SAR TEST REPORT

No. I15Z40275-SEM01

For

Asiatelco Technologies Co.

LTE Mobile hotspot

Model name: ALM-N245

Marketing name: ATEL

With

Hardware Version: KF1030

Software Version: N245V1.0.0B03

FCC ID: XYOALM-N245

Issued Date: 2015-06-23

TESTING
CNAS L0570

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

Test Laboratory:

CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT

No. 51 Shouxiang Science Building, Xueyuan Road, Haidian District, Beijing, P. R. China100191

Tel:+86(0)10-62304633-2512,Fax:+86(0)10-62304633-2504

Email:cttl_terminals@catr.cn, website:www.chinattl.com

REPORT HISTORY

Report Number	Revision	Issue Date	Description
I15Z40275-SEM01	Rev.0	2015-06-23	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

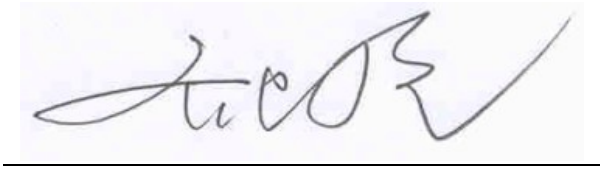
1.3 Project Data

Project Leader:	Qi Dianyuan
Test Engineer:	Lin Xiaojun
Testing Start Date:	April 19, 2015
Testing End Date:	April 20, 2015

1.4 Signature

Lin Xiaojun

(Prepared this test report)



Qi Dianyuan

(Reviewed this test report)

Xiao Li

Deputy Director of the laboratory

(Approved this test report)

2 Statement of Compliance

The maximum results of SAR found during testing for Asiatelco Technologies Co. LTE Mobile hotspot ALM-N245 / ATEL are as follows:

Table 2.1: Highest Reported SAR (1g)

Exposure Configuration	Technology Band	Highest Reported SAR 1g (W/Kg)	Equipment Class
Body-worn (Separation Distance 10mm)	LTE Band 2	0.60	PCE
	LTE Band 4	1.21	
	LTE Band 5	0.72	
	LTE Band 12	0.31	
	LTE Band 13	0.77	
	LTE Band 25	0.80	
	LTE Band 26	0.38	
	LTE Band 41	0.30	

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 C95.1-1999.

For body worn operation, this device has been tested and meets FCC RF exposure guidelines when used with any accessory that contains no metal and 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**: 1.21 W/kg (1g).**

3 Client Information

3.1 Applicant Information

Company Name:	Asiatelco Technologies Co.
Address /Post:	#289 Bisheng Road, Building-8, 3F, Zhangjiang Hi-Tech Park, Pudong,Shanghai 201204, China
City:	Shanghai
Postal Code:	201204
Country:	China
Contact Person:	Yang Zhan
E-mail:	zyang@asiatelco.com
Telephone:	021-51688806-192
Fax:	02133932400

3.2 Manufacturer Information

Company Name:	HUIZHOU QIAOXING TELECOMMUNICATION INDUSTRY CO.,LTD
Address /Post:	Huizhou Qiaoxing Industrial Park, Tangquan, Huizhou City, Guangdong Province,P.R.C
City:	Guangdong
Postal Code:	/
Country:	China
Contact Person:	Liang Xiaohua
E-mail:	Liangxiao_hua_love@126.com
Telephone:	0752-2820345 2820322
Fax:	0752-2820377

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

4.1 About EUT

Description:	LTE Mobile hotspot
Model name:	ALM-N245
Marketing Name:	ATEL
Operating mode(s):	LTE Band 2/4/5/12/13/25/26/41
Tested Tx Frequency:	1860 – 1900 MHz (LTE Band 2)
	1720 – 1745 MHz (LTE Band 4)
	824.7 – 848.3 MHz (LTE Band 5)
	699.7 – 715.3 MHz (LTE Band 12)
	779.5 – 784.5 MHz (LTE Band 13)
	1850.7 – 1914.3 MHz (LTE Band 25)
	814.7 – 848.3 MHz (LTE Band 26)
	2498.5 – 2687.5 MHz (LTE Band 41)
Test device Production information:	Production unit
Device type:	Portable device
Antenna type:	Integrated antenna

4.2 Internal Identification of EUT used during the test

EUT ID*	IMEI	HW	SW Version
EUT1	863867020576680	KF1030	N245V1.0.0B03
EUT2	863867020576649	KF1030	N245V1.0.0B03
EUT3	863867020575286	KF1030	N245V1.0.0B03

*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 and conducted power with the EUT 3.

4.3 Internal Identification of AE used during the test

AE ID*	Description	Model	SN	Manufacturer
AE1	Battery	N-1800	/	Heyuan New Lingjia Electroacoustic Co.,Ltd

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

5 TEST METHODOLOGY

5.1 Applicable Limit Regulations

ANSI C95.1–1999: 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 1528–2003: Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques.

KDB447498 D01: General RF Exposure Guidance v05r02: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

KDB648474 D04 Handset SAR v01r02: SAR Evaluation Considerations for Wireless Handsets.

KDB941225 D05 SAR for LTE Devices v02r03: SAR Evaluation Considerations for LTE Devices

KDB 865664 D01SAR measurement 100 MHz to 6 GHz v01r03: SAR Measurement Requirements for 100 MHz to 6 GHz.

KDB865664 D02RF Exposure Reporting v01r01: 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
750	Head	0.89	0.85～0.93	41.94	39.8～44.0
750	Body	0.96	0.91～1.01	55.5	52.7～58.3
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
1750	Head	1.37	1.30～1.44	40.08	38.1～42.1
1750	Body	1.49	1.42～1.56	53.4	50.7～56.1
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
2600	Head	1.96	1.86～2.06	39.01	37.06～40.96
2600	Body	2.16	2.05～2.27	52.5	49.9～55.1

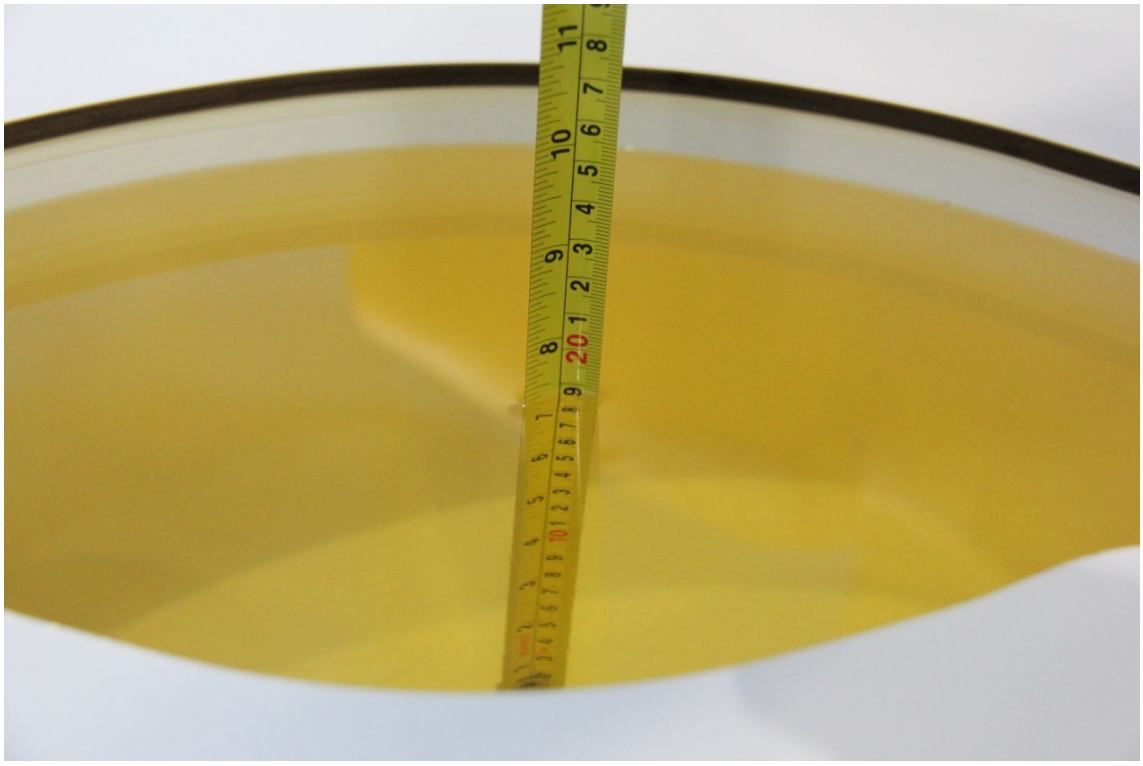
7.2 Dielectric Performance

Table 7.2: Dielectric Performance of Tissue Simulating Liquid

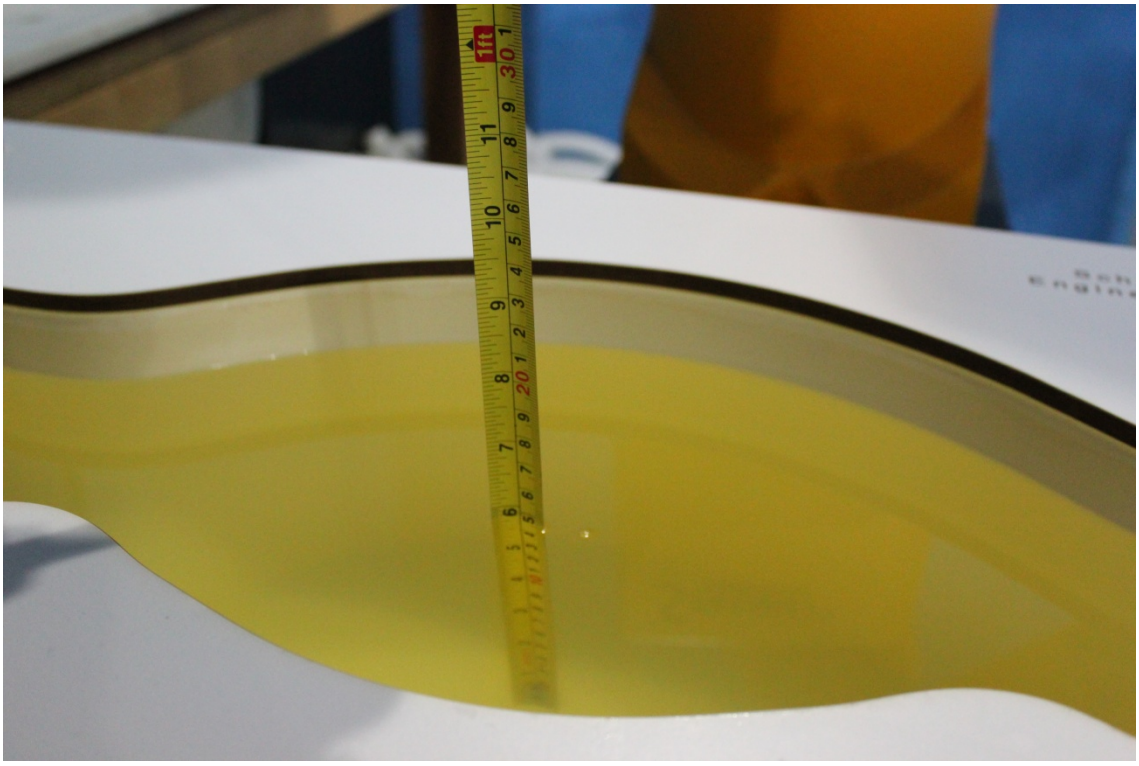
Measurement Date (yyyy-mm-dd)	Type	Frequency	Permittivity ε	Drift (%)	Conductivity σ (S/m)	Drift (%)
2015-04-19	Body	750 MHz	57.36	3.35	0.934	-2.71
2015-04-19	Body	835 MHz	56.71	2.74	0.971	0.10
2015-04-20	Body	1750 MHz	53.43	0.06	1.55	4.03
2015-04-20	Body	1900 MHz	52.1	-2.25	1.496	-1.58
2015-04-20	Body	2600 MHz	50.7	-3.80	2.024	3.79

Note: The liquid temperature is 22.0 °C

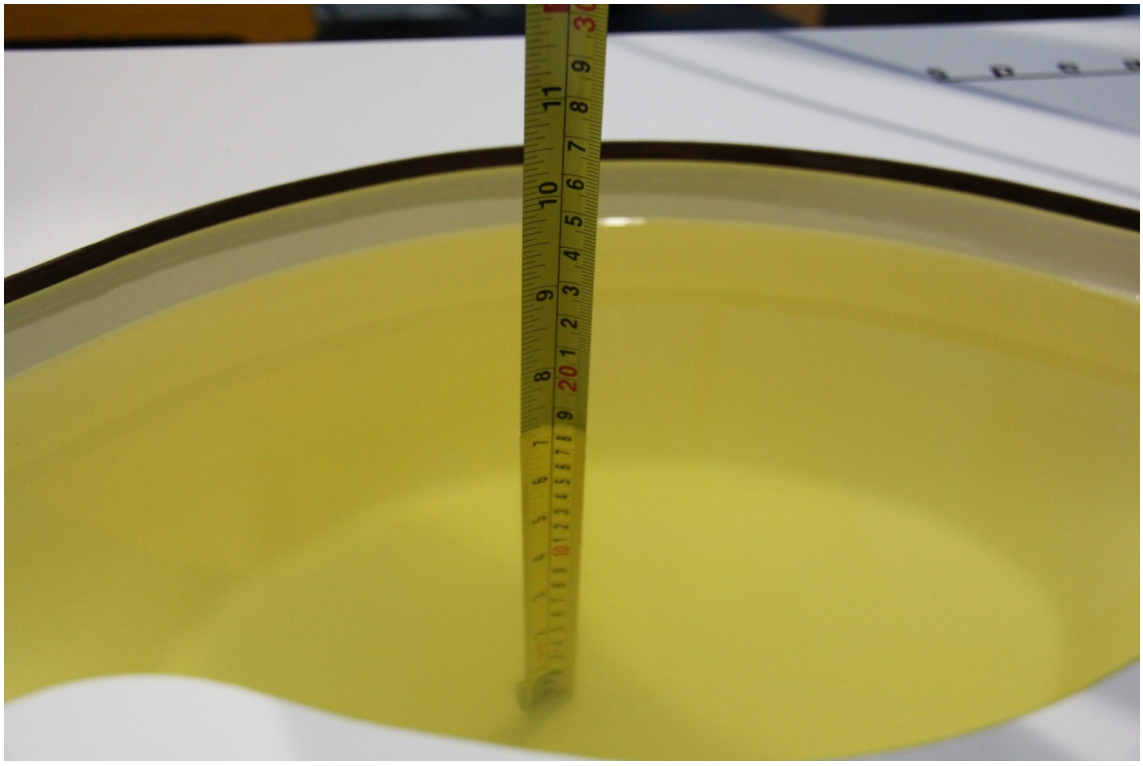
Picture 7-1: Liquid depth in the Flat Phantom (750 MHz)



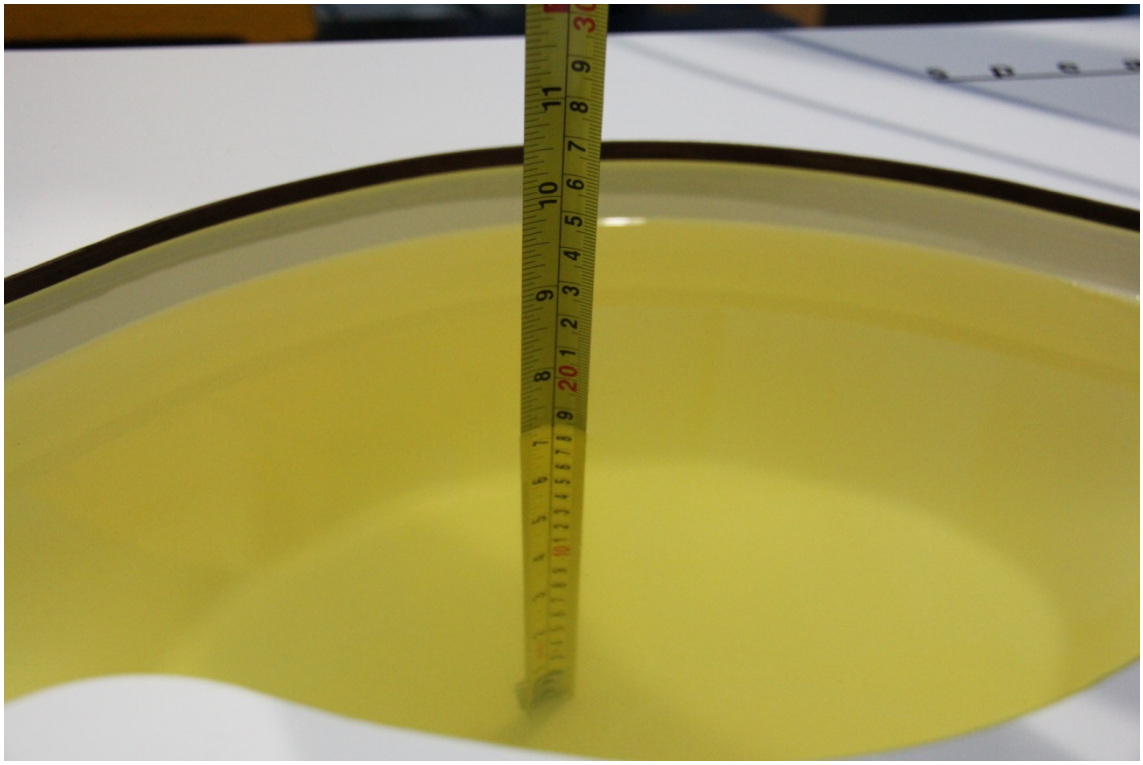
Picture 7-2: Liquid depth in the Flat Phantom (835 MHz)



Picture 7-3 Liquid depth in the Flat Phantom (1750MHz)



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

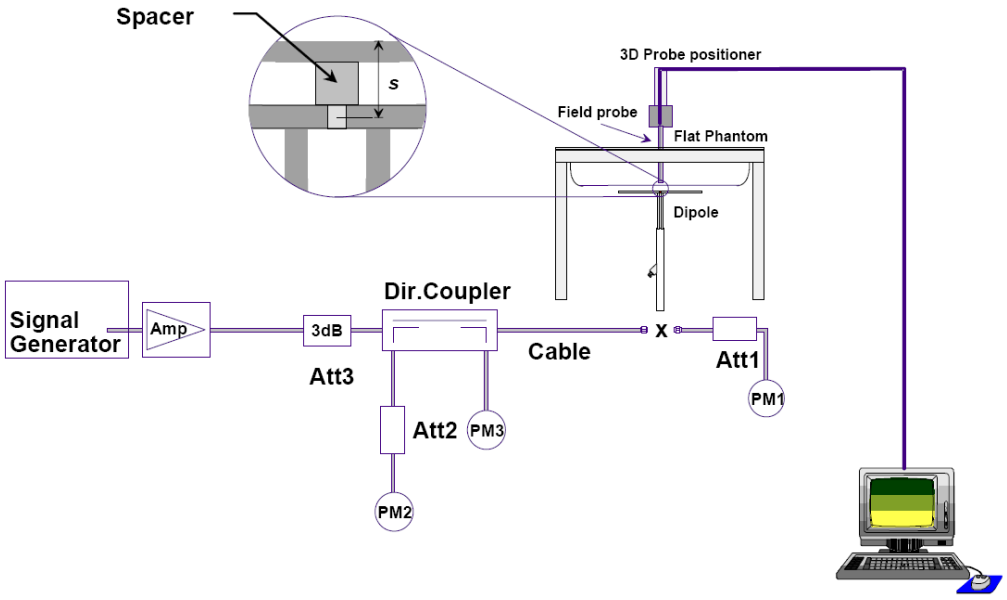


Picture 7-5 Liquid depth in the Flat Phantom (2600MHz)

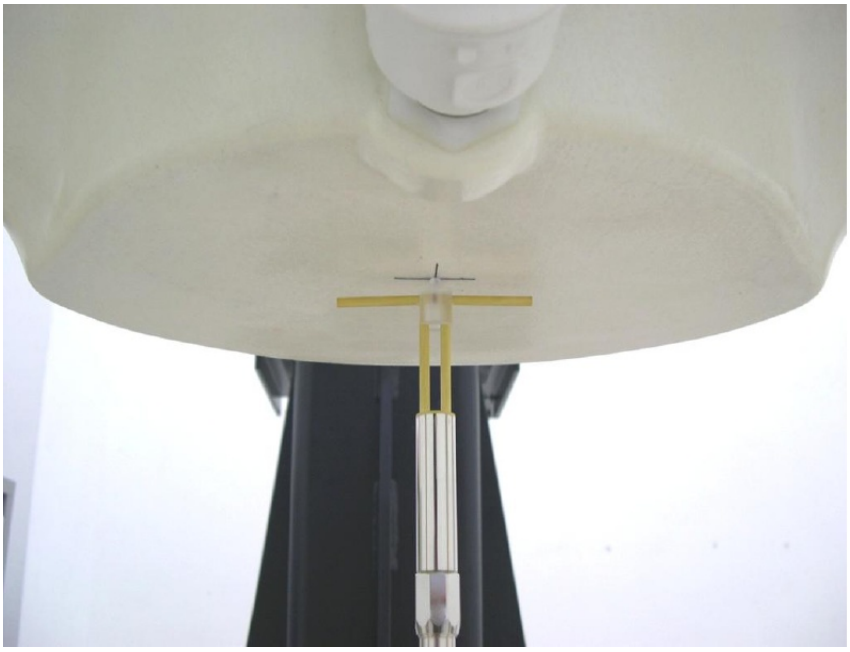
8 System verification

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 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
2015-04-19	750 MHz	5.85	8.75	5.91	8.91	1.03%	1.83%
2015-04-19	835 MHz	6.33	9.55	6.15	9.31	-2.84%	-2.51%
2015-04-20	1750 MHz	20.3	37.7	19.95	37.19	-1.72%	-1.35%
2015-04-20	1900 MHz	21.4	40.4	21.95	41.59	2.57%	2.95%
2015-04-20	2600 MHz	25.4	57.2	25.87	57.99	1.85%	1.38%

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.

