SAR TEST REPORT

No. I18Z60820-SEM02

For

Wingtech Group (Hong Kong) Limited

Muti-band GSM/WCDMA/LTE phone with Bluetooth.WLAN

Model name: VFD 525

With

Hardware Version: 88909_1_12

Software Version: VFD-525-ZA-B23

FCC ID: 2APXWVFD525

Issued Date: 2018-6-11

TESTING
NVLAP LAB CODE 600118-0

Note:

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Test Laboratory:

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REPORT HISTORY

Report Number	Revision	Issue Date	Description
I18Z60820-SEM02	Rev.0	2018-6-11	Initial creation of test report

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

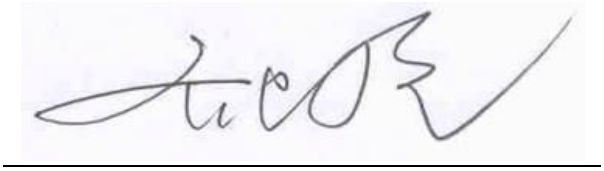
1.3 Project Data

Project Leader:	Qi Dianyuan
Test Engineer:	Lin Xiaojun
Testing Start Date:	June 4, 2018
Testing End Date:	June 8, 2018

1.4 Signature

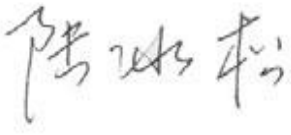
Lin Xiaojun

(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 Wingtech Group (Hong Kong) Limited Muti-band GSM/WCDMA/LTE phone with Bluetooth.WLAN VFD 525 are as follows:

Table 2.1: Highest Reported SAR (1g)

Exposure Configuration	Technology Band	Highest Reported SAR 1g(W/kg)	Equipment Class
Head (Separation Distance 0mm)	GSM 850	0.27	PCE
	PCS 1900	0.42	
	UMTS FDD 5	0.30	
	UMTS FDD 2	0.80	
	LTE Band 7	0.17	
	WLAN 2.4 GHz	0.62	DTS
Hotspot (Separation Distance 10mm)	GSM 850	0.31	PCE
	PCS 1900	0.95	
	UMTS FDD 5	0.34	
	UMTS FDD 2	1.10	
	LTE Band 7	0.94	
	WLAN 2.4 GHz	0.14	DTS

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 10 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 highest reported SAR value is obtained at the case of **(Table 2.1),** and the values are**: 1.10 W/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	Left hand, Touch cheek	0.80	0.62	**1.42**
Highest reported SAR value for Body	Rear	1.10	0.14	**1.24**

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	Left hand, Touch cheek	0.80	0.17[1]	**0.97**
Maximum reported SAR value for Body	Rear	1.10	0.08[1]	**1.18**

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

According to the above tables, the highest sum of reported SAR values is **1.42 W/kg (1g)**. The detail for simultaneous transmission consideration is described in chapter 13.

3 Client Information

3.1 Applicant Information

Company Name:	Wingtech Group (Hong Kong) Limited
Address/Post:	Flat/RM 1903, 19/F, Podium Plaza 5 Hanoi Road, Tsim Sha Tsui Kowloon, Hong Kong
Contact Person:	/
E-mail:	/
Telephone:	/
Fax:	/

3.2 Manufacturer Information

Company Name:	Wingtech Group (Hong Kong) Limited
Address/Post:	Flat/RM 1903, 19/F, Podium Plaza 5 Hanoi Road, Tsim Sha Tsui Kowloon, Hong Kong
Contact Person:	/
E-mail:	/
Telephone:	/
Fax:	/

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

4.1 About EUT

Description:	Muti-band GSM/WCDMA/LTE phone with Bluetooth.WLAN
Model name:	VFD 525
Operating mode(s):	GSM 850/900/1800/1900, UMTS FDD 1/2/5/8, BT, Wi-Fi LTE Band 1/3/7/8/20
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)
	2502.5 – 2567.5 MHz (LTE Band 7)
	2412 – 2462 MHz (Wi-Fi 2.4G)
GPRS/EGPRS Multislot Class:	33
GPRS capability Class:	B
Test device Production information:	Production unit
Device type:	Portable device
Antenna type:	Integrated antenna
Hotspot mode:	Support
VoIP:	Support
Product Dimension:	L: 157mm W: 74mm overall diagonal: 173.6mm

4.2Internal Identification of EUT used during the test

EUT ID*	IMEI	HW	SW Version
EUT1	356984090007118	88909_1_12	VFD-525-ZA-B23
EUT2	356984090009262	88909_1_12	VFD-525-ZA-B23
EUT3	356984090006870	88909_1_12	VFD-525-ZA-B23
EUT4	356984090009759	88909_1_12	VFD-525-ZA-B23
EUT5	356984090008611	88909_1_12	VFD-525-ZA-B23
EUT6	356984090007134	88909_1_12	VFD-525-ZA-B23

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

Note: It is performed to test SAR with the EUT1&2&3&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	Li-ion Polymer，Built-in battery	88909	Jiade Energy Technology (Zhuhai) Co., Ltd.
AE2	Headset	JWEP1049-W09R	/	HUIZHOU JUWEI ELECTRONICS CO.,LTD

*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 Procedures and Equipment 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

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 with Wireless 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

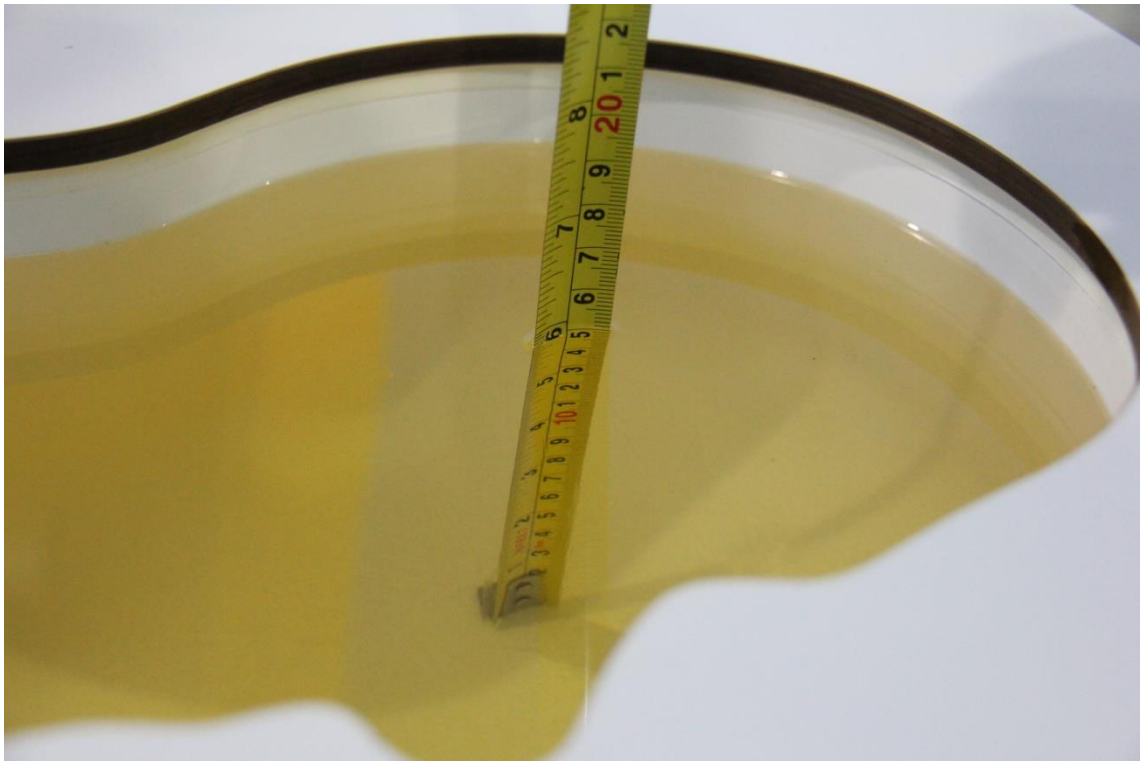
Frequency(MHz)	Liquid Type	Conductivity(σ)	± 5% Range	Permittivity(ε)	± 5% Range
835	Head	0.90	0.86～0.95	41.5	39.4～43.6
835	Body	0.97	0.92～1.02	55.2	52.4～58.0
1900	Head	1.40	1.33～1.47	40.0	38.0～42.0
1900	Body	1.52	1.44～1.60	53.3	50.6～56.0
2450	Head	1.80	1.71～1.89	39.2	37.2～41.2
2450	Body	1.95	1.85～2.05	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

7.2 Dielectric Performance

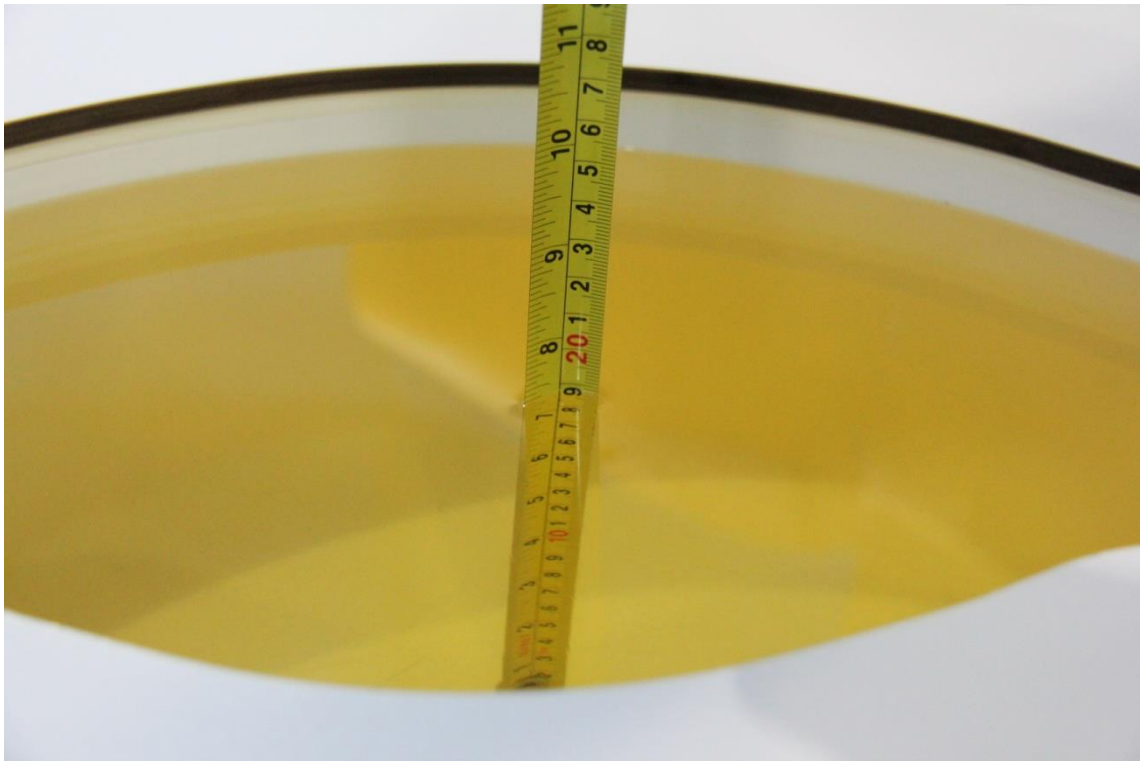
Table 7.2: Dielectric Performance of Tissue Simulating Liquid

Measurement Date (yyyy-mm-dd)	Type	Frequency	Permittivity ε	Drift (%)	Conductivity σ (S/m)	Drift (%)
2018-6-4	Head	835 MHz	41.87	0.89	0.887	-1.44
	Body	835 MHz	55.98	1.41	0.986	1.65
2018-6-5	Head	1900 MHz	40.71	1.78	1.401	0.07
	Body	1900 MHz	52.62	-1.28	1.538	1.18
2018-6-8	Head	2450 MHz	38.7	-1.28	1.823	1.28
	Body	2450 MHz	51.98	-1.37	1.965	0.77
2018-6-7	Head	2600 MHz	38.38	-1.61	1.969	0.46
	Body	2600 MHz	52.81	0.59	2.173	0.60

