FCC

SAR

TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.

FOR

GSM/WCDMA/LTE Android phone

ISSUED TO
Reliance Communications, LLC

555 Wireless Blvd 555 Wireless Blvd. Hauppauge, NY

Report No.:	BL-SZ1640189-703
EUT Type:	GSM/WCDMA/LTE Android phone
Model Name:	RC500L
Brand Name:	Orbic
FCC ID:	2ABGH-RC500L
Test Standard:	FCC 47 CFR Part 2.1093
	ANSI C95.1: 1992
	IEEE 1528: 2013
Maximum SAR:	Head (1 g): 0.462 W/kg
	Body (1 g): 0.606 W/kg
Test Conclusion:	Pass
Test Date:	Apr. 22, 2016 – Apr. 28, 2016
Date of Issue:	Jun. 12, 2016

Tested by: Tu Lang
Tu Lang
(Engineer)
Date Jun. 12, 2016

Approved by: Wei Yanquan
Wei Yanquan
(Chief Engineer)
Date Jun. 12, 2016

CERTIFICATION CONSULTING SERVICE BALUN

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Revision History

Version	Issue Date	Revisions Content
Rev. 01	Jun. 12, 2016	Initial Issue

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1 GENERAL INFORMATION

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co.,Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province,P. R. China
Phone Number	+86 755 6685 0100
Fax Number	+86 755 6182 4271

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co.,Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province,P. R. China
Accreditation Certificate	The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1. The laboratory has been listed by US Federal Communications Commission to perform electromagnetic emission measurements. The recognition numbers of test site are 832625. The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Test Environment Condition

Ambient Temperature	21 to 23℃
Ambient Relative Humidity	35 to 44%
Ambient Pressure	100 to 102KPa

1.4 Announce

(1) The test report reference to the report template version v2.2.

(2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.

(3) The test report is invalid if there is any evidence and/or falsification.

(4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.

(5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.

(6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

2 PRODUCT INFORMATION

2.1 Applicant

Applicant	Reliance Communications, LLC
Address	555 Wireless Blvd 555 Wireless Blvd. Hauppauge, NY

2.2 Manufacturer

Manufacturer	SHENZHEN HAOCHENG GROUP CO.,LTD.
Address	Room 1001-1002,10th Floor, Block B, Terra Building Terra 8th Road, Futian District, ShenZhen, China.

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Type	GSM/WCDMA/LTE Android phone
Model Name Under Test	RC500L
Series Model Name	N/A
Description of Model Name Differentiation	N/A
Hardware Version	HCT-T823MB-A2
Software Version	Orbic-rc500L_v1.0.5
Dimensions (Approx.)	142×69×6mm
Weight (Approx.)	132 g
Network and Wireless connectivity	2G Network GSM 850/ 1900, GPRS, EGPRS; 3G Network WCDMA Band 2/4/5, HSDPA, HSUPA; 4G Network FDD LTE Band 2/ 4/ 5/12/17; 2.4G WLAN, Bluetooth, GPS

2.5 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	N/A
	Model No.	Orbic-RC500L
	Serial No.	N/A
	Capacitance	2100 mAh
	Rated Voltage	3.8 V
	Extreme Voltage	4.35 V

2.6 Technical Information

The requirement for the following technical information of the EUT was tested in this report:

Operating Mode Note 1	GSM, WCDMA, FDD-LTE		
Frequency Range	GSM 850	TX: 824 MHz ~ 849 MHz	RX: 869 MHz ~ 894 MHz
	GSM 1900	TX: 1850 MHz ~ 1910 MHz	RX: 1930 MHz ~ 1990 MHz
	WCDMA Band 2	TX: 1850 MHz ~ 1910 MHz	RX: 1930 MHz ~ 1990 MHz
	WCDMA Band 4	TX: 1710 MHz ~ 1755 MHz	RX: 2110 MHz ~ 2155 MHz
	WCDMA Band 5	TX: 824 MHz ~ 849 MHz	RX: 869 MHz ~ 894 MHz
	LTE Band 2	TX: 1850 MHz ~ 1910 MHz	RX: 1930 MHz ~ 1990 MHz
	LTE Band 4	TX: 1710 MHz ~ 1755 MHz	RX: 2110 MHz ~ 2155 MHz
	LTE Band 5	TX: 824 MHz ~ 849 MHz	RX: 869 MHz ~ 894 MHz
Antenna Type	PIFA Antenna		
DTM	Not Support		
Hotspot Function	Support		
Power Reduction	Not Support		
Exposure Category	General Population/Uncontrolled exposure		
EUT Stage	Portable Device		
Product	Type		
	☒ Production unit	☐ Identical prototype	