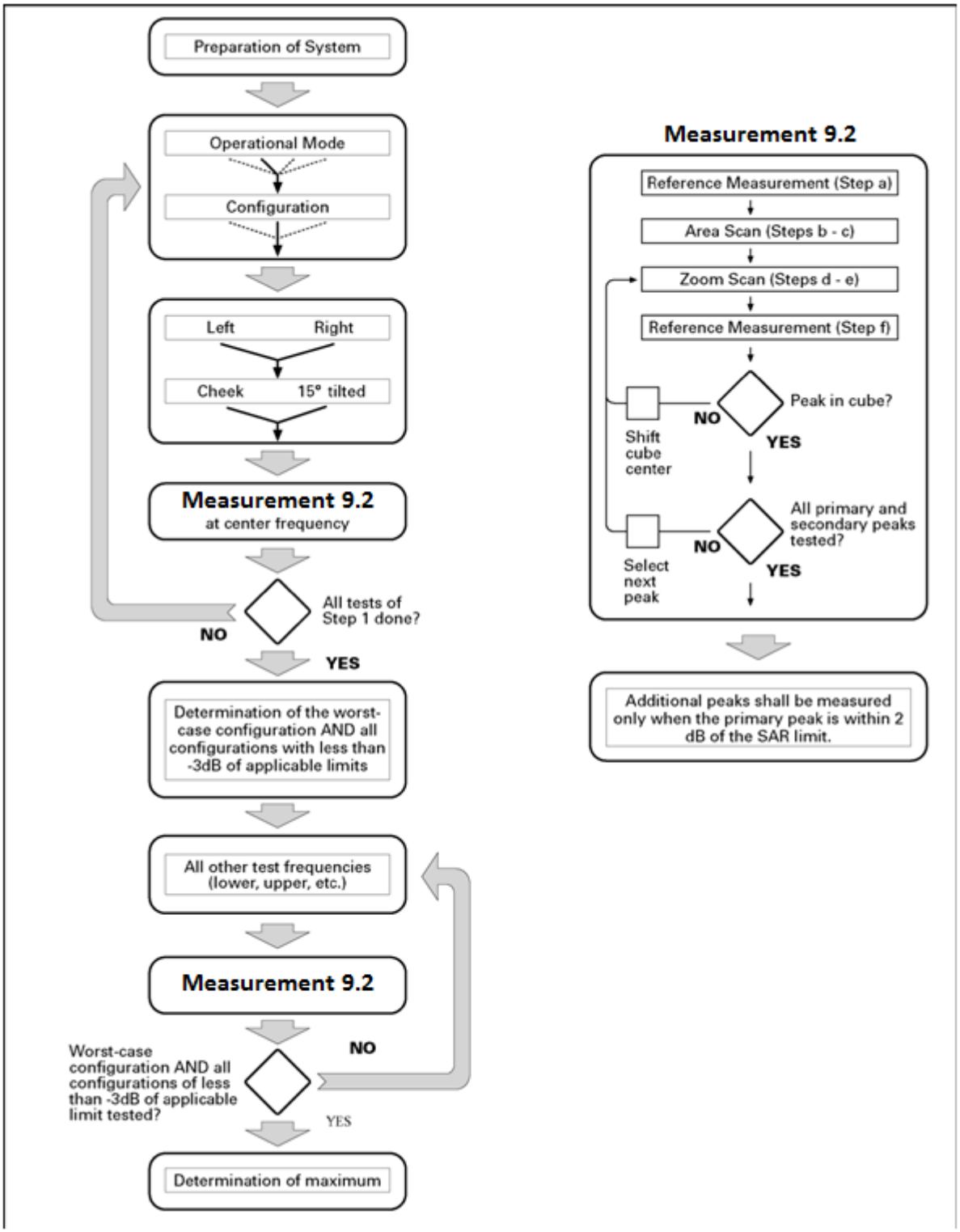
Step 1: The tests described in 9.2 shall be performed at the channel that is closest to the centre of the transmit frequency band (f_c) for:

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 within 3 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 9.1 Block 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 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 D05v02r03 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 D05v02r03. SAR testing is performed using the extended cyclic prefix listed in 3GPP TS 36.211.

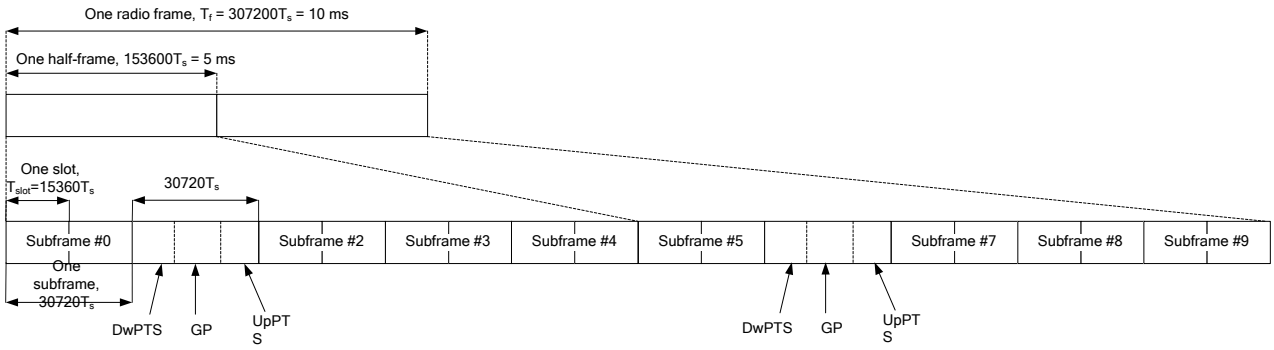


Figure 9.2: Frame structure type 2 (for 5 ms switch-point periodicity)

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 subframe*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 SAR evaluation.

9.4 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 section 12 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-g SAR 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 55 wireless handsets. For the sample size studied, the root-mean-squared errors of the algorithm are 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

Table 11.1: The conducted Power for LTE

Band 2						
Bandwidth (MHz)	RB allocation RB offset (Start RB)	Frequency (MHz)	QPSK		16QAM	
			Actual output power (dBm)	Tune up	Actual output power (dBm)	Tune up
1.4 MHz	1RB High (5)	1909.3	21.28	23	20.33	22
		1880	22.55	23	21.64	22
		1850.7	20.83	22.4	19.87	23
	1RB Middle (3)	1909.3	21.32	23	20.23	22
		1880	22.46	23	21.43	22
		1850.7	20.65	22.4	19.72	21
	1RB Low (0)	1909.3	21.28	23	20.29	22
		1880	22.49	23	21.52	22
		1850.7	20.75	22.4	19.77	21
	3RB High (3)	1909.3	21.28	23	20.30	22
		1880	22.45	23	21.41	22
		1850.7	20.79	22.4	19.83	21
	3RB Middle (1)	1909.3	21.28	23	20.37	22
		1880	22.47	23	21.41	22
		1850.7	20.81	22.4	19.73	21
	3RB Low (0)	1909.3	21.35	23	20.28	22
		1880	22.46	23	21.50	22
		1850.7	20.70	22.4	19.71	21
	6RB (0)	1909.3	20.24	22	19.28	21
		1880	21.55	22	20.64	21
		1850.7	19.60	21	18.57	20
3 MHz	1RB High (14)	1908.5	21.27	23	20.30	22
		1880	22.59	23	21.68	22
		1851.5	20.86	22.5	19.93	21
	1RB Middle (7)	1908.5	21.38	23	20.40	22
		1880	22.39	23	21.42	22
		1851.5	20.69	22.5	19.72	21
	1RB Low (0)	1908.5	21.20	23	20.24	22
		1880	22.28	23	21.19	22
		1851.5	20.62	22.5	19.67	21
	8RB High (7)	1908.5	20.32	22	19.34	21
		1880	21.55	22	20.58	21
		1851.5	19.56	21.5	18.61	21.5
	8RB Middle (4)	1908.5	20.32	22	19.38	21
		1880	21.50	22	20.41	21
		1851.5	19.80	21.5	18.76	21

	8RB Low (0)	1908.5	20.27	22	19.23	21
		1880	20.31	22	19.23	21
		1851.5	19.60	21.5	18.57	21.5
	15RB (0)	1908.5	20.17	22	19.25	21
		1880	21.44	22	20.51	21
		1851.5	19.61	21	18.65	21
5 MHz	1RB High (24)	1907.5	21.25	23	20.28	22
		1880	22.69	23	21.70	22
		1852.5	22.38	23	21.43	22
	1RB Middle (12)	1907.5	21.34	23	20.37	22
		1880	22.53	23	21.50	22
		1852.5	20.71	22.5	19.64	21
	1RB Low (0)	1907.5	22.62	23	21.70	22
		1880	22.32	23	21.25	22
		1852.5	20.84	22.5	19.75	21
	12RB High (13)	1907.5	20.37	22.3	19.42	21
		1880	21.58	22.3	20.50	22
		1852.5	21.23	22	20.18	21
	12RB Middle (6)	1907.5	20.22	22	19.25	21
		1880	21.48	23	20.56	22
		1852.5	19.67	21.5	18.61	20.5
	12RB Low (0)	1907.5	21.84	23	20.80	22
		1880	21.39	23	20.38	22
		1852.5	19.60	21.5	18.51	20.5
	25RB (0)	1907.5	21.64	22	20.59	21
		1880	21.60	22	20.54	21
		1852.5	21.09	22	20.14	21
10 MHz	1RB High (49)	1905	21.39	23	20.46	22
		1880	22.79	23	21.84	22
		1855	22.89	23	21.98	22
	1RB Middle (24)	1905	22.70	23	21.76	22
		1880	22.60	23.4	21.55	22
		1855	22.46	23.4	21.37	22
	1RB Low (0)	1905	22.39	23	21.32	22
		1880	22.24	23	21.21	22
		1855	20.88	22.5	19.95	21
	25RB High (25)	1905	21.69	23	20.77	21
		1880	21.62	23	20.63	22
		1855	21.66	23	20.75	22
	25RB Middle (12)	1905	21.62	23	20.71	22
		1880	21.56	23	20.52	22
		1855	21.48	23	20.55	22

	25RB Low (0)	1905	21.51	23	20.60	22
		1880	21.51	23	20.56	22
		1855	21.19	23	20.17	22
	50RB (0)	1905	21.46	23	20.37	22
		1880	21.54	23	20.57	22
		1855	21.35	23	20.43	22
15 MHz	1RB High (74)	1902.5	21.41	23	20.44	22.2
		1880	22.96	23	22.05	22.2
		1857.5	22.57	23	21.64	22.2
	1RB Middle (37)	1902.5	22.51	23	21.53	23
		1880	22.61	23	21.64	23
		1857.5	22.82	23	21.85	23
	1RB Low (0)	1902.5	22.32	23	21.36	22
		1880	22.21	23	21.12	22
		1857.5	20.95	22.5	20.00	22
	36RB High (38)	1902.5	21.68	23	20.70	22
		1880	21.77	23	20.80	22
		1857.5	21.77	23	20.82	22
	36RB Middle (19)	1902.5	21.41	23	20.47	22
		1880	21.58	23	20.49	22
		1857.5	21.78	23	20.74	22
	36RB Low (0)	1902.5	21.22	23	20.18	22
		1880	21.25	23	20.17	22
		1857.5	21.34	23	20.31	22
	75RB (0)	1902.5	21.40	23	20.48	22
		1880	21.59	23	20.66	22
		1857.5	21.56	23	20.60	22
20 MHz	1RB High (99)	1900	21.66	23	20.69	22
		1880	22.99	24	22.00	24
		1860	22.36	24	21.41	23
	1RB Middle (50)	1900	22.53	23	21.56	23
		1880	22.71	23	21.68	23
		1860	23.11	23.2	22.04	24
	1RB Low (0)	1900	23.07	25	22.15	23
		1880	22.47	24	21.40	23
		1860	21.11	23	20.02	22
	50RB High (50)	1900	21.54	22	20.59	22
		1880	21.80	22	20.72	22
		1860	21.38	23	20.33	22
	50RB Middle (25)	1900	21.36	23	20.39	22
		1880	21.57	23	20.65	22
		1860	21.78	23	20.72	22
	50RB	1900	21.37	23	20.33	22

	Low (0)	1880	21.31	23	20.30	22
		1860	21.53	23	20.44	22
	100RB (0)	1900	21.44	23	20.39	22
		1880	21.55	23	20.49	22
		1860	21.65	23	20.70	22
Band 4						
Bandwidth (MHz)	RB allocation RB offset (Start RB)	Frequency (MHz)	QPSK		16QAM	
			Actual output power (dBm)	Tune up	Actual output power (dBm)	Tune up
1.4 MHz	1RB High (5)	1754.3	22.33	24	21.36	23
		1732.5	22.18	24	21.19	23
		1710.7	22.71	24	21.76	23
	1RB Middle (3)	1754.3	22.37	24	21.40	23
		1732.5	22.15	24	21.12	23
		1710.7	22.79	24	21.72	23
	1RB Low (0)	1754.3	22.19	24	21.27	23
		1732.5	22.19	24	21.12	23
		1710.7	22.80	24	21.71	23
	3RB High (3)	1754.3	22.43	24	21.48	23
		1732.5	22.14	24	21.06	23
		1710.7	22.72	24	21.67	23
	3RB Middle (1)	1754.3	22.24	24	21.27	23
		1732.5	22.19	24	21.27	23
		1710.7	22.67	24	21.61	23
	3RB Low (0)	1754.3	22.27	24	21.23	23
		1732.5	22.14	24	21.13	23
		1710.7	22.66	24	21.57	23
	6RB (0)	1754.3	21.29	23	20.24	22
		1732.5	21.25	23	20.19	22
		1710.7	21.69	23	20.74	22
3 MHz	1RB High (14)	1753.5	22.14	24	21.17	23
		1732.5	22.18	24	21.27	23
		1711.5	22.82	24	21.89	23
	1RB Middle (7)	1753.5	22.37	24	21.39	23
		1732.5	22.24	24	21.27	23
		1711.5	22.72	24	21.75	23
	1RB Low (0)	1753.5	22.25	24	21.29	23
		1732.5	22.25	24	21.16	23
		1711.5	22.57	24	21.62	23
	8RB High (7)	1753.5	21.37	23	20.39	22
		1732.5	21.31	23	20.34	22
		1711.5	21.54	23	20.59	22

	8RB Middle (4)	1753.5	21.36	23	20.42	22
		1732.5	21.21	23	20.12	22
		1711.5	21.47	23	20.43	22
	8RB Low (0)	1753.5	21.46	23	20.42	22
		1732.5	21.42	23	20.34	22
		1711.5	21.58	23	20.55	22
	15RB (0)	1753.5	21.35	23	20.43	22
		1732.5	21.26	23	20.33	22
		1711.5	21.76	23	20.80	22
5 MHz	1RB High (24)	1752.5	22.22	24	21.27	23
		1732.5	21.97	23	21.06	23
		1712.5	22.85	24	21.89	23
	1RB Middle (12)	1752.5	22.29	24	21.20	23
		1732.5	22.17	24	21.14	23
		1712.5	22.98	24	22.05	23
	1RB Low (0)	1752.5	22.35	24	21.36	23
		1732.5	22.38	24	21.41	23
		1712.5	23.02	25	22.04	23
	12RB High (13)	1752.5	21.27	23	20.29	22
		1732.5	21.04	23	20.00	22
		1712.5	21.81	23	20.85	22
	12RB Middle (6)	1752.5	21.35	23	20.44	22
		1732.5	21.23	23	20.17	22
		1712.5	21.91	23	20.83	22
	12RB Low (0)	1752.5	21.27	23	20.20	22
		1732.5	21.34	23	20.38	22
		1712.5	21.86	23	20.87	22
	25RB (0)	1752.5	21.07	23	20.11	22
		1732.5	21.12	23	20.21	22
		1712.5	21.73	23	20.70	22
10 MHz	1RB High (49)	1750	22.14	23.9	21.21	22.9
		1732.5	21.97	23.9	21.02	22.9
		1715	22.75	23.9	21.84	22.9
	1RB Middle (24)	1750	22.18	23.9	21.24	22.9
		1732.5	22.14	23.9	21.09	22.9
		1715	22.83	23.9	21.74	22.9
	1RB Low (0)	1750	21.99	23.9	20.92	22.9
		1732.5	22.49	23.9	21.46	22.9
		1715	22.81	23.9	21.88	22.9
	25RB High (25)	1750	21.13	22.9	20.21	22
		1732.5	20.99	22.9	20.00	22
		1715	21.26	22.9	20.35	22

	25RB Middle (12)	1750	21.22	22.9	20.31	22
		1732.5	21.14	22.9	20.10	22
		1715	21.70	22.9	20.77	22
	25RB Low (0)	1750	21.13	22.9	20.22	22
		1732.5	21.23	22.9	20.28	22
		1715	21.72	22.9	20.70	22
	50RB (0)	1750	21.03	23	19.94	21.9
		1732.5	21.11	23	20.14	21.9
		1715	21.68	23	20.76	21.9
15 MHz	1RB High (74)	1747.5	22.37	23.9	21.42	22.9
		1732.5	21.93	23.9	21.02	22.9
		1717.5	22.38	23.9	21.42	22.9
	1RB Middle (37)	1747.5	22.02	23.9	20.93	22.9
		1732.5	22.10	23.9	21.07	22.9
		1717.5	22.85	23.9	21.92	22.9
	1RB Low (0)	1747.5	21.92	23.9	20.93	22.9
		1732.5	22.41	23.9	21.44	22.9
		1717.5	22.88	23.9	21.90	22.9
	36RB High (38)	1747.5	21.19	22.9	20.21	21.8
		1732.5	20.92	22.9	19.88	21.8
		1717.5	21.53	22.9	20.57	21.8
	36RB Middle (19)	1747.5	21.05	22.9	20.14	21.8
		1732.5	21.09	22.9	20.03	21.8
		1717.5	21.61	22.9	20.53	21.8
	36RB Low (0)	1747.5	20.90	22.9	19.83	21.8
		1732.5	21.29	22.9	20.33	21.8
		1717.5	21.76	22.9	20.77	21.8
	75RB (0)	1747.5	21.07	23	20.11	22
		1732.5	21.04	23	20.13	22
		1717.5	21.62	23	20.59	22
20 MHz	1RB High (99)	1745	22.14	24	21.21	23
		1732.5	21.86	23	20.91	22
		1720	22.35	23	21.44	23
	1RB Middle (50)	1745	22.01	23	21.07	23
		1732.5	22.17	23	21.12	23
		1720	22.70	23	21.61	23
	1RB Low (0)	1745	22.06	23	20.99	22
		1732.5	22.41	23	21.38	23
		1720	22.98	23	22.05	24
	50RB High (50)	1745	21.15	23	20.23	22
		1732.5	20.95	22.4	19.96	21.5

		1720	21.43	23	20.52	22
	50RB Middle (25)	1745	20.93	22.4	20.02	22
		1732.5	21.16	23	20.12	22
		1720	21.67	23	20.74	22
	50RB Low (0)	1745	20.97	22.4	20.06	22
		1732.5	21.34	23	20.39	22
		1720	21.70	22	20.68	22
	100RB (0)	1745	21.01	21.5	19.92	21.9
		1732.5	21.17	21.5	20.20	21.9
		1720	21.48	21.5	20.56	21.9
Band 5						
Bandwidth (MHz)	RB allocation RB offset (Start RB)	Frequency (MHz)	QPSK		16QAM	
			Actual output power (dBm)	Tune up	Actual output power (dBm)	Tune up
1.4 MHz	1RB High (5)	848.3	21.32	23	20.37	22
		836.5	22.56	24	21.65	23
		824.7	22.58	24	21.62	23
	1RB Middle (3)	848.3	21.24	23	20.15	22
		836.5	22.52	24	21.49	23
		824.7	22.51	24	21.58	23
	1RB Low (0)	848.3	21.15	23	20.16	22
		836.5	22.53	24	21.56	23
		824.7	22.68	24	21.70	23
	3RB High (3)	848.3	21.11	23	20.13	22
		836.5	22.55	24	21.51	23
		824.7	22.58	24	21.62	23
	3RB Middle (1)	848.3	21.15	23	20.24	22
		836.5	22.52	24	21.46	23
		824.7	22.67	24	21.59	23
	3RB Low (0)	848.3	21.23	23	20.16	22
		836.5	22.50	24	21.54	23
		824.7	22.57	24	21.58	23
	6RB (0)	848.3	21.29	23	20.33	22
		836.5	21.50	23	20.59	22
		824.7	21.66	23	20.63	22
3 MHz	1RB High (14)	847.5	20.98	22.4	20.01	22
		836.5	22.54	24	21.55	23
		825.5	22.09	24	21.14	23
	1RB	847.5	21.17	23	20.20	22