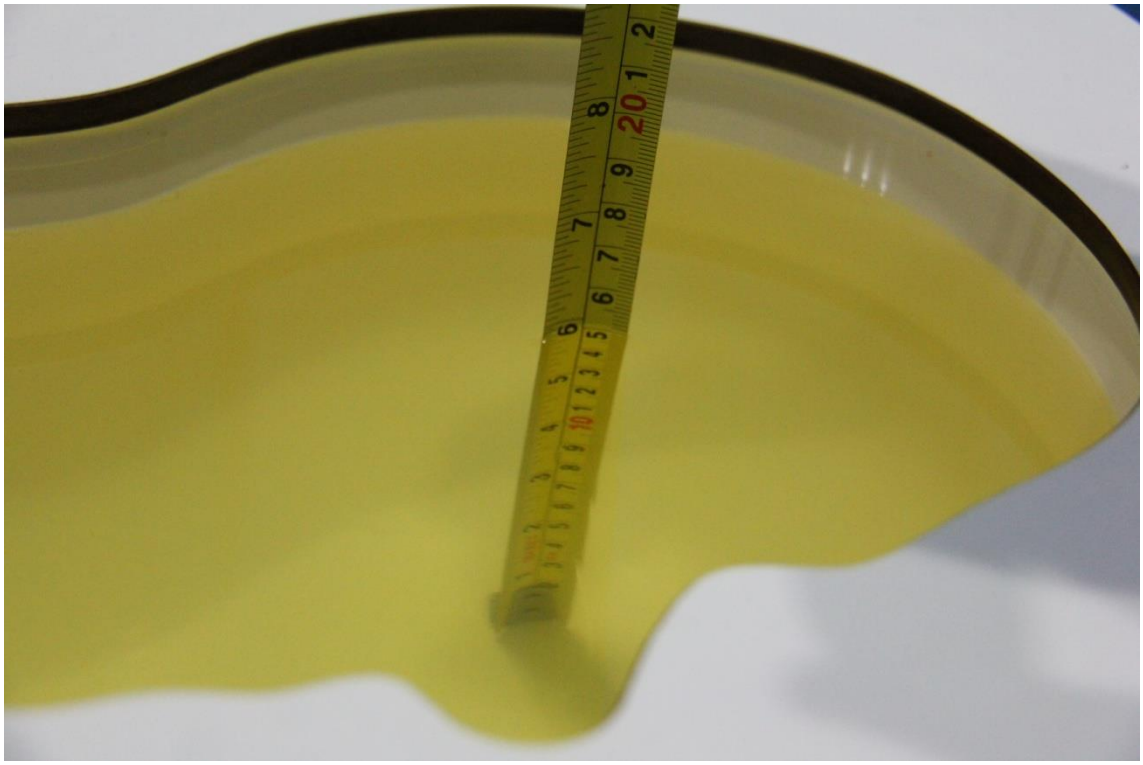
Note: The liquid temperature is 22.0℃



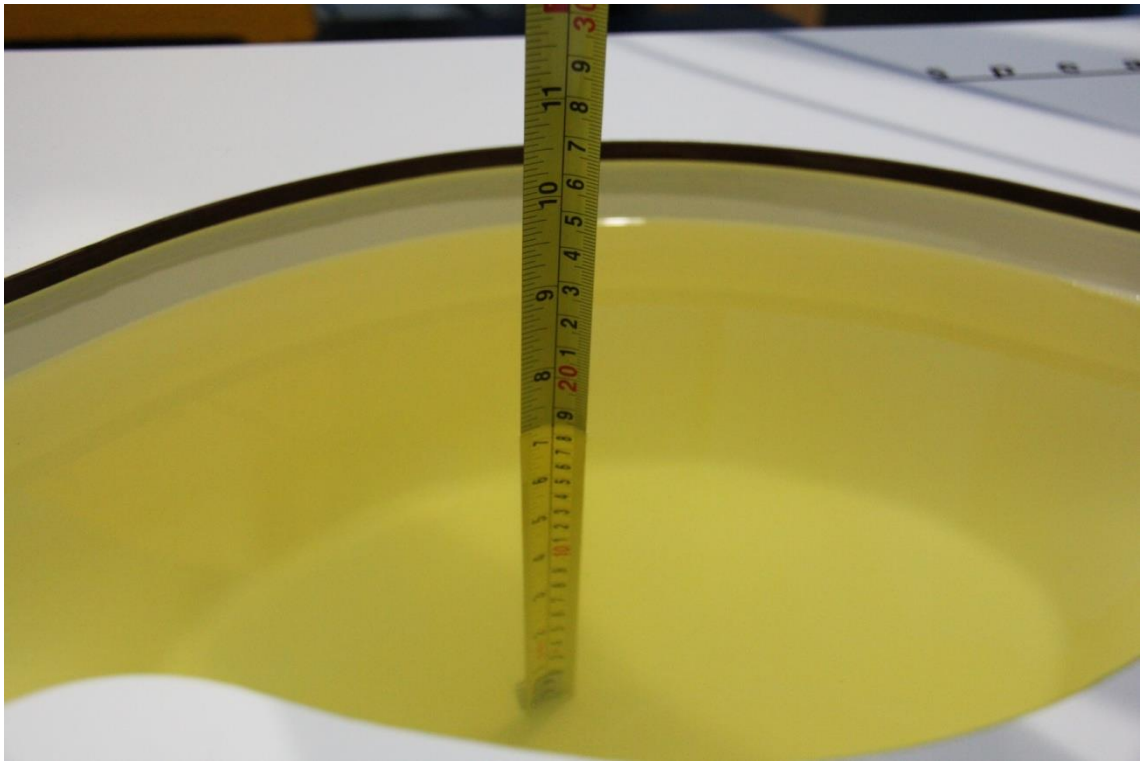
Picture 7-1 Liquid depth in the Head Phantom (835 MHz)



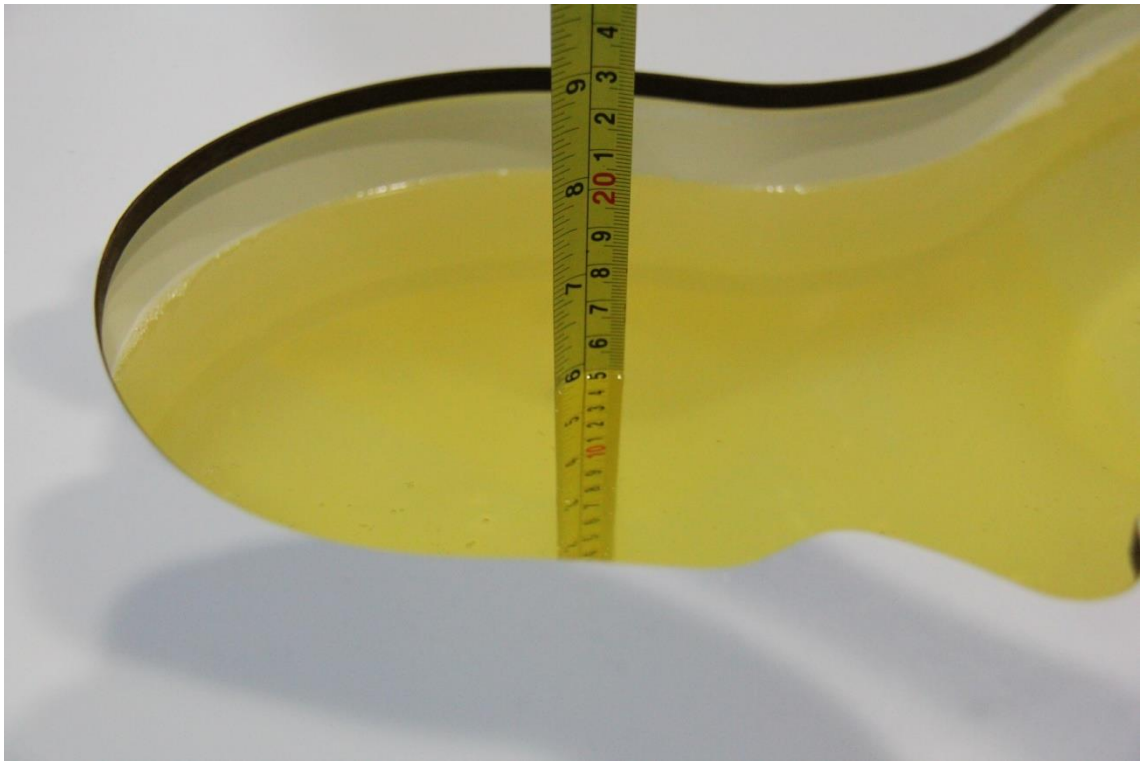
Picture 7-2 Liquid depth in the Flat Phantom (835 MHz)



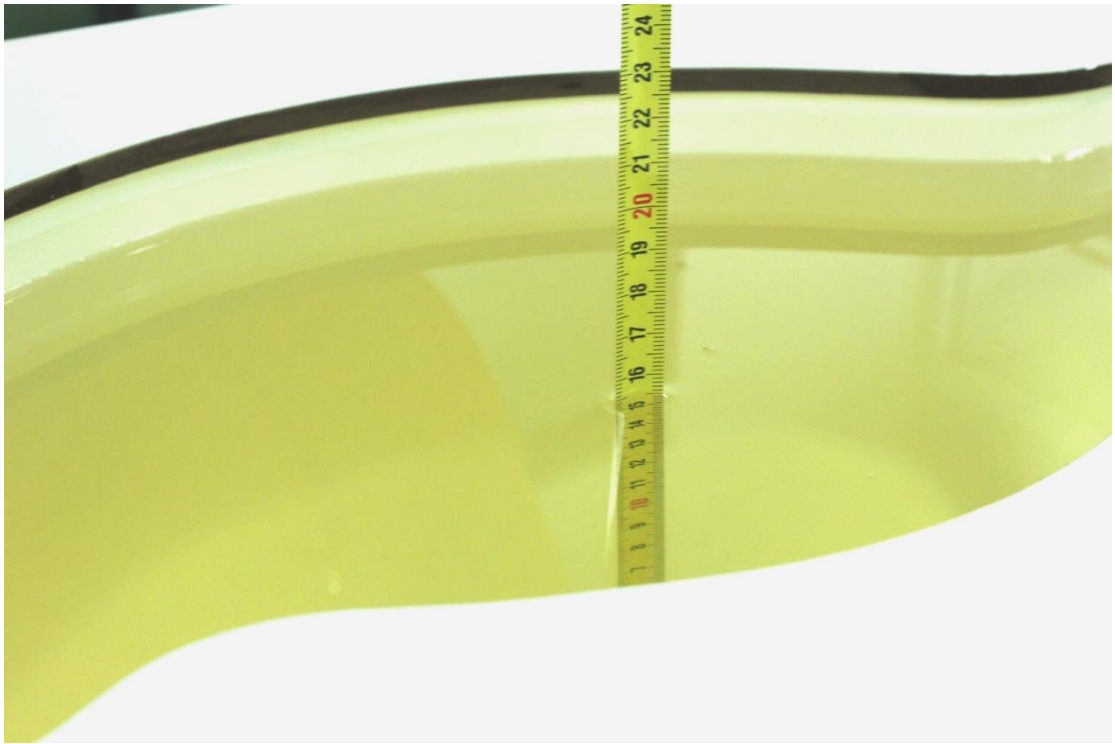
Picture 7-3 Liquid depth in the Head Phantom (1900 MHz)



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

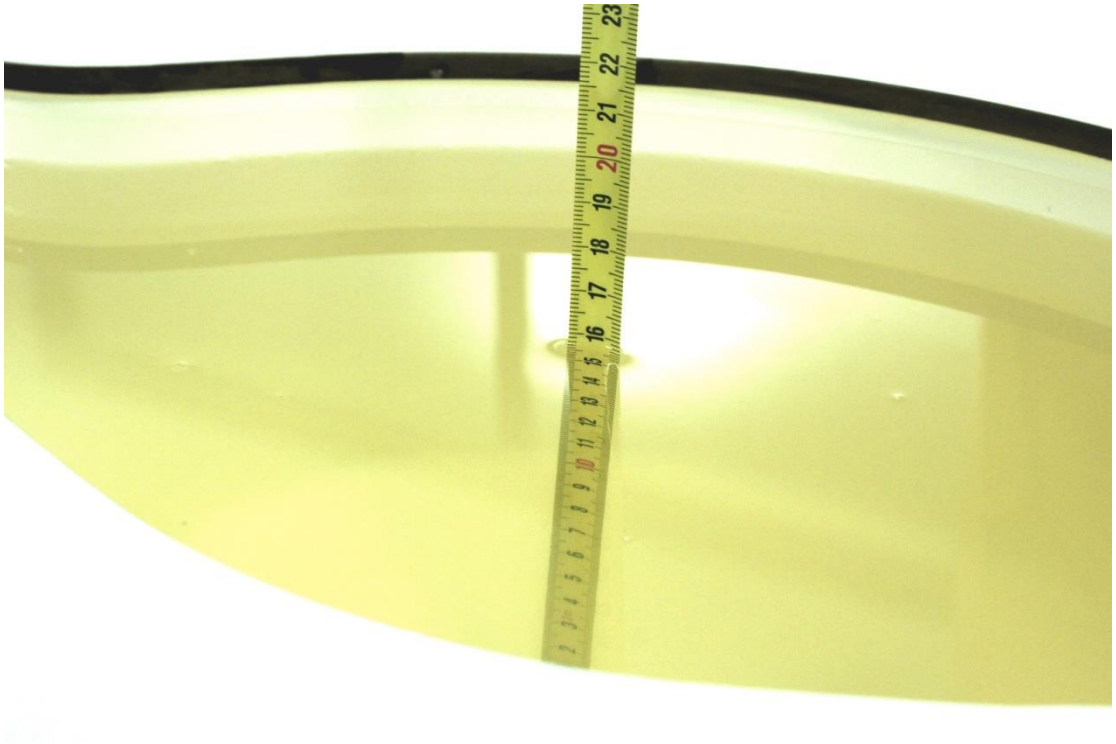


Picture 7-5 Liquid depth in the Head Phantom (2450MHz)



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

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

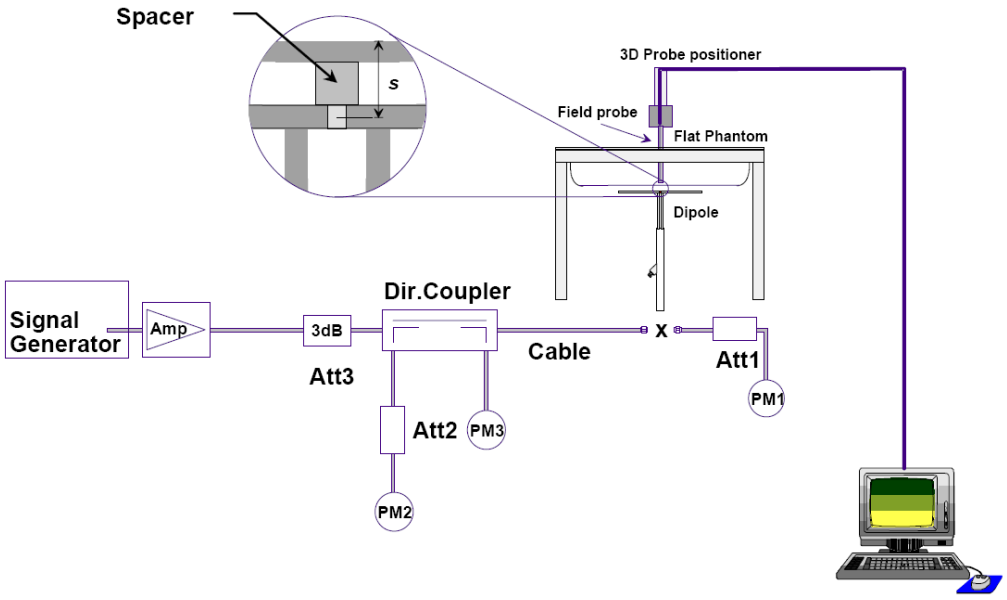


Picture 7-8 Liquid depth in the Flat Phantom (2600MHz)

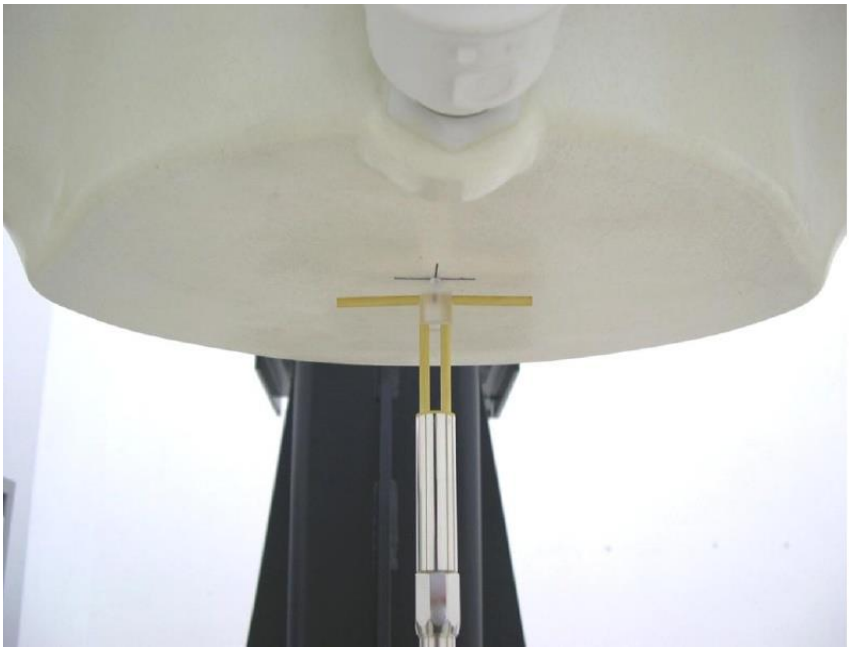
8 System verification

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

8.2 System Verification

SAR system verification is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range 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
2018-6-4	835 MHz	6.06	9.37	5.96	9.32	-1.65%	-0.53%
2018-6-5	1900 MHz	21.0	40.0	21.2	40.4	1.14%	1.00%
2018-6-8	2450 MHz	24.7	52.2	25.0	53.2	1.05%	1.92%
2018-6-7	2600 MHz	25.8	57.9	26.3	58.8	1.86%	1.55%

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
2018-6-4	835 MHz	6.12	9.41	6.20	9.48	1.31%	0.74%
2018-6-5	1900 MHz	21.5	40.5	22.20	42.00	3.26%	3.70%
2018-6-8	2450 MHz	23.8	50.4	24.44	51.60	2.69%	2.38%
2018-6-7	2600 MHz	24.8	55.5	25.28	56.80	1.94%	2.34%

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, all device positions, configurations and operational modes shall be tested for each frequency band according to steps 1 to 3 below. A flowchart of the test process is shown in picture 9.1.

