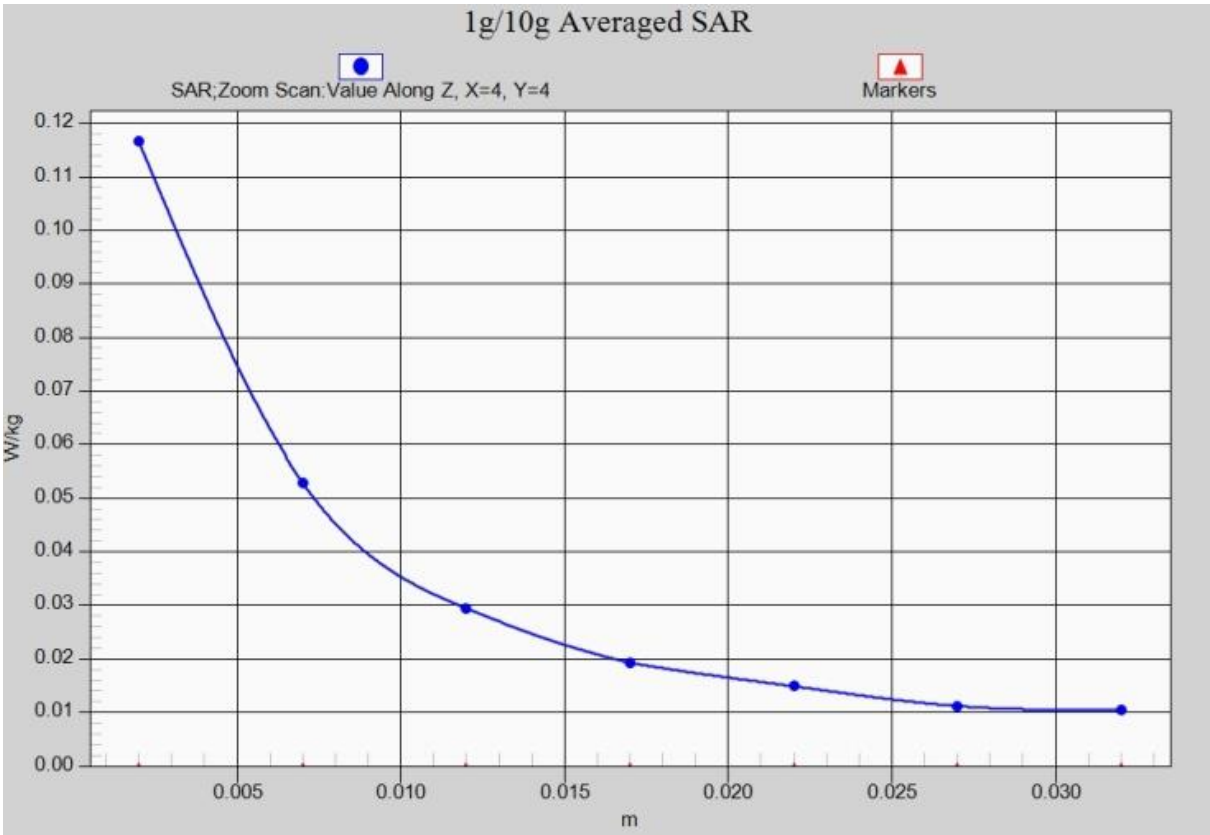


Fig. 17-1 Z-Scan at power reference point (2450 MHz)

Wifi 802.11b Body Rear Channel 6

Date: 2019-6-9

Electronics: DAE4 Sn1525

Medium: Body 2450 MHz

Medium parameters used (interpolated): f = 2437 MHz; σ = 1.97mho/m; ε_r = 52.32; ρ = 1000 kg/m^3

Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC

Communication System: WLan 2450 Frequency: 2437 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN7514ConvF(7.13, 7.13, 7.13)

Area Scan (141x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

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

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

Reference Value = 8.358 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 1.43 W/kg

SAR(1 g) = 0.633 W/kg; SAR(10 g) = 0.276 W/kg

Maximum value of SAR (measured) = 1.02 W/kg

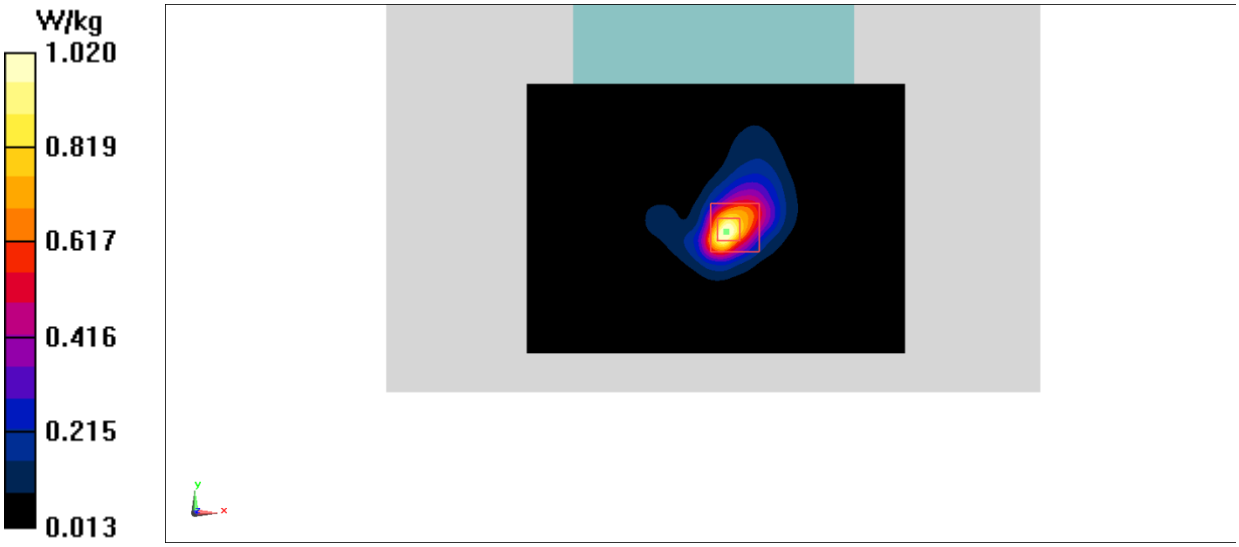


Fig.18 2450 MHz

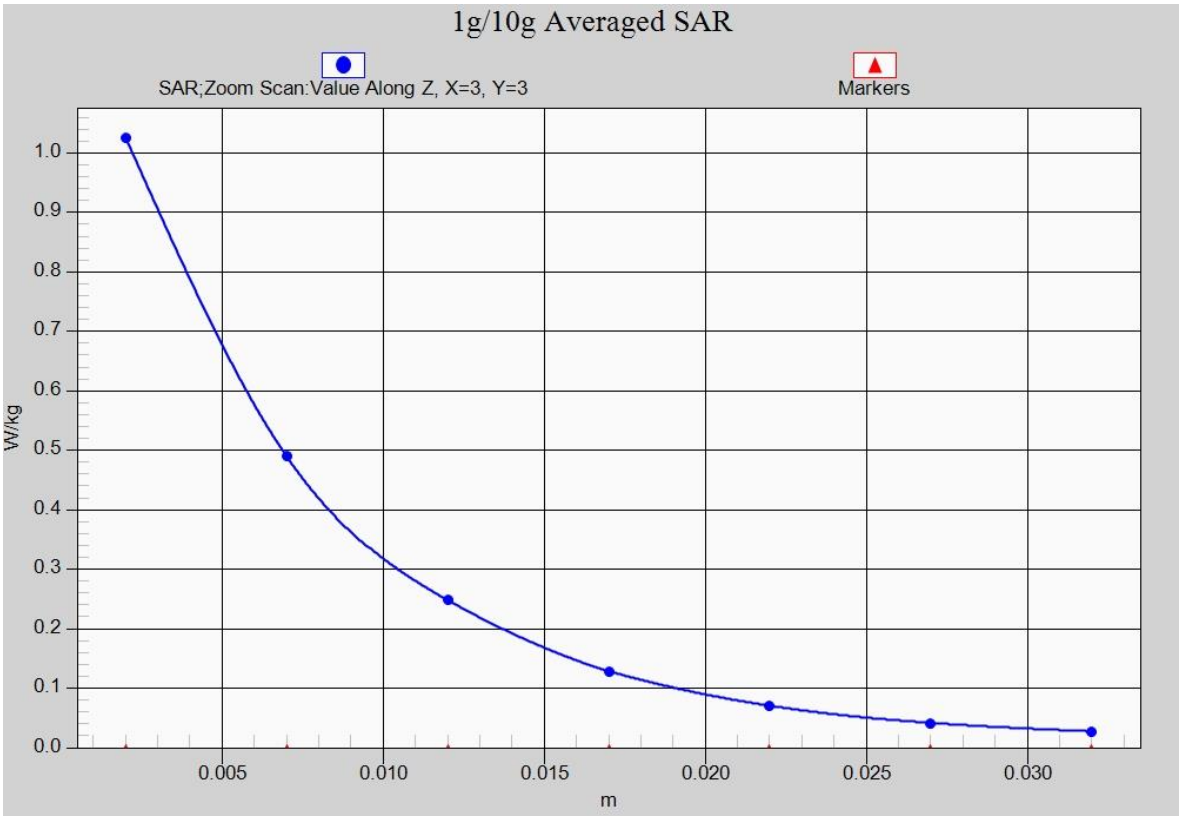


Fig. 18-1 Z-Scan at power reference point (2450 MHz)

Wifi 802.11aRightCheekChannel 64

Date: 2019-6-11
Electronics: DAE4 Sn1525
Medium: Head 5 GHz
Medium parameters used: f = 5320 MHz; σ = 4.580mho/m; ε_r = 34.703; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: WLan5G Frequency: 5320 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7514ConvF(4.99, 4.99, 4.99)

Area Scan (151x241x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.785 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 8.233 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 1.20 W/kg
SAR(1 g) = 0.323 W/kg; SAR(10 g) = 0.126 W/kg
Maximum value of SAR (measured) = 0.736 W/kg