	Middle (7)	836.5	22.59	24	21.56	23
		825.5	22.61	24	21.54	23
	1RB Low (0)	847.5	20.78	22.4	19.86	21.5
		836.5	22.29	24	21.22	23
		825.5	22.43	24	21.34	23
	8RB High (7)	847.5	21.20	23	20.25	22
		836.5	21.47	23	20.39	22
		825.5	21.57	23	20.52	22
	8RB Middle (4)	847.5	21.30	23	20.33	22
		836.5	21.50	23	20.58	22
		825.5	21.65	23	20.59	22
	8RB Low (0)	847.5	21.03	23	19.99	21.5
		836.5	21.60	23	20.59	22
		825.5	21.63	23	20.54	22
	15RB (0)	847.5	21.12	23	20.07	22
		836.5	21.43	23	20.37	22
		825.5	21.48	23	20.53	22
5 MHz	1RB High (24)	846.5	20.67	22.4	19.70	21.5
		836.5	22.26	24	21.35	23
		826.5	21.61	23	20.68	22
	1RB Middle (12)	846.5	21.11	23	20.13	22
		836.5	22.55	24	21.58	23
		826.5	22.55	24	21.58	23
	1RB Low (0)	846.5	21.02	23	20.06	22
		836.5	21.94	23	20.85	22
		826.5	22.13	24	21.18	23
	12RB High (13)	846.5	21.07	23	20.09	22
		836.5	21.46	23	20.49	22
		826.5	21.69	23	20.74	22
	12RB Middle (6)	846.5	21.36	23	20.42	22
		836.5	21.42	23	20.33	22
		826.5	21.72	23	20.68	22
	12RB Low (0)	846.5	21.22	23	20.18	22
		836.5	21.57	23	20.49	22
		826.5	21.56	23	20.53	22
	25RB (0)	846.5	21.21	23	20.29	22
		836.5	21.36	23	20.43	22
		826.5	21.40	23	20.44	22
10 MHz	1RB High (49)	844.0	20.80	22.4	19.87	21.5
		836.5	22.14	24	21.19	23
		829.0	21.85	23	20.94	22

	1RB Middle (24)	844.0	21.82	23	20.88	22
		836.5	22.39	24	21.34	23
		829.0	22.64	23	21.55	23
	1RB Low (0)	844.0	22.57	24	21.50	23
		836.5	21.76	23	20.73	22
		829.0	22.33	24	21.40	23
	25RB High (25)	844.0	21.33	22	20.41	22
		836.5	21.39	22	20.40	22
		829.0	21.50	22	20.59	22
	25RB Middle (12)	844.0	21.41	22	20.50	22
		836.5	21.30	22	20.26	22
		829.0	21.61	22	20.68	22
	25RB Low (0)	844.0	21.63	22	20.72	22
		836.5	21.36	22	20.41	22
		829.0	21.42	22	20.40	22
	50RB (0)	844.0	21.36	23	20.27	22
		836.5	21.36	23	20.39	22
		829.0	21.38	23	20.46	22
Band 12						
Bandwidth (MHz)	RB allocation RB offset (Start RB)	Frequency (MHz)	QPSK		16QAM	
			Actual output power (dBm)	Tune up	Actual output power (dBm)	Tune up
1.4 MHz	1RB-High (5)	715.3	21.55	23	20.58	22
		707.5	22.66	24	21.67	23
		699.7	21.14	23	20.19	22
	1RB-Middle (3)	715.3	21.43	23	20.46	22
		707.5	22.70	24	21.67	23
		699.7	21.12	23	20.05	22
	1RB-Low (0)	715.3	21.39	23	20.47	22
		707.5	22.62	24	21.55	23
		699.7	21.01	23	19.92	21.5
	3RB-High (3)	715.3	21.45	23	20.50	22
		707.5	22.46	24	21.38	23
		699.7	21.03	23	19.98	21.5
	3RB-Middle (1)	715.3	21.40	23	20.43	22
		707.5	22.53	24	21.61	23
		699.7	21.00	23	19.94	21.5
	3RB-Low (0)	715.3	21.37	23	20.33	22
		707.5	22.56	24	21.55	23
		699.7	20.97	22.4	19.88	21.5
	6RB (0)	715.3	20.50	22	19.45	21
		707.5	21.64	23	20.58	22
		699.7	19.99	21.4	19.04	21

3 MHz	1RB-High (14)	714.5	21.39	23	20.44	22
		707.5	22.45	24	21.54	23
		700.5	21.00	23	20.04	22
	1RB-Middle (7)	714.5	21.34	23	20.25	22
		707.5	22.71	24	21.68	23
		700.5	21.08	23	20.15	22
	1RB-Low (0)	714.5	21.19	23	20.20	22
		707.5	22.80	24	21.83	23
		700.5	21.05	23	20.07	22
	8RB-High (7)	714.5	20.38	22.3	19.40	21.4
		707.5	21.62	23	20.58	22
		700.5	20.05	22	19.09	21
	8RB-Middle (4)	714.5	20.25	22	19.34	21
		707.5	21.62	23	20.56	22
		700.5	20.03	22	18.95	20.9
	8RB-Low (0)	714.5	20.22	22	19.15	21
		707.5	21.64	23	20.68	22
		700.5	19.96	21.9	18.97	20.9
	15RB (0)	714.5	20.22	22	19.26	21
		707.5	21.53	23	20.62	22
		700.5	19.89	21.4	18.86	20.8
5 MHz	1RB-High (24)	713.5	21.48	23	20.51	22
		707.5	22.40	24	21.49	23
		701.5	22.78	24	21.85	23
	1RB-Middle (12)	713.5	21.28	23	20.30	22
		707.5	22.70	24	21.73	23
		701.5	20.87	22.4	19.90	21.4
	1RB-Low (0)	713.5	22.46	24	21.50	23
		707.5	22.49	24	21.40	23
		701.5	20.86	22.4	19.91	21.4
	12RB-High (13)	713.5	20.39	22.3	19.41	21.4
		707.5	21.50	23	20.53	22
		701.5	21.71	23	20.76	22
	12RB-Middle (6)	713.5	20.20	22.2	19.26	20.9
		707.5	21.56	23	20.47	22
		701.5	21.64	23	20.60	22
	12RB-Low (0)	713.5	21.42	23	20.38	22
		707.5	21.59	23	20.51	22
		701.5	19.99	21.9	18.96	20.9
	25RB (0)	713.5	21.50	23	20.58	22
		707.5	21.37	23	20.44	22
		701.5	21.43	23	20.47	22

10 MHz	1RB-High (49)	711	21.47	23	20.54	22
		707.5	22.61	23	21.66	23
		704	22.60	23	21.69	23
	1RB-Middle (24)	711	22.42	23	21.48	23
		707.5	22.74	23	21.69	23
		704	22.66	23	21.57	23
	1RB-Low (0)	711	22.74	23	21.67	23
		707.5	22.86	23	21.83	23
		704	20.96	22.4	20.03	22
	25RB-High (25)	711	21.62	22	20.70	22
		707.5	21.29	22	20.30	22
		704	21.38	22	20.47	22
	25RB-Middle (12)	711	21.53	22	20.62	22
		707.5	21.48	22	20.44	22
		704	21.56	22	20.63	22
	25RB-Low (0)	711	21.42	22	20.51	22
		707.5	21.54	22	20.59	22
		704	21.35	22	20.33	22
	50RB (0)	711	21.31	23	20.22	22
		707.5	21.33	23	20.36	22
		704	21.26	23	20.34	22
Band 13						
Bandwidth (MHz)	RB allocation RB offset (Start RB)	Frequency (MHz)	QPSK		16QAM	
			Actual output power (dBm)	Tune up	Actual output power (dBm)	Tune up
5 MHz	1RB High (24)	784.5	22.80	24	21.83	23
		782	22.63	24	21.64	23
		779.5	22.76	24	21.81	23
	1RB Middle (12)	784.5	22.81	24	21.84	23
		782	22.75	24	21.72	23
		779.5	22.80	24	21.73	23
	1RB Low (0)	784.5	22.88	24	21.96	23
		782	22.90	24	21.83	23
		779.5	22.87	24	21.78	23
	12RB High (13)	784.5	21.71	23	20.76	22
		782	21.73	23	20.65	22
		779.5	21.96	23	20.91	22
	12RB Middle (6)	784.5	21.75	23	20.78	22
		782	21.84	23	20.92	22
		779.5	21.83	23	20.77	22
	12RB Low (0)	784.5	21.73	23	20.69	22
		782	21.94	23	20.93	22

		779.5	21.80	23	20.71	22
	25RB (0)	784.5	21.54	23	20.49	22
		782	21.72	23	20.66	22
		779.5	21.81	23	20.86	22
10 MHz	1RB High (49)	782	21.62	21.7	20.69	22
	1RB Middle (24)	782	21.50	21.7	20.52	22
	1RB Low (0)	782	21.63	21.7	20.66	22
	25RB High (25)	782	21.64	21.7	20.67	22
	25RB Middle (12)	782	21.54	21.7	20.58	22
	25RB Low (0)	782	21.56	21.7	20.47	22
	50RB (0)	782	21.65	23	20.70	22
Band 25						
Bandwidth (MHz)	RB allocation	Frequency (MHz)	QPSK		16QAM	
	RB offset (Start RB)		Actual output power (dBm)	Tune up	Actual output power (dBm)	Tune up
1.4 MHz	1RB High (5)	1914.3	20.44	22.4	19.47	21.4
		1882.5	22.93	24	21.94	23
		1850.7	21.23	23	20.28	22
	1RB Middle (3)	1914.3	20.54	22.4	19.57	21.4
		1882.5	22.80	24	21.77	23
		1850.7	20.97	22.4	19.90	21.4
	1RB Low (0)	1914.3	20.58	22.4	19.66	21.4
		1882.5	23.08	25	22.01	24
		1850.7	21.09	23	20.00	22
	3RB High (3)	1914.3	20.46	22.4	19.51	21.4
		1882.5	22.91	24	21.83	23
		1850.7	21.16	23	20.11	22
	3RB Middle (1)	1914.3	20.57	22.4	19.60	21.4
		1882.5	23.01	25	22.09	24
		1850.7	21.20	23	20.14	22
	3RB Low (0)	1914.3	20.75	22.4	19.71	21.4
		1882.5	22.95	24	21.94	23
		1850.7	21.04	23	19.95	21.4
	6RB (0)	1914.3	19.60	21.4	18.55	20.5
		1882.5	22.25	24	21.19	23
		1850.7	20.32	22	19.37	21.3

3 MHz	1RB High (14)	1913.5	19.91	21.9	18.94	20.9
		1882.5	22.73	24	21.82	23
		1851.5	20.77	22.4	19.84	21.4
	1RB Middle (7)	1913.5	20.40	22.4	19.42	21.4
		1882.5	22.58	24	21.61	23
		1851.5	20.68	22.4	19.71	21.4
	1RB Low (0)	1913.5	20.66	22.4	19.70	21.4
		1882.5	22.62	24	21.53	23
		1851.5	20.73	22.4	19.78	21.4
	8RB High (7)	1913.5	19.18	21	18.20	20.2
		1882.5	21.79	23	20.82	22
		1851.5	19.74	21.6	18.79	20.5
	8RB Middle (4)	1913.5	19.37	21	18.43	20
		1882.5	21.80	23	20.71	22
		1851.5	19.78	21.6	18.74	20.5
	8RB Low (0)	1913.5	19.66	21.6	18.62	20.5
		1882.5	21.76	23	20.68	22
		1851.5	19.72	21.6	18.69	20.5
	15RB (0)	1913.5	19.31	21	18.39	20.3
		1882.5	21.85	23	20.92	22
		1851.5	19.67	21.4	18.71	20.5
5 MHz	1RB High (24)	1912.5	20.04	21.4	19.09	21
		1882.5	22.78	24	21.87	23
		1852.5	22.31	24	21.35	23
	1RB Middle (12)	1912.5	20.68	22.4	19.59	21.4
		1882.5	22.67	24	21.64	23
		1852.5	20.69	22.4	19.76	21.4
	1RB Low (0)	1912.5	22.73	24	21.74	23
		1882.5	22.59	24	21.62	23
		1852.5	20.82	22.4	19.84	21.4
	12RB High (13)	1912.5	19.34	21.4	18.36	20.3
		1882.5	21.76	23	20.72	22
		1852.5	21.28	23	20.32	22
	12RB Middle (6)	1912.5	19.68	21.3	18.77	20.3
		1882.5	21.84	23	20.78	22
		1852.5	19.80	21.3	18.72	20.3
	12RB Low (0)	1912.5	21.38	23	20.31	22
		1882.5	21.65	23	20.69	22
		1852.5	19.81	21.3	18.82	20.3
	25RB (0)	1912.5	21.08	23	20.12	22
		1882.5	21.79	23	20.88	22
		1852.5	21.14	23	20.11	22

10 MHz	1RB High (49)	1910	20.05	22	19.12	21
		1882.5	22.85	24	21.90	23
		1855	22.78	24	21.87	23
	1RB Middle (24)	1910	22.69	24	21.75	23
		1882.5	22.73	24	21.68	23
		1855	22.27	24	21.18	23
	1RB Low (0)	1910	22.89	24	21.82	23
		1882.5	22.38	24	21.35	23
		1855	20.81	22.4	19.88	21.4
	25RB High (25)	1910	21.17	23	20.25	22
		1882.5	21.66	23	20.67	22
		1855	21.38	23	20.47	22
	25RB Middle (12)	1910	21.51	23	20.60	22
		1882.5	21.73	23	20.69	22
		1855	21.35	23	20.42	22
	25RB Low (0)	1910	21.79	23	20.88	22
		1882.5	21.49	23	20.54	22
		1855	21.13	23	20.11	22
	50RB (0)	1910	21.25	23	20.16	22
		1882.5	21.57	23	20.60	22
		1855	21.33	23	20.41	22
15 MHz	1RB High (74)	1907.5	20.09	22	19.14	21.2
		1882.5	22.68	24	21.77	23
		1857.5	22.22	24	21.26	23
	1RB Middle (37)	1907.5	22.80	24	21.71	23
		1882.5	22.68	24	21.65	23
		1857.5	22.65	24	21.72	23
	1RB Low (0)	1907.5	22.30	24	21.31	23
		1882.5	22.12	24	21.15	23
		1857.5	22.43	24	21.45	23
	36RB High (38)	1907.5	21.29	23	20.31	22
		1882.5	21.63	23	20.59	22
		1857.5	21.55	23	20.59	22
	36RB Middle (19)	1907.5	21.64	23	20.73	22
		1882.5	21.58	23	20.52	22
		1857.5	21.41	23	20.33	22
	36RB Low (0)	1907.5	21.43	23	20.36	22
		1882.5	21.43	23	20.47	22
		1857.5	21.21	23	20.22	22
	75RB (0)	1907.5	21.32	23	20.36	22
		1882.5	21.49	23	20.58	22
		1857.5	21.34	23	20.31	22

20 MHz	1RB High (99)	1905	20.36	22.3	19.43	21.4
		1882.5	22.49	24	21.54	23
		1860	21.94	23	21.03	23
	1RB Middle (50)	1905	22.59	23	21.65	23
		1882.5	22.54	23	21.49	23
		1860	22.78	23	21.69	23
	1RB Low (0)	1905	22.16	23	21.09	23
		1882.5	22.20	23	21.17	23
		1860	20.84	22.4	19.91	21.4
	50RB High (50)	1905	21.43	21.6	20.51	22
		1882.5	21.54	21.6	20.56	22
		1860	21.33	21.6	20.42	22
	50RB Middle (25)	1905	21.43	21.6	20.52	22
		1882.5	21.55	21.6	20.51	22
		1860	21.52	21.6	20.59	22
	50RB Low (0)	1905	21.26	21.6	20.35	22
		1882.5	21.33	21.6	20.38	22
		1860	21.38	21.6	20.36	22
	100RB (0)	1905	21.34	23	20.25	22
		1882.5	21.57	23	20.60	22
		1860	21.41	23	20.49	22
Band 26						
Bandwidth (MHz)	RB allocation RB offset (Start RB)	Frequency (MHz)	QPSK		16QAM	
			Actual output power (dBm)	Tune up	Actual output power (dBm)	Tune up
1.4 MHz	1RB High (5)	848.3	22.35	24	21.38	23
		831.5	22.64	24	21.73	23
		814.7	22.63	24	21.70	23
	1RB Middle (3)	848.3	22.53	24	21.55	23
		831.5	22.72	24	21.75	23
		814.7	22.63	24	21.66	23
	1RB Low (0)	848.3	22.24	24	21.28	23
		831.5	22.66	24	21.57	23
		814.7	22.63	24	21.68	23
	3RB High (3)	848.3	22.32	24	21.34	23
		831.5	22.70	24	21.73	23
		814.7	22.61	24	21.66	23
	3RB Middle (1)	848.3	22.27	24	21.33	23
		831.5	22.73	24	21.64	23
		814.7	22.69	24	21.65	23
	3RB Low (0)	848.3	22.38	24	21.34	23
		831.5	22.67	24	21.59	23

		814.7	22.64	24	21.61	23
	6RB (0)	848.3	21.27	23	20.35	22
		831.5	21.75	23	20.82	22
		814.7	21.75	23	20.79	22
3 MHz	1RB High (14)	847.5	22.44	24	21.47	23
		831.5	22.76	24	21.77	23
		815.5	22.70	24	21.75	23
	1RB Middle (7)	847.5	22.46	24	21.49	23
		831.5	22.64	24	21.61	23
		815.5	22.61	24	21.54	23
	1RB Low (0)	847.5	22.42	24	21.50	23
		831.5	22.60	24	21.53	23
		815.5	22.64	24	21.55	23
	8RB High (7)	847.5	21.26	23	20.31	22
		831.5	21.73	23	20.65	22
		815.5	21.75	23	20.70	22
	8RB Middle (4)	847.5	21.26	23	20.29	22
		831.5	21.75	23	20.83	22
		815.5	21.79	23	20.73	22
	8RB Low (0)	847.5	21.31	23	20.27	22
		831.5	21.77	23	20.76	22
		815.5	21.68	23	20.59	22
	15RB (0)	847.5	21.24	23	20.19	22
		831.5	21.71	23	20.65	22
		815.5	21.71	23	20.76	22
5 MHz	1RB High (24)	846.5	22.33	24	21.38	23
		831.5	22.82	24	21.91	23
		816.5	22.99	24	22.03	23
	1RB Middle (12)	846.5	22.47	24	21.38	23
		831.5	22.82	24	21.79	23
		816.5	22.73	24	21.80	23
	1RB Low (0)	846.5	22.79	24	21.80	23
		831.5	22.81	24	21.84	23
		816.5	22.66	24	21.68	23
	12RB High (13)	846.5	21.26	23	20.28	22
		831.5	21.66	23	20.62	22
		816.5	21.80	23	20.84	22
	12RB Middle (6)	846.5	21.41	23	20.50	22
		831.5	21.73	23	20.67	22
		816.5	21.87	23	20.79	22
	12RB Low (0)	846.5	21.65	23	20.58	22
		831.5	21.80	23	20.84	22

		816.5	21.73	23	20.74	22
	25RB (0)	846.5	21.24	23	20.28	22
		831.5	21.60	23	20.69	22
		816.5	21.55	23	20.52	22
10 MHz	1RB High (49)	844	22.36	24	21.43	23
		831.5	22.72	24	21.77	23
		820	22.92	24	22.01	24
	1RB Middle (24)	844	22.95	24	22.01	24
		831.5	22.79	24	21.74	23
		820	23.03	24	21.94	23
	1RB Low (0)	844	22.85	24	21.78	23
		831.5	22.73	24	21.70	23
		820	22.81	24	21.88	23
	25RB High (25)	844	21.38	23	20.46	22
		831.5	21.47	23	20.48	22
		820	21.69	23	20.78	22
	25RB Middle (12)	844	21.62	23	20.71	22
		831.5	21.63	23	20.59	22
		820	21.86	23	20.93	22
	25RB Low (0)	844	21.70	23	20.79	22
		831.5	21.65	23	20.70	22
		820	21.51	23	20.49	22
	50RB (0)	844	21.47	23	20.38	22
		831.5	21.41	23	20.44	22
		820	21.61	23	20.69	22
15 MHz	1RB High (74)	841.5	22.39	23	21.44	23
		831.5	22.66	23	21.75	23
		822.5	22.91	23	21.95	23
	1RB Middle (37)	841.5	22.90	23	21.81	23
		831.5	22.79	23	21.76	23
		822.5	22.97	23	22.04	24
	1RB Low (0)	841.5	22.88	23	21.89	23
		831.5	22.89	23	21.92	23
		822.5	22.81	23	21.83	23
	36RB High (38)	841.5	21.56	22	20.58	22
		831.5	21.42	22	20.38	22
		822.5	21.83	22	20.87	22
	36RB Middle (19)	841.5	21.69	22	20.78	22
		831.5	21.67	22	20.61	22
		822.5	21.69	22	20.61	22
	36RB Low (0)	841.5	21.55	22	20.48	22
		831.5	21.57	22	20.61	22
		822.5	21.69	22	20.70	22