Note 1:
The EUT supports 2G Network GSM 850/ 1900, GPRS, EGPRS, 3G Network WCDMA Band 2/4/5, HSDPA, HSUPA, 4G Network FDD LTE Band 2/ 4/ 5/12/17, 2.4G WLAN and Bluetooth. Only 2G Network GSM 850/ 1900, GPRS, EGPRS, 3G Network WCDMA Band 2/4/5, HSDPA, HSUPA, and 4G LTE BAND 2/4/5 were conducted for RF exposure test or evaluate in this report, which used the DASY SAR system, and all other wireless functions were conducted for RF exposure test or evaluate in test report, BL-SZ1640189-704, which used the SATIMO SAR system.

3 SUMMARY OF TEST RESULT

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	ANSI/IEEE Std. C95.1-1992	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz
3	IEEE Std. 1528-2013	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
4	FCC KDB 447498 D01 v06	Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies
5	FCC KDB 941225 D01 v03r01	3G SAR MEAUREMENT PROCEDURES
6	FCC KDB 941225 D05 v02r04	SAR Evaluation Considerations for LTE Devices
7	FCC KDB 941225 D06 v02r01	SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities
8	FCC KDB 865664 D01 v01r04	SAR Measurement 100 MHz to 6 GHz
9	FCC KDB 865664 D02 v01r02	RF Exposure Reporting
10	FCC KDB 648474 D04 v01r03	SAR Evaluation Considerations for Wireless Handsets
11	FCC KDB248227 D01 v02r02	SAR Guidance for IEEE 802.11 (Wi-Fi) Transmitters

3.2 Device Category and SAR Limit

This device belongs to portable device category because its radiating structure is allowed to be used within 20 centimeters of the body of the user.

Limit for General Population/Uncontrolled exposure should be applied for this device, it is 1.6 W/kg as averaged over any 1 gram of tissue.

Table of Exposure Limits:

Body Position	SAR Value (W/Kg)	
	General Population/ Uncontrolled Exposure	Occupational/ ControlledExposure
Whole-Body SAR (averaged over the entire body)	0.08	0.4
Partial-Body SAR (averaged over any 1 gram of tissue)	1.60	8.0
SAR for hands, wrists, feet and ankles	4.0	20.0

(averaged over any 10 grams of tissue)		

NOTE:

General Population/Uncontrolled Exposure: Locations where there is the exposure of individuals who have no knowledge or control of their exposure. General population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

Occupational/Controlled Exposure: Locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

3.3 Test Result Summary

3.3.1 Highest SAR (1 g Value)

Band	Maximum Scaled SAR (W/kg)			Maximum Report SAR (W/kg)	
	Head	Body		Head	Body
		Body-worn	Hotspot		
GSM 850	0.167	0.133	0.387	0.462	0.660
GSM 1900	0.259	0.322	0.530		
WCDMA Band 2	**0.462**	0.582	0.582		
WCDMA Band 4	0.188	0.427	0.427		
WCDMA Band 5	0.132	0.189	0.276		
LTE Band 2	0.419	**0.606**	**0.606**		
LTE Band 4	0.177	0.323	0.323		
LTE Band 5	0.145	0.159	0.227		
Limit (W/kg)	1.60				
Verdict	Pass				

3.3.2 Highest Simultaneous SAR

Please refer to the “BL-SZ1640189-704”report.

3.4 Test Uncertainty

According to KDB 865664 D01, When the highest measured 1 g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis is not required in SAR reports submitted for equipment approval.

The maximum 1 g SAR for the EUT in this report is 0.606 W/kg, which is lower than 1.5 W/kg, so the the extensive SAR measurement uncertainty analysis is not required in this report.

4 MEASUREMENT SYSTEM

4.1 Specific Absorption Rate (SAR) Definition

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.