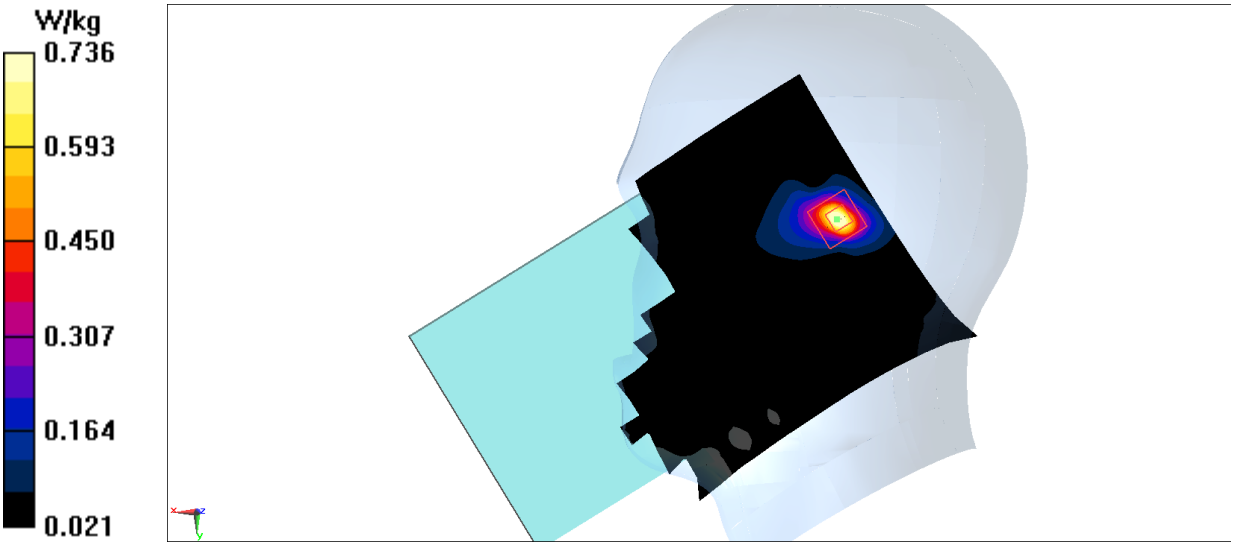


Fig.19 5GHz

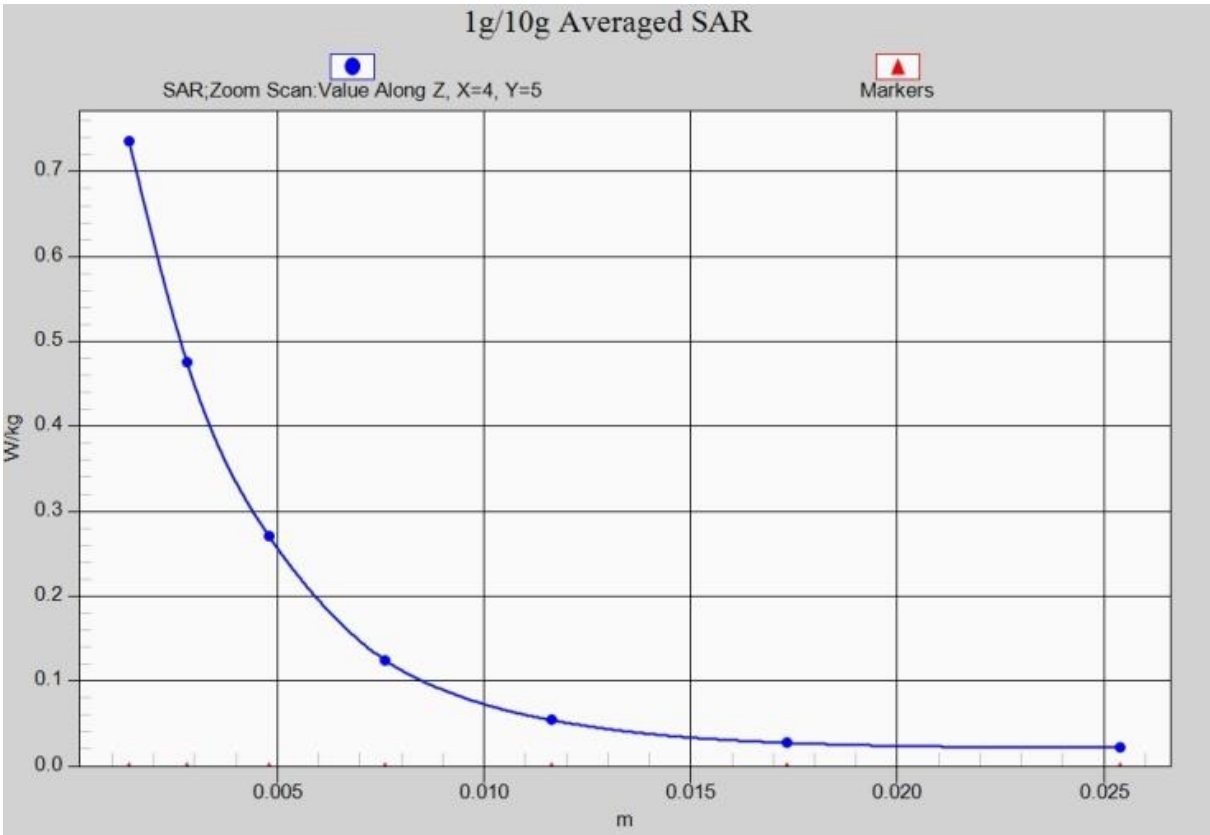


Fig. 19-1 Z-Scan at power reference point (5GHz)

Wifi 802.11nRear Channel 159

Date: 2019-6-11
Electronics: DAE4 Sn1525
Medium: Body5 GHz
Medium parameters used: f = 5795 MHz; σ = 5.271 mho/m; ε_r = 47.355; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: WLan5G Frequency: 5795 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7514ConvF(3.94, 3.94, 3.94)

Area Scan (171x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.846 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 3.353 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 6.42 W/kg
SAR(1 g) = 0.597 W/kg; SAR(10 g) = 0.162 W/kg
Maximum value of SAR (measured) = 1.96 W/kg