	75RB (0)	841.5	21.49	23	20.53	22
		831.5	21.56	23	20.65	22
		822.5	21.71	23	20.68	22
Band 41						
Bandwidth (MHz)	RB allocation RB offset (Start RB)	Frequency (MHz)	QPSK		16QAM	
			Actual output power (dBm)	Tune up	Actual output power (dBm)	Tune up
5 MHz	1RB High (24)	2687.5	21.46	23	20.49	22
		2640.3	22.25	24	21.78	23
		2593	23.07	25	22.08	24
		2545.8	22.81	24	22.12	24
		2498.5	21.17	23	20.22	22
	1RB Middle (12)	2687.5	21.52	23	20.55	22
		2640.3	22.22	24	21.63	23
		2593	23.12	25	22.09	24
		2545.8	22.87	24	22.08	24
		2498.5	21.06	23	19.99	19.4
	1RB Low (0)	2687.5	22.84	24	21.92	23
		2640.3	22.15	24	21.57	23
		2593	23.05	25	21.98	23
		2545.8	22.66	24	21.97	23
		2498.5	20.96	22.4	19.87	19.4
	12RB High (13)	2687.5	20.50	22.4	19.55	19.4
		2640.3	21.19	23	20.78	22
		2593	22.08	24	21.00	23
		2545.8	21.87	23	21.19	23
		2498.5	21.62	23	20.57	22
	12RB Middle (6)	2687.5	20.40	22.4	19.43	19.4
		2640.3	21.10	23	20.70	22
		2593	22.06	24	21.14	23
		2545.8	21.89	23	21.18	23
		2498.5	20.03	22	18.97	18.9
	12RB Low (0)	2687.5	21.99	23	20.95	22
		2640.3	21.20	23	20.79	22
		2593	22.10	24	21.09	23
		2545.8	21.87	23	21.18	23
		2498.5	19.90	21.9	18.81	28.8
	25RB (0)	2687.5	21.80	23	20.75	22
		2640.3	20.95	22.5	20.01	22
		2593	22.02	24	20.96	22
		2545.8	21.77	23	20.99	22
		2498.5	21.31	23	20.36	22
10 MHz	1RB	2685	21.43	23	20.48	22

	High (49)	2639	21.89	23	21.30	23
		2593	23.01	25	22.10	24
		2547	22.64	24	22.08	24
		2501	22.72	24	21.76	23
	1RB Middle (24)	2685	22.94	24	21.85	23
		2639	22.04	24	21.49	23
		2593	23.03	24	22.00	24
		2547	22.71	24	22.05	24
		2501	22.72	24	21.79	23
	1RB Low (0)	2685	22.85	24	21.86	23
		2639	22.14	24	21.63	23
		2593	23.01	25	22.04	24
		2547	22.70	24	22.13	24
		2501	20.93	22.4	19.95	19.4
	25RB High (25)	2685	21.79	23	20.81	22
		2639	20.83	22.4	20.11	22
		2593	22.03	24	20.99	22
		2547	21.61	23	21.08	22
		2501	21.68	23	20.72	22
	25RB Middle (12)	2685	21.96	23	21.05	23
		2639	20.87	22.4	20.19	22
		2593	21.98	23	20.92	22
		2547	21.67	23	21.04	23
		2501	21.45	23	20.37	22
	25RB Low (0)	2685	21.78	23	20.71	22
		2639	20.91	22.4	20.22	22
		2593	21.98	23	21.02	23
		2547	21.57	23	20.99	22
		2501	21.38	23	20.39	22
	50RB (0)	2685	21.77	23	20.81	22
		2639	20.68	22.4	19.96	21.9
		2593	21.94	23	21.03	23
		2547	21.38	23	20.52	22
		2501	21.39	23	20.36	22
15 MHz	1RB High (74)	2682.5	21.42	23	20.45	22
		2637.8	22.00	24	21.30	23
		2593	23.05	25	22.14	24
		2548.3	22.71	24	22.08	24
		2503.5	22.93	24	22.00	24
	1RB Middle (37)	2682.5	22.94	24	21.96	23
		2637.8	21.93	23	21.27	23
		2593	23.11	25	22.14	24
		2548.3	22.63	24	22.00	24

		2503.5	22.71	24	21.74	23
	1RB Low (0)	2682.5	22.73	24	21.77	23
		2637.8	21.90	23	21.17	23
		2593	23.14	25	22.05	24
		2548.3	22.80	24	22.03	24
		2503.5	21.04	23	20.09	22
	36RB High (38)	2682.5	21.93	23	20.95	22
		2637.8	20.61	22.4	20.01	22
		2593	21.91	23	20.94	22
		2548.3	21.38	23	20.85	22
		2503.5	21.62	23	20.67	22
	36RB Middle (19)	2682.5	21.77	23	20.83	22
		2637.8	20.64	22.4	20.30	22
		2593	21.97	23	20.88	22
		2548.3	21.51	23	20.97	22
		2503.5	21.63	23	20.59	22
	36RB Low (0)	2682.5	21.76	23	20.72	22
		2637.8	20.74	22.4	20.19	22
		2593	21.92	23	20.84	22
		2548.3	21.48	23	20.91	22
		2503.5	21.49	23	20.46	22
	75RB (0)	2682.5	21.74	23	20.82	22
		2637.8	20.60	22.5	19.90	21.9
		2593	21.95	23	21.02	22
		2548.3	21.44	23	20.63	22
		2503.5	21.44	23	20.48	22
20 MHz	1RB High (99)	2680	21.51	23	20.58	22
		2636.5	21.99	23	21.32	23
		2593	23.04	25	22.09	24
		2549.5	22.32	24	21.77	23
		2506	23.01	25	22.10	24
	1RB Middle (50)	2680	22.92	24	21.98	23
		2636.5	21.98	23	21.30	23
		2593	23.10	25	22.05	24
		2549.5	22.59	24	21.98	23
		2506	22.83	24	21.74	23
	1RB Low (0)	2680	22.73	24	21.66	23
		2636.5	21.87	23	21.23	23
		2593	23.14	23.2	22.11	24
		2549.5	22.76	24	22.09	24
		2506	21.09	23	20.16	22
	50RB High (50)	2680	21.83	23	20.91	22
		2636.5	20.50	22.4	19.97	21.4

		2593	22.04	22.2	21.05	23
		2549.5	21.27	23	20.83	22
		2506	21.75	23	20.84	22
	50RB Middle (25)	2680	21.61	23	20.70	22
		2636.5	20.57	22.4	20.01	22
		2593	21.96	23	20.92	22
		2549.5	21.36	23	20.87	22
		2506	21.58	23	20.65	22
	50RB Low (0)	2680	21.58	23	20.67	22
		2636.5	20.75	22.4	20.41	22
		2593	21.89	23	20.94	22
		2549.5	21.41	23	20.99	22
		2506	21.40	23	20.38	22
	100RB (0)	2680	21.78	23	20.69	22
		2636.5	20.52	22.5	19.88	21.4
		2593	22.01	23	21.04	22
		2549.5	21.40	23	20.29	22
		2506	21.56	23	20.64	22

12 SAR Test Result

It is determined by user manual for the distance between the EUT and the phantom bottom. The distance is 10mm 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-g SAR 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.

12.1 SAR results for Fast SAR

Table 12.1: SAR Values (LTE Band2 - Body)

Ambient Temperature: 22.6 °C Liquid Temperature: 22.1 °C											
Frequency		Mode	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)
MHz	Ch.										
1860	18700	1RB_Mid	Front	/	23.11	23.2	0.219	**0.22**	0.405	**0.41**	-0.02
1860	18700	1RB_Mid	Rear	/	23.11	23.2	0.148	**0.15**	0.245	**0.25**	0.06
1860	18700	1RB_Mid	Left	/	23.11	23.2	0.027	**0.03**	0.044	**0.05**	0.08
1860	18700	1RB_Mid	Right	/	23.11	23.2	0.109	**0.11**	0.199	**0.20**	0.07
1860	18700	1RB_Mid	Top	/	23.11	23.2	0.062	**0.06**	0.109	**0.11**	-0.11
1860	18700	1RB_Mid	Bottom	/	23.11	23.2	0.108	**0.11**	0.188	**0.19**	-0.08
1880	18900	50RB_High	Front	Fig.1	21.80	22.0	0.321	**0.34**	0.571	**0.60**	0.06
1880	18900	50RB_High	Rear	/	21.80	22.0	0.218	**0.23**	0.353	**0.37**	0.10
1880	18900	50RB_High	Left	/	21.80	22.0	0.031	**0.03**	0.051	**0.05**	-0.13
1880	18900	50RB_High	Right	/	21.80	22.0	0.186	**0.19**	0.336	**0.35**	0.04
1880	18900	50RB_High	Top	/	21.80	22.0	0.102	**0.11**	0.177	**0.19**	-0.01
1880	18900	50RB_High	Bottom	/	21.80	22.0	0.158	**0.17**	0.273	**0.29**	-0.08

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

Table 12.2: SAR Values (LTE Band4 - Body)

Ambient Temperature: 22.6 °C Liquid Temperature: 22.1°C											
Frequency		Mode	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)
MHz	Ch.										
1720	20050	1RB_Low	Front	/	22.98	23.0	0.308	**0.31**	0.558	**0.56**	0.00
1745	20300	1RB_Low	Rear	/	22.06	23.0	0.507	**0.63**	0.822	**1.02**	-0.04
1732.5	20175	1RB_Low	Rear	Fig.2	22.41	23.0	0.692	**0.79**	1.06	**1.21**	0.02
1720	20050	1RB_Low	Rear	/	22.98	23.0	0.641	**0.64**	0.975	**0.98**	0.00
1720	20050	1RB_Low	Left	/	22.98	23.0	0.058	**0.06**	0.088	**0.09**	-0.13
1720	20050	1RB_Low	Right	/	22.98	23.0	0.128	**0.13**	0.225	**0.23**	-0.03
1720	20050	1RB_Low	Top	/	22.98	23.0	0.075	**0.08**	0.127	**0.13**	-0.06
1720	20050	1RB_Low	Bottom	/	22.98	23.0	0.127	**0.13**	0.205	**0.21**	-0.02
1720	20050	50RB_Low	Front	/	21.70	22.0	0.281	**0.30**	0.463	**0.50**	0.01
1745	20300	50RB_Low	Rear	/	20.97	22.0	0.421	**0.53**	0.685	**0.87**	0.05
1732.5	20175	50RB_Low	Rear	/	21.34	22.0	0.471	**0.55**	0.760	**0.88**	-0.08
1720	20050	50RB_Low	Rear	/	21.70	22.0	0.597	**0.64**	0.955	**1.02**	0.11
1720	20050	50RB_Low	Left	/	21.70	22.0	0.043	**0.05**	0.068	**0.07**	-0.14
1720	20050	50RB_Low	Right	/	21.70	22.0	0.104	**0.11**	0.183	**0.20**	0.09
1720	20050	50RB_Low	Top	/	21.70	22.0	0.060	**0.06**	0.101	**0.11**	0.15
1720	20050	50RB_Low	Bottom	/	21.70	22.0	0.104	**0.11**	0.169	**0.18**	0.04
1720	20050	100RB	Rear	/	21.48	21.5	0.528	**0.53**	0.850	**0.85**	0.12

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

Table 12.3: SAR Values (LTE Band5 - Body)

Ambient Temperature: 22.5 °C Liquid Temperature: 22.0 °C											
Frequency		Mode	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)
MHz	Ch.										
829	20450	1RB_Mid	Front	Fig.3	22.64	23.0	0.437	**0.47**	0.659	**0.72**	0.03
829	20450	1RB_Mid	Rear	/	22.64	23.0	0.394	**0.43**	0.575	**0.62**	-0.12
829	20450	1RB_Mid	Left	/	22.64	23.0	0.028	**0.03**	0.041	**0.04**	-0.12
829	20450	1RB_Mid	Right	/	22.64	23.0	0.093	**0.10**	0.148	**0.16**	0.05
829	20450	1RB_Mid	Top	/	22.64	23.0	0.138	**0.15**	0.202	**0.22**	-0.04
829	20450	1RB_Mid	Bottom	/	22.64	23.0	0.123	**0.13**	0.181	**0.20**	0.04
844	20600	25RB_Low	Front	/	21.63	22.0	0.349	**0.38**	0.533	**0.58**	0.05
844	20600	25RB_Low	Rear	/	21.63	22.0	0.306	**0.33**	0.453	**0.49**	0.13
844	20600	25RB_Low	Left	/	21.63	22.0	0.009	**0.01**	0.014	**0.01**	0.17
844	20600	25RB_Low	Right	/	21.63	22.0	0.066	**0.07**	0.104	**0.11**	-0.09
844	20600	25RB_Low	Top	/	21.63	22.0	0.086	**0.09**	0.126	**0.14**	0.02
844	20600	25RB_Low	Bottom	/	21.63	22.0	0.119	**0.13**	0.180	**0.20**	0.00

Note1: The distance between the EUT and the phantom bottom is 10mm. Note2: The LTE mode is QPSK_10MHz.

Table 12.4: SAR Values (LTE Band12 - Body)

Ambient Temperature: 22.5 °C Liquid Temperature: 22.0 °C											
Frequency		Mode	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)
MHz	Ch.										
707.5	23095	1RB_Low	Front	Fig.4	22.86	23.0	0.213	**0.22**	0.298	**0.31**	0.08
707.5	23095	1RB_Low	Rear	/	22.86	23.0	0.153	**0.16**	0.222	**0.23**	0.06
707.5	23095	1RB_Low	Left	/	22.86	23.0	0.044	**0.05**	0.065	**0.07**	-0.14
707.5	23095	1RB_Low	Right	/	22.86	23.0	0.033	**0.03**	0.047	**0.05**	0.04
707.5	23095	1RB_Low	Top	/	22.86	23.0	0.006	**0.01**	0.008	**0.01**	-0.19
707.5	23095	1RB_Low	Bottom	/	22.86	23.0	0.042	**0.04**	0.064	**0.07**	0.19
711	23130	25RB_High	Front	/	21.62	22.0	0.147	**0.16**	0.215	**0.23**	0.13
711	23130	25RB_High	Rear	/	21.62	22.0	0.112	**0.12**	0.164	**0.18**	-0.11
711	23130	25RB_High	Left	/	21.62	22.0	0.034	**0.04**	0.050	**0.05**	0.09
711	23130	25RB_High	Right	/	21.62	22.0	0.026	**0.03**	0.037	**0.04**	0.13
711	23130	25RB_High	Top	/	21.62	22.0	0.005	**0.01**	0.007	**0.01**	0.14
711	23130	25RB_High	Bottom	/	21.62	22.0	0.030	**0.03**	0.046	**0.05**	0.16

Note1: The distance between the EUT and the phantom bottom is 10mm. Note2: The LTE mode is QPSK_10MHz.

Table 12.5: SAR Values (LTE Band13 - Body)

Ambient Temperature: 22.5 °C Liquid Temperature: 22.0 °C											
Frequency		Mode	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)
MHz	Ch.										
782	23230	1RB_Low	Front	Fig.5	21.63	21.7	0.544	**0.55**	0.760	**0.77**	-0.06
782	23230	1RB_Low	Rear	/	21.63	21.7	0.417	**0.42**	0.613	**0.62**	0.02
782	23230	1RB_Low	Left	/	21.63	21.7	0.018	**0.02**	0.026	**0.03**	-0.18
782	23230	1RB_Low	Right	/	21.63	21.7	0.055	**0.06**	0.081	**0.08**	-0.06
782	23230	1RB_Low	Top	/	21.63	21.7	0.138	**0.14**	0.204	**0.21**	-0.11
782	23230	1RB_Low	Bottom	/	21.63	21.7	0.133	**0.14**	0.193	**0.20**	-0.12
782	23230	25RB_High	Front	/	21.64	21.7	0.453	**0.46**	0.662	**0.67**	0.03
782	23230	25RB_High	Rear	/	21.64	21.7	0.367	**0.37**	0.539	**0.55**	-0.06
782	23230	25RB_High	Left	/	21.64	21.7	0.018	**0.02**	0.025	**0.03**	-0.09
782	23230	25RB_High	Right	/	21.64	21.7	0.044	**0.04**	0.063	**0.06**	0.07
782	23230	25RB_High	Top	/	21.64	21.7	0.121	**0.12**	0.179	**0.18**	0.04
782	23230	25RB_High	Bottom	/	21.64	21.7	0.118	**0.12**	0.171	**0.17**	-0.02

Note1: The distance between the EUT and the phantom bottom is 10mm. Note2: The LTE mode is QPSK_10MHz.

Table 12.6: SAR Values (LTE Band25 - Body)

Ambient Temperature: 22.6 °C Liquid Temperature: 22.1 °C											
Frequency		Mode	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)
MHz	Ch.										
1860	26140	1RB_Mid	Front	/	22.78	23.0	0.220	**0.23**	0.406	**0.43**	-0.03
1860	26140	1RB_Mid	Rear	/	22.78	23.0	0.151	**0.16**	0.252	**0.27**	0.08
1860	26140	1RB_Mid	Left	/	22.78	23.0	0.028	**0.03**	0.046	**0.05**	-0.18
1860	26140	1RB_Mid	Right	/	22.78	23.0	0.109	**0.11**	0.196	**0.21**	-0.03
1860	26140	1RB_Mid	Top	/	22.78	23.0	0.062	**0.07**	0.108	**0.11**	0.06
1860	26140	1RB_Mid	Bottom	/	22.78	23.0	0.109	**0.11**	0.189	**0.20**	-0.01
1882.5	26365	50RB_Mid	Front	Fig.6	21.55	22.0	0.406	**0.45**	0.718	**0.80**	0.09
1882.5	26365	50RB_Mid	Rear	/	21.55	22.0	0.187	**0.21**	0.307	**0.34**	0.11
1882.5	26365	50RB_Mid	Left	/	21.55	22.0	0.034	**0.04**	0.055	**0.06**	-0.14
1882.5	26365	50RB_Mid	Right	/	21.55	22.0	0.153	**0.17**	0.277	**0.31**	-0.04
1882.5	26365	50RB_Mid	Top	/	21.55	22.0	0.082	**0.09**	0.142	**0.16**	-0.13
1882.5	26365	50RB_Mid	Bottom	/	21.55	22.0	0.128	**0.14**	0.221	**0.25**	0.01

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

Table 12.7: SAR Values (LTE Band26 - Body)

Ambient Temperature: 22.5 °C Liquid Temperature: 22.0 °C											
Frequency		Mode	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)
MHz	Ch.										
822.5	26775	1RB_Mid	Front	/	22.97	23.0	0.243	**0.24**	0.359	**0.36**	0.02
822.5	26775	1RB_Mid	Rear	Fig.7	22.97	23.0	0.265	**0.27**	0.374	**0.38**	0.04
822.5	26775	1RB_Mid	Left	/	22.97	23.0	0.023	**0.02**	0.033	**0.03**	0.16
822.5	26775	1RB_Mid	Right	/	22.97	23.0	0.055	**0.06**	0.088	**0.09**	-0.01
822.5	26775	1RB_Mid	Top	/	22.97	23.0	0.115	**0.12**	0.170	**0.17**	-0.12
822.5	26775	1RB_Mid	Bottom	/	22.97	23.0	0.130	**0.13**	0.190	**0.19**	0.05
822.5	26775	36RB_High	Front	/	21.83	22.0	0.197	**0.20**	0.293	**0.30**	0.01
822.5	26775	36RB_High	Rear	/	21.83	22.0	0.195	**0.20**	0.285	**0.30**	0.12
822.5	26775	36RB_High	Left	/	21.83	22.0	0.015	**0.02**	0.022	**0.02**	-0.11
822.5	26775	36RB_High	Right	/	21.83	22.0	0.046	**0.05**	0.074	**0.08**	0.11
822.5	26775	36RB_High	Top	/	21.83	22.0	0.077	**0.08**	0.114	**0.12**	0.04
822.5	26775	36RB_High	Bottom	/	21.83	22.0	0.089	**0.09**	0.130	**0.14**	-0.02

Note1: The distance between the EUT and the phantom bottom is 10mm. Note2: The LTE mode is QPSK_15MHz.