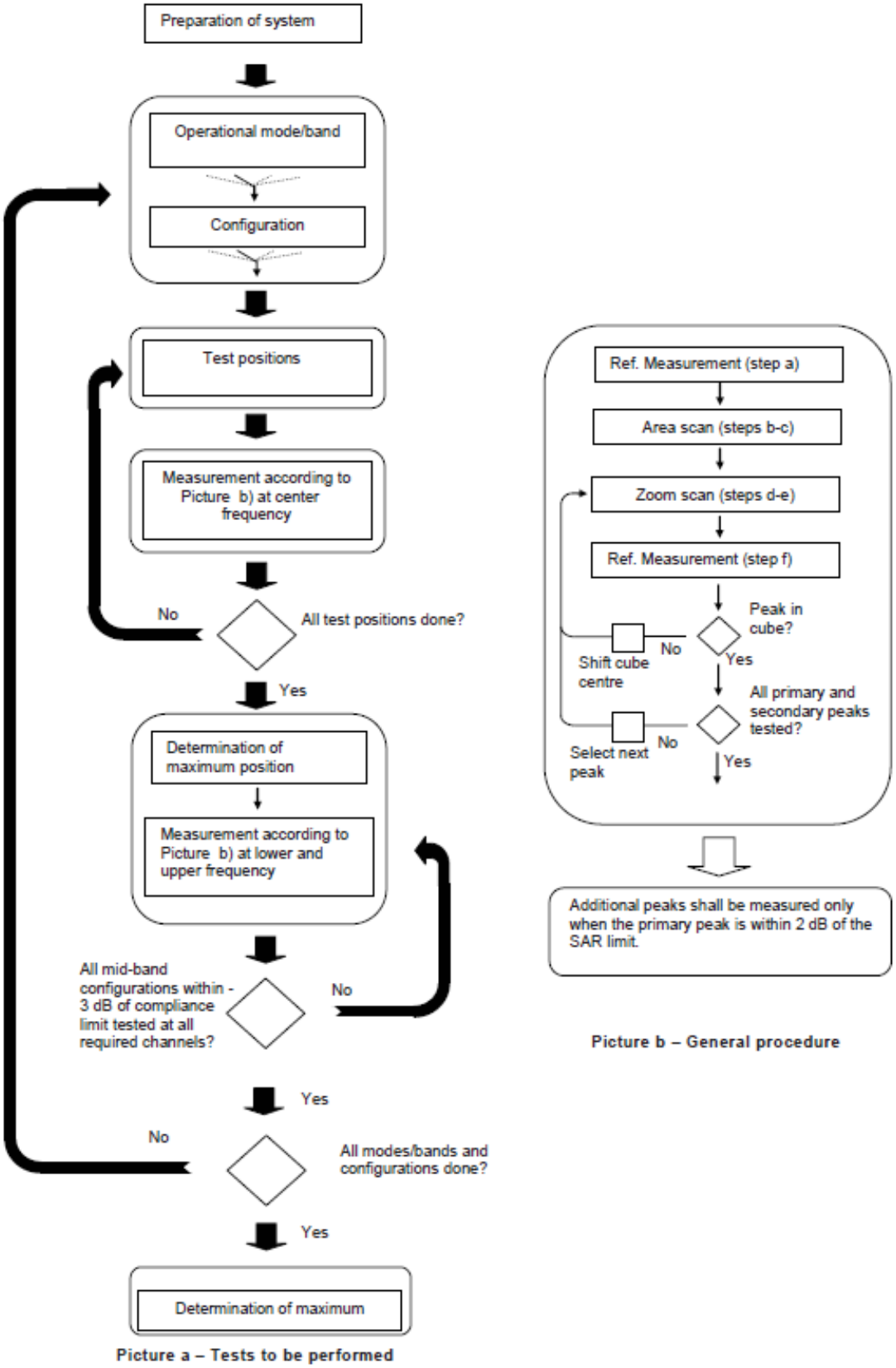
Step 1: The tests described in 9.2 shall be performed at the channel that is closest to the centre of the transmit frequency band (f_c) for:

a) all device positions (cheek and tilt, for both left and right sides of the SAM phantom, as described 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) and configuration 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 all frequencies, 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 be tested as well.

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



Picture 9.1Block diagram of the tests to be performed

9.2 General Measurement Procedure

The area and zoom scan resolutions specified in the table below must be applied to the SAR measurements and fully documented in SAR reports to qualify for TCB approval. Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std 1528-2003. The results should be documented as part of the system validation records and may be requested to support test results when all the measurement parameters in the following 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.

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

10.1 Requirement 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 other purpose; for example, if the peak SAR location required for simultaneous transmission SAR test exclusion can be determined accurately by the SAR system or manually to discriminate between distinctive peaks and scattered noisy SAR distributions from area scans.

There must not be any warning or alert messages due to various measurement concerns identified 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 also demonstrate that the area scan estimated 1-g SAR is within 3% of the zoom scan 1-g SAR (See Annex B). When all the SAR 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.

10.2 Fast SAR Algorithms

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

In the initial study, an approximation algorithm based on Linear fit was developed. The accuracy of 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 algorithm mare 1.2% and 5.8% for 1- and 10-g averaged SAR, respectively. The paper describing the algorithm in detail is expected to be published in August 2004 within the Special Issue of Transactions 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 of this 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 PCS1900/WCDMA1900/LTE B7 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 – Normal power

GSM 850	Measured Power (dBm)			Tune up	calculation	Averaged Power (dBm)		
Speech (GMSK)	251	190	128			251	190	128
1 Txslot	32.45	32.79	32.76	**33.5**	/	/	/	/
GSM 850	Measured Power (dBm)				calculation	Averaged Power (dBm)		
GPRS (GMSK)	251	190	128			251	190	128
1 Txslot	32.44	32.78	32.76	**33.5**	-9.03	23.41	23.75	23.73
2 Txslots	30.00	29.93	30.06	**30.5**	-6.02	23.98	23.91	24.04
3Txslots	28.35	28.41	28.34	**29**	-4.26	24.09	24.15	24.08
4 Txslots	27.21	27.17	27.19	**28**	-3.01	**24.20**	**24.16**	**24.18**
GSM 850	Measured Power (dBm)				calculation	Averaged Power (dBm)		
EGPRS (GMSK)	251	190	128			251	190	128
1 Txslot	32.48	32.76	32.74	**33.5**	-9.03	23.45	23.73	23.71
2 Txslots	29.93	29.91	30.04	**30.5**	-6.02	23.91	23.89	24.02
3Txslots	28.41	28.38	28.41	**29**	-4.26	24.15	24.12	24.15
4 Txslots	27.17	27.15	27.27	**28**	-3.01	**24.16**	**24.14**	**24.26**
GSM 850	Measured Power (dBm)				calculation	Averaged Power (dBm)		
EGPRS (8PSK)	251	190	128			251	190	128
1 Txslot	27.23	26.61	26.74	**28**	-9.03	18.20	17.58	17.71
2 Txslots	26.41	26.59	26.84	**27.5**	-6.02	20.39	20.57	20.82
3Txslots	25.16	25.22	25.35	**26.5**	-4.26	20.90	20.96	21.09
4 Txslots	24.12	24.47	24.12	**25.5**	-3.01	21.11	21.46	21.11

PCS1900	Measured Power (dBm)			Tune up	calculation	Averaged Power (dBm)		
Speech (GMSK)	810	661	512			810	661	512
1 Txslot	30.39	30.12	30.35	**30.5**	/	/	/	/
PCS1900	Measured Power (dBm)				calculation	Averaged Power (dBm)		
GPRS (GMSK)	810	661	512			810	661	512
1 Txslot	30.17	30.23	30.21	**30.5**	-9.03	21.14	21.20	21.18
2 Txslots	27.22	27.28	27.22	**28**	-6.02	**21.20**	**21.26**	**21.20**
3Txslots	25.02	25.02	25.24	**26**	-4.26	20.76	20.76	20.98
4 Txslots	24.08	24.09	24.00	**25**	-3.01	21.07	21.08	20.99

PCS1900	Measured Power (dBm)				calculation	Averaged Power (dBm)		
EGPRS (GMSK)	810	661	512			810	661	512
1 Txslot	30.16	30.17	30.20	**30.5**	-9.03	21.13	21.14	21.17
2 Txslots	27.23	27.30	27.20	**28**	-6.02	**21.21**	**21.28**	**21.18**
3Txslots	25.03	25.04	25.28	**26**	-4.26	20.77	20.78	21.02
4 Txslots	24.12	24.14	24.05	**25**	-3.01	21.11	21.13	21.04
PCS1900	Measured Power (dBm)				calculation	Averaged Power (dBm)		
EGPRS (8PSK)	810	661	512			810	661	512
1 Txslot	25.66	25.28	25.57	**27**	-9.03	16.63	16.25	16.54
2 Txslots	25.26	25.33	25.42	**26.5**	-6.02	19.24	19.31	19.40
3Txslots	24.11	24.09	24.17	**25.5**	-4.26	19.85	19.83	19.91
4 Txslots	23.32	23.42	23.59	**24.5**	-3.01	20.31	20.41	20.58

NOTES:

1) Division Factors

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 4Txslots for GSM850 and 2Txslots for GSM1900.

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

PCS1900	Measured Power (dBm)				calculation	Averaged Power (dBm)		
GPRS (GMSK)	810	661	512			810	661	512
1 Txslot	27.59	27.60	27.54	**28**	-9.03	18.56	18.57	18.51
2 Txslots	27.38	27.39	27.33	**28**	-6.02	**21.36**	**21.37**	**21.31**
3Txslots	25.50	25.51	25.51	**26**	-4.26	21.24	21.25	21.25
4 Txslots	24.27	24.36	24.27	**25**	-3.01	21.26	21.35	21.26

NOTES:

1) Division Factors

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 GSM1900.

11.2 WCDMA Measurement result

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

Item	band	FDDV result			
	ARFCN	4233 (846.6MHz)	4182 (836.4MHz)	4132 (826.4MHz)	Tune up
WCDMA	\	24.15	24.02	23.97	24.5
HSUPA	1	22.37	22.32	22.18	23.5
	2	21.75	21.74	21.77	23
	3	21.38	21.37	21.40	22.5
	4	22.52	22.42	22.40	23.5
	5	22.98	22.83	22.83	23.5
DC-HSDPA	1	22.72	22.71	22.58	23.5
	2	22.71	22.72	22.57	23.5
	3	22.71	22.71	22.55	23.5
	4	22.7	22.71	22.56	23.5
Item	band	FDDII result			
	ARFCN	9538 (1907.6MHz)	9400 (1880MHz)	9262 (1852.4MHz)	
WCDMA	\	24.20	24.04	24.00	24.5
HSUPA	1	22.41	22.33	22.36	23.5
	2	21.86	21.90	21.84	23
	3	21.43	21.54	21.41	22.5
	4	22.61	22.48	22.47	23.5
	5	22.97	22.96	22.89	23.5
DC-HSDPA	1	22.81	22.72	22.69	23.5
	2	22.79	22.72	22.68	23.5
	3	22.78	22.71	22.68	23.5
	4	22.83	22.70	22.67	23.5

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

Item	band	FDDII result			
	ARFCN	9538 (1907.6MHz)	9400 (1880MHz)	9262 (1852.4MHz)	
WCDMA	\	22.20	22.11	22.12	22.5
HSUPA	1	22.65	22.48	22.56	23.5
	2	20.11	20.03	20.15	21
	3	19.69	19.64	19.76	20.5
	4	20.74	20.68	20.61	21.5
	5	21.13	21.07	21.09	22
DC-HSDPA	1	20.93	20.71	20.79	21.5
	2	20.92	20.71	20.78	21.5
	3	20.92	20.70	20.78	21.5
	4	20.91	20.70	20.77	21.5

11.3 LTE Measurement result

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

Band 7							
Bandwidth (MHz)	RB allocation	Frequency (MHz)	Max. Target Power (dBm)	QPSK		16QAM	
	RB offset (Start RB)			Actual output power (dBm)	MPR	Actual output power (dBm)	MPR
5 MHz	1RB High (24)	2567.5	24.2	23.38	0	21.87	1
		2535	24.2	23.27	0	22.04	1
		2502.5	24.2	23.91	0	22.47	1
	1RB Middle (12)	2567.5	24.2	23.69	0	21.97	1
		2535	24.2	23.60	0	22.02	1
		2502.5	24.2	23.81	0	22.23	1
	1RB Low (0)	2567.5	24.2	23.52	0	22.03	1
		2535	24.2	23.23	0	22.09	1
		2502.5	24.2	23.99	0	22.39	1
	12RB High (13)	2567.5	24.2	22.51	1	21.45	2
		2535	24.2	22.52	1	21.28	2
		2502.5	24.2	22.68	1	21.60	2
	12RB Middle (6)	2567.5	24.2	22.55	1	21.42	2
		2535	24.2	22.45	1	21.30	2
		2502.5	24.2	22.89	1	21.55	2
	12RB Low (0)	2567.5	24.2	22.53	1	21.55	2
		2535	24.2	22.45	1	21.31	2
		2502.5	24.2	22.78	1	21.64	2
	25RB (0)	2567.5	24.2	22.52	1	21.65	2
		2535	24.2	22.54	1	21.40	2
		2502.5	24.2	22.81	1	21.59	2
10 MHz	1RB High (49)	2565	24.2	23.69	0	22.66	1
		2535	24.2	23.56	0	22.99	1
		2505	24.2	23.57	0	22.66	1
	1RB Middle (24)	2565	24.2	23.66	0	23.02	1
		2535	24.2	23.68	0	22.90	1
		2505	24.2	23.78	0	22.99	1
	1RB Low (0)	2565	24.2	23.71	0	22.96	1
		2535	24.2	23.50	0	22.84	1
		2505	24.2	23.76	0	22.92	1
	25RB High (25)	2565	24.2	22.55	1	21.28	2
		2535	24.2	22.53	1	21.64	2
		2505	24.2	22.77	1	21.66	2
	25RB Middle (12)	2565	24.2	22.67	1	21.40	2
		2535	24.2	22.49	1	21.61	2
		2505	24.2	22.78	1	21.65	2
	25RB Low (0)	2565	24.2	22.59	1	21.45	2
		2535	24.2	22.49	1	21.49	2
		2505	24.2	22.75	1	21.74	2