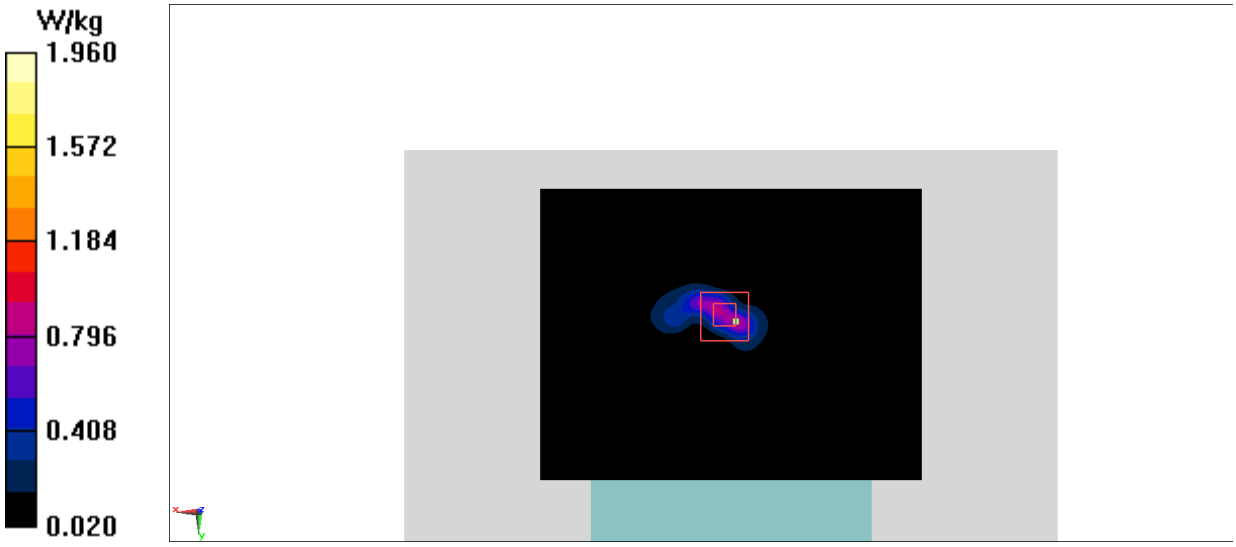


Fig.20 5GHz

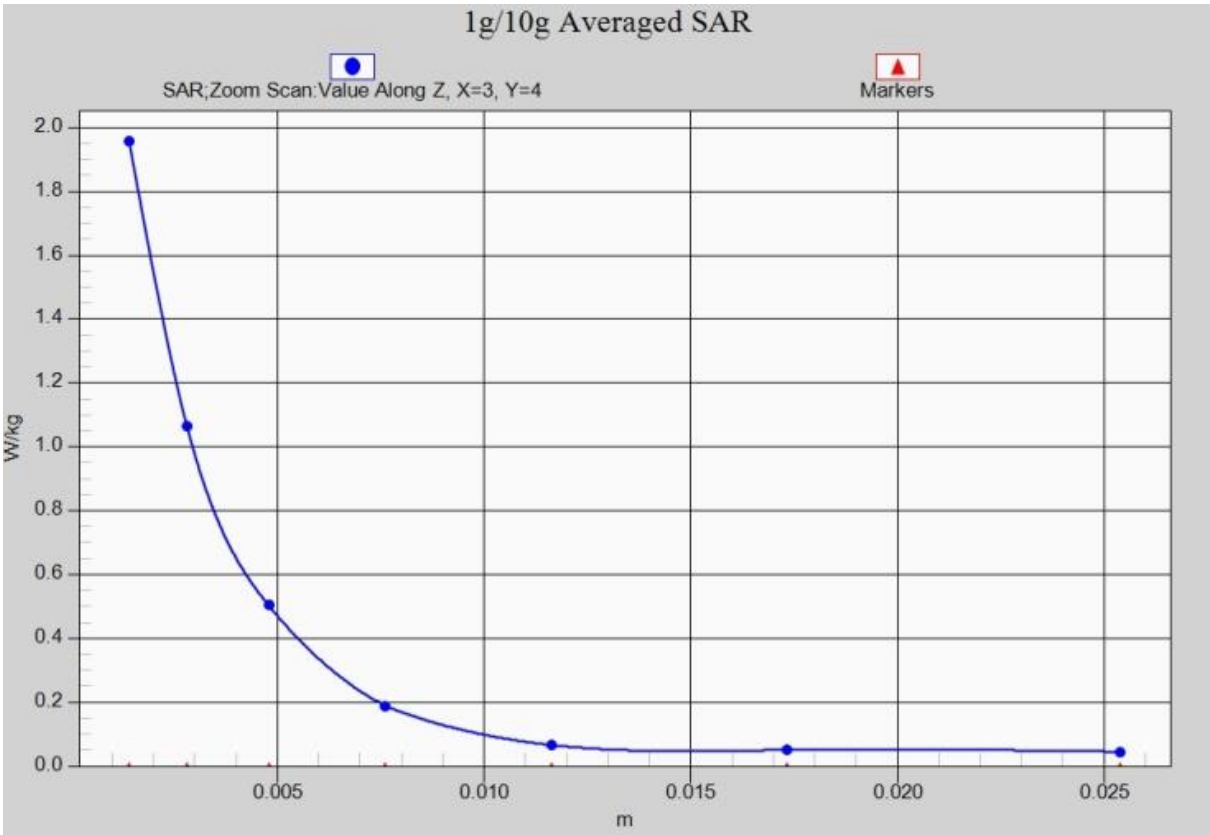


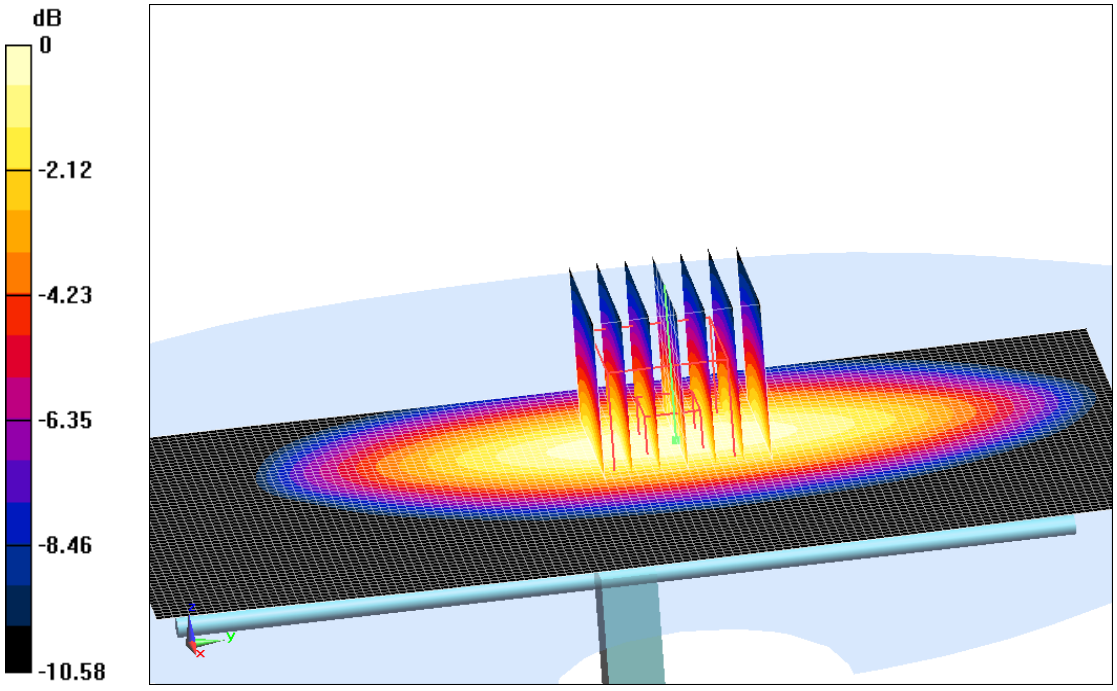
Fig. 20-1 Z-Scan at power reference point (5GHz)

ANNEX B SystemVerification Results

835MHz

Date: 2019-6-7
Electronics: DAE4 Sn1525
Medium: Head 850 MHz
Medium parameters used: f = 835 MHz; σ = 0.887S/m; ε_r = 41.6; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: CW Frequency: 835 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7514ConvF(9.09, 9.09, 9.09)
System Validation/Area Scan (61x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 54.19 V/m; Power Drift = -0.03 dB
Fast SAR: SAR(1 g) = 2.34 W/kg; SAR(10 g) = 1.51 W/kg
Maximum value of SAR (interpolated) = 2.54 W/kg

System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.19 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 3.07 W/kg
SAR(1 g) = 2.31 W/kg; SAR(10 g) = 1.49 W/kg
Maximum value of SAR (measured) = 2.51 W/kg



0 dB = 2.51 W/kg = 4.00dBW/kg

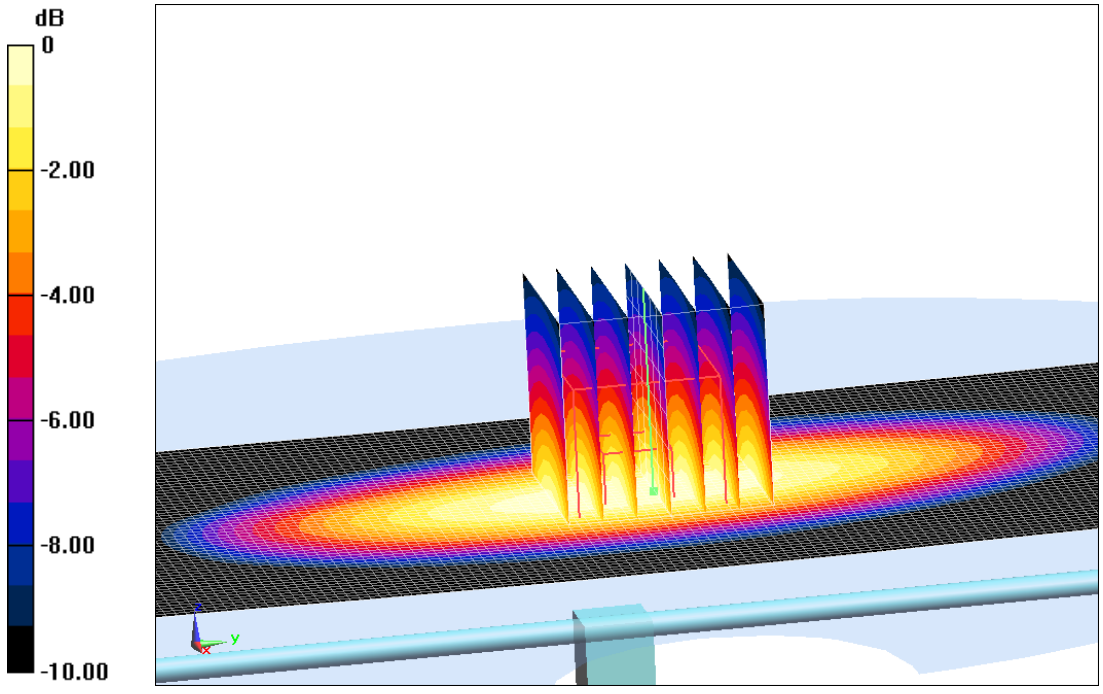
Fig.B.1 validation 835MHz 250mW

835MHz

Date: 2019-6-7
Electronics: DAE4 Sn1525
Medium: Body 850 MHz
Medium parameters used: f = 835 MHz; σ = 0.958S/m; ε_r = 55.16; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: CW Frequency: 835 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7514ConvF(9.47, 9.47, 9.47)

System Validation /Area Scan (61x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 52.66 V/m; Power Drift = 0.05 dB
Fast SAR: SAR(1 g) = 2.38 W/kg; SAR(10 g) = 1.57 W/kg
Maximum value of SAR (interpolated) = 2.71 W/kg

System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.66 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 3.14 W/kg
SAR(1 g) = 2.41 W/kg; SAR(10 g) = 1.59 W/kg
Maximum value of SAR (measured) = 2.74 W/kg



0 dB = 2.74 W/kg = 4.38 dBW/kg

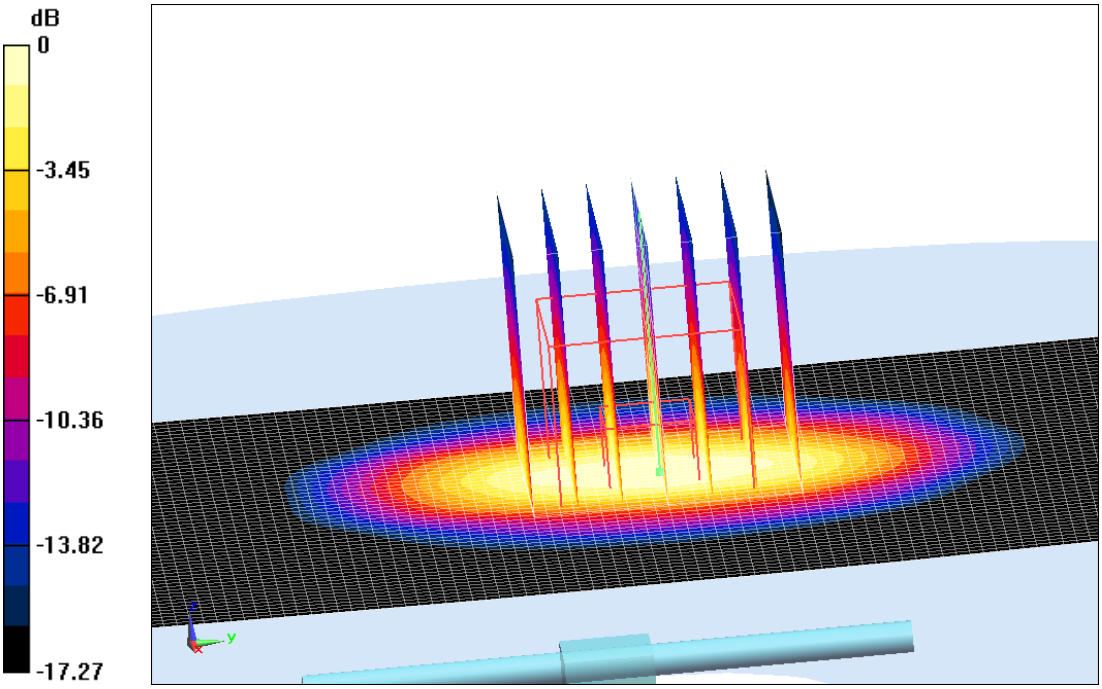
Fig.B.2 validation 835MHz 250mW

1900MHz

Date: 2019-6-8
Electronics: DAE4 Sn1525
Medium: Head 1900 MHz
Medium parameters used:f = 1900 MHz;σ =1.392 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: CW Frequency: 1900 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7514 ConvF(7.73, 7.73, 7.73)

System Validation /Area Scan(61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 89.9 V/m; Power Drift = 0.03 dB
SAR(1 g) = 10.1W/kg; SAR(10 g) = 5.31 W/kg
Maximum value of SAR (interpolated) = 12.3 W/kg

System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89.8 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 17.81 W/kg
SAR(1 g) = 10 W/kg; SAR(10 g) = 5.24W/kg
Maximum value of SAR (measured) = 12.2 W/kg