Table 12.8: SAR Values (LTE Band41 - Body)

Ambient Temperature: 22.6 °C					Liquid Temperature: 22.1 °C						
Frequency		Mode	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)
MHz	Ch.										
2593	40620	1RB_Low	Front	/	23.14	23.2	0.124	**0.13**	0.234	**0.24**	0.15
2593	40620	1RB_Low	Rear	/	23.14	23.2	0.101	**0.10**	0.190	**0.19**	-0.01
2593	40620	1RB_Low	Left	/	23.14	23.2	0.005	**0.01**	0.009	**0.01**	0.12
2593	40620	1RB_Low	Right	Fig.8	23.14	23.2	0.143	**0.14**	0.297	**0.30**	0.02
2593	40620	1RB_Low	Top	/	23.14	23.2	0.075	**0.08**	0.151	**0.15**	0.12
2593	40620	1RB_Low	Bottom	/	23.14	23.2	0.012	**0.01**	0.021	**0.02**	-0.17
2593	40620	50RB_High	Front	/	22.04	22.2	0.081	**0.08**	0.155	**0.16**	0.09
2593	40620	50RB_High	Rear	/	22.04	22.2	0.071	**0.07**	0.134	**0.14**	0.12
2593	40620	50RB_High	Left	/	22.04	22.2	0.003	**0.00**	0.005	**0.01**	0.15
2593	40620	50RB_High	Right	/	22.04	22.2	0.093	**0.10**	0.193	**0.20**	0.05
2593	40620	50RB_High	Top	/	22.04	22.2	0.049	**0.05**	0.099	**0.10**	0.09
2593	40620	50RB_High	Bottom	/	22.04	22.2	0.008	**0.01**	0.014	**0.01**	0.14

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

Note2: The LTE mode is QPSK_20MHz.

12.2 SAR results for Standard procedure

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

Table 12.9: SAR Values (LTE Band2 - Body)

Ambient Temperature: 22.6 °C					Liquid Temperature: 22.1 °C						
Frequency		Mode	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)
MHz	Ch.										
1880	18900	50RB_High	Front	Fig.1	21.80	22.0	0.321	**0.34**	0.571	**0.60**	0.06

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

Table 12.10: SAR Values (LTE Band4 - Body)

Ambient Temperature: 22.6 °C					Liquid Temperature: 22.1°C						
Frequency		Mode	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)
MHz	Ch.										
1732.5	20175	1RB_Low	Rear	Fig.2	22.41	23.0	0.692	**0.79**	1.06	**1.21**	0.02

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

Table 12.11: SAR Values (LTE Band5 - Body)

Ambient Temperature: 22.5 °C					Liquid Temperature: 22.0 °C						
Frequency		Mode	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)
MHz	Ch.										
829	20450	1RB_Mid	Front	Fig.3	22.64	23.0	0.437	**0.47**	0.659	**0.72**	0.03

Note1: The distance between the EUT and the phantom bottom is 10mm. Note2: The LTE mode is QPSK_10MHz.

Table 12.12: SAR Values (LTE Band12 - Body)

Ambient Temperature: 22.5 °C					Liquid Temperature: 22.0 °C						
Frequency		Mode	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)
MHz	Ch.										
707.5	23095	1RB_Low	Front	Fig.4	22.86	23.0	0.213	**0.22**	0.298	**0.31**	0.08

Note1: The distance between the EUT and the phantom bottom is 10mm. Note2: The LTE mode is QPSK_10MHz.

Table 12.13: SAR Values (LTE Band13 - Body)

Ambient Temperature: 22.5 °C					Liquid Temperature: 22.0 °C						
Frequency		Mode	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)
MHz	Ch.										
782	23230	1RB_Low	Front	Fig.5	21.63	21.7	0.544	**0.55**	0.760	**0.77**	-0.06

Note1: The distance between the EUT and the phantom bottom is 10mm. Note2: The LTE mode is QPSK_10MHz.

Table 12.14: SAR Values (LTE Band25 - Body)

Ambient Temperature: 22.6 °C					Liquid Temperature: 22.1 °C						
Frequency		Mode	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)
MHz	Ch.										
1882.5	26365	50RB_Mid	Front	Fig.6	21.55	22.0	0.406	**0.45**	0.718	**0.80**	0.09

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

Table 12.15: SAR Values (LTE Band26 - Body)

Ambient Temperature: 22.5 °C					Liquid Temperature: 22.0 °C						
Frequency		Mode	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)
MHz	Ch.										
822.5	26775	1RB_Mid	Rear	Fig.7	22.97	23.0	0.265	**0.27**	0.374	**0.38**	0.04

Note1: The distance between the EUT and the phantom bottom is 10mm. Note2: The LTE mode is QPSK_15MHz.

Table 12.16: SAR Values (LTE Band41 - Body)

Ambient Temperature: 22.6 °C					Liquid Temperature: 22.1 °C						
Frequency		Mode	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)
MHz	Ch.										
2593	40620	1RB_Low	Right	Fig.8	23.14	23.2	0.143	**0.14**	0.297	**0.30**	0.02

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

13 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; steps 2) 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 ≥ 1.45 W/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 13.1: SAR Measurement Variability for Body LTE Band4 (1g)

Frequency		Test Position	Spacing (mm)	Original SAR (W/kg)	First Repeated SAR (W/kg)	The Ratio	Second Repeated SAR (W/kg)
MHz	Ch.						
1732.5	20175	Rear	10	1.06	1.04	1.02	/

14 Measurement Uncertainty

14.1 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	5.5	N	1	1	1	5.5	5.5	∞
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	RF ambient 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	$u_c' = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$					9.25	9.12	257
Expanded uncertainty (confidence interval of 95 %)	$u_e = 2u_c$					18.5	18.2	

14.2 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	6.5	N	1	1	1	6.5	6.5	∞
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	RF ambient 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	4.0	R	$\sqrt{3}$	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	$\sqrt{3}$	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		$u_c' = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$						10.8	10.7	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						21.6	21.4	

14.3 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	5.5	N	1	1	1	5.5	5.5	∞
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	RF ambient 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		$u_c^{'} = \sqrt{\sum_{i=1}^{22} c_i^2 u_i^2}$						10.1	9.95	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						20.2	19.9	

14.4 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	6.5	N	1	1	1	6.5	6.5	∞
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	RF ambient 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 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		$u_c^{'} = \sqrt{\sum_{i=1}^{22} c_i^2 u_i^2}$						13.3	13.2	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						26.6	26.4	

15 MAIN TEST INSTRUMENTS

Table 15.1: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	E5071C	MY46110673	February 03, 2015	One year
02	Power meter	NRVD	102196	March 03, 2015	One year
03	Power sensor	NRV-Z5	100596		
04	Signal Generator	E4438C	MY49071430	February 02, 2015	One Year
05	Amplifier	60S1G4	0331848	No Calibration Requested	
06	BTS	CMW500	129942	March 03, 2015	One year
07	E-field Probe	SPEAG EX3DV4	3846	September 24, 2014	One year
08	DAE	SPEAG DAE4	777	September 17, 2014	One year
09	Dipole Validation Kit	SPEAG D750V3	1017	August 28, 2014	One year
10	Dipole Validation Kit	SPEAG D835V2	4d069	August 28, 2014	One year
11	Dipole Validation Kit	SPEAG D1750V2	1003	August 18, 2014	One year
12	Dipole Validation Kit	SPEAG D1900V2	5d101	July 23, 2014	One year
13	Dipole Validation Kit	SPEAG D2600V2	1012	July 16, 2014	One year

END OF REPORT BODY

ANNEX A Graph Results

LTE Band2 Body Front Middle with QPSK_20M_50RB_High

Date: 2015-4-20
Electronics: DAE4 Sn777
Medium: Body 1900 MHz
Medium parameters used: f = 1880 MHz; σ = 1.478 mho/m; εr = 52.201; ρ = 1000 kg/m^3
Ambient Temperature: 22.6°C Liquid Temperature: 22.1°C
Communication System: LTE Band2 Frequency: 1880 MHz Duty Cycle: 1:1
Probe: EX3DV4 - SN3846 ConvF(7.15, 7.15, 7.15)

Front Middle/Area Scan (91x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.797 W/kg

Front Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.64 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.966 W/kg
SAR(1 g) = 0.571 W/kg; SAR(10 g) = 0.321 W/kg
Maximum value of SAR (measured) = 0.786 W/kg

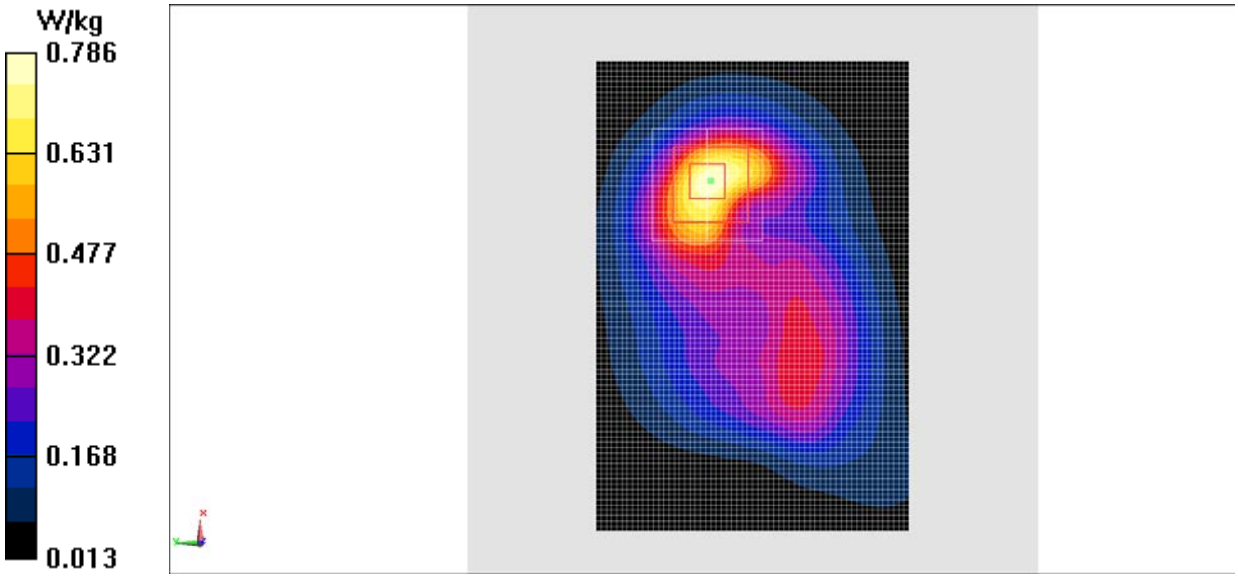


Fig.1 LTE Band2

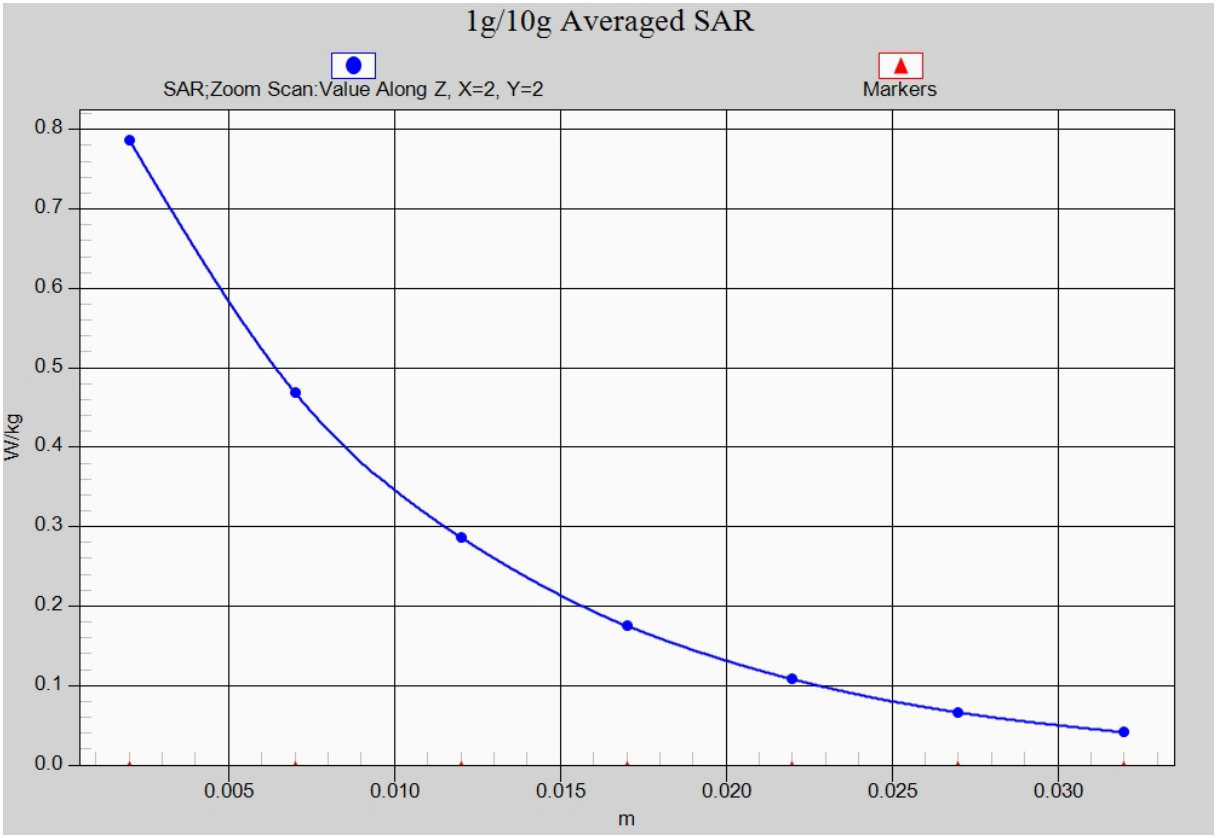


Fig. 1-1 Z-Scan at power reference point (LTE Band2)

LTE Band4 Body Rear Middle with QPSK_20M_1RB_Low
Date: 2015-4-20
Electronics: DAE4 Sn777
Medium: Body 1750 MHz
Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.537 mho/m; εr = 53.483; ρ = 1000 kg/m^3
Ambient Temperature: 22.6°C Liquid Temperature: 22.1°C
Communication System: LTE Band4 Frequency: 1732.5 MHz Duty Cycle: 1:1
Probe: EX3DV4 - SN3846 ConvF(7.43, 7.43, 7.43)

Rear Middle/Area Scan (91x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.35 W/kg

Rear Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.96 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.55 W/kg
SAR(1 g) = 1.06 W/kg; SAR(10 g) = 0.692 W/kg
Maximum value of SAR (measured) = 1.30 W/kg

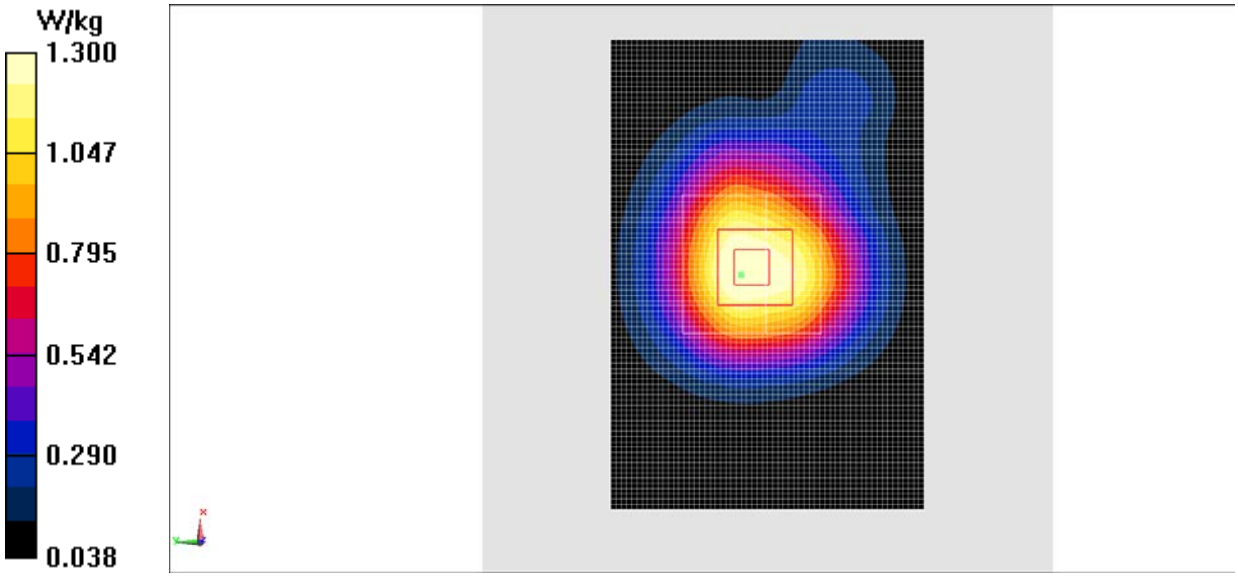


Fig.2 LTE Band4

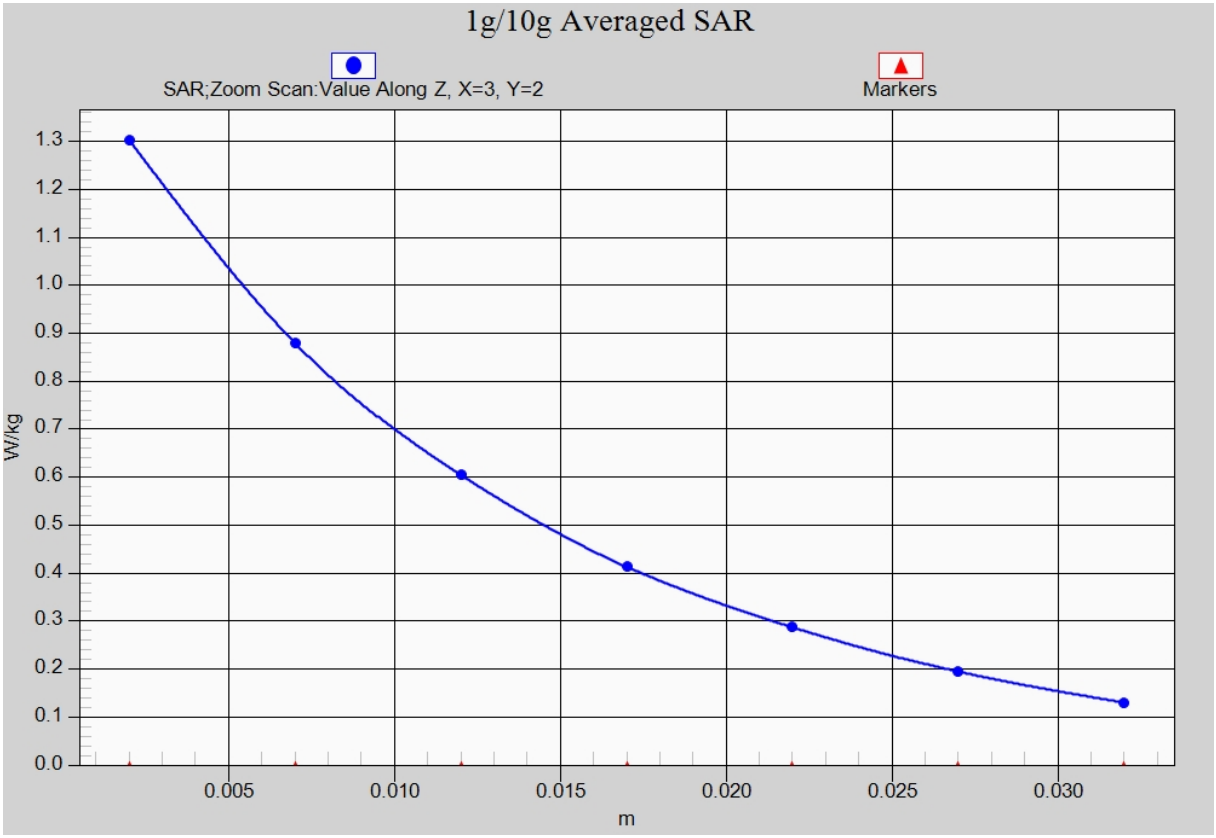


Fig. 2-1 Z-Scan at power reference point (LTE Band4)

LTE Band5 Body Front Low with QPSK_10M_1RB_Middle
Date: 2015-4-19
Electronics: DAE4 Sn777
Medium: Body 850 MHz
Medium parameters used (interpolated): f = 829 MHz; σ = 0.966 mho/m; εr = 56.756; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C Liquid Temperature: 22.0°C
Communication System: LTE Band5 Frequency: 829 MHz Duty Cycle: 1:1
Probe: EX3DV4 - SN3846 ConvF(9.09, 9.09, 9.09)

Front Low/Area Scan (91x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.732 W/kg

Front Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.05 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.01 W/kg
SAR(1 g) = 0.659 W/kg; SAR(10 g) = 0.437 W/kg
Maximum value of SAR (measured) = 0.710 W/kg