	50RB (0)	2565	24.2	22.62	1	21.42	2
		2535	24.2	22.56	1	21.37	2
		2505	24.2	22.76	1	21.69	2
15 MHz	1RB High (74)	2562.5	24.2	23.75	0	22.59	1
		2535	24.2	23.61	0	22.79	1
		2507.5	24.2	23.48	0	23.20	1
	1RB Middle (37)	2562.5	24.2	23.61	0	22.34	1
		2535	24.2	23.38	0	22.35	1
		2507.5	24.2	23.57	0	22.30	1
	1RB Low (0)	2562.5	24.2	23.95	0	22.38	1
		2535	24.2	23.46	0	22.65	1
		2507.5	24.2	23.63	0	23.19	1
	36RB High (38)	2562.5	24.2	22.54	1	21.18	2
		2535	24.2	22.44	1	21.44	2
		2507.5	24.2	22.65	1	21.46	2
	36RB Middle (19)	2562.5	24.2	22.55	1	21.24	2
		2535	24.2	22.39	1	21.40	2
		2507.5	24.2	22.78	1	21.54	2
	36RB Low (0)	2562.5	24.2	22.54	1	21.32	2
		2535	24.2	22.41	1	21.34	2
		2507.5	24.2	22.89	1	21.65	2
	75RB (0)	2562.5	24.2	22.45	1	21.25	2
		2535	24.2	22.46	1	21.36	2
		2507.5	24.2	22.76	1	21.66	2
20 MHz	1RB High (99)	2560	24.2	23.76	0	22.83	1
		2535	24.2	23.35	0	23.03	1
		2510	24.2	23.04	0	22.20	1
	1RB Middle (50)	2560	24.2	23.72	0	23.00	1
		2535	24.2	23.26	0	22.93	1
		2510	24.2	23.40	0	22.22	1
	1RB Low (0)	2560	24.2	23.61	0	22.44	1
		2535	24.2	23.22	0	22.53	1
		2510	24.2	23.34	0	22.44	1
	50RB High (50)	2560	24.2	22.50	1	21.37	2
		2535	24.2	22.53	1	21.27	2
		2510	24.2	22.49	1	21.39	2
	50RB Middle (25)	2560	24.2	22.48	1	21.37	2
		2535	24.2	22.55	1	21.32	2
		2510	24.2	22.67	1	21.50	2
	50RB Low (0)	2560	24.2	22.43	1	21.23	2
		2535	24.2	22.45	1	21.32	2
		2510	24.2	22.73	1	21.45	2
	100RB (0)	2560	24.2	22.41	1	21.31	2
		2535	24.2	22.50	1	21.28	2
		2510	24.2	22.77	1	21.49	2

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

Band 7							
Bandwidth (MHz)	RB allocation	Frequency (MHz)	Max. Target Power (dBm)	QPSK		16QAM	
	RB offset (Start RB)			Actual output power (dBm)	MPR	Actual output power (dBm)	MPR
5 MHz	1RB High (24)	2567.5	22.7	22.01	0	20.43	1
		2535	22.7	21.84	0	20.60	1
		2502.5	22.7	22.20	0	20.98	1
	1RB Middle (12)	2567.5	22.7	21.97	0	20.50	1
		2535	22.7	21.93	0	20.83	1
		2502.5	22.7	22.26	0	20.90	1
	1RB Low (0)	2567.5	22.7	22.05	0	20.37	1
		2535	22.7	21.85	0	20.55	1
		2502.5	22.7	22.37	0	20.95	1
	12RB High (13)	2567.5	22.7	20.81	1	19.72	2
		2535	22.7	21.01	1	19.73	2
		2502.5	22.7	21.23	1	20.06	2
	12RB Middle (6)	2567.5	22.7	20.95	1	19.71	2
		2535	22.7	20.91	1	19.81	2
		2502.5	22.7	21.24	1	20.18	2
	12RB Low (0)	2567.5	22.7	20.95	1	19.80	2
		2535	22.7	20.93	1	19.84	2
		2502.5	22.7	21.22	1	20.14	2
	25RB (0)	2567.5	22.7	20.88	1	19.77	2
		2535	22.7	21.03	1	20.02	2
		2502.5	22.7	21.18	1	20.20	2
10 MHz	1RB High (49)	2565	22.7	22.06	0	20.93	1
		2535	22.7	22.02	0	21.24	1
		2505	22.7	22.29	0	21.20	1
	1RB Middle (24)	2565	22.7	22.25	0	21.32	1
		2535	22.7	22.31	0	21.06	1
		2505	22.7	22.40	0	21.48	1
	1RB Low (0)	2565	22.7	22.02	0	21.02	1
		2535	22.7	21.99	0	21.40	1
		2505	22.7	22.26	0	21.24	1
	25RB High (25)	2565	22.7	20.86	1	19.87	2
		2535	22.7	21.04	1	20.20	2
		2505	22.7	21.32	1	20.38	2
	25RB Middle (12)	2565	22.7	20.99	1	19.93	2
		2535	22.7	21.00	1	20.20	2
		2505	22.7	21.33	1	20.47	2
	25RB Low (0)	2565	22.7	21.01	1	19.94	2
		2535	22.7	21.03	1	20.11	2
		2505	22.7	21.24	1	20.38	2
	50RB (0)	2565	22.7	20.83	1	19.78	2
		2535	22.7	21.08	1	20.04	2
		2505	22.7	21.33	1	20.32	2

15 MHz	1RB High (74)	2562.5	22.7	21.72	0	21.03	1
		2535	22.7	22.23	0	20.92	1
		2507.5	22.7	22.13	0	21.67	1
	1RB Middle (37)	2562.5	22.7	21.79	0	21.06	1
		2535	22.7	21.93	0	20.84	1
		2507.5	22.7	22.09	0	21.65	1
	1RB Low (0)	2562.5	22.7	22.22	0	21.16	1
		2535	22.7	22.13	0	21.00	1
		2507.5	22.7	22.28	0	21.66	1
	36RB High (38)	2562.5	22.7	20.81	1	19.60	2
		2535	22.7	21.01	1	19.88	2
		2507.5	22.7	21.20	1	20.22	2
	36RB Middle (19)	2562.5	22.7	20.93	1	19.76	2
		2535	22.7	20.96	1	19.98	2
		2507.5	22.7	21.32	1	20.15	2
	36RB Low (0)	2562.5	22.7	20.97	1	19.78	2
		2535	22.7	20.96	1	20.04	2
		2507.5	22.7	21.17	1	20.20	2
	75RB (0)	2562.5	22.7	20.86	1	19.70	2
		2535	22.7	21.07	1	20.03	2
		2507.5	22.7	21.20	1	20.26	2
20 MHz	1RB High (99)	2560	22.7	21.65	0	20.62	1
		2535	22.7	21.90	0	21.07	1
		2510	22.7	22.25	0	20.87	1
	1RB Middle (50)	2560	22.7	22.38	0	20.88	1
		2535	22.7	21.83	0	20.98	1
		2510	22.7	22.37	0	21.02	1
	1RB Low (0)	2560	22.7	22.07	0	20.83	1
		2535	22.7	21.75	0	20.66	1
		2510	22.7	22.30	0	20.97	1
	50RB High (50)	2560	22.7	20.88	1	19.66	2
		2535	22.7	20.96	1	19.80	2
		2510	22.7	21.17	1	20.00	2
	50RB Middle (25)	2560	22.7	21.00	1	19.87	2
		2535	22.7	21.01	1	19.93	2
		2510	22.7	21.18	1	20.11	2
	50RB Low (0)	2560	22.7	20.94	1	19.68	2
		2535	22.7	21.00	1	19.89	2
		2510	22.7	21.16	1	20.12	2
	100RB (0)	2560	22.7	20.87	1	19.76	2
		2535	22.7	21.07	1	19.97	2
		2510	22.7	21.13	1	19.97	2

11.4 Wi-Fi and BT Measurement result

The output power of BT antenna is as following:

Mode	Conducted Power (dBm)		
	Channel 0 (2402MHz)	Channel 39 (2441MHz)	Channel 78(2480MHz)
GFSK	3.33	4.10	3.36
Tune up	**5**	**6**	**5**
EDR2M-4_DQPSK	1.35	2.19	1.39
Tune up	**3**	**4**	**3**
EDR3M-8DPSK	1.33	2.12	1.38
Tune up	**3**	**4**	**3**

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

802.11b (dBm)

Channel\data rate	1Mbps	2Mbps	5.5Mbps	11Mbps
11	16.18	15.97	15.77	15.45
6	15.67	/	/	/
1	15.89	/	/	/
Tune up	**17**	**17**	**17**	**16.5**

802.11g (dBm)

Channel\data rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
11	13.65	13.41	13.17	12.78	12.41	11.78	11.27	11.08
6	13.23	/	/	/	/	/	/	/
1	13.57	/	/	/	/	/	/	/
Tune up	**15**	**15**	**14.5**	**14**	**14**	**13.5**	**13**	**12.5**

802.11n (dBm) - HT20 (2.4G)

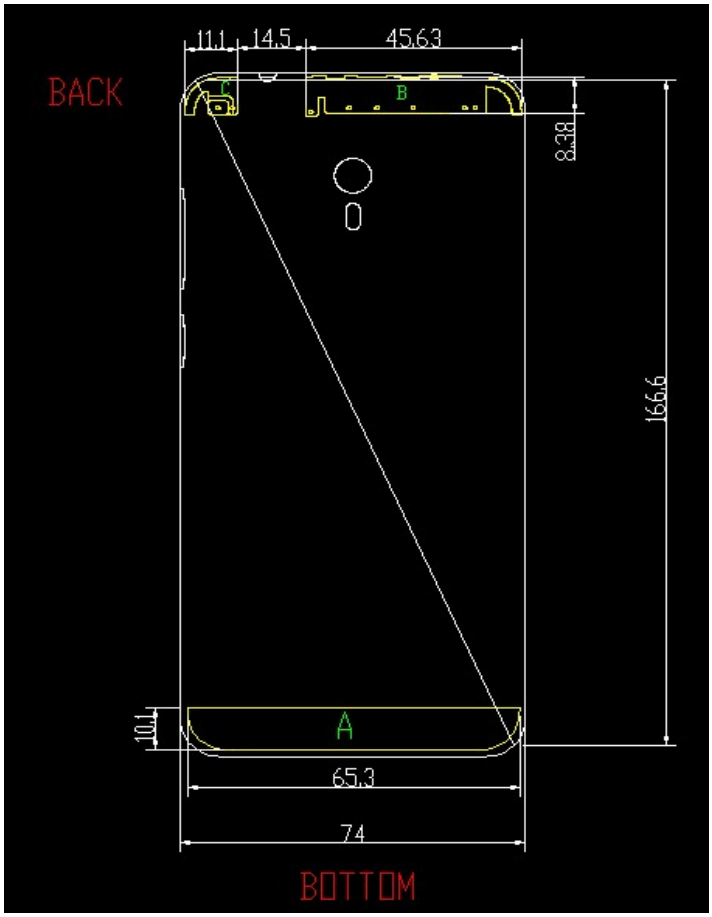
Channel\data rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
11	11.72	11.25	10.83	10.46	9.88	9.38	9.18	8.96
6	11.21	/	/	/	/	/	/	/
1	11.64	/	/	/	/	/	/	/
Tune up	**13**	**13**	**12.5**	**12**	**11.5**	**11**	**10.5**	**10.5**

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



Antenna	Mode	Band
ANT A	Main LB/MB/HB	GSM 2/3/5/8 WCDMA 1/2/5/8 LTE 1/3/7/8/20 TX RX
ANT B	DIV LB/MB/HB	WCDMA 1/2/5/8 LTE 1/3/7/8/20 RX
ANT C	WIFI/GPS	BT/WIFI(2.4G)/GPS

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	Yes	Yes	Yes	Yes	No	Yes
WLAN	Yes	Yes	No	Yes	Yes	No

12.4 Standalone SAR Test Exclusion Considerations

Standalone 1-g head or body SAR 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	3.98	Yes
		Body	19.20	6	3.98	Yes
2.4GHz WLAN	2.45	Head	9.58	17	50.12	No
		Body	19.17	17	50.12	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	Left hand, Touch cheek	0.80	0.62	**1.42**
Highest reported SAR value for Body	Rear	1.10	0.14	**1.24**

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	Left hand, Touch cheek	0.80	0.17[1]	**0.97**
Maximum reported SAR value for Body	Rear	1.10	0.08[1]	**1.18**

[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	3.98	0.17
Bluetooth	2.441	Body	10	6	3.98	0.08

* - 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 10/15 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:

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

Where P_{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
GSM 850	1:2
PCS 1900	1:4
WCDMA & LTE	1:1

14.1 SAR results for Fast SAR

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

Ambient Temperature: 22.9 ºC Liquid Temperature: 22.5ºC											
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	Left	Touch	Fig.1	27.21	28	0.175	**0.21**	0.228	**0.27**	0.02
190	836.6	Left	Touch	/	27.17	28	0.139	**0.17**	0.186	**0.23**	0.08
128	824.2	Left	Touch	/	27.19	28	0.097	**0.12**	0.131	**0.16**	-0.04
190	836.6	Left	Tilt	/	27.17	28	0.056	**0.07**	0.071	**0.09**	0.01
190	836.6	Right	Touch	/	27.17	28	0.097	**0.12**	0.127	**0.15**	0.03
190	836.6	Right	Tilt	/	27.17	28	0.039	**0.05**	0.057	**0.07**	0.09

Note: the head SAR of GSM850 is tested with GPRS (4Txslots) mode because of VoIP.

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

Ambient Temperature: 22.9 ºC Liquid Temperature: 22.5ºC											
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 (4)	Front	/	27.17	28	0.128	**0.15**	0.168	**0.20**	0.08
251	848.8	GPRS (4)	Rear	Fig.2	27.21	28	0.195	**0.23**	0.256	**0.31**	0.09
190	836.6	GPRS (4)	Rear	/	27.17	28	0.186	**0.23**	0.237	**0.29**	0.12
128	824.2	GPRS (4)	Rear	/	27.19	28	0.156	**0.19**	0.200	**0.24**	0.03
190	836.6	GPRS (4)	Left	/	27.17	28	0.121	**0.15**	0.170	**0.21**	0.18
190	836.6	GPRS (4)	Right	/	27.17	28	0.088	**0.11**	0.126	**0.15**	0.02
190	836.6	GPRS (4)	Bottom	/	27.17	28	0.052	**0.06**	0.081	**0.10**	0.08
251	848.8	EGPRS (4)	Rear	/	27.17	28	0.188	**0.23**	0.238	**0.29**	-0.03

Note: The distance between the EUT and the phantom bottom is 10mm.

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

Ambient Temperature: 22.9 ºC Liquid Temperature: 22.5ºC											
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	Left	Touch	Fig.3	27.22	28	0.215	**0.26**	0.353	**0.42**	-0.03
661	1880	Left	Touch	/	27.28	28	0.192	**0.23**	0.310	**0.37**	0.12
512	1850.2	Left	Touch	/	27.22	28	0.186	**0.22**	0.294	**0.35**	0.09
661	1880	Left	Tilt	/	27.28	28	0.108	**0.13**	0.166	**0.20**	-0.03
661	1880	Right	Touch	/	27.28	28	0.096	**0.11**	0.142	**0.17**	0.01
661	1880	Right	Tilt	/	27.28	28	0.083	**0.10**	0.129	**0.15**	0.17

Note: the head SAR of GSM1900 is tested with GPRS (2Txslots) mode because of VoIP.