0 dB = 12.2 W/kg = 10.86 dBW/kg

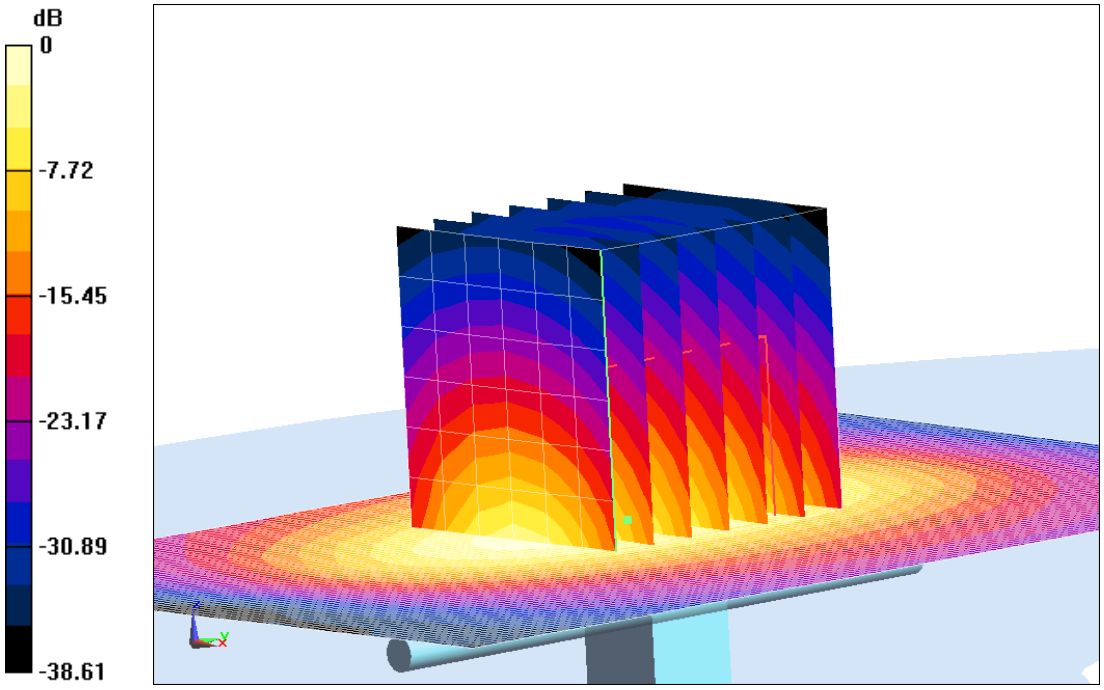
Fig.B.3validation 1900MHz 250mW

1900MHz

Date: 2019-6-8
Electronics: DAE4 Sn1525
Medium: Body 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.535 S/m; ε_r = 52.81; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: CW Frequency: 1900 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7514 ConvF(7.53, 7.53, 7.53)

System Validation/Area Scan (81x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 94.6 V/m; Power Drift = -0.05 dB
Fast SAR: SAR(1 g) = 10.5 W/kg; SAR(10 g) = 5.6 W/kg
Maximum value of SAR (interpolated) = 12.5 W/kg

System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.5 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 19.06 W/kg
SAR(1 g) = 10.4 W/kg; SAR(10 g) = 5.51 W/kg
Maximum value of SAR (measured) = 12.4 W/kg



0 dB = 12.4W/kg = 10.93 dB W/kg

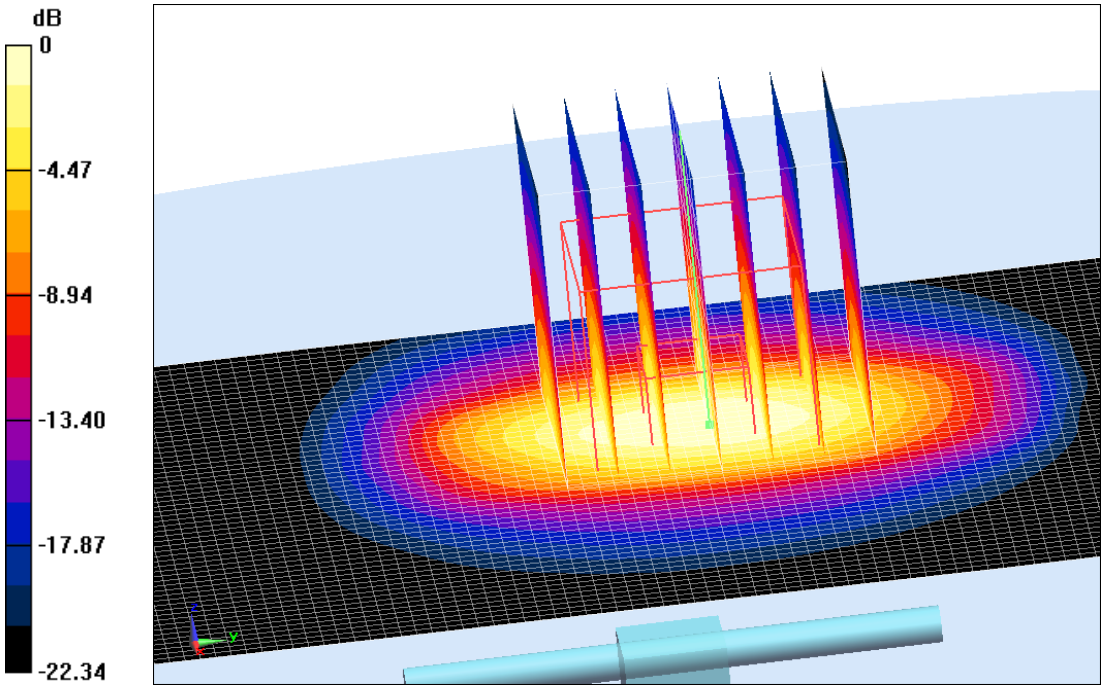
Fig.B.4validation 1900MHz 250mW

2450MHz

Date: 2019-6-9
Electronics: DAE4 Sn1525
Medium: Head 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.82 mho/m; ε_r = 39.36; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: CW Frequency: 2450 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7514 ConvF(6.95, 6.95, 6.95)

System Validation /Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 85.12 V/m; Power Drift = -0.03 dB
SAR(1 g) = 13W/kg; SAR(10 g) = 6.14 W/kg
Maximum value of SAR (interpolated) = 16.2 W/kg

System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 85.16 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 26.86 W/kg
SAR(1 g) = 12.8 W/kg; SAR(10 g) = 5.96 W/kg
Maximum value of SAR (measured) = 16 W/kg



0 dB = 16 W/kg = 12.04 dBW/kg

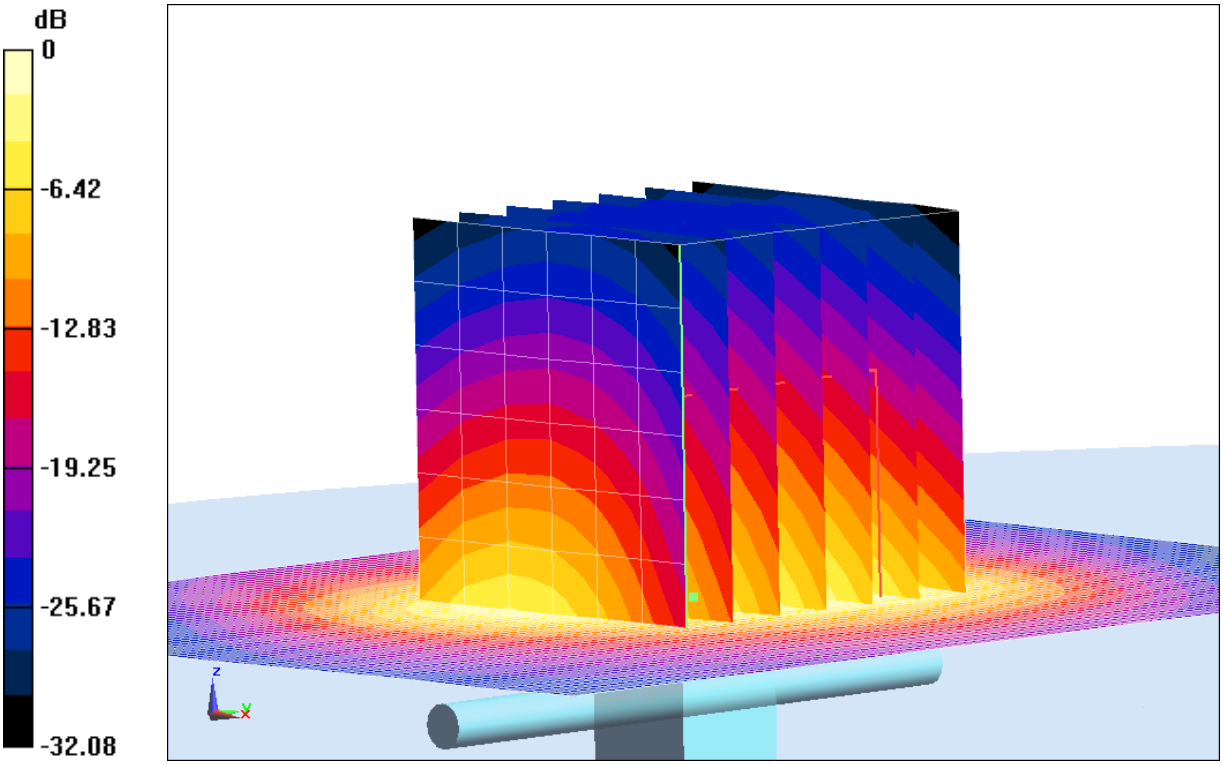
Fig.B.5 validation 2450MHz 250mW

2450MHz

Date: 2019-6-9
Electronics: DAE4 Sn1525
Medium: Body 2450 MHz
Medium parameters used: f = 2450 MHz; σ =1.986 S/m; ε_r = 52.29; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: CW Frequency: 2450 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7514 ConvF(7.13, 7.13, 7.13)

System Validation/Area Scan (81x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 87.28 V/m; Power Drift = -0.01 dB
SAR(1 g) = 12.5W/kg; SAR(10 g) = 5.74 W/kg
Maximum value of SAR (interpolated) = 14.1 W/kg

System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.28 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 24.29 W/kg
SAR(1 g) = 12.7 W/kg; SAR(10 g) = 5.91 W/kg
Maximum value of SAR (measured) = 14.3 W/kg



0 dB = 14.3 W/kg = 11.55 dB W/kg

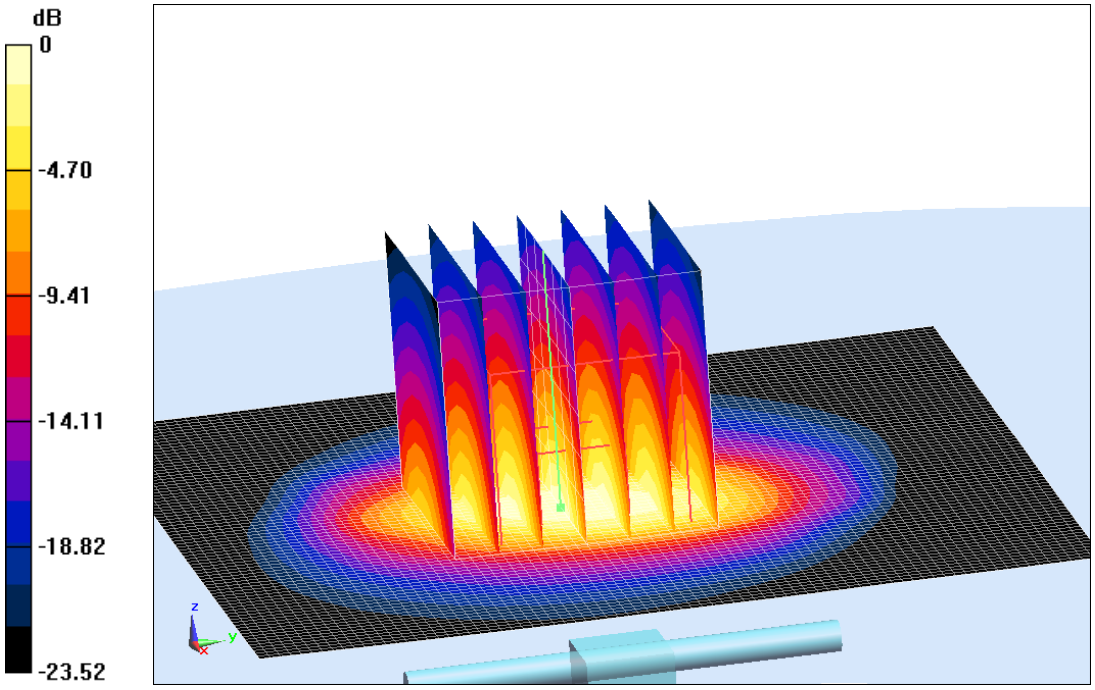
Fig.B.6validation 2450MHz 250mW

2600MHz

Date: 2019-6-10
Electronics: DAE4 Sn1525
Medium: Head 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 1.955mho/m; ε_r = 38.27; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: CW Frequency: 2600 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7514 ConvF(6.92, 6.92, 6.92)