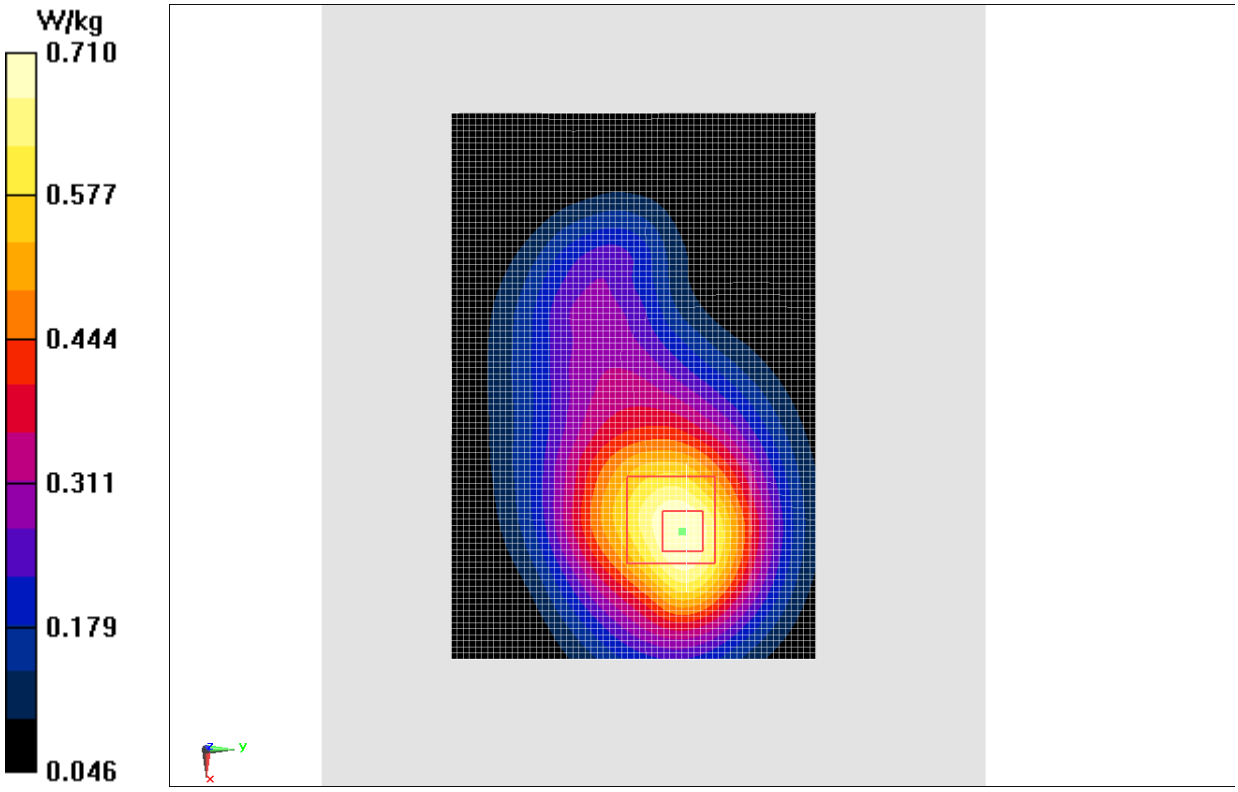


Fig.3 LTE Band5

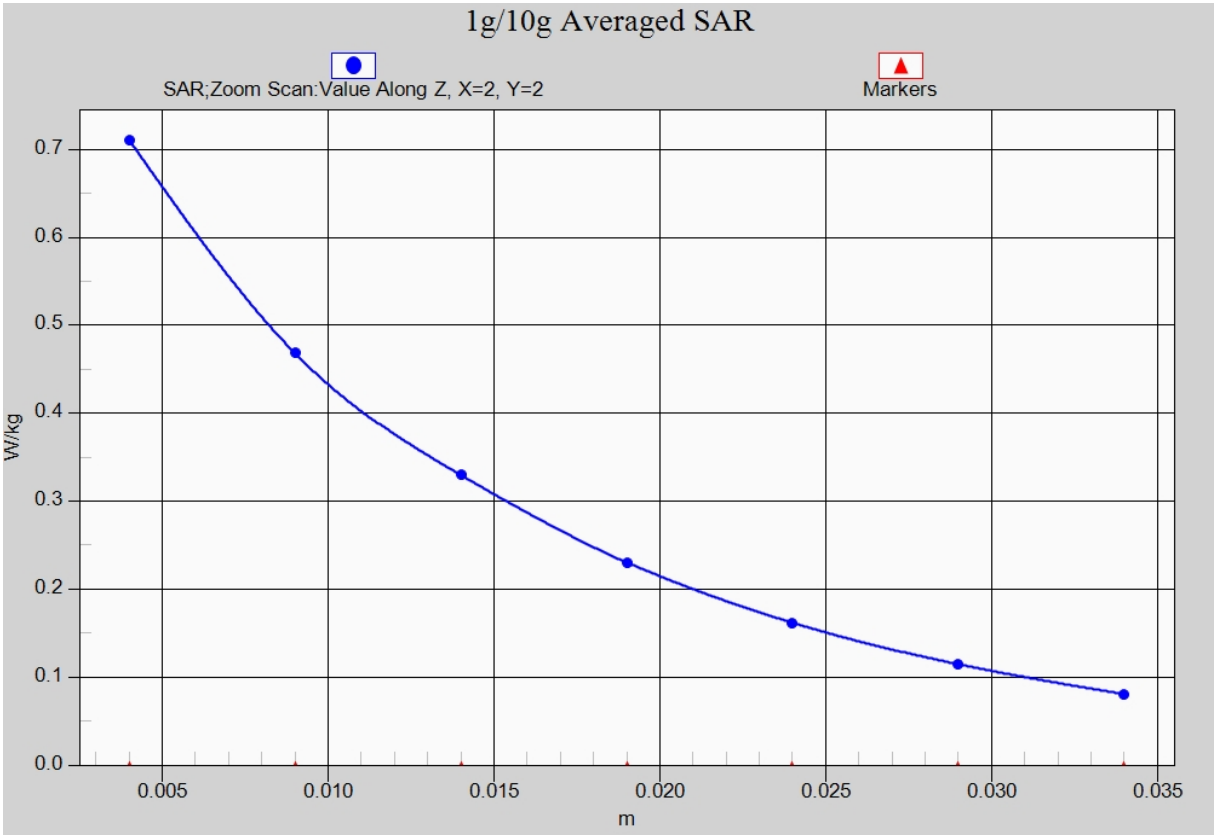


Fig. 3-1 Z-Scan at power reference point (LTE Band5)

LTE Band12 Body Front Middle with QPSK_10M_1RB_Low

Date: 2015-4-19
Electronics: DAE4 Sn777
Medium: Body 750 MHz
Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.896 mho/m; εr = 57.735; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C Liquid Temperature: 22.0°C
Communication System: LTE Band12 Frequency: 707.5 MHz Duty Cycle: 1:1
Probe: EX3DV4 - SN3846 ConvF(9.18, 9.18, 9.18)

Front Middle/Area Scan (81x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.316 W/kg

Front Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.82 V/m; Power Drift = 0.08dB
Peak SAR (extrapolated) = 0.410 W/kg
SAR(1 g) = 0.298 W/kg; SAR(10 g) = 0.213 W/kg
Maximum value of SAR (measured) = 0.318 W/kg

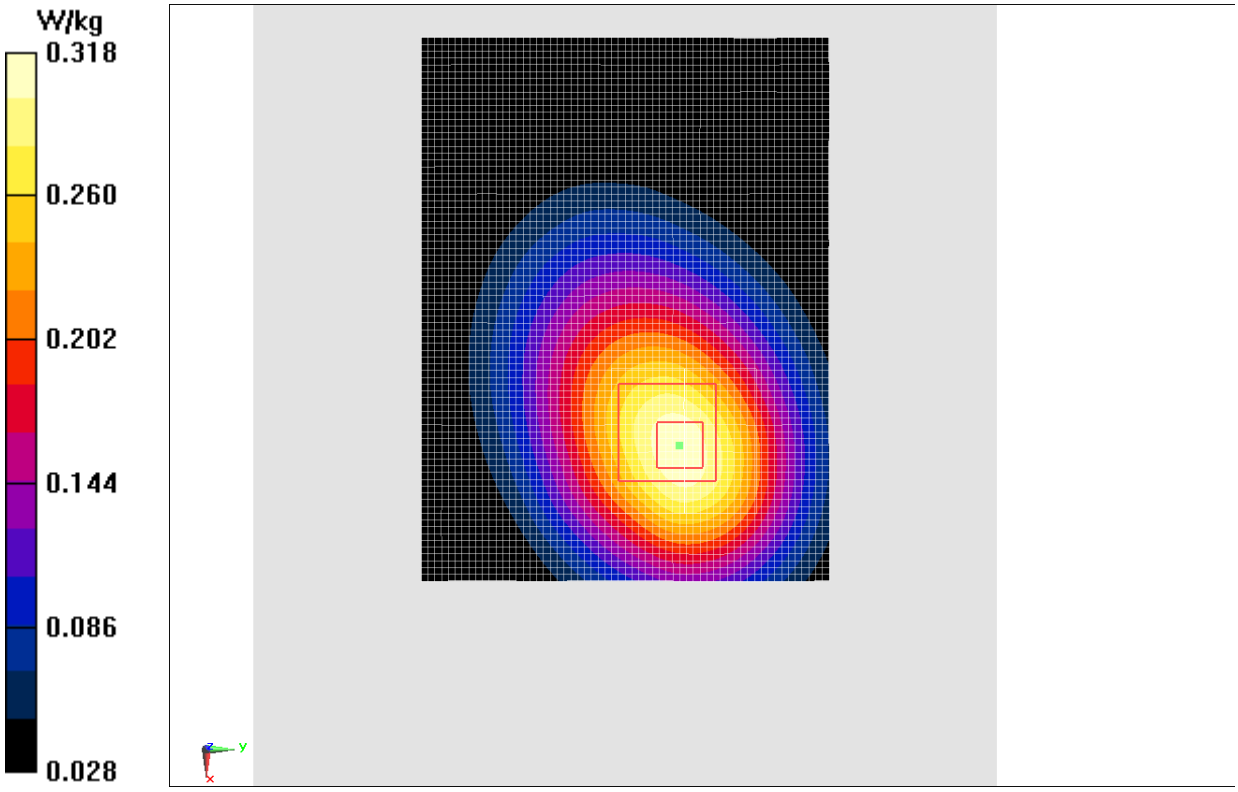


Fig.4 LTE Band12

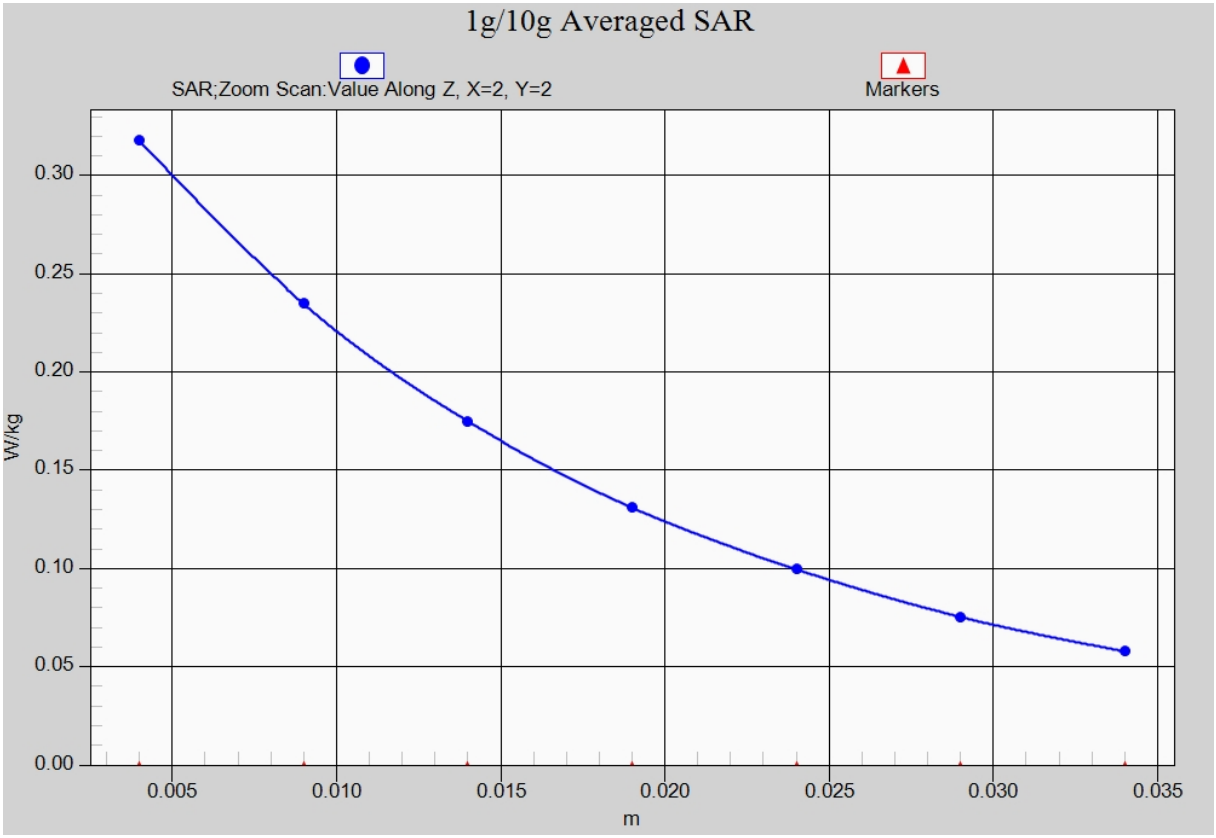


Fig. 4-1 Z-Scan at power reference point (LTE Band12)

LTE Band13 Body Front Middle with QPSK_10M_1RB_Low
Date: 2015-4-19
Electronics: DAE4 Sn777
Medium: Body 750 MHz
Medium parameters used (interpolated): f = 782 MHz; σ = 0.929 mho/m; εr = 58.494; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C Liquid Temperature: 22.0°C
Communication System: LTE Band13 Frequency: 782 MHz Duty Cycle: 1:1
Probe: EX3DV4 - SN3846 ConvF(9.18, 9.18, 9.18)

Front Middle/Area Scan (91x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.814 W/kg

Front Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 25.38 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 1.07 W/kg
SAR(1 g) = 0.760 W/kg; SAR(10 g) = 0.544 W/kg
Maximum value of SAR (measured) = 0.807 W/kg

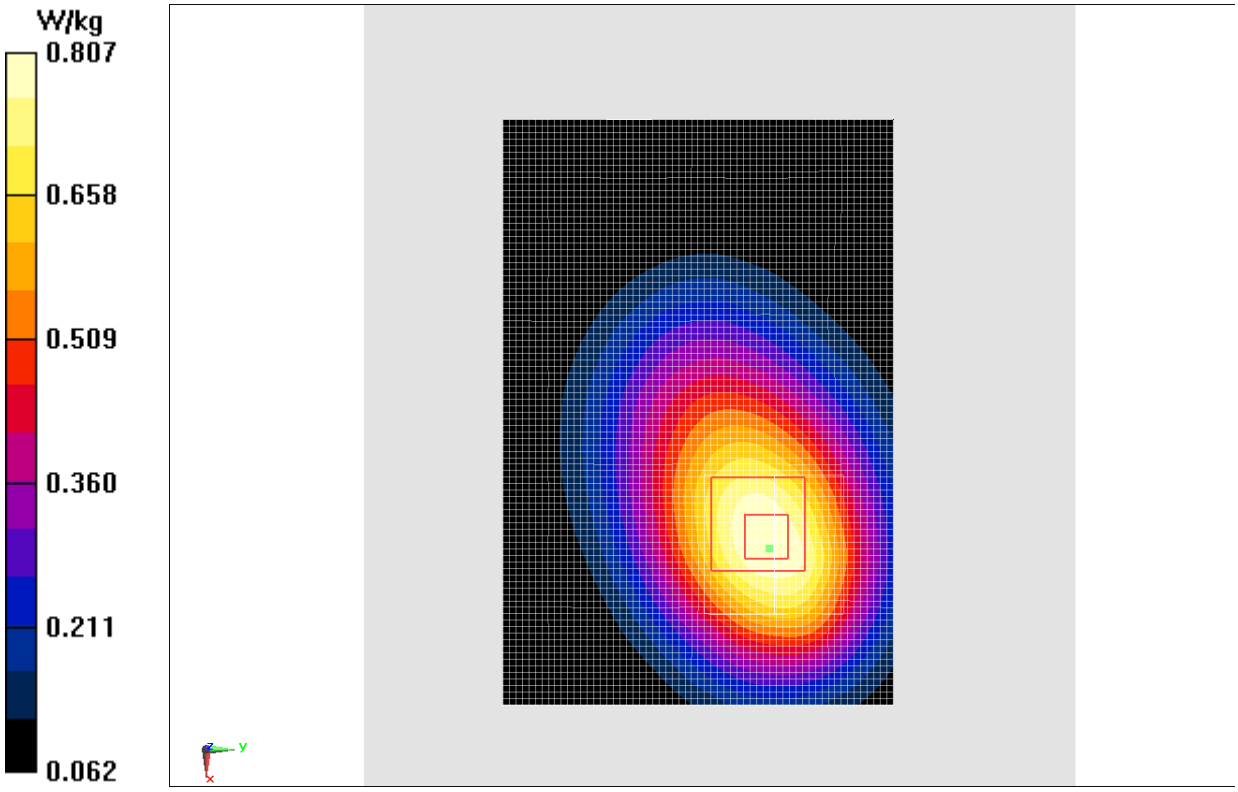


Fig.5 LTE Band13

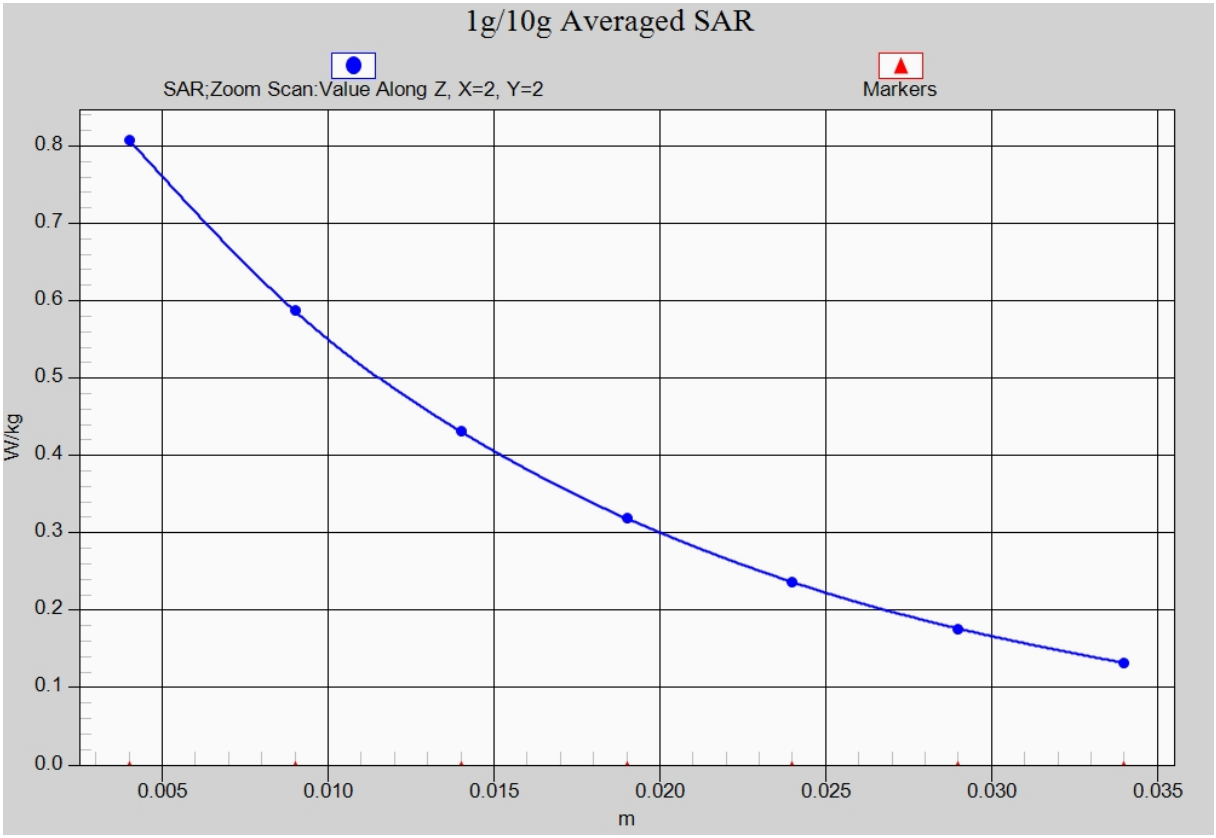


Fig. 5-1 Z-Scan at power reference point (LTE Band13)

LTE Band25 Body Front Middle with QPSK_20M_50RB_Middle
Date: 2015-4-20
Electronics: DAE4 Sn777
Medium: Body 1900 MHz
Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.48 mho/m; εr = 52.195; ρ = 1000 kg/m^3
Ambient Temperature: 22.6°C Liquid Temperature: 22.1°C
Communication System: LTE Band25 Frequency: 1882.5 MHz Duty Cycle: 1:1
Probe: EX3DV4 - SN3846 ConvF(7.15, 7.15, 7.15)