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

Ambient Temperature: 22.9 ºC Liquid Temperature: 22.5ºC											
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)	Front	/	27.39	28	0.319	**0.37**	0.601	**0.69**	0.09
810	1909.8	GPRS (2)	Rear	Fig.4	27.38	28	0.431	**0.50**	0.825	**0.95**	0.14
661	1880	GPRS (2)	Rear	/	27.39	28	0.379	**0.44**	0.724	**0.83**	0.03
512	1850.2	GPRS (2)	Rear	/	27.33	28	0.362	**0.42**	0.685	**0.80**	-0.05
661	1880	GPRS (2)	Left	/	27.39	28	0.218	**0.25**	0.392	**0.45**	0.07
661	1880	GPRS (2)	Right	/	27.39	28	0.090	**0.10**	0.172	**0.20**	0.03
661	1880	GPRS (2)	Bottom	/	27.39	28	0.242	**0.28**	0.487	**0.56**	-0.08
810	1909.8	EGPRS (2)	Rear	/	27.46	28	0.425	**0.48**	0.819	**0.93**	0.01
810	1909.8	GPRS (2)	Rear	Note2	27.22	28	0.210	**0.25**	0.377	**0.45**	-0.01

Note1: The distance between the EUT and the phantom bottom is 10mm.

Note2: The distance between the EUT and the phantom bottom is 15mm. (See detail in annexI)

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

Ambient Temperature: 22.9 ºC Liquid Temperature: 22.5ºC											
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										
4233	846.6	Left	Touch	Fig.5	24.15	24.5	0.212	**0.23**	0.277	**0.30**	-0.07
4182	836.4	Left	Touch	/	24.02	24.5	0.189	**0.21**	0.246	**0.27**	0.02
4132	826.4	Left	Touch	/	23.97	24.5	0.174	**0.20**	0.227	**0.26**	0.19
4182	836.4	Left	Tilt	/	24.02	24.5	0.107	**0.12**	0.142	**0.16**	0.04
4182	836.4	Right	Touch	/	24.02	24.5	0.158	**0.18**	0.210	**0.23**	-0.08
4182	836.4	Right	Tilt	/	24.02	24.5	0.060	**0.07**	0.112	**0.13**	0.16

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

Ambient Temperature: 22.9 ºC Liquid Temperature: 22.5ºC										
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	Front	/	24.02	24.5	0.166	**0.19**	0.213	**0.24**	0.09
4233	846.6	Rear	Fig.6	24.15	24.5	0.239	**0.26**	0.313	**0.34**	0.07
4182	836.4	Rear	/	24.02	24.5	0.235	**0.26**	0.307	**0.34**	0.12
4132	826.4	Rear	/	23.97	24.5	0.224	**0.25**	0.295	**0.33**	-0.03
4182	836.4	Left	/	24.02	24.5	0.169	**0.19**	0.247	**0.28**	0.07
4182	836.4	Right	/	24.02	24.5	0.131	**0.15**	0.191	**0.21**	0.04
4182	836.4	Bottom	/	24.02	24.5	0.040	**0.04**	0.066	**0.07**	-0.01

Note: The distance between the EUT and the phantom bottom is 10mm.

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

Ambient Temperature: 22.9 ºC Liquid Temperature: 22.5ºC											
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										
9938	1907.6	Left	Touch	Fig.7	24.20	24.5	0.459	**0.49**	0.751	**0.80**	0.01
9800	1880	Left	Touch	/	24.04	24.5	0.431	**0.48**	0.701	**0.78**	-0.04
9662	1852.4	Left	Touch	/	24.00	24.5	0.381	**0.43**	0.612	**0.69**	0.19
9800	1880	Left	Tilt	/	24.04	24.5	0.252	**0.28**	0.392	**0.44**	0.03
9800	1880	Right	Touch	/	24.04	24.5	0.226	**0.25**	0.338	**0.38**	0.08
9800	1880	Right	Tilt	/	24.04	24.5	0.208	**0.23**	0.318	**0.35**	0.01

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

Ambient Temperature: 22.9 ºC Liquid Temperature: 22.5ºC										
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									
9800	1880	Front	/	22.11	22.5	0.388	**0.42**	0.677	**0.74**	0.09
9938	1907.6	Rear	Fig.8	22.20	22.5	0.535	**0.57**	1.03	**1.10**	0.01
9800	1880	Rear	/	22.11	22.5	0.519	**0.57**	0.982	**1.07**	-0.03
9662	1852.4	Rear	/	22.12	22.5	0.482	**0.53**	0.910	**0.99**	0.19
9800	1880	Left	/	22.11	22.5	0.286	**0.31**	0.508	**0.56**	0.04
9800	1880	Right	/	22.11	22.5	0.104	**0.11**	0.189	**0.21**	0.09
9800	1880	Bottom	/	22.11	22.5	0.328	**0.36**	0.618	**0.68**	0.14
9938	1907.6	Rear	Note2	24.20	24.5	0.426	**0.46**	0.767	**0.82**	-0.01

Note1: The distance between the EUT and the phantom bottom is 10mm.

Note2: The distance between the EUT and the phantom bottom is 15mm. (See detail in annexI)

Table 14.1-9: SAR Values (LTE Band7 - Head)

Ambient Temperature: 22.9 ºC Liquid Temperature: 22.5ºC												
Frequency		Mode	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											
21350	2560	1RB_High	Left	Touch	/	23.76	24.2	0.053	**0.06**	0.100	**0.11**	0.09
21350	2560	1RB_High	Left	Tilt	/	23.76	24.2	0.040	**0.04**	0.066	**0.07**	-0.03
21350	2560	1RB_High	Right	Touch	Fig.9	23.76	24.2	0.084	**0.09**	0.156	**0.17**	0.04
21350	2560	1RB_High	Right	Tilt	/	23.76	24.2	0.022	**0.02**	0.040	**0.04**	0.09
20850	2510	50RB_Low	Left	Touch	/	22.73	23.2	0.032	**0.04**	0.055	**0.06**	-0.06
20850	2510	50RB_Low	Left	Tilt	/	22.73	23.2	0.017	**0.02**	0.030	**0.03**	0.12
20850	2510	50RB_Low	Right	Touch	/	22.73	23.2	0.046	**0.05**	0.085	**0.09**	0.02
20850	2510	50RB_Low	Right	Tilt	/	22.73	23.2	0.014	**0.02**	0.022	**0.02**	0.08

Note1: The LTE mode is QPSK_20MHz.

Table 14.1-10: SAR Values (LTE Band7 - Body)

Ambient Temperature: 22.9 ºC Liquid Temperature: 22.5ºC											
Frequency		Mode	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										
21350	2560	1RB_Mid	Front	/	22.38	22.7	0.283	**0.30**	0.515	**0.55**	0.09
21350	2560	1RB_Mid	Rear	/	22.38	22.7	0.351	**0.38**	0.690	**0.74**	-0.04
21350	2560	1RB_Mid	Left	/	22.38	22.7	0.039	**0.04**	0.073	**0.08**	0.02
21350	2560	1RB_Mid	Right	/	22.38	22.7	0.085	**0.09**	0.141	**0.15**	0.19
21350	2560	1RB_Mid	Bottom	/	22.38	22.7	0.412	**0.44**	0.769	**0.83**	0.05
21100	2535	1RB_High	Bottom	Fig.10	21.90	22.7	0.416	**0.50**	0.783	**0.94**	0.19
20850	2510	1RB_Mid	Bottom	/	22.37	22.7	0.368	**0.40**	0.683	**0.74**	0.01
20850	2510	50RB_Mid	Front	/	21.18	21.7	0.204	**0.23**	0.374	**0.42**	0.03
20850	2510	50RB_Mid	Rear	/	21.18	21.7	0.234	**0.26**	0.471	**0.53**	0.09
20850	2510	50RB_Mid	Left	/	21.18	21.7	0.026	**0.03**	0.046	**0.05**	-0.01
20850	2510	50RB_Mid	Right	/	21.18	21.7	0.058	**0.07**	0.096	**0.11**	0.18
20850	2510	50RB_Mid	Bottom	/	21.18	21.7	0.289	**0.33**	0.553	**0.62**	0.02
20850	2510	100RB	Bottom	/	21.13	21.7	0.248	**0.28**	0.484	**0.55**	0.08
21100	2535	1RB_High	Bottom	Note2	23.35	24.2	0.364	**0.44**	0.652	**0.79**	0.00

Note1: The distance between the EUT and the phantom bottom is 10mm.

Note2: The distance between the EUT and the phantom bottom is 15mm. (See detail in annexI)

Note3: The LTE mode is QPSK_20MHz.

14.2 SAR results for Standard procedure

There is zoom scan measurement to be added 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 ºC Liquid Temperature: 22.5ºC											
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	Left	Touch	Fig.1	27.21	28	0.175	**0.21**	0.228	**0.27**	0.02

Note: the head SAR of GSM850 is tested with GPRS (4Txslots) mode because of VoIP.

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

Ambient Temperature: 22.9 ºC Liquid Temperature: 22.5ºC											
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 (4)	Rear	Fig.2	27.21	28	0.195	**0.23**	0.256	**0.31**	0.09

Note: The distance between the EUT and the phantom bottom is 10mm.

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

Ambient Temperature: 22.9 ºC Liquid Temperature: 22.5ºC											
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	Left	Touch	Fig.3	27.22	28	0.215	**0.26**	0.353	**0.42**	-0.03

Note: the head SAR of GSM1900 is tested with GPRS (2Txslots) mode because of VoIP.

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

Ambient Temperature: 22.9 ºC Liquid Temperature: 22.5ºC											
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 (2)	Rear	Fig.4	27.38	28	0.431	**0.50**	0.825	**0.95**	0.14

Note1: The distance between the EUT and the phantom bottom is 10mm.

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

Ambient Temperature: 22.9 ºC Liquid Temperature: 22.5ºC											
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										
4233	846.6	Left	Touch	Fig.5	24.15	24.5	0.212	**0.23**	0.277	**0.30**	-0.07

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

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)
Ch.	MHz									
4233	846.6	Rear	Fig.6	24.15	24.5	0.239	**0.26**	0.313	**0.34**	0.07

Note: The distance between the EUT and the phantom bottom is 10mm.

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

Ambient Temperature: 22.9 ℃ Liquid Temperature: 22.5℃											
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										
9938	1907.6	Left	Touch	Fig.7	24.20	24.5	0.459	**0.49**	0.751	**0.80**	0.01

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

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)
Ch.	MHz									
9938	1907.6	Rear	Fig.8	22.20	22.5	0.535	**0.57**	1.03	**1.10**	0.01

Note1: The distance between the EUT and the phantom bottom is 10mm.

Table 14.2-9: SAR Values (LTE Band7 - Head)

Ambient Temperature: 22.9 ℃ Liquid Temperature: 22.5℃												
Frequency		Mode	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											
21350	2560	1RB_High	Right	Touch	Fig.9	23.76	24.2	0.084	**0.09**	0.156	**0.17**	0.04

Note1: The LTE mode is QPSK_20MHz.

Table 14.2-10: SAR Values (LTE Band7 - Body)

Ambient Temperature: 22.9 ℃ Liquid Temperature: 22.5℃											
Frequency		Mode	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										
21100	2535	1RB_High	Bottom	Fig.10	21.90	22.7	0.416	**0.50**	0.783	**0.94**	0.19

Note1: The distance between the EUT and the phantom bottom is 10mm.
Note2: The LTE mode is QPSK_20MHz.

14.3 WLAN 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-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.										
2412	1	Left	Touch	/	16.18	17	0.225	**0.27**	0.479	**0.58**	0.15
2412	1	Left	Tilt	/	16.18	17	0.138	**0.17**	0.291	**0.35**	0.10
2412	1	Right	Touch	/	16.18	17	0.111	**0.13**	0.200	**0.24**	-0.01
2412	1	Right	Tilt	/	16.18	17	0.121	**0.15**	0.236	**0.29**	0.05

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-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.										
2412	1	Left	Touch	Fig.11	16.18	17	0.226	**0.27**	0.508	**0.61**	0.15
2412	1	Left	Tilt	/	16.18	17	0.141	**0.17**	0.325	**0.39**	0.10
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.						
2412	1	Left	Touch	97.62%	100%	**0.61**	**0.62**

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 ºC					Liquid Temperature: 22.5ºC				
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.									
2412	1	Front	/	16.18	17	0.037	**0.04**	0.065	**0.08**	0.01
2412	1	Rear	/	16.18	17	0.056	**0.07**	0.110	**0.13**	0.09
2412	1	Left	/	16.18	17	0.008	**0.01**	0.014	**0.02**	0.05
2412	1	Right	/	16.18	17	0.041	**0.05**	0.078	**0.09**	-0.14
2412	1	Top	/	16.18	17	0.027	**0.03**	0.049	**0.06**	0.13

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)