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:

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

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

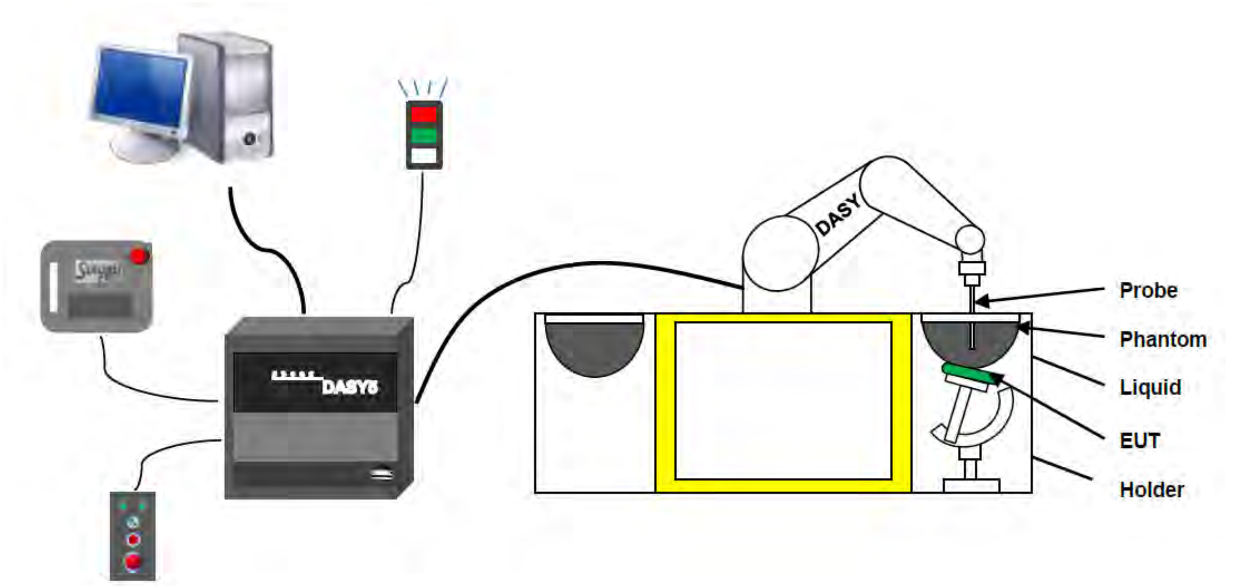
$$\mathrm{SAR} = \frac{\sigma \mathrm{E}^2}{\rho}$$

Where: σ is the conductivity of the tissue,

ρis the mass density of the tissue and E is the RMS electrical field strength.

4.2 DASY SAR System

4.2.1 DASY SAR System Diagram



The DASY5 system for performing compliance tests consists of the following items:

1. A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).
2. A dosimetric probe, i.e. an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
3. A data acquisition electronic (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.
4. A unit to operate the optical surface detector which is connected to the EOC.
5. The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY5 measurement server.
6. The DASY5 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation.
7. DASY5 software and SEMCAD data evaluation software.
8. Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
9. The generic twin phantom enabling the testing of left-hand and right-hand usage.
10. The device holder for handheld mobile phones.
11. Tissue simulating liquid mixed according to the given recipes.
12. System validation dipoles allowing to validate the proper functioning of the system.

4.2.2 Robot

The Dasy SAR system uses the high precision robots. Symmetrical design with triangular core Built-in optical fiber for surface detection system For the 6-axis controller system, Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents). The robot series have many features that are important for our application:

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

4.2.3 E-Field Probe

The probe is specially designed and calibrated for use in liquids with high permittivities for the measurements the Specific Dosimetric E-Field Probe EX3DV4-SN:7340 with following specifications is used.

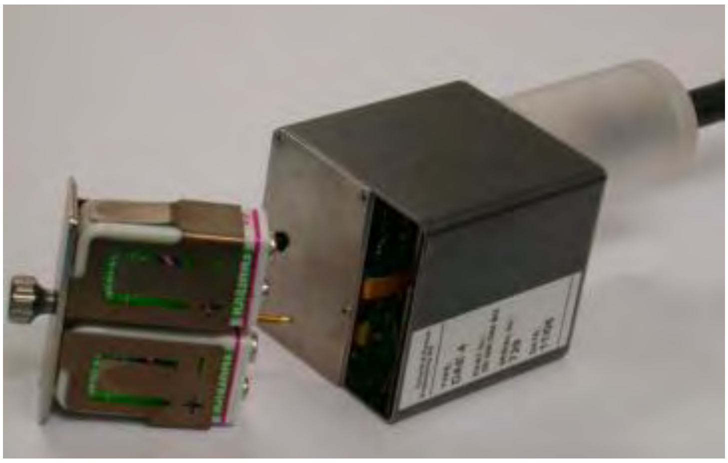
Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection systemBuilt-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., glycolether)
Calibration	ISO/IEC 17025 calibration service available
Frequency	10 MHz to 6 GHz; Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.2 dB in HSL (rotation around probe axis) ; ± 0.4 dB in HSL (rotation normal to probe axis)
Dynamic range	5 μW/g to > 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 337 mm (Tip: 9 mm) Tip diameter: 2.5 mm (Body: 10 mm) Distance from probe tip to dipole centers: 1.0 mm
Application	General dosimetry up to 3 GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms (EX3DV4)