Front Middle/Area Scan (91x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.989 W/kg

Front Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.18 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.21 W/kg
SAR(1 g) = 0.718 W/kg; SAR(10 g) = 0.406 W/kg
Maximum value of SAR (measured) = 0.985 W/kg

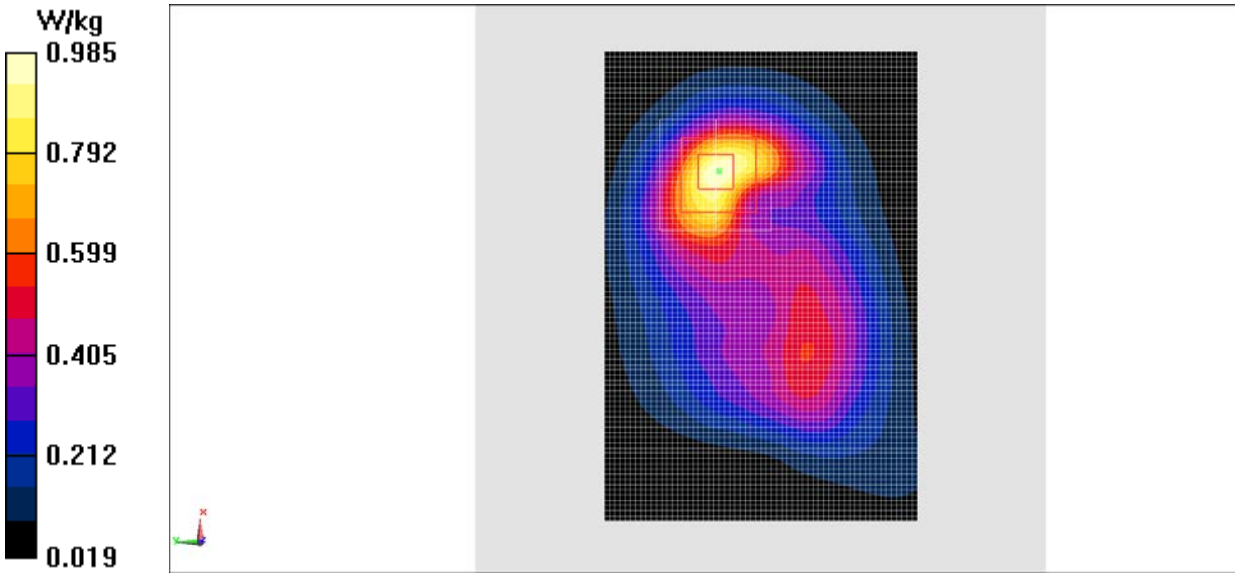


Fig.6 LTE Band25

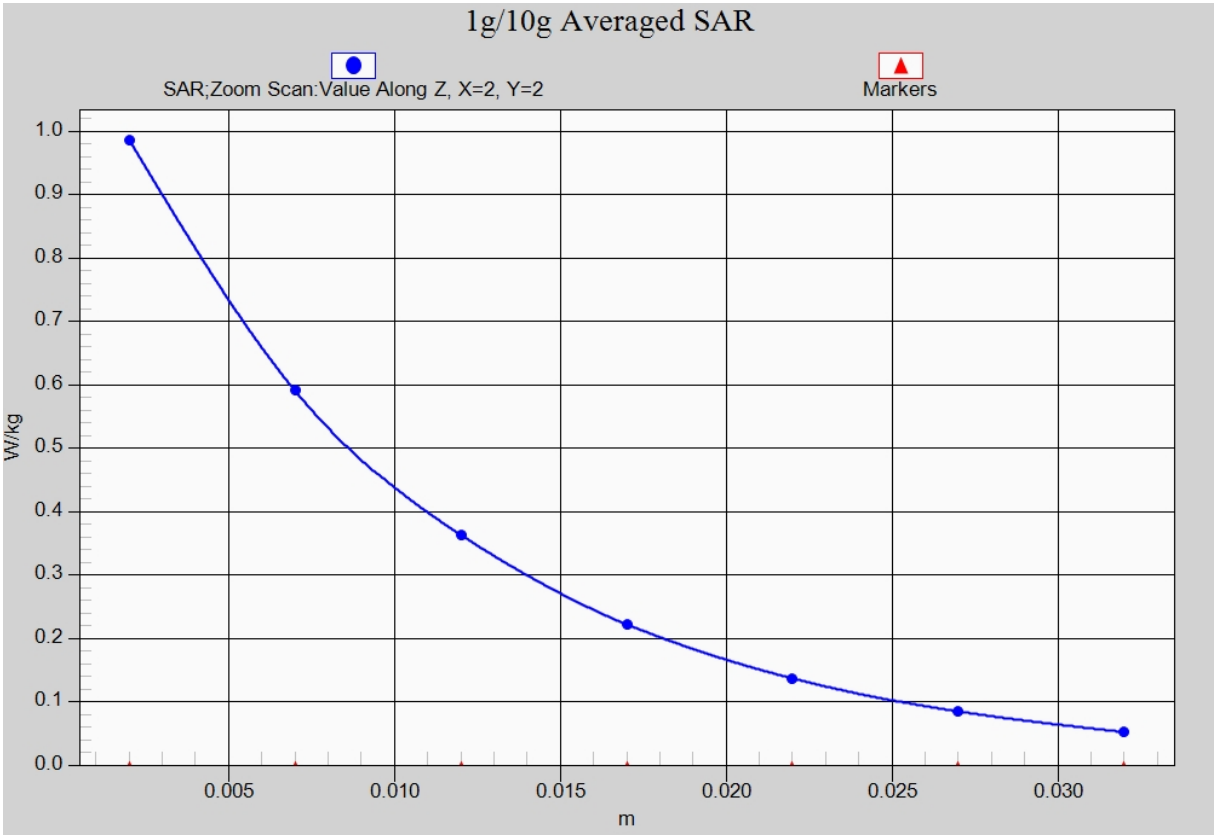


Fig. 6-1 Z-Scan at power reference point (LTE Band25)

LTE Band26 Body Rear Low with QPSK_15M_1RB_Middle

Date: 2015-4-19
Electronics: DAE4 Sn777
Medium: Body 850 MHz
Medium parameters used (interpolated): f = 822.5 MHz; σ = 0.96 mho/m; εr = 56.799; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C Liquid Temperature: 22.0°C
Communication System: LTE Band26 Frequency: 822.5 MHz Duty Cycle: 1:1
Probe: EX3DV4 - SN3846 ConvF(9.09, 9.09, 9.09)

Rear Low/Area Scan (91x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.394 W/kg

Rear Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.64 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.519 W/kg
SAR(1 g) = 0.374 W/kg; SAR(10 g) = 0.265 W/kg
Maximum value of SAR (measured) = 0.398 W/kg

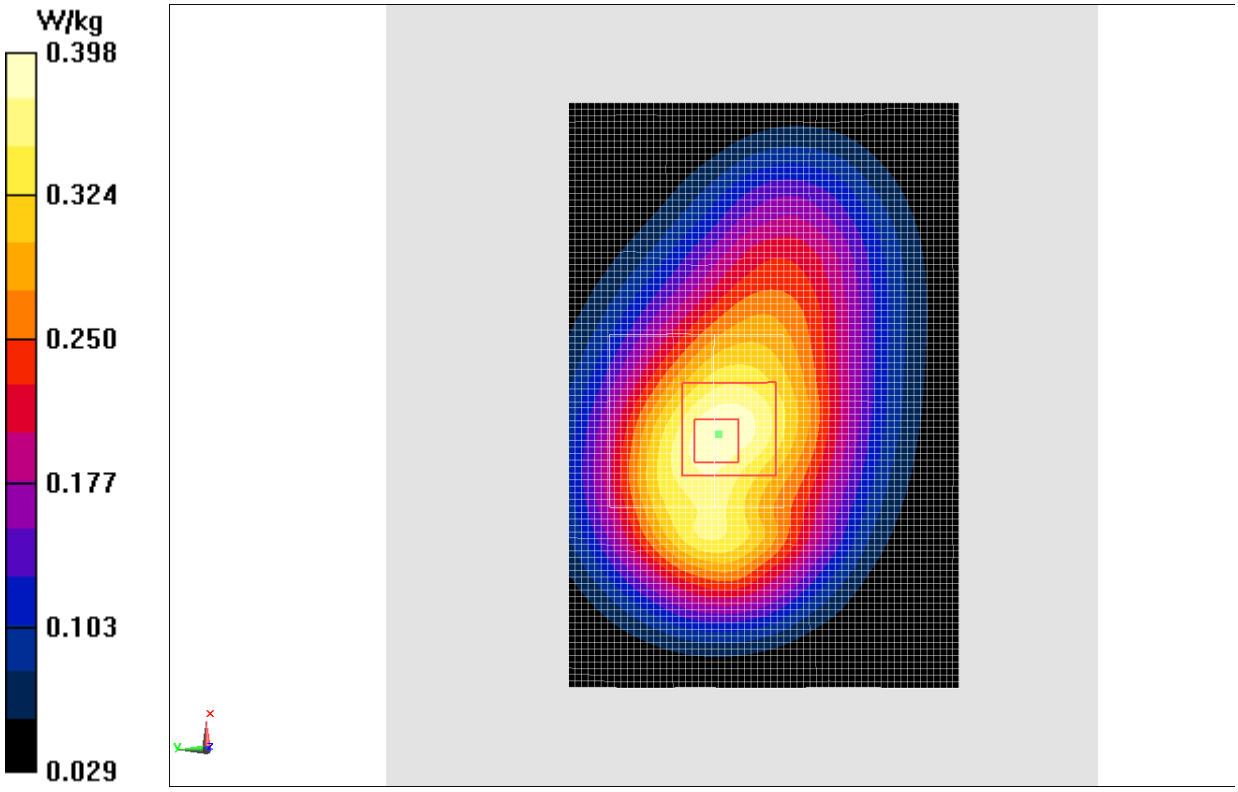


Fig.7 LTE Band26

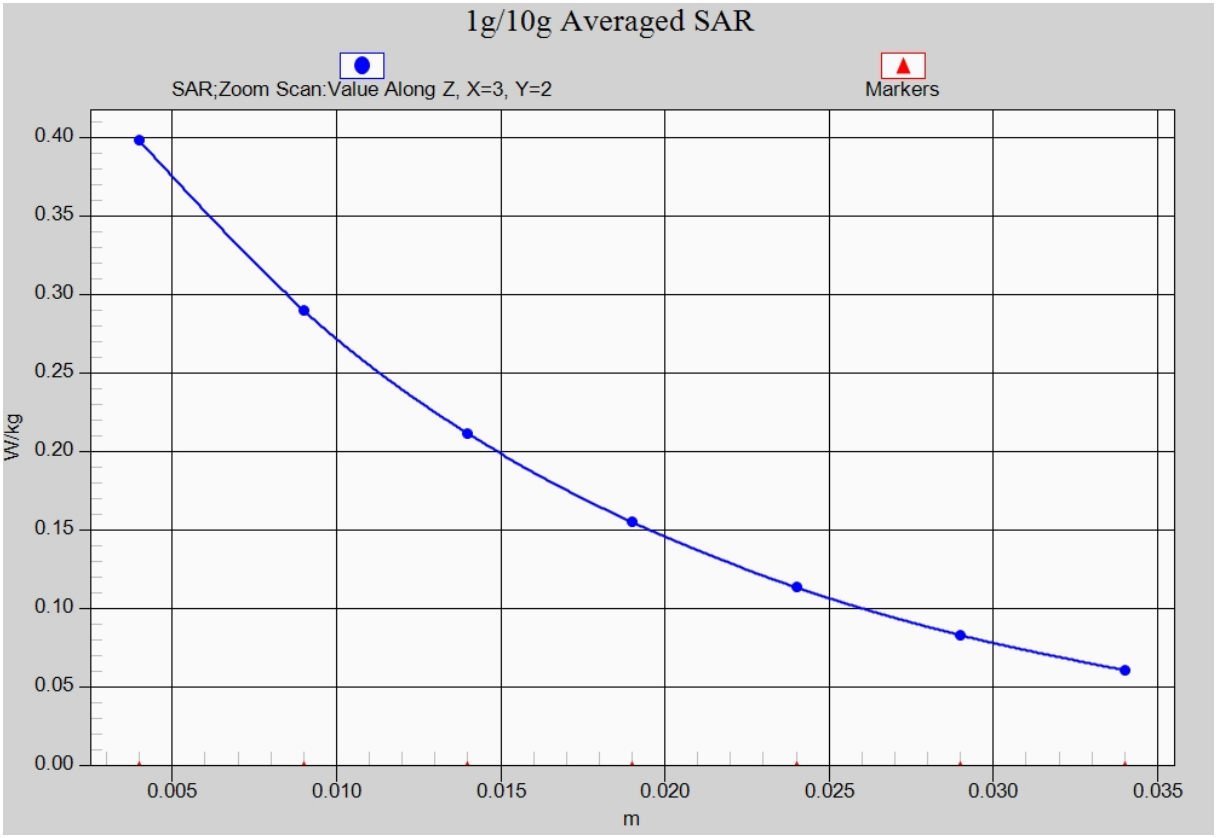


Fig. 7-1 Z-Scan at power reference point (LTE Band26)

LTE Band41 Body Right with QPSK_20M_1RB_Low

Date: 2015-4-20
Electronics: DAE4 Sn777
Medium: Body 2600 MHz
Medium parameters used (interpolated): f = 2593 MHz; σ = 2.027 mho/m; εr = 50.705; ρ = 1000 kg/m^3
Ambient Temperature: 22.6°C Liquid Temperature: 22.1°C
Communication System: LTE Band41 Frequency: 2593 MHz Duty Cycle: 1:1.58
Probe: EX3DV4 - SN3846 ConvF(6.68, 6.68, 6.68)

Right/Area Scan (111x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.399 W/kg

Right/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.42 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.590 W/kg
SAR(1 g) = 0.297 W/kg; SAR(10 g) = 0.143 W/kg
Maximum value of SAR (measured) = 0.336 W/kg

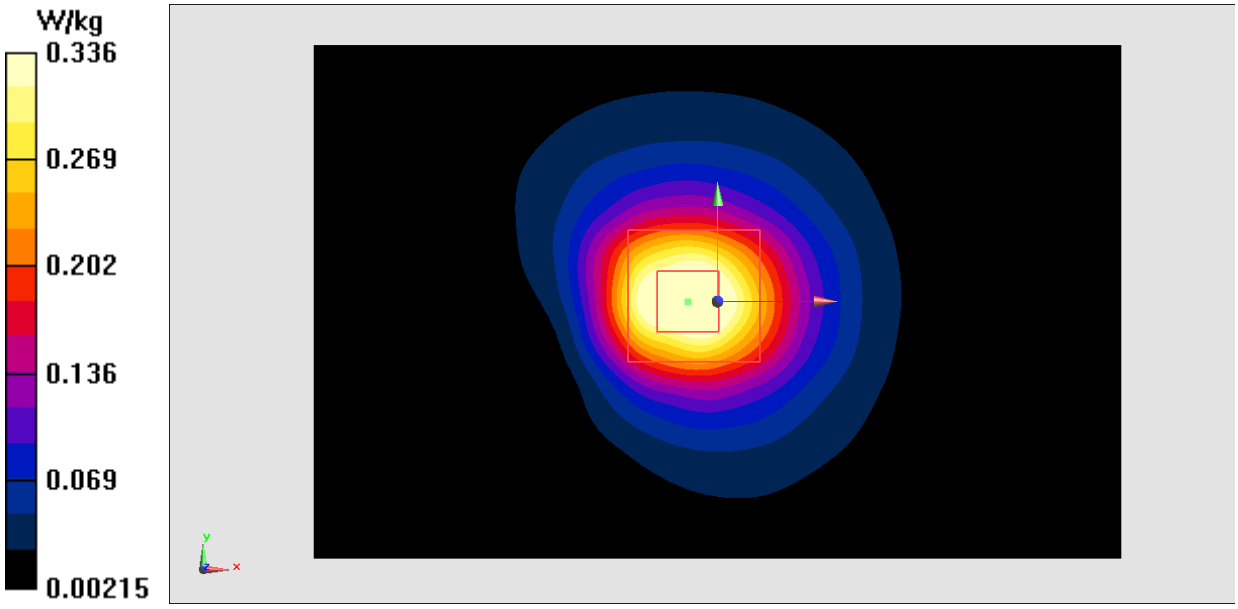


Fig.8 LTE Band41

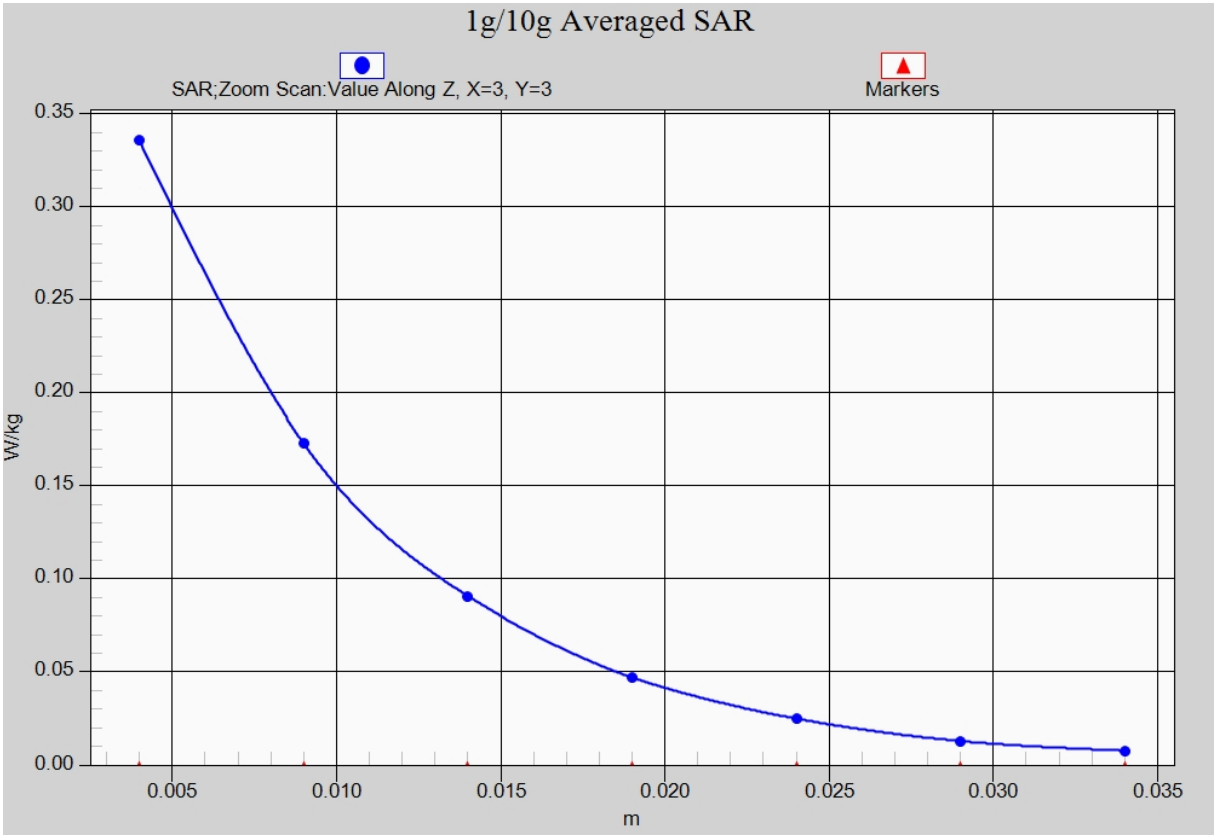


Fig. 8-1 Z-Scan at power reference point (LTE Band41)