System Validation/Area Scan(81x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 78.44 V/m; Power Drift = 0.02 dB
SAR(1 g) = 14.4W/kg; SAR(10 g) = 6.52 W/kg
Maximum value of SAR (interpolated) = 22 W/kg

System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 78.44 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 30.64 W/kg
SAR(1 g) = 14.2 W/kg; SAR(10 g) = 6.35 W/kg
Maximum value of SAR (measured) = 21.8 W/kg



0 dB = 21.8 W/kg = 13.38dBW/kg

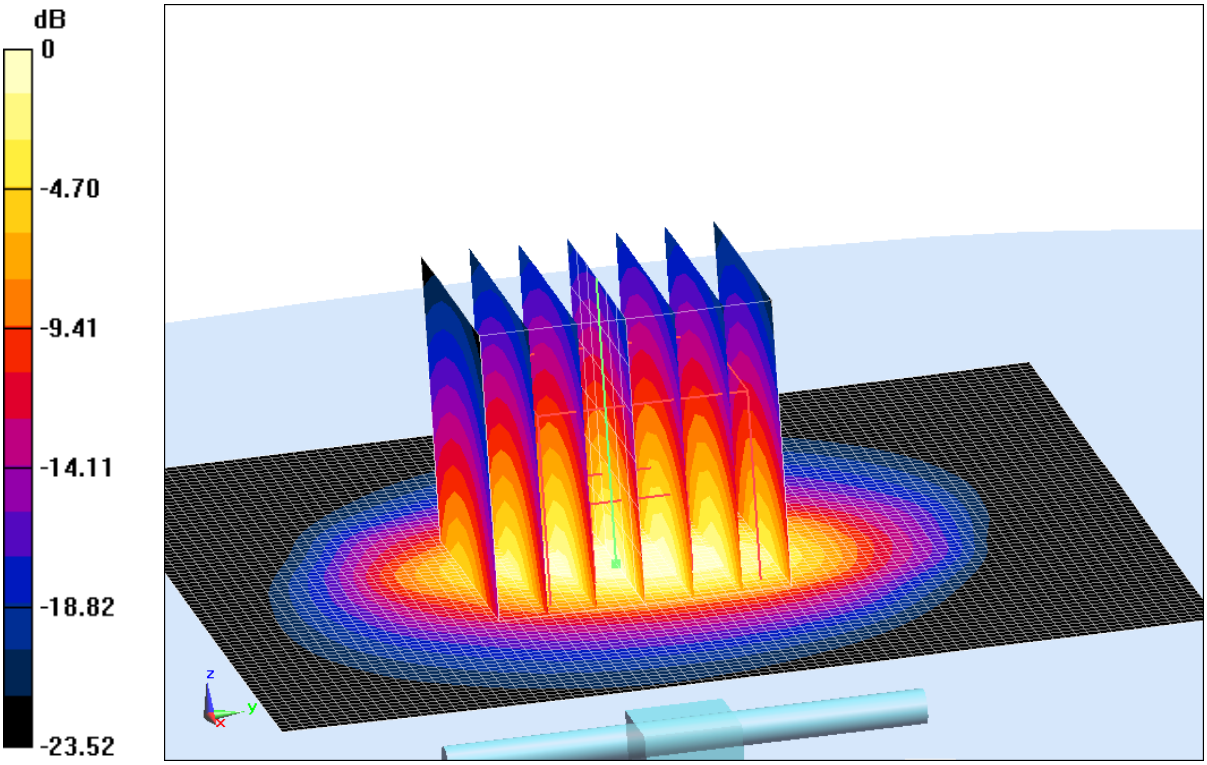
Fig.B.7 validation 2600MHz 250mW

2600MHz

Date: 2019-6-10
Electronics: DAE4 Sn1525
Medium: Body 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.18 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: CW Frequency: 2600 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7514 ConvF(7.06, 7.06, 7.06)

System Validation /Area Scan(81x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 79.15 V/m; Power Drift = 0.02 dB
Fast SAR: SAR(1 g) = 14W/kg; SAR(10 g) = 6.35 W/kg
Maximum value of SAR (interpolated) = 22.1W/kg

System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 79.15 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 30.85W/kg
SAR(1 g) = 13.9W/kg; SAR(10 g) = 6.29W/kg
Maximum value of SAR (measured) = 22W/kg



0 dB = 22W/kg = 13.42 dB W/kg

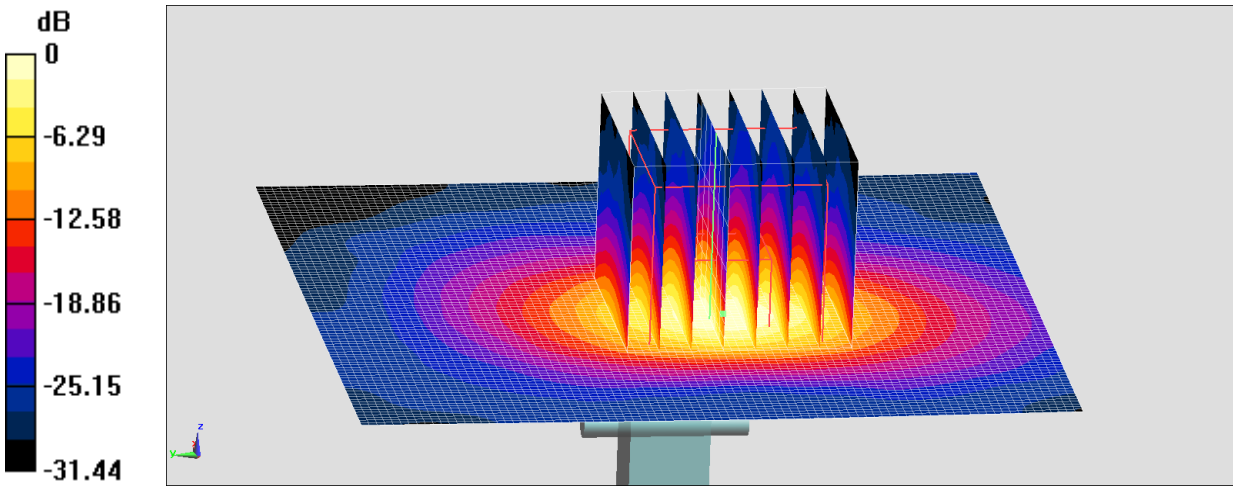
Fig.B.8 validation 2600MHz 250mW

5250MHz

Date: 2019-6-11
Electronics: DAE4 Sn1525
Medium: Head 5GHz
Medium parameters used: f = 5250 MHz; σ = 4.679 mho/m; ε_r = 35.51; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: CW Frequency: 5250 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7514 ConvF(5.02, 5.02, 5.02)

System Validation /Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 17.9 W/kg

System Validation /Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 57.19 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 31.28 W/kg
SAR(1 g) = 7.91 W/kg; SAR(10 g) = 2.27 W/kg
Maximum value of SAR (measured) = 18.1 W/kg



0 dB = 18.1 W/kg = 12.58 dBW/kg

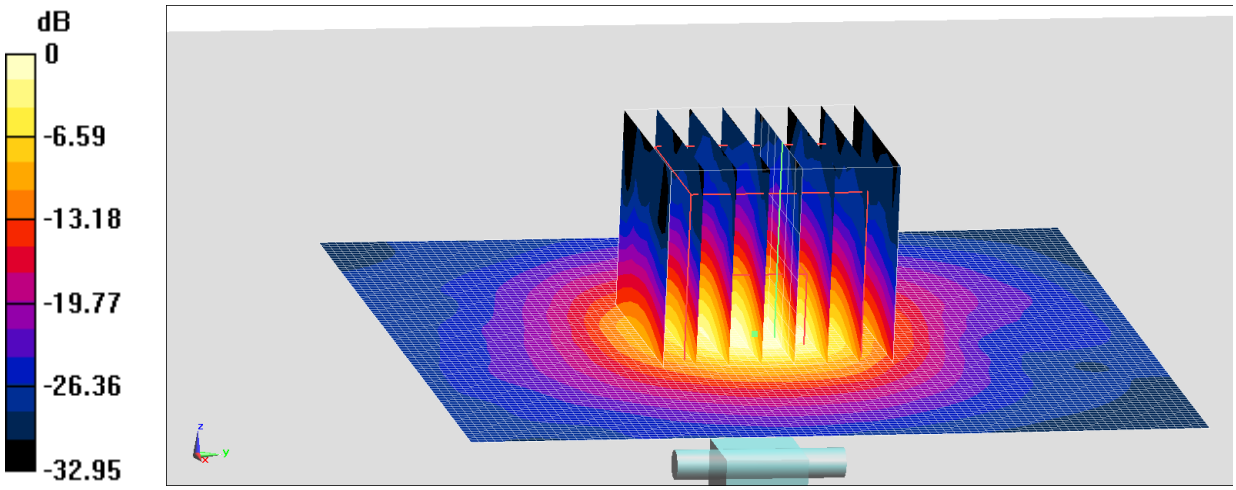
Fig.B.9validation 5250MHz 100mW

5250MHz

Date: 2019-6-11
Electronics: DAE4 Sn1525
Medium: Body5GHz
Medium parameters used: f = 5250 MHz; σ = 5.391 mho/m; ε_r = 49.16; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: CW Frequency: 5250 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7514 ConvF(4.54, 4.54, 4.54)

System Validation /Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 18.1 W/kg

System Validation /Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 53.65 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 29.61 W/kg
SAR(1 g) = 7.38 W/kg; SAR(10 g) = 2.08 W/kg
Maximum value of SAR (measured) = 17.9 W/kg