E-Field Probe Calibration Process

Probe calibration is realized, in compliance with CENELEC EN 62209-1/-2 and IEEE 1528 std, with CALISAR, Antennessa proprietary calibration system. The calibration is performed with the EN 62209-1/2 annexe technique using reference guide at the five frequencies.

4.2.4 Data Acquisition Electronics

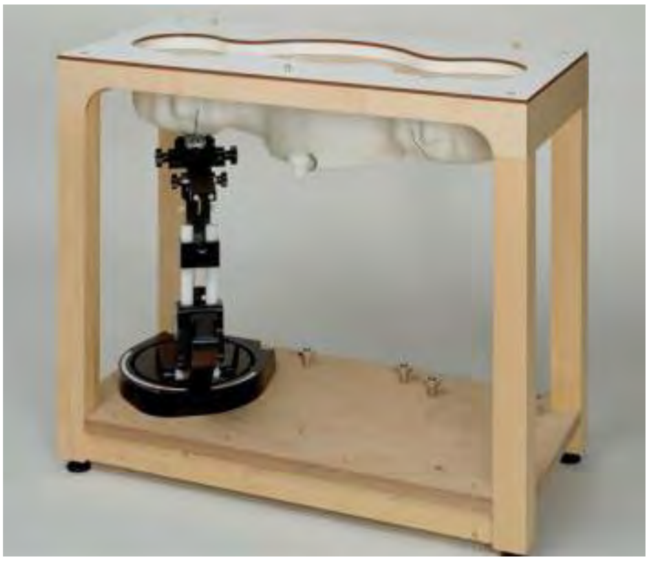
The data acquisition electronics (DAE) consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converte and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock.



- Input Impedance: 200MOhm
- The Inputs: Symmetrical and Floating
- Commom Mode Rejection: Above 80dB

4.2.5 Phantoms

For the measurements the Specific Anthropomorphic Mannequin (SAM) defined by the IEEE SCC-34/SC2 group is used. The phantom is a polyurethane shell integrated in a wooden table. The thickness of the phantom amounts to 2mm +/- 0.2mm. It enables the dosimetric evaluation of left and right phone usage and includes an additional flat phantom part for the simplified performance check. The phantom set-up includes a cover, which prevents the evaporation of the liquid.



- Left hand
- Right hand
- Flat phantom

Photo of Phantom SN1857

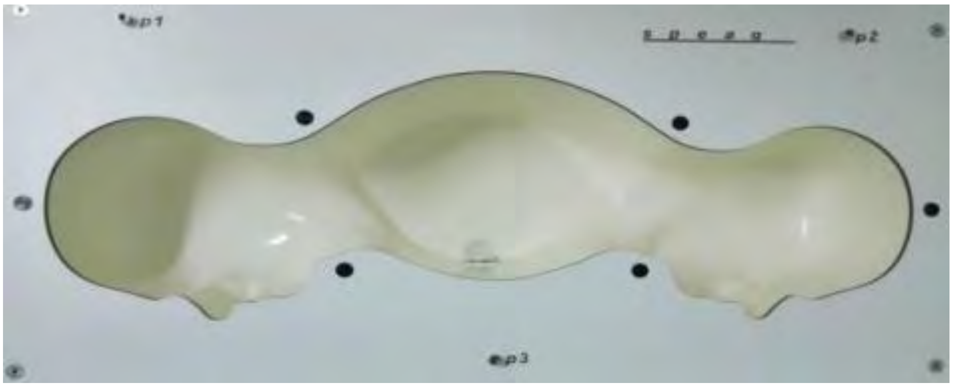
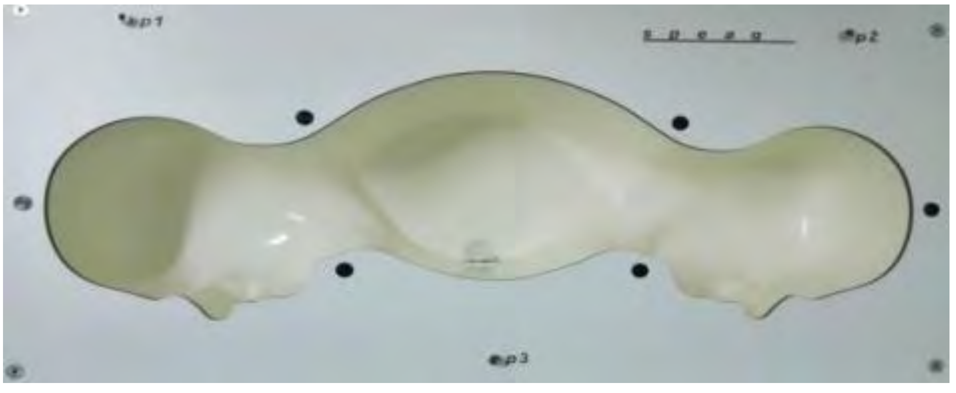