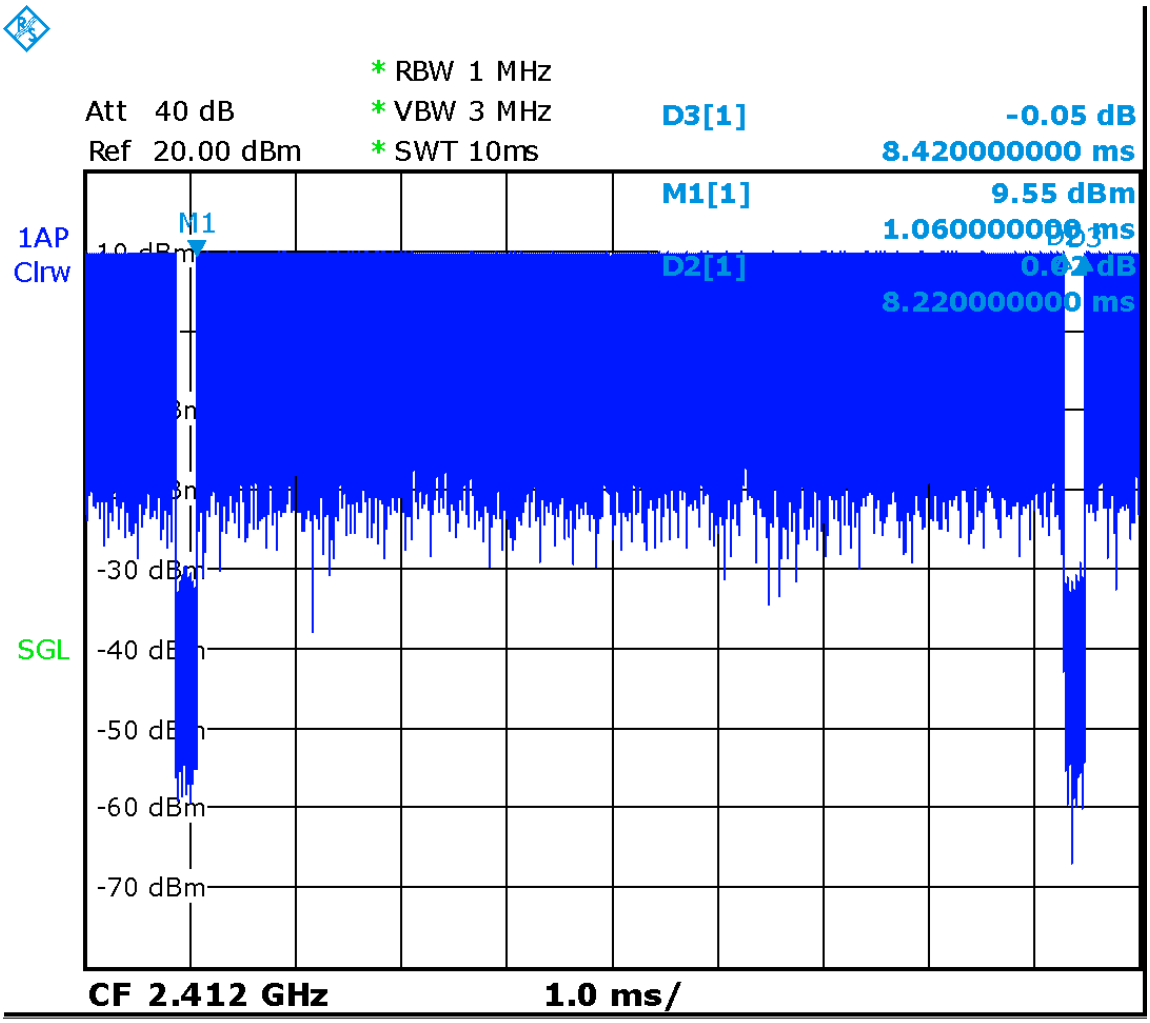
Ambient Temperature: 22.9 ºC					Liquid Temperature: 22.5ºC					
Frequency		Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g)(W/kg)	Power Drift (dB)
MHz	Ch.									
2412	1	Rear	Fig.12	16.18	17	0.055	**0.07**	0.112	**0.14**	0.09
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 ºC					Liquid Temperature: 22.5ºC	
Frequency		Test Position	Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
MHz	Ch.					
2412	1	Rear	97.62%	100%	**0.14**	**0.14**

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



Picture 14.1 Duty factor plot for CH1

15 SAR Measurement Variability

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

The following procedures are applied to determine if repeated measurements 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 original and 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 repeated measurements is > 1.20.

Table 15.1: SAR Measurement Variability for Body PCS1900 (1g)

Frequency		Test Position	Spacing (mm)	Original SAR (W/kg)	First Repeated SAR (W/kg)	The Ratio	Second Repeated SAR (W/kg)
Ch.	MHz						
810	1909.8	Rear	10	0.825	0.818	1.01	/

Table 15.2: SAR Measurement Variability for Body W1900 (1g)

Frequency		Test Position	Spacing (mm)	Original SAR (W/kg)	First Repeated SAR (W/kg)	The Ratio	Second Repeated SAR (W/kg)
Ch.	MHz						
9938	1907.6	Rear	10	1.03	1.01	1.02	/

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	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
4	Linearity	B	4.7	R	$\sqrt{3}$	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	$\sqrt{3}$	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	0.4	R	$\sqrt{3}$	1	1	0.2	0.2	∞
12	Probe positioning with respect to phantom shell	B	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
13	Post-processing	B	1.0	R	$\sqrt{3}$	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	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up										
17	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
18	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	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	$\sqrt{3}$	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	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
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	0.4	R	$\sqrt{3}$	1	1	0.2	0.2	∞
12	Probe positioning with respect to phantom shell	B	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
13	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
14	Fast SAR z-Approximation	B	7.0	R	$\sqrt{3}$	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	$\sqrt{3}$	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		$u_c' = \sqrt{\sum_{i=1}^{22} c_i^2 u_i^2}$						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, 2018	One year
02	Power meter	NRVD	102083	November 01, 2017	One year
03	Power sensor	NRV-Z5	100542		
04	Signal Generator	E4438C	MY49071430	January 2,2018	One Year
05	Amplifier	60S1G4	0331848	No Calibration Requested	
06	BTS	E5515C	MY50263375	January 23, 2018	One year
07	BTS	CMW500	149646	October 31, 2017	One year
08	E-field Probe	SPEAG EX3DV4	7464	September 12,2017	One year
09	DAE	SPEAG DAE4	1525	October 2, 2017	One year
10	Dipole Validation Kit	SPEAG D835V2	4d069	July 19, 2017	One year
11	Dipole Validation Kit	SPEAG D1900V2	5d101	July 26, 2017	One year
12	Dipole Validation Kit	SPEAG D2450V2	853	July 21, 2017	One year
13	Dipole Validation Kit	SPEAG D2600V2	1012	July 21, 2017	One year

END OF REPORT BODY

ANNEX A Graph Results

850 Left Cheek High

Date: 2018-6-4
Electronics: DAE4 Sn1525
Medium: Head 850 MHz
Medium parameters used: f = 848.8 MHz; σ = 0.891 mho/m; εr = 41.83; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: GSM 850 GPRS Frequency: 848.8 MHz Duty Cycle: 1:2
Probe: EX3DV4 – SN7464 ConvF(10.28, 10.28, 10.28)

Area Scan (71x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.254 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.934 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.281 W/kg
SAR(1 g) = 0.228 W/kg; SAR(10 g) = 0.175 W/kg
Maximum value of SAR (measured) = 0.248 W/kg

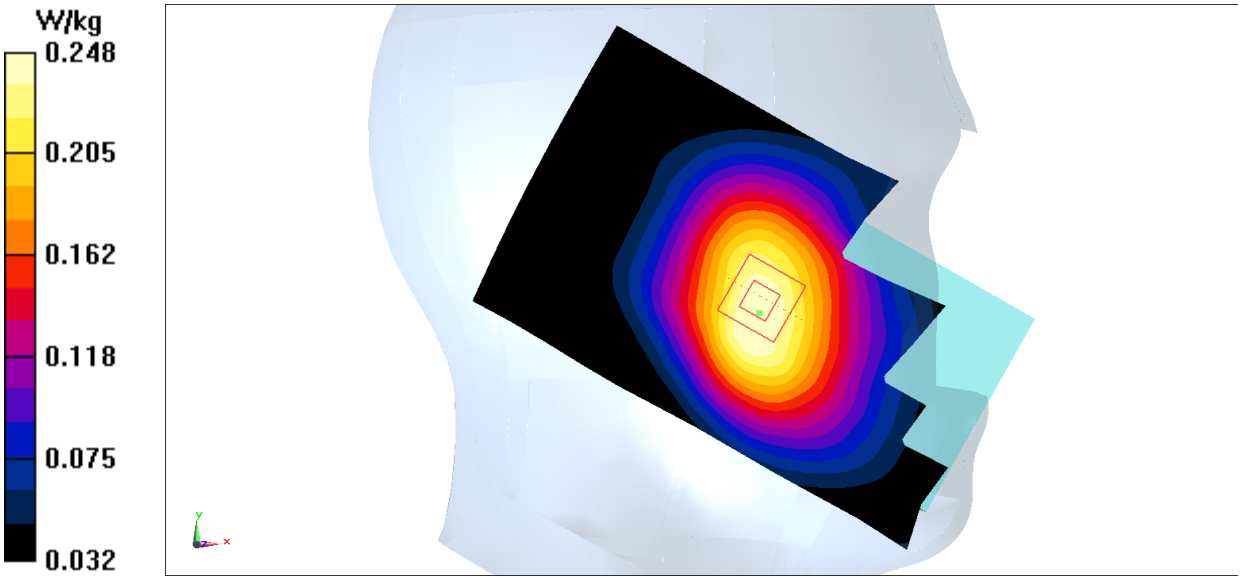


Fig.1 850MHz

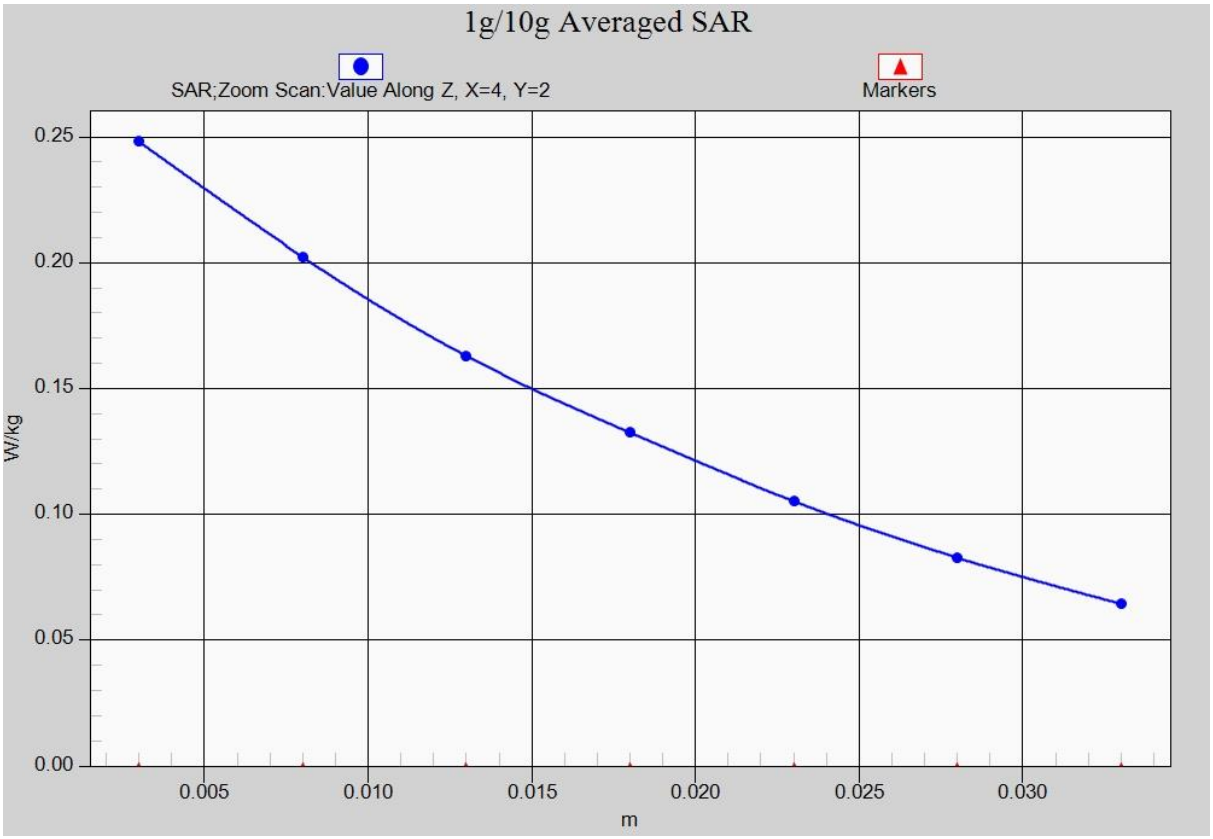


Fig. 1-1 Z-Scan at power reference point (850 MHz)

850 Body Rear High

Date: 2018-6-4
Electronics: DAE4 Sn1525
Medium: Body 850 MHz
Medium parameters used: f = 848.8 MHz; σ = 0.991 mho/m; εr = 55.94; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: GSM 850 GPRS Frequency: 848.8 MHz Duty Cycle: 1:2
Probe: EX3DV4 – SN7464 ConvF(10.21, 10.21, 10.21)

Area Scan (71x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.278 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.59 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.322 W/kg
SAR(1 g) = 0.256 W/kg; SAR(10 g) = 0.195 W/kg
Maximum value of SAR (measured) = 0.282 W/kg

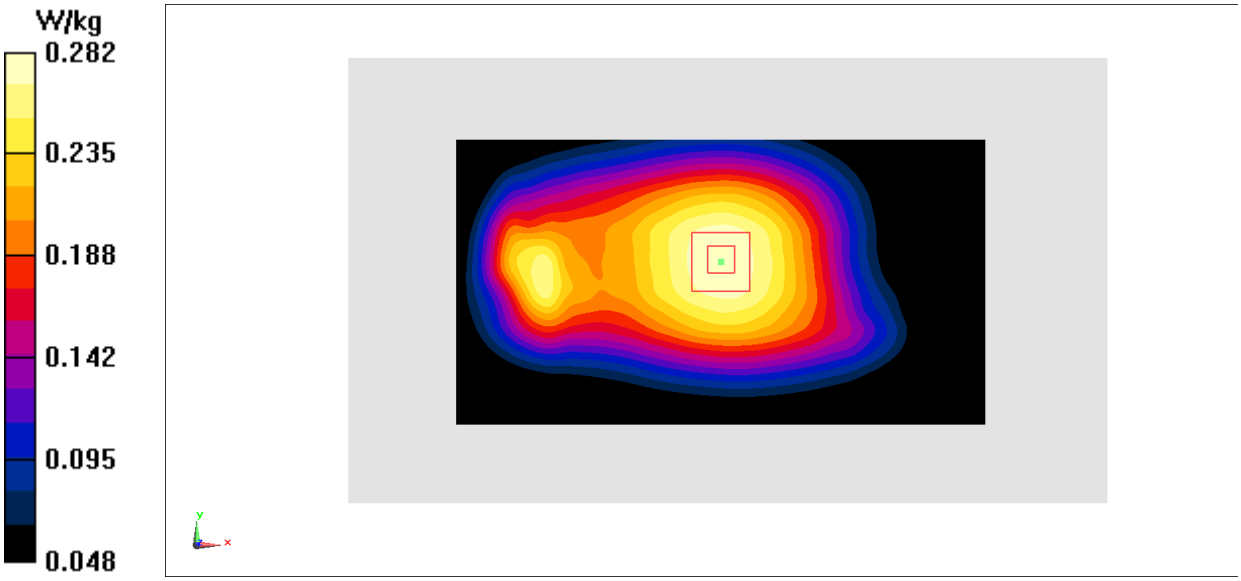


Fig.2 850 MHz

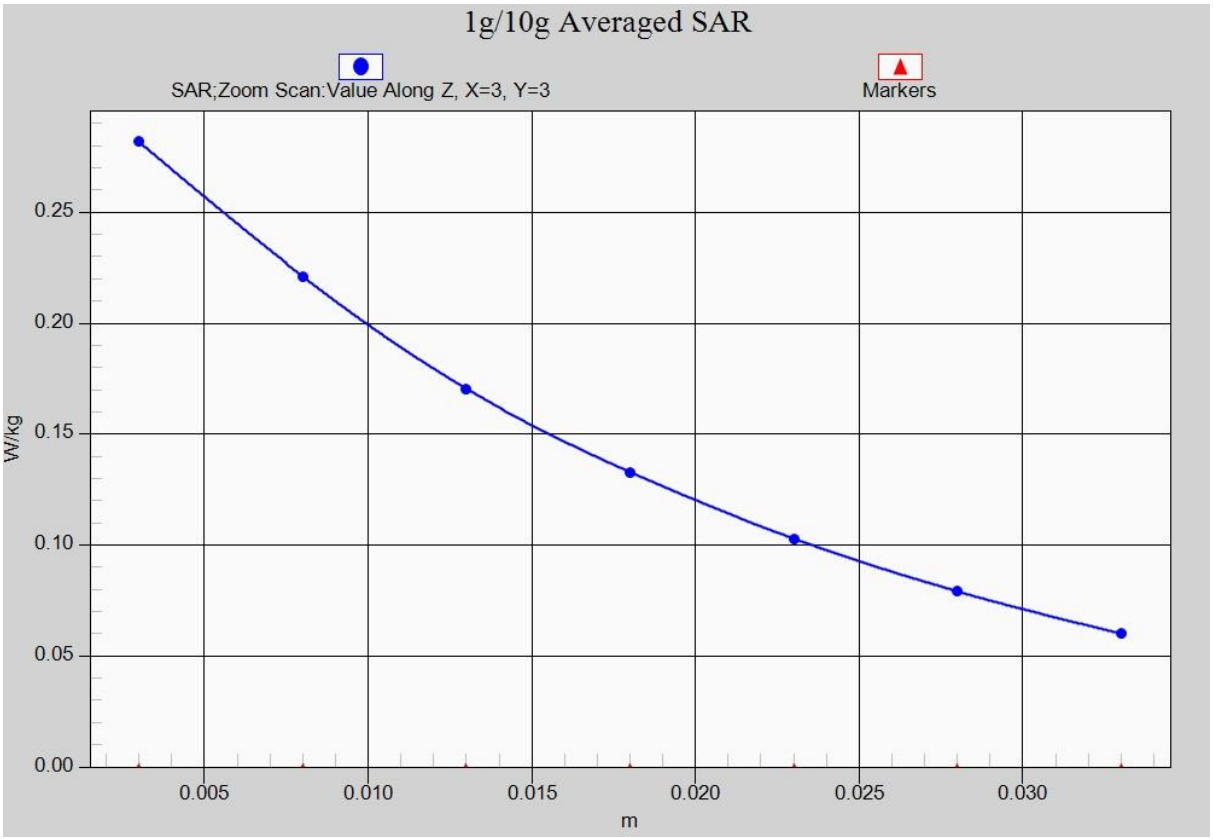


Fig. 2-1 Z-Scan at power reference point (850 MHz)