0 dB = 17.9 W/kg = 12.53 dBW/kg

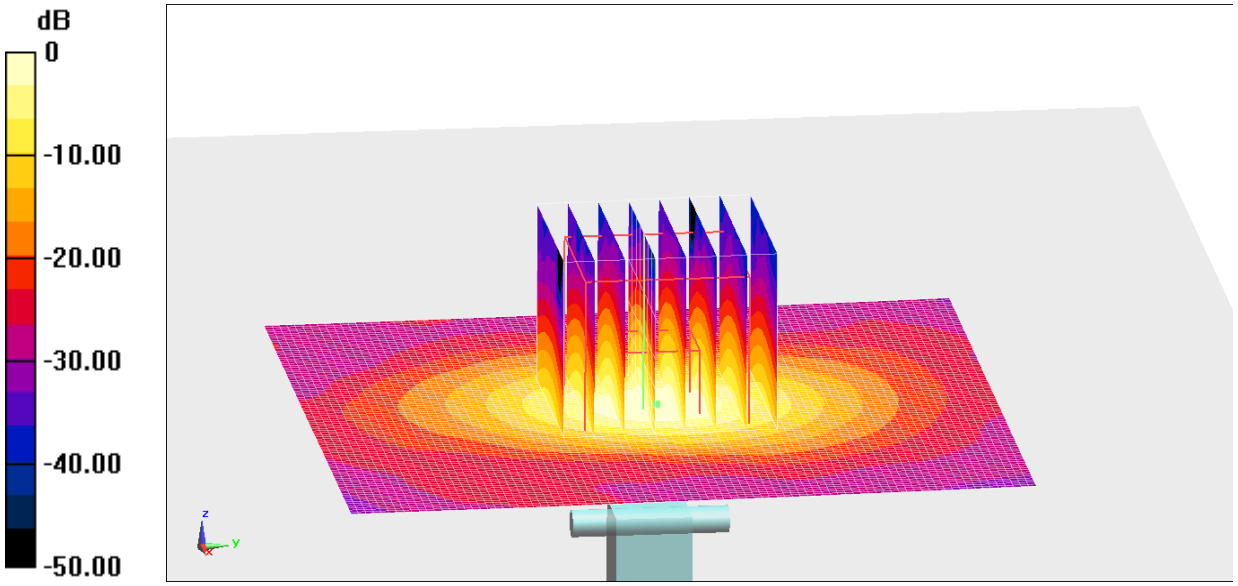
Fig.B.10validation 5250MHz 100mW

5600MHz

Date: 2019-6-11
Electronics: DAE4 Sn1525
Medium: Head 5GHz
Medium parameters used: f = 5600 MHz; σ = 5.123 mho/m; ε_r = 35.93; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: CW Frequency: 5600 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7514 ConvF(4.41, 4.41, 4.41)

System Validation /Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 19.8 W/kg

System Validation /Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 74.55 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 35.37 W/kg
SAR(1 g) = 8.29 W/kg; SAR(10 g) = 2.37 W/kg
Maximum value of SAR (measured) = 19.6 W/kg



0 dB = 19.6 W/kg = 12.92 dBW/kg

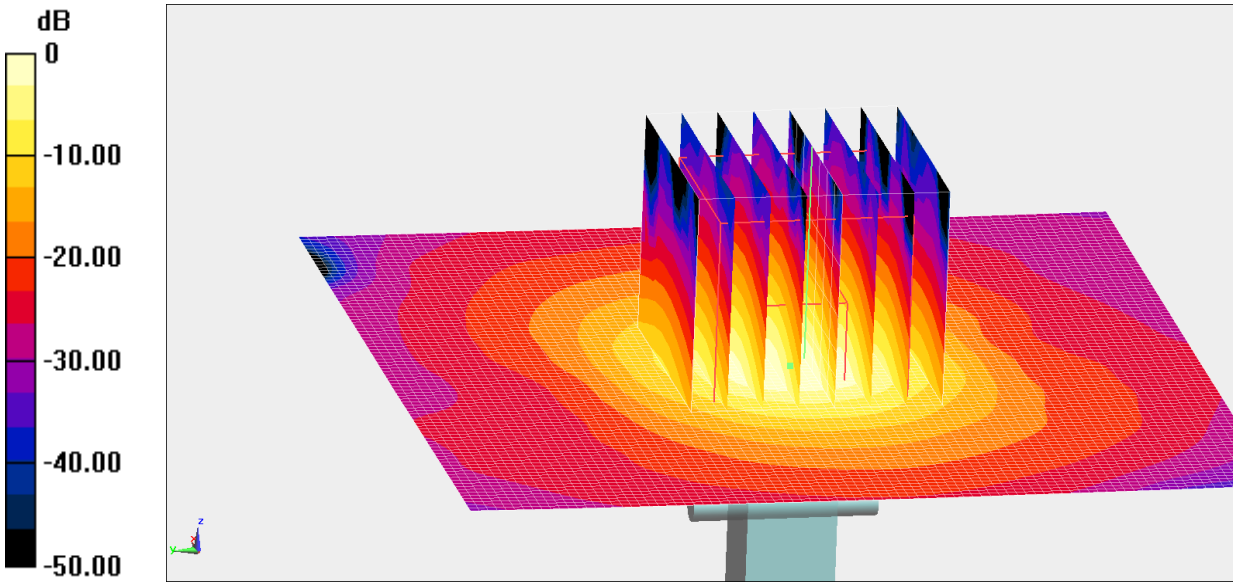
Fig.B.11validation 5600MHz 100mW

5600MHz

Date: 2019-6-11
Electronics: DAE4 Sn1525
Medium: Body5GHz
Medium parameters used: f = 5600 MHz; σ = 5.756mho/m; ε_r = 48.3; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: CW Frequency: 5600 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7514 ConvF(4.00, 4.00, 4.00)

System Validation /Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 20.3 W/kg

System Validation /Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 67.1 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 37.19 W/kg
SAR(1 g) = 7.97 W/kg; SAR(10 g) = 2.25 W/kg
Maximum value of SAR (measured) = 20.1 W/kg



0 dB = 20.1 W/kg = 13.03 dBW/kg

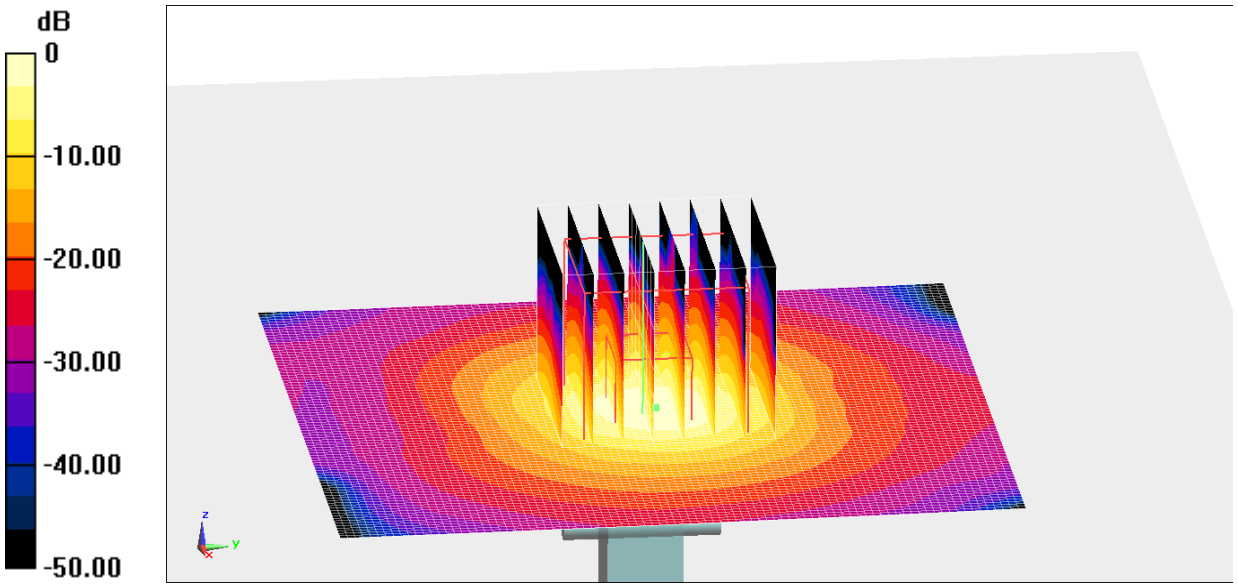
Fig.B.12validation 5600MHz 100mW

5750MHz

Date: 2019-6-11
Electronics: DAE4 Sn1525
Medium: Head 5GHz
Medium parameters used: f = 5750 MHz; σ = 5.264 mho/m; ε_r = 35.41; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: CW Frequency: 5750 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7514 ConvF(4.47, 4.47, 4.47)

System Validation /Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 20.2 W/kg

System Validation /Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 72.09 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 40.08 W/kg
SAR(1 g) = 8.11 W/kg; SAR(10 g) = 2.35 W/kg
Maximum value of SAR (measured) = 20.4 W/kg



0 dB = 20.4 W/kg = 13.10 dBW/kg

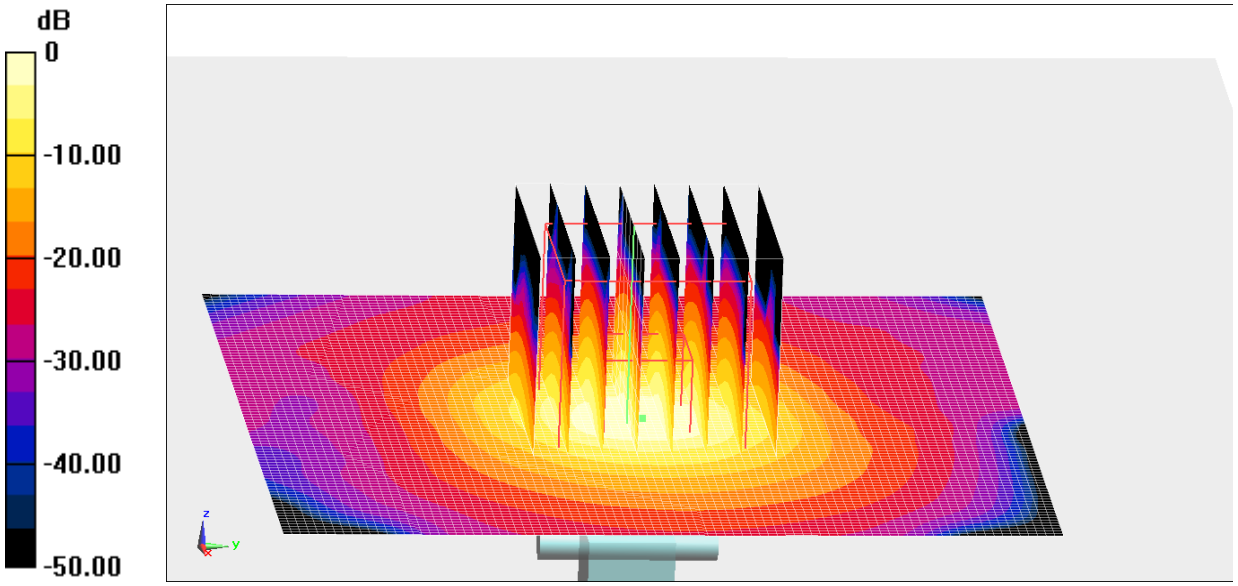
Fig.B.13validation 5750MHz 100mW

5750MHz

Date: 2019-6-11
Electronics: DAE4 Sn1525
Medium: Body5GHz
Medium parameters used: f = 5750 MHz; σ = 5.922 mho/m; ε_r = 48.19; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: CW Frequency: 5750 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7514 ConvF(3.98, 3.98, 3.98)

System Validation /Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 18.5 W/kg

System Validation /Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 66.02 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 35.51 W/kg
SAR(1 g) = 7.53 W/kg; SAR(10 g) = 2.08 W/kg
Maximum value of SAR (measured) = 18.7 W/kg



0 dB = 18.7 W/kg = 12.72 dBW/kg

Fig.B.14validation 5750MHz 100mW

The SAR system verification must be required that the area scan estimated 1-g SAR is within 3% of the zoom scan 1-g SAR.