Photo of Phantom SN1859



Serial Number	Material	Length	Height
SN 1857 SAM1	Vinylester, glass fiber reinforced	1000	500
SN 1859 SAM2	Vinylester, glass fiber reinforced	1000	500

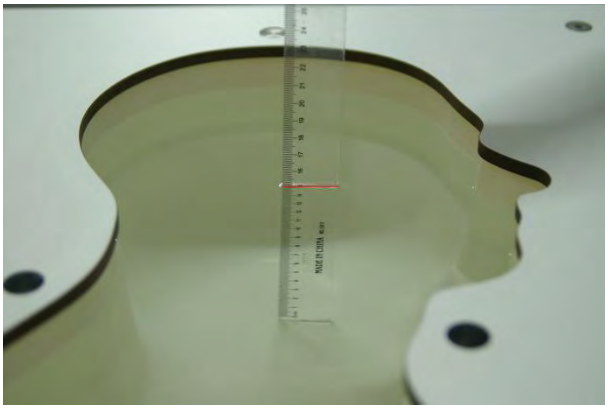
4.2.6 Device Holder

The DASY5 device holder has two scales for device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of 65°. The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. This device holder is used for standard mobile phones or PDA‟s only. If necessary an additional support of polystyrene material is used. Larger DUT‟s (e.g. notebooks) cannot be tested using this device holder. Instead a support of bigger polystyrene cubes and thin polystyrene plates is used to position the DUT in all relevant positions to find and measure spots with maximum SAR values. Therefore those devices are normally only tested at the flat part of the SAM.

The positioning system allows obtaining cheek and tilting position with a very good accuracy. Incompliance with CENELEC, the tilt angle uncertainty is lower than 1°.

4.2.7 Simulating Liquid

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid to a depth of at least 15 cm. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5%.

Head Liquid Depth	Body Liquid Depth
	

The following table gives the recipes for tissue simulating liquid and the theoretical Conductivity/Permittivity.

Head (Reference IEEE1528)								
Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity σ (S/m)	Permittivity ε
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
900	40.3	57.9	0.2	1.4	0.2	0	0.97	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.4	40.0
2450	55.0	0	0	0.1	0	44.9	1.80	39.2
2600	54.9	0	0	0.1	0	45.0	1.96	39.0
Frequency (MHz)	Water (%)	Hexyl Carbitol (%)			Triton X-100 (%)		Conductivity σ (S/m)	Permittivity ε
5200	62.52	17.24			17.24		4.66	36.0
5800	62.52	17.24			17.24		5.27	35.3
Body (From instrument manufacturer)								
Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity σ (S/m)	Permittivity ε
750	51.7	47.2	0	0.9	0.1	0	0.96	55.5
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
900	50.8	48.2	0	0.9	0.1	0	1.05	55.0
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0.1	0	31.3	1.95	52.7
2600	68.2	0	0	0.1	0	31.7	2.16	52.5
Frequency(MHz)	Water	DGBE (%)			Salt (%)		Conductivity σ (S/m)	Permittivity ε
5200	78.60	21.40			/		5.54	47.86
5800	78.50	21.40			0.1		6.0	48.20