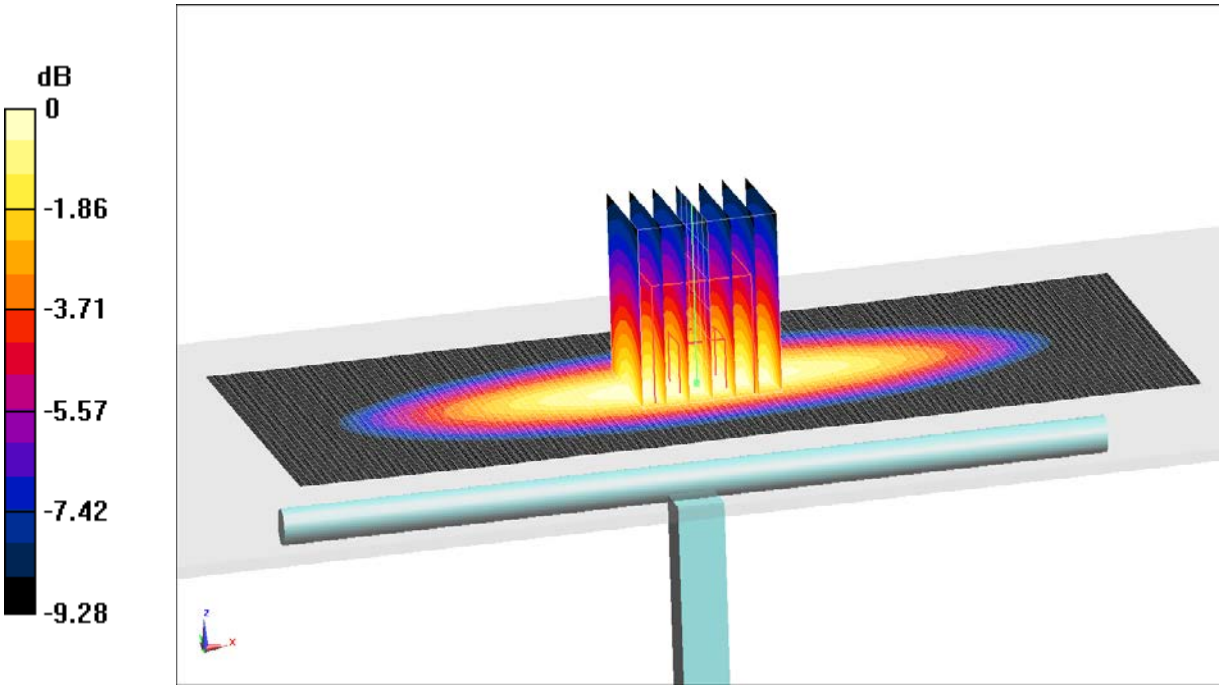
ANNEX B System Verification Results

750MHz

Date: 2015-4-19
Electronics: DAE4 Sn777
Medium: Body750 MHz
Medium parameters used: f = 750 MHz; σ = 0.934 mho/m; ε_r = 57.36; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C Liquid Temperature: 22.0°C
Communication System: CW Frequency: 750 MHz Duty Cycle: 1:1
Probe: EX3DV4 - SN3846 ConvF(9.18, 9.18, 9.18)

System Validation/Area Scan (81x191x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 51.903 V/m; Power Drift = -0.09 dB
Fast SAR: SAR(1 g) = 2.25 W/kg; SAR(10 g) = 1.49 W/kg
Maximum value of SAR (interpolated) = 2.39 W/kg

System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 51.903 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 3.12 W/kg
SAR(1 g) = 2.22 W/kg; SAR(10 g) = 1.47 W/kg
Maximum value of SAR (measured) = 2.37 W/kg



0 dB = 2.37 W/kg = 3.75 dB W/kg

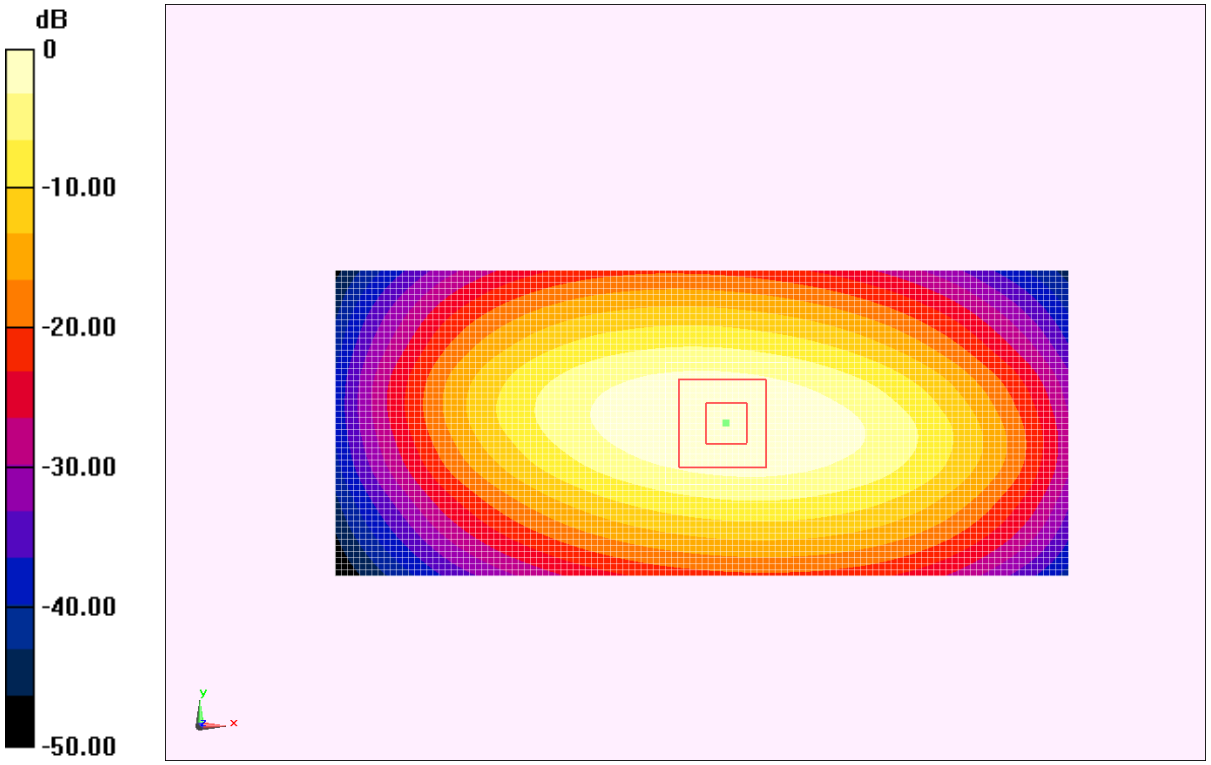
Fig.B.1 validation 750MHz 250mW

835MHz

Date: 2015-4-19
Electronics: DAE4 Sn777
Medium: Body 850 MHz
Medium parameters used: f = 835 MHz; σ = 0.971 S/m; ε_r = 56.71; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C Liquid Temperature: 22.0°C
Communication System: CW Frequency: 835 MHz Duty Cycle: 1:1
Probe: EX3DV4 - SN3846 ConvF(9.09, 9.09, 9.09)

System Validation /Area Scan (81x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 52.619 V/m; Power Drift = 0.04 dB
Fast SAR: SAR(1 g) = 2.30 W/kg; SAR(10 g) = 1.52 W/kg
Maximum value of SAR (interpolated) = 2.50 W/kg

System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.619 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 3.50 W/kg
SAR(1 g) = 2.32 W/kg; SAR(10 g) = 1.53 W/kg
Maximum value of SAR (measured) = 2.52 W/kg



0 dB = 2.52 W/kg = 4.01 dBW/kg

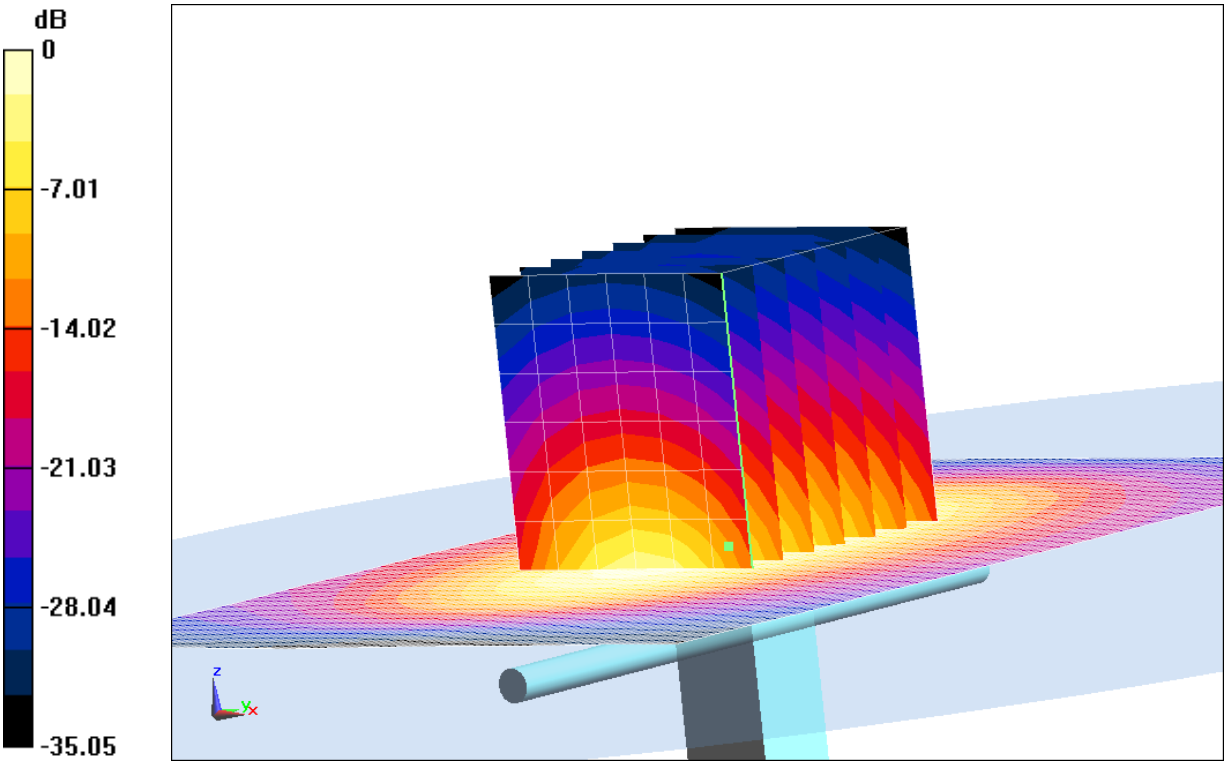
Fig.B.2 validation 835MHz 250mW

1750MHz

Date: 2015-4-20
Electronics: DAE4 Sn777
Medium: Body 1750 MHz
Medium parameters used: f=1750 MHz; σ = 1.55 mho/m; εr = 53.43; ρ = 1000 kg/m^3
Ambient Temperature: 22.6°C Liquid Temperature: 22.1°C
Communication System: CW Frequency: 1750 MHz Duty Cycle: 1:1
Probe: EX3DV4 - SN3846 ConvF(7.43, 7.43, 7.43)

System Validation/Area Scan (81x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 94.746 V/m; Power Drift = -0.09 dB
Fast SAR: SAR(1 g) = 9.40 W/kg; SAR(10 g) = 5.07 W/kg
Maximum value of SAR (interpolated) = 10.2 W/kg

System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.746 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 16.27 W/kg
SAR(1 g) = 9.29 W/kg; SAR(10 g) = 4.89 W/kg
Maximum value of SAR (measured) = 10.1 W/kg



0 dB = 10.1 W/kg = 10.04 dB W/kg

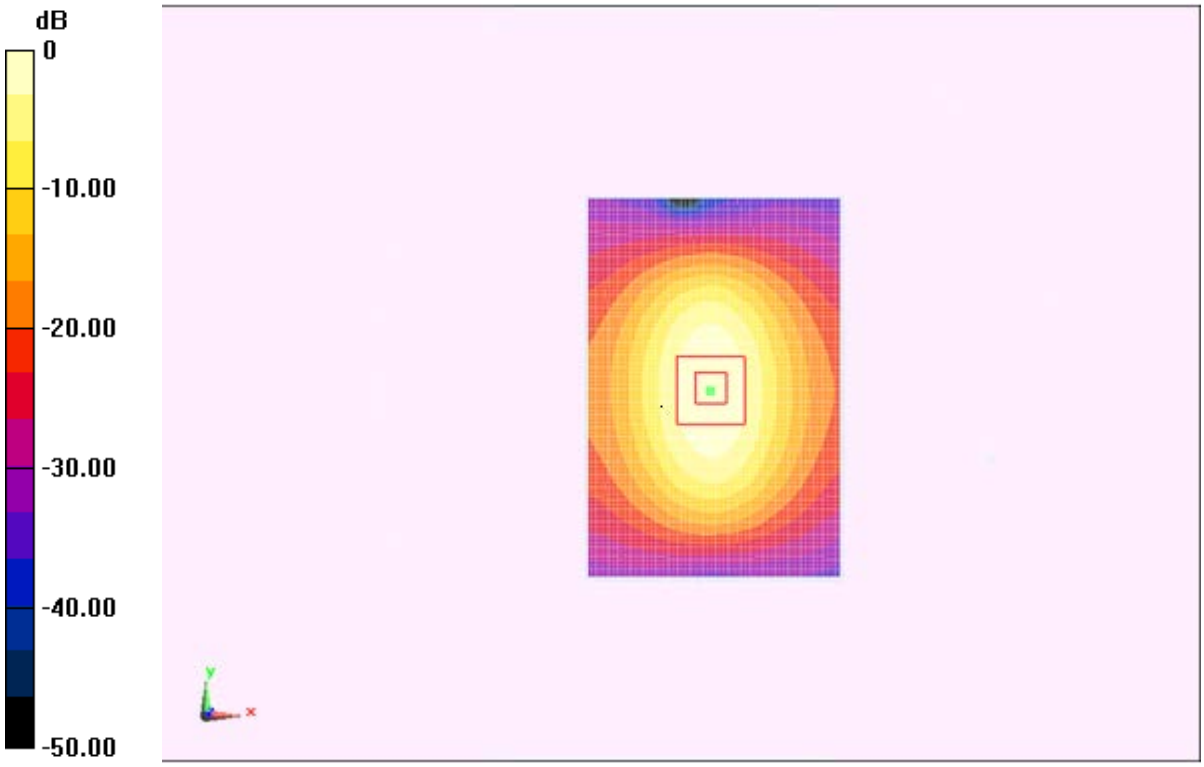
Fig.B.3 validation 1750MHz 250mW

1900MHz

Date: 2015-4-20
Electronics: DAE4 Sn777
Medium: Body 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.496 S/m; ε_r = 52.1; ρ = 1000 kg/m^3
Ambient Temperature: 22.6°C Liquid Temperature: 22.1°C
Communication System: CW Frequency: 1900 MHz Duty Cycle: 1:1
Probe: EX3DV4 - SN3846 ConvF(7.15, 7.15, 7.15)

System validation /Area Scan (81x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 62.254 V/m; Power Drift = 0.04 dB
Fast SAR: SAR(1 g) = 10.4 W/kg; SAR(10 g) = 5.57 W/kg
Maximum value of SAR (interpolated) = 13.3 W/kg

System validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 62.254 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 19.4 W/kg
SAR(1 g) = 10.3 W/kg; SAR(10 g) = 5.48 W/kg
Maximum value of SAR (measured) = 12.3 W/kg



0 dB = 12.3 W/kg = 10.90 dBW/kg

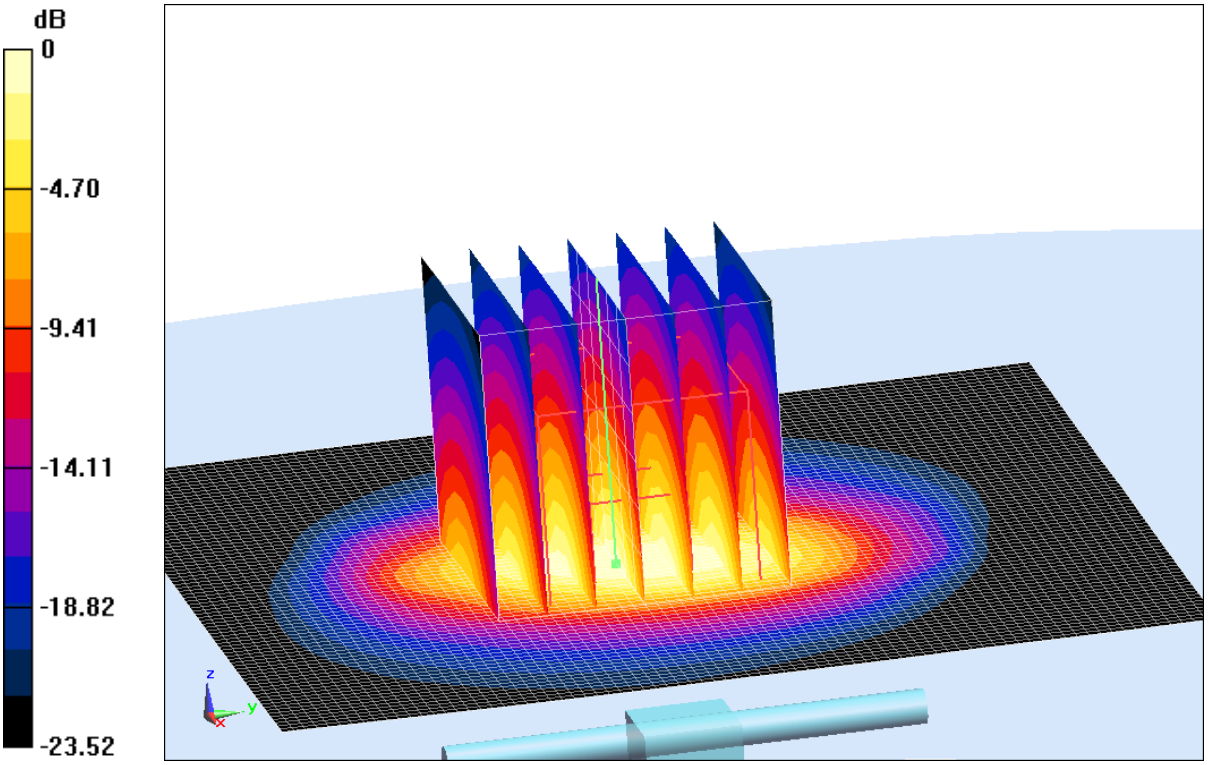
Fig.B.4 validation 1900MHz 250mW

2600MHz

Date: 2015-4-20
Electronics: DAE4 Sn777
Medium: Body 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.024 mho/m; ε_r = 50.7; ρ = 1000 kg/m^3
Ambient Temperature: 22.6°C Liquid Temperature: 22.1°C
Communication System: CW Frequency: 2600 MHz Duty Cycle: 1:1
Probe: EX3DV4 - SN3846 ConvF(6.68, 6.68, 6.68)

System Validation /Area Scan (81x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 83.84 V/m; Power Drift = 0.07 dB
Fast SAR: SAR(1 g) = 14.6 W/kg; SAR(10 g) = 6.59 W/kg
Maximum value of SAR (interpolated) = 22.5 W/kg

System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 83.84 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 31.22 W/kg
SAR(1 g) = 14.4 W/kg; SAR(10 g) = 6.45 W/kg
Maximum value of SAR (measured) = 22.3 W/kg



0 dB = 22.3 W/kg = 13.48 dB W/kg

Fig.B.5 validation 2600MHz 250mW

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.

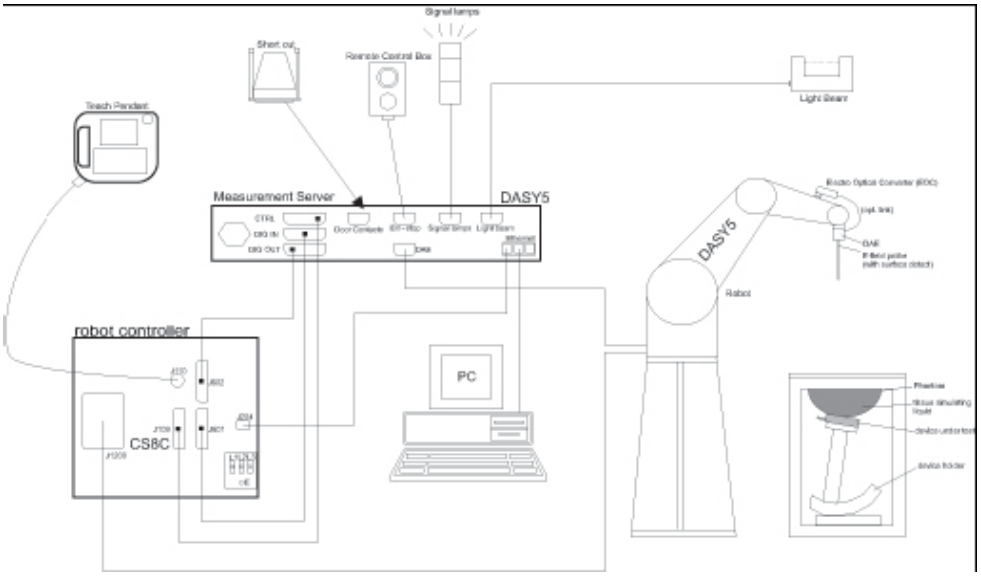
Table B.1 Comparison between area scan and zoom scan for system verification

Band	Position	Area scan (1g)	Zoom scan (1g)	Drift (%)
750	Body	2.25	2.22	1.35
835	Body	2.30	2.32	-0.86
1750	Body	9.40	9.29	1.18
1900	Body	10.4	10.3	0.97
2600	Body	14.6	14.4	1.39

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.1 SAR Lab Test Measurement Set-up

- A standard high precision 6-axis robot (Stäubli TX=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 2nd ord 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
Dynamic Range: 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: SAR Dosimetry Testing
Compliance tests of mobile phones
Dosimetry in strong gradient fields

Picture C.2 Near-field Probe

Picture C.3 E-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