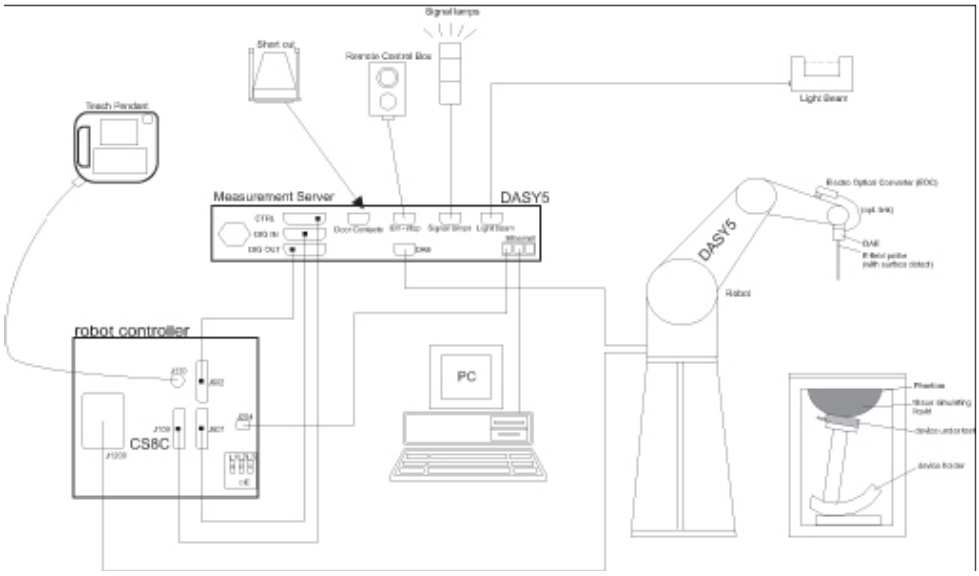
Table B.1 Comparison between area scan and zoom scan for system verification

Date	Band	Position	Area scan (1g)	Zoom scan (1g)	Drift (%)
2019-6-7	835	Head	2.34	2.31	1.30
	835	Body	2.38	2.41	-1.24
2019-6-8	1900	Head	10.1	10	1.00
	1900	Body	10.5	10.4	0.96
2019-6-9	2300	Head	12.2	12.1	0.83
	2300	Body	12.3	12.1	1.65
2019-6-9	2450	Head	13	12.8	1.56
	2450	Body	12.5	12.7	-1.57
2019-6-10	2600	Head	14.4	14.2	1.41
	2600	Body	14	13.9	0.72

ANNEX C SAR Measurement Setup

C.1 Measurement Set-up

The Dasy4 or DASY5 system for performing compliance tests is illustrated above graphically. This system consists of the following items:



Picture C.1SAR Lab Test Measurement Set-up

- A standard high precision 6-axis robot (StäubliTX=RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP and the DASY4 or DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as
- warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

C.2 Dasy4 or DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multifiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY4 or DASY5 software reads the reflection durning a software approach and looks for the maximum using 2ndord curve fitting. The approach is stopped at reaching the maximum.

Probe Specifications:

Model: ES3DV3, EX3DV4
Frequency 10MHz — 6.0GHz(EX3DV4)
Range: 10MHz — 4GHz(ES3DV3)
Calibration: In head and body simulating tissue at Frequencies from 835 up to 5800MHz
Linearity: ± 0.2 dB(30 MHz to 6 GHz) for EX3DV4
± 0.2 dB(30 MHz to 4 GHz) for ES3DV3
DynamicRange: 10 mW/kg — 100W/kg
Probe Length: 330 mm
Probe Tip
Length: 20 mm
Body Diameter: 12 mm
Tip Diameter: 2.5 mm (3.9 mm for ES3DV3)
Tip-Center: 1 mm (2.0mm for ES3DV3)
Application:SARDosimetry Testing
Compliance tests ofmobile phones
Dosimetry in strong gradient fields

Picture C.2Near-field Probe

Picture C.3E-field Probe

C.3 E-field Probe Calibration

Each E-Probe/Probe Amplifier combination has unique calibration parameters. A TEM cell calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm^2) using an RF Signal generator, TEM cell, and RF Power Meter.

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if the frequency is below 1 GHz and inn a waveguide or other methodologies 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 until the three channels show the maximum reading. The power density readings equates to 1 mW/cm^2.·

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

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

Where:

Δt = Exposure time (30 seconds),

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

ΔT = Temperature increase due to RF exposure.

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

Where:

σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m^3).

C.4 Other Test Equipment

C.4.1 Data Acquisition Electronics(DAE)

The data acquisition electronics consist of a highly sensitive electrometer-gradepreamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converterand a command decoder with a control logic unit. Transmission to the measurement server isaccomplished through an optical downlink for data and status information, as well as an opticaluplink for commands and the clock.

The mechanical probe mounting device includes two different sensor systems for frontal and sidewaysprobe contacts. They are used for mechanical surface detection and probe collision detection.

The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

PictureC.4: DAE

C.4.2 Robot

The SPEAG DASY system uses the high precision robots (DASY4: RX90XL; DASY5: RX160L) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability 0.02mm)
- High reliability (industrial design)
- Low maintenance costs (virtually maintenance free due to direct drive gears; no belt drives)
- Jerk-free straight movements (brushless synchron motors; no stepper motors)
- Low ELF interference (motor control fields shielded via the closed metallic construction shields)

Picture C.5DASY 4

Picture C.6DASY 5

C.4.3 Measurement Server

The Measurement server is based on a PC/104 CPU broad with CPU (dasy4: 166 MHz, Intel Pentium; DASY5: 400 MHz, Intel Celeron), chipdisk (DASY4: 32 MB; DASY5: 128MB), RAM (DASY4: 64 MB, DASY5: 128MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O broad, which is directly connected to the PC/104 bus of the CPU broad.

The measurement server performs all real-time data evaluation of field measurements and surface detection, controls robot movements and handles safety operation. The PC operating system cannot interfere with these time critical processes. All connections are supervised by a watchdog, and disconnection of any of the cables to the measurement server will automatically disarm the robot and disable all program-controlled robot movements. Furthermore, the measurement server is equipped with an expansion port which is reserved for future applications. Please note that this expansion port does not have a standardized pinout, and therefore only devices provided by SPEAG can be connected. Devices from any other supplier could seriously damage the measurement server.

Picture C.7 Server forDASY 4

Picture C.8 Server forDASY 5

C.4.4 Device Holder for Phantom

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5mm distance, a positioning uncertainty of ±0.5mm would produce a SAR uncertainty of ±20%. Accurate device positioning is thereforecrucial for accurate and repeatable measurements. The positions in which the devices must bemeasured are defined by the standards.

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

The DASY device holder is constructed of low-lossPOM material having the following dielectricparameters: relative permittivity ε=3 and loss tangent δ=0.02. The amount of dielectric materialhas been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

<Laptop Extension Kit>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the Mounting Device in place of the phone positioner. The extension is fully compatible with the Twin-SAM and ELI phantoms.

Picture C.9-1: Device HolderPicture C.9-2: Laptop Extension Kit

C.4.5 Phantom

The SAM Twin Phantom V4.0 is constructed of a fiberglass shell integrated in a table. The shape of the shell is based on data from an anatomical study designed to
Represent the 90th percentile of the population. The phantom enables the dissymmetric evaluation of SAR for both left and right handed handset usage, as well as body-worn usage using the flat phantom region. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot. The shell phantom has a 2mm shell thickness (except the ear region where shell thickness increases to 6 mm).

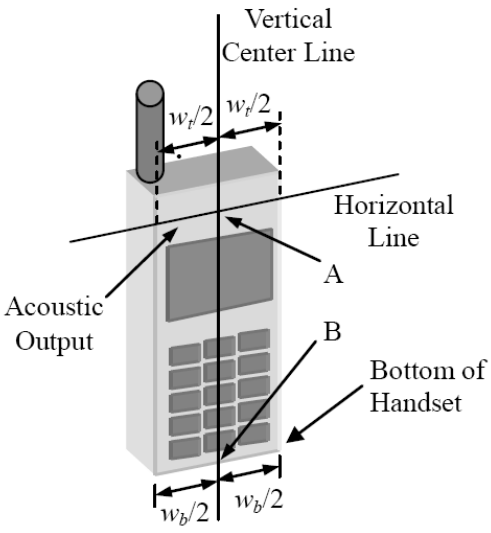
Shell Thickness:	2±0. 2 mm
Filling Volume:	Approx. 25 liters
Dimensions:	810 x l000 x 500 mm (H x L x W)
Available:	Special

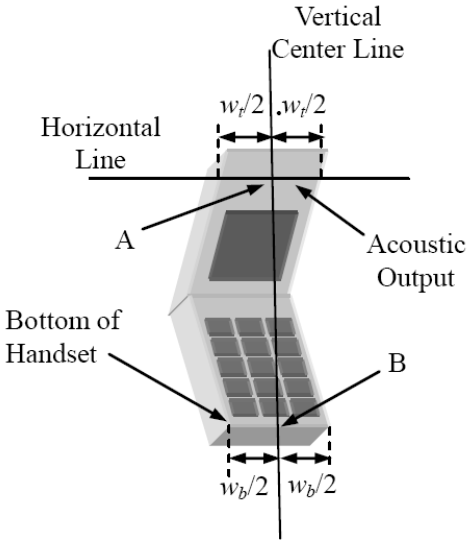
Picture C.10: SAM Twin Phantom

ANNEX D Position of the wireless device in relation to the phantom

D.1 General considerations

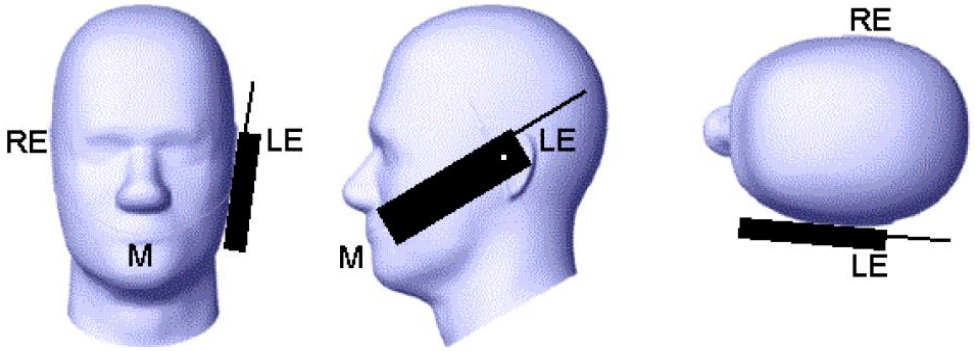
This standard specifies two handset test positions against the head phantom – the “cheek”position and the “tilt” position.