1900 Left Cheek High

Date: 2018-6-5
Electronics: DAE4 Sn1525
Medium: Head 1900 MHz
Medium parameters used: f = 1909.8 MHz; σ = 1.442 mho/m; εr = 40.49; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: GSM 1900MHz Frequency: 1909.8 MHz Duty Cycle: 1:4
Probe: EX3DV4– SN7464 ConvF(8.39, 8.39, 8.39)

Area Scan (71x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.421 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.643 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.533 W/kg
SAR(1 g) = 0.353 W/kg; SAR(10 g) = 0.215 W/kg
Maximum value of SAR (measured) = 0.419 W/kg

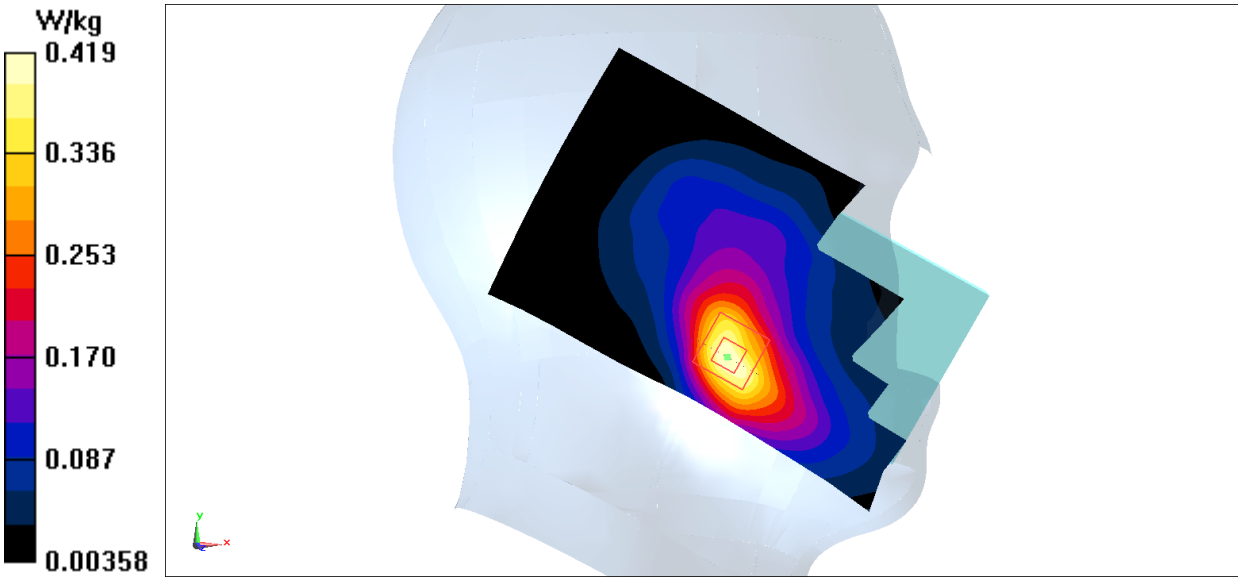


Fig.3 1900 MHz

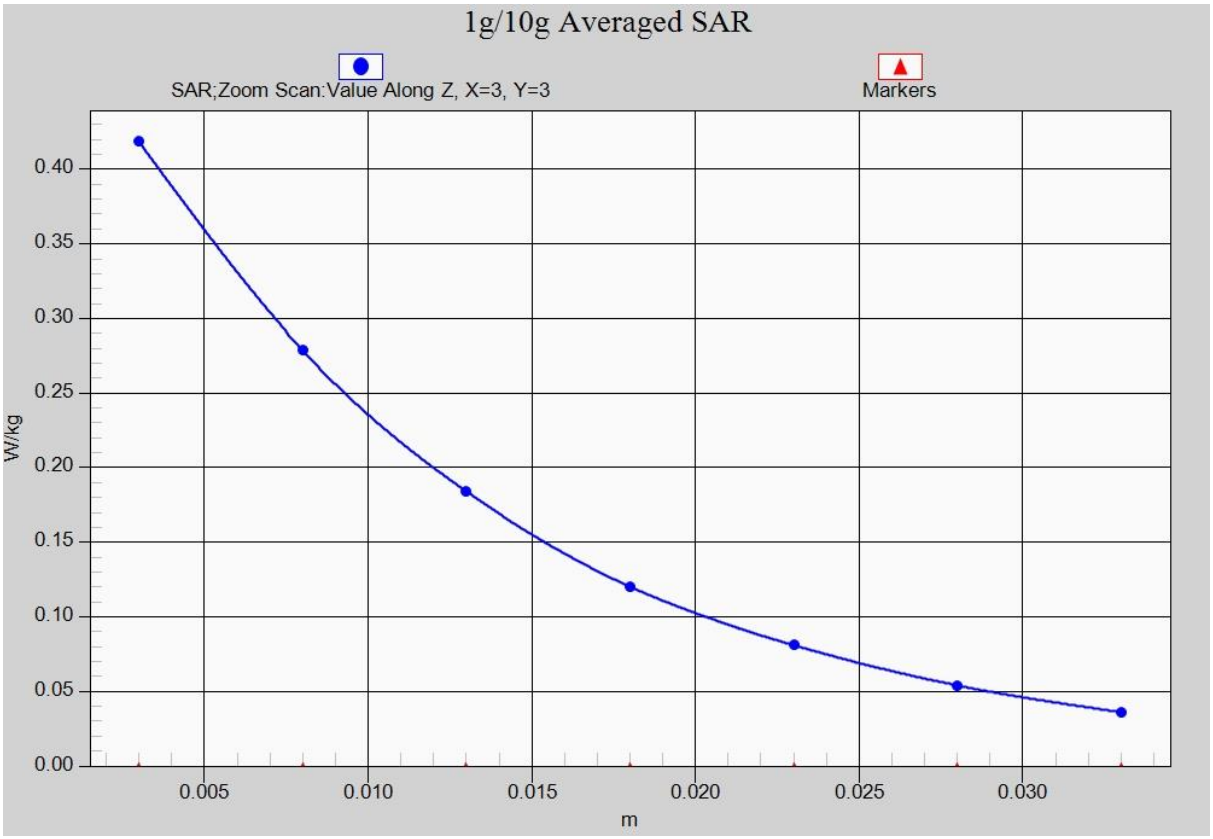


Fig. 3-1 Z-Scan at power reference point (1900 MHz)

1900 Body Rear High

Date: 2018-6-5
Electronics: DAE4 Sn1525
Medium: Body 1900 MHz
Medium parameters used: f = 1909.8 MHz; σ =1.586 mho/m; εr = 52.56; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: GSM 1900MHz GPRS Frequency: 1909.8 MHz Duty Cycle: 1:4
Probe: EX3DV4– SN7464 ConvF(8.32, 8.32, 8.32)

Area Scan (71x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.09 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.097 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 1.52 W/kg
SAR(1 g) = 0.825 W/kg; SAR(10 g) = 0.431 W/kg
Maximum value of SAR (measured) = 1.05 W/kg

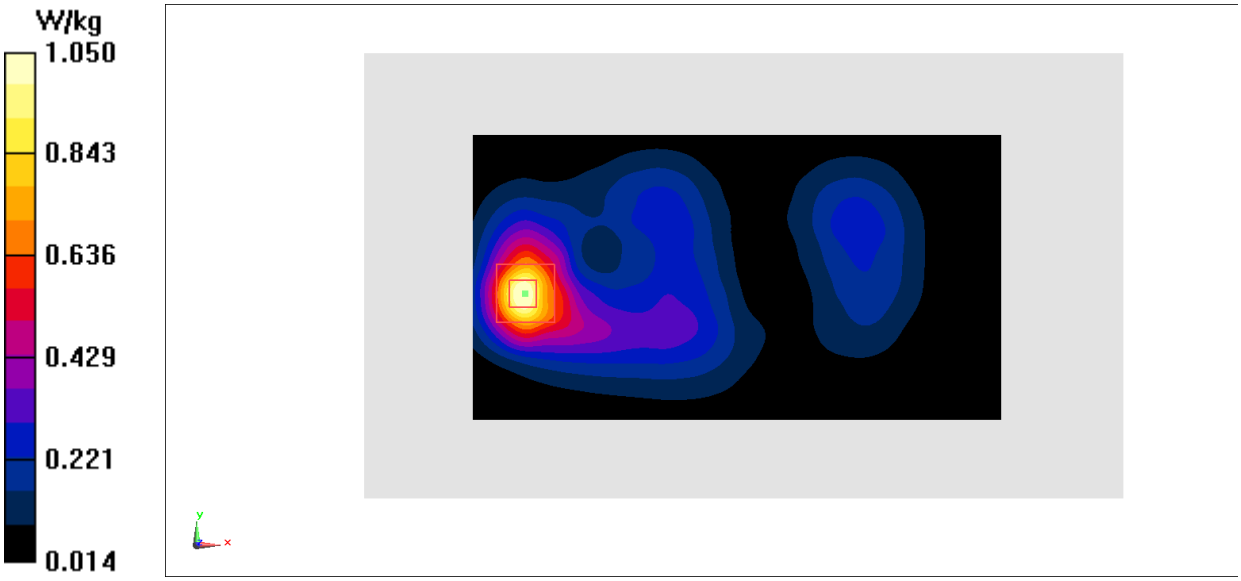


Fig.4 1900 MHz

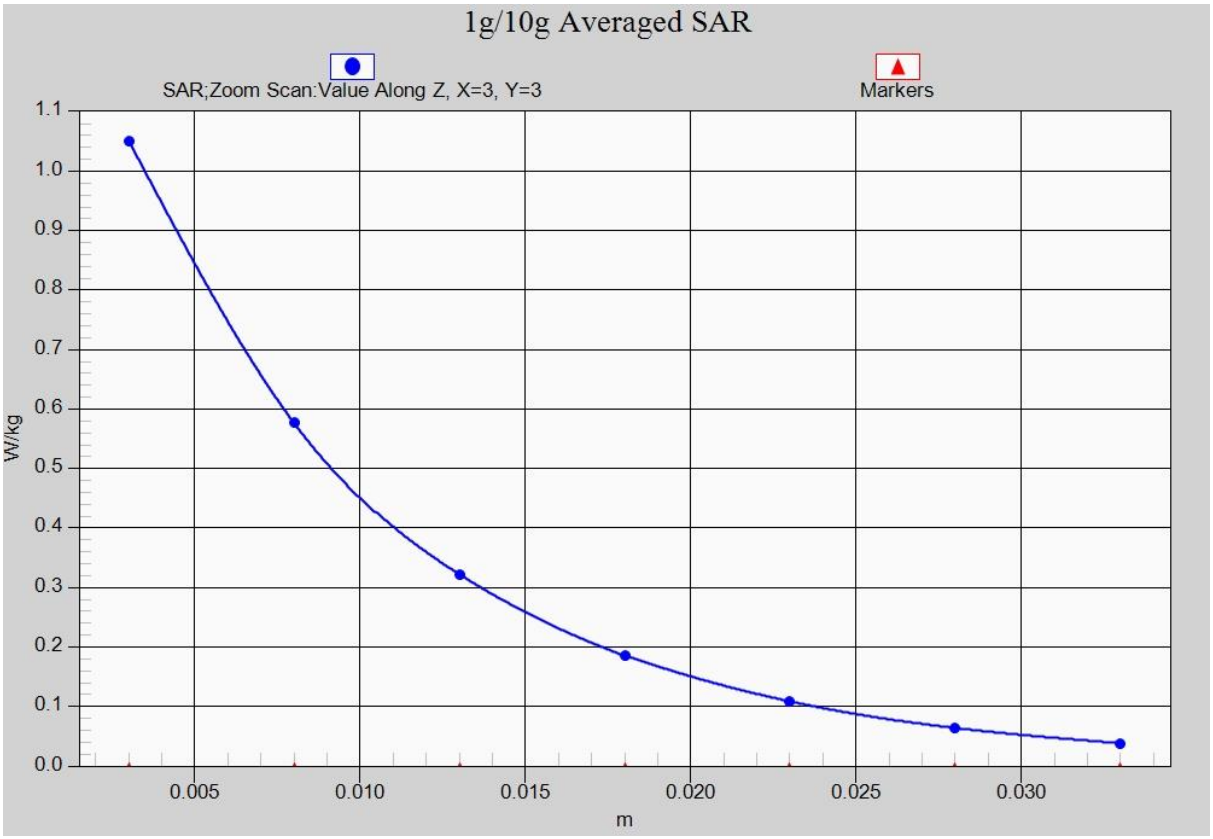


Fig. 4-1 Z-Scan at power reference point (1900 MHz)

WCDMA 850 Left Cheek High

Date: 2018-6-4
Electronics: DAE4 Sn1525
Medium: Head 850 MHz
Medium parameters used (interpolated): f = 846.6 MHz; σ = 0.888 mho/m; εr = 41.835; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: WCDMA; Frequency: 846.6 MHz; Duty Cycle: 1:1
Probe: EX3DV4 – SN7464 ConvF(10.28, 10.28, 10.28)