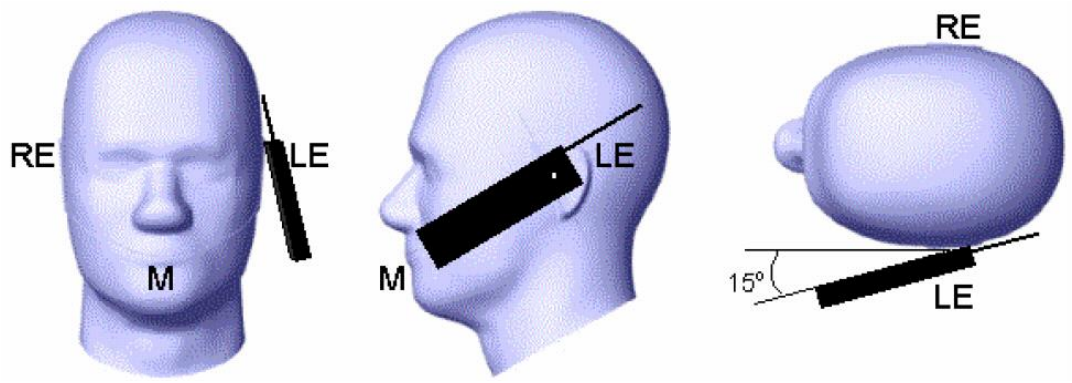


W_t	Width of the handset at the level of the acoustic
W_b	Width of the bottom of the handset
A	Midpoint of the width W_t of the handset at the level of the acoustic output
B	Midpoint of the width W_b of the bottom of the handset

Picture D.1-a Typical “fixed” case handset **Picture D.1-b Typical “clam-shell” case handset**



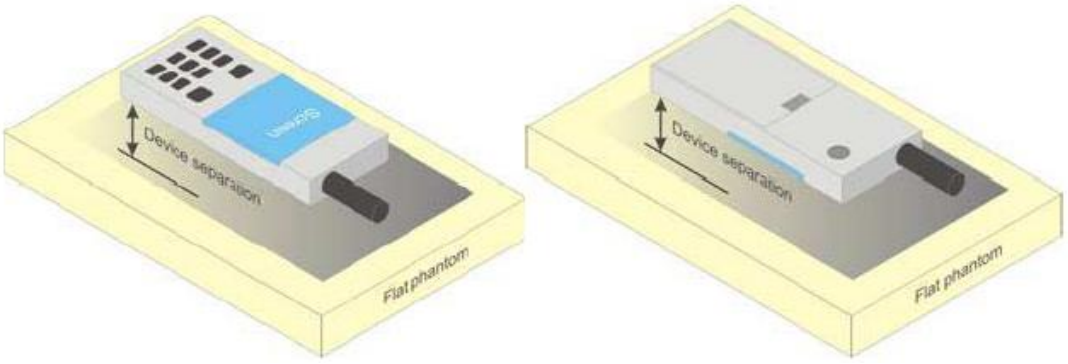
Picture D.2 Cheek position of the wireless device on the left side of SAM



Picture D.3 Tilt position of the wireless device on the left side of SAM

D.2 Body-worn device

A typical example of a body-worn device is a mobile phone, wireless enabled PDA or other battery operated wireless device with the ability to transmit while mounted on a person's body using a carry accessory approved by the wireless device manufacturer.

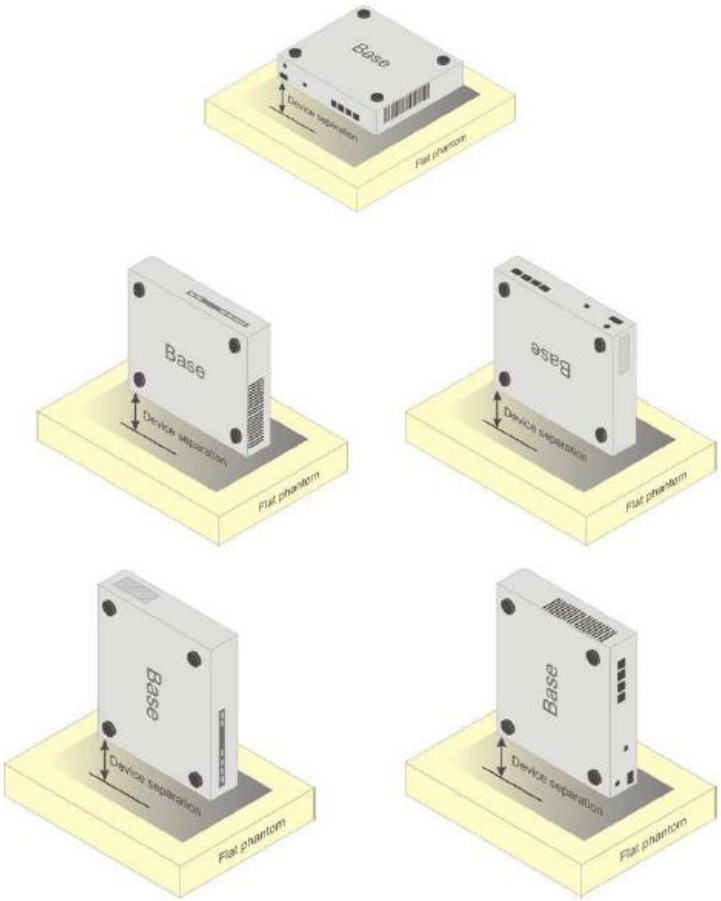


Picture D.4Test positions for body-worn devices

D.3 Desktop device

A typical example of a desktop device is a wireless enabled desktop computer placed on atable or desk when used.

The DUT shall be positioned at the distance and in the orientation to the phantom thatcorresponds to the intended use as specified by the manufacturer in the user instructions. Fordevices that employ an external antenna with variable positions, tests shall be performed forall antenna positions specified. Picture8.5 show positions for desktop device SAR tests.If the intended use is not specified, the device shall be tested directly against the flatphantom.



Picture D.5 Test positions for desktop devices

D.4 DUT Setup Photos

Picture D.6

ANNEX E Equivalent Media Recipes

The liquid used for the frequency range of 800-3000 MHz consisted of water, sugar, salt,preventol, glycol monobutyl and Cellulose. The liquid has been previously proven to be suited for worst-case. The Table E.1 shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the IEEE 1528 and IEC 62209.

TableE.1: Composition of the Tissue Equivalent Matter

Frequency (MHz)	835Head	835Body	1900 Head	1900 Body	2450 Head	2450 Body	5800 Head	5800 Body
Ingredients (% by weight)								
Water	41.45	52.5	55.242	69.91	58.79	72.60	65.53	65.53
Sugar	56.0	45.0	\	\	\	\	\	\
Salt	1.45	1.4	0.306	0.13	0.06	0.18	\	\
Preventol	0.1	0.1	\	\	\	\	\	\
Cellulose	1.0	1.0	\	\	\	\	\	\
Glycol Monobutyl	\	\	44.452	29.96	41.15	27.22	\	\
Diethylenglycol monohexylether	\	\	\	\	\	\	17.24	17.24
Triton X-100	\	\	\	\	\	\	17.24	17.24
Dielectric Parameters Target Value	ε=41.5 σ=0.90	ε=55.2 σ=0.97	ε=40.0 σ=1.40	ε=53.3 σ=1.52	ε=39.2 σ=1.80	ε=52.7 σ=1.95	ε=35.3 σ=5.27	ε=48.2 σ=6.00

Note: There are a little adjustment respectively for 750, 1750, 2600, 5200, 5300 and 5600 based on the recipe of closest frequency in table E.1.

ANNEX F System Validation

The SAR system must be validated against its performance specifications before it is deployed. WhenSAR probes, system components or software are changed, upgraded or recalibrated, these must bevalidated with the SAR system(s) that operates with such components.

Table F.1: System Validationfor 7514

Probe SN.	Liquid name	Validation date	Frequency point	Status (OK or Not)
7514	Head 750MHz	Sep.10,2018	750 MHz	OK
7514	Head 850MHz	Sep.10,2018	835 MHz	OK
7514	Head 900MHz	Sep.10,2018	900 MHz	OK
7514	Head 1750MHz	Sep.10,2018	1750 MHz	OK
7514	Head 1810MHz	Sep.10,2018	1810 MHz	OK
7514	Head 1900MHz	Sep.11,2018	1900 MHz	OK
7514	Head 2000MHz	Sep.11,2018	2000 MHz	OK
7514	Head 2100MHz	Sep.11,2018	2100 MHz	OK
7514	Head 2300MHz	Sep.11,2018	2300 MHz	OK
7514	Head 2450MHz	Sep.11,2018	2450 MHz	OK
7514	Head 2600MHz	Sep.12,2018	2600 MHz	OK
7514	Head 3500MHz	Sep.12,2018	3500 MHz	OK
7514	Head 3700MHz	Sep.12,2018	3700 MHz	OK
7514	Head 5200MHz	Sep.12,2018	5250 MHz	OK
7514	Head 5500MHz	Sep.12,2018	5600 MHz	OK
7514	Head 5800MHz	Sep.12,2018	5800 MHz	OK
7514	Body 750MHz	Sep.12,2018	750 MHz	OK
7514	Body 850MHz	Sep.9,2018	835 MHz	OK
7514	Body 900MHz	Sep.9,2018	900 MHz	OK
7514	Body 1750MHz	Sep.9,2018	1750 MHz	OK
7514	Body 1810MHz	Sep.9,2018	1810 MHz	OK
7514	Body 1900MHz	Sep.9,2018	1900 MHz	OK
7514	Body 2000MHz	Sep.13,2018	2000 MHz	OK
7514	Body 2100MHz	Sep.13,2018	2100 MHz	OK
7514	Body 2300MHz	Sep.13,2018	2300 MHz	OK
7514	Body 2450MHz	Sep.13,2018	2450 MHz	OK
7514	Body 2600MHz	Sep.13,2018	2600 MHz	OK
7514	Body 3500MHz	Sep.8,2018	3500 MHz	OK
7514	Body 3700MHz	Sep.8,2018	3700 MHz	OK
7514	Body 5200MHz	Sep.8,2018	5250 MHz	OK
7514	Body 5500MHz	Sep.8,2018	5600 MHz	OK
7514	Body 5800MHz	Sep.8,2018	5800 MHz	OK