Area Scan (71x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.306 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.946 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.342 W/kg
SAR(1 g) = 0.277 W/kg; SAR(10 g) = 0.212 W/kg
Maximum value of SAR (measured) = 0.302 W/kg

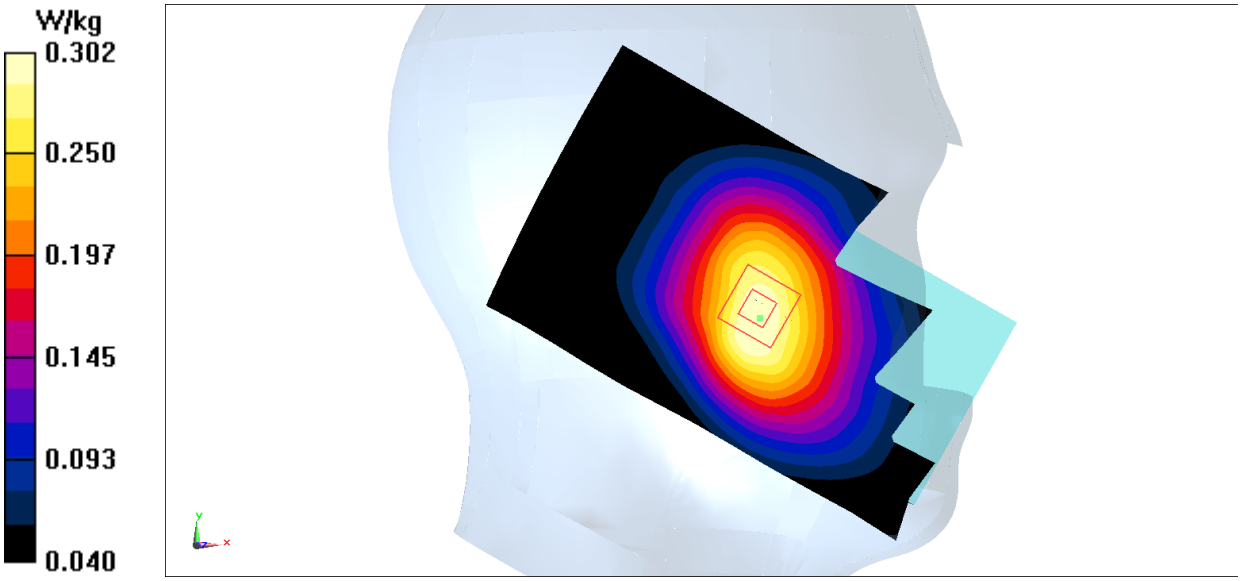


Fig.5 WCDMA 850

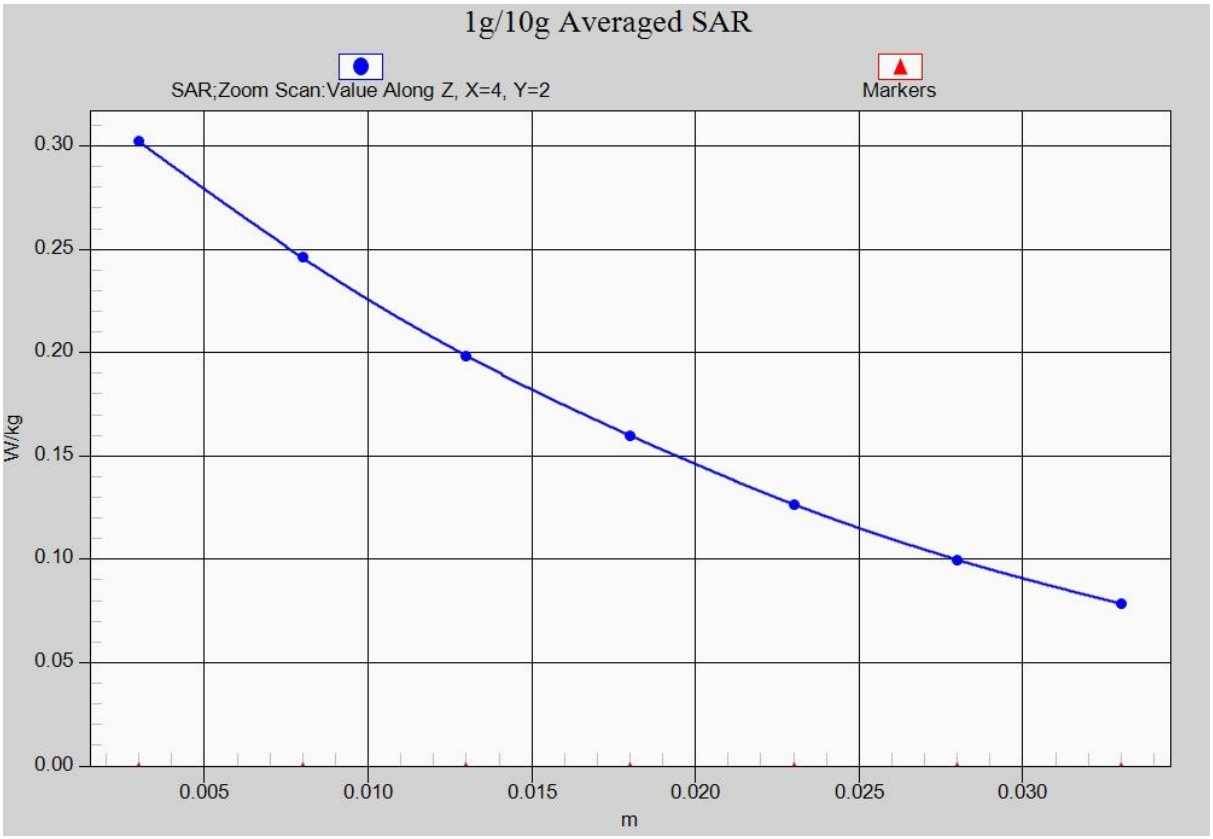


Fig. 5-1 Z-Scan at power reference point (850 MHz)

WCDMA 850 Body Rear High

Date: 2018-6-4
Electronics: DAE4 Sn1525
Medium: Body 850 MHz
Medium parameters used (interpolated): f = 846.6 MHz; σ = 0.988 mho/m; εr = 55.946; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: WCDMA; Frequency: 846.6 MHz; Duty Cycle: 1:1
Probe: EX3DV4 – SN7464 ConvF(10.21, 10.21, 10.21)

Area Scan (71x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.343 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.62 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.394 W/kg
SAR(1 g) = 0.313 W/kg; SAR(10 g) = 0.239 W/kg
Maximum value of SAR (measured) = 0.343 W/kg

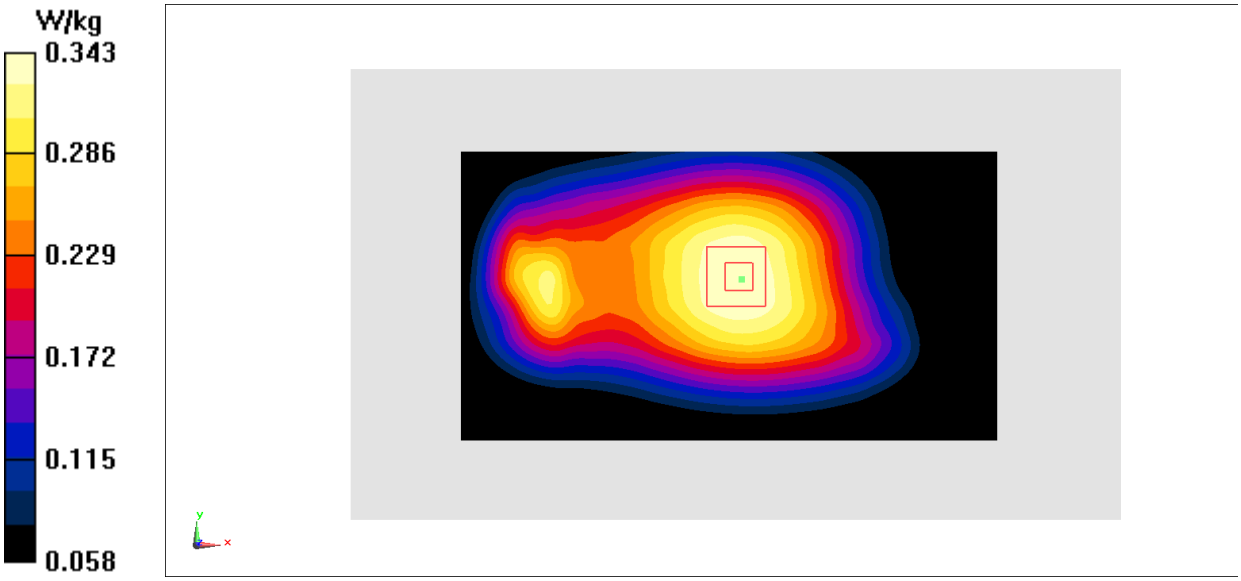


Fig.6 WCDMA 850

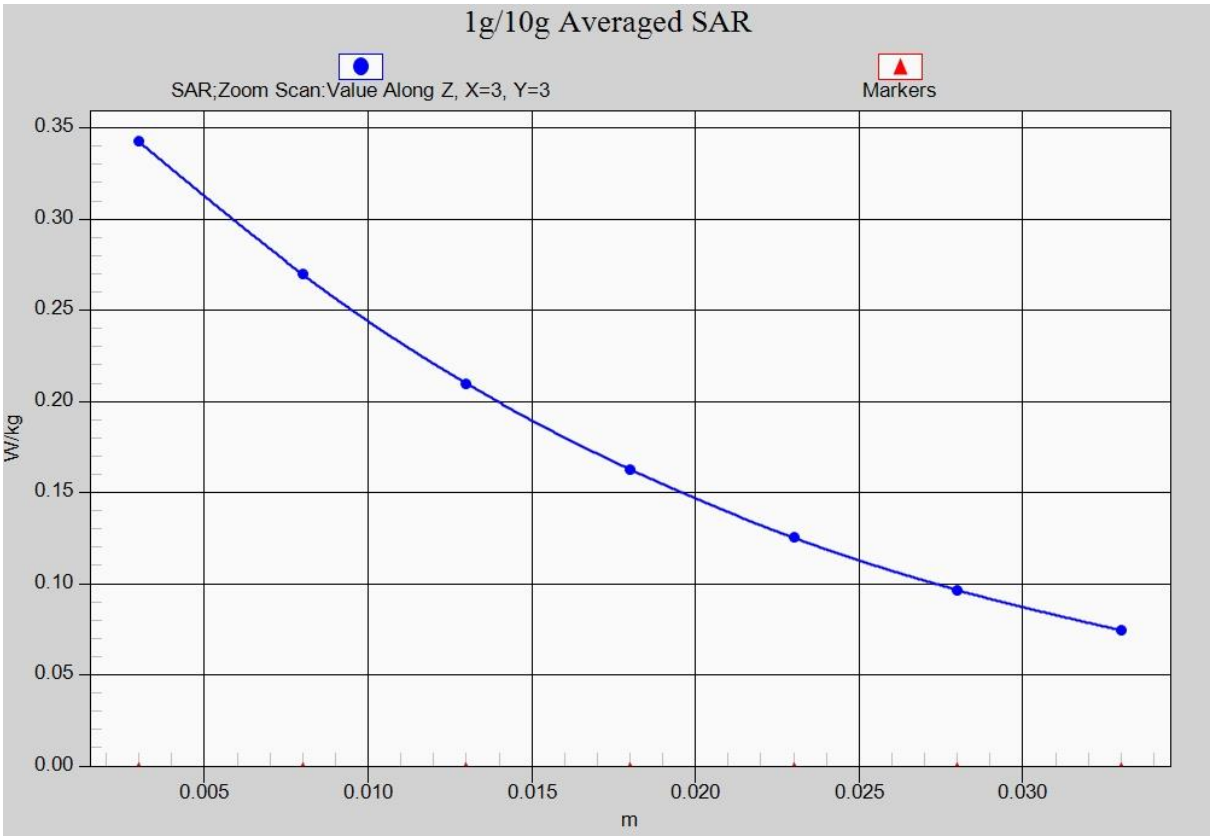


Fig. 6-1 Z-Scan at power reference point (WCDMA850)

WCDMA 1900 Left Cheek High

Date: 2018-6-5
Electronics: DAE4 Sn1525
Medium: Head 1900 MHz
Medium parameters used: f = 1907.6 MHz; σ = 1.455 mho/m; εr = 40.906; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: WCDMA 1900 Frequency: 1907.6 MHz Duty Cycle: 1:1
Probe: EX3DV4– SN7464 ConvF(8.39, 8.39, 8.39)

Area Scan (71x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.885 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.143 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.14 W/kg
SAR(1 g) = 0.751 W/kg; SAR(10 g) = 0.459 W/kg
Maximum value of SAR (measured) = 0.887 W/kg

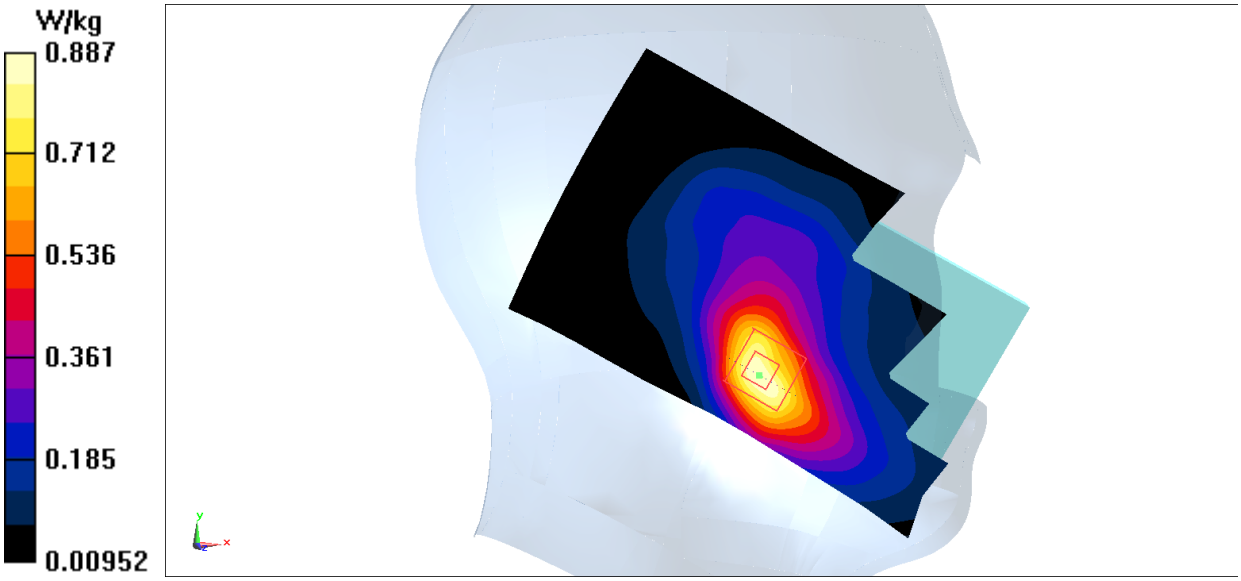


Fig.7 WCDMA1900