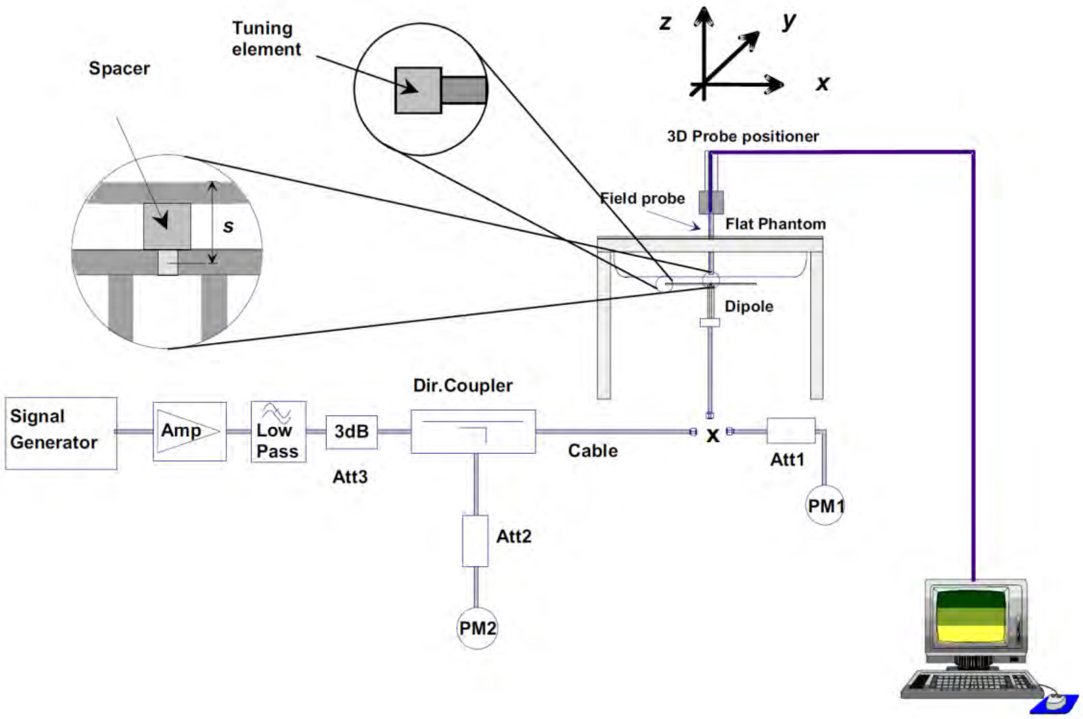
5 SYSTEM VERIFICATION

5.1 Purpose of System Check

The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system performance check uses normal SAR measurements in a simplified setup with a well characterized source.This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

5.2 System Check Setup

In the simplified setup for system evaluation, the EUT 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:



6 TEST POSITION CONFIGURATIONS

According to KDB 648474 D04 Handset v01r02, handsets are tested for SAR compliance in head, body-worn accessory and other use configurations described in the following subsections.

6.1 Head Exposure Conditions

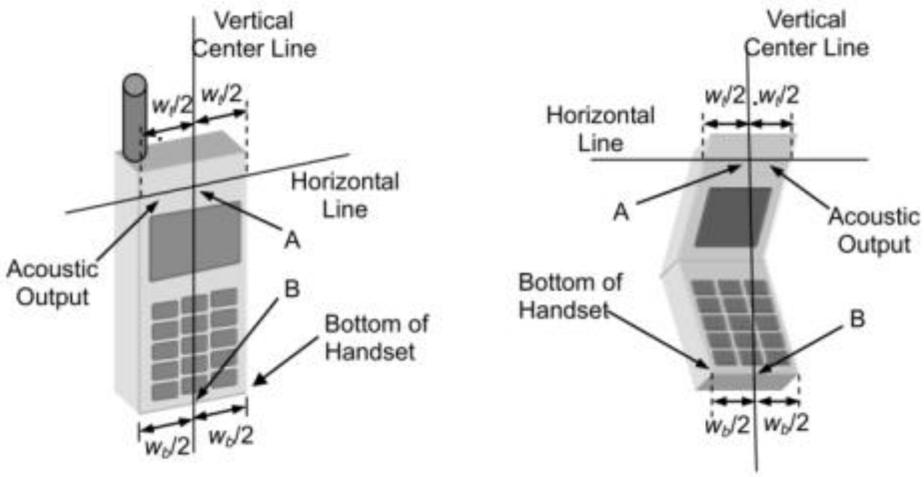
Head exposure is limited to next to the ear voice mode operations. Head SAR compliance is tested according to the test positions defined in IEEE Std 1528-2013 using the SAM phantom illustrated as below.

6.1.1 Two Imaginary Lines on the Handset

(a) The vertical center line passes through two points on the front side of the handset - the midpoint of the width w t of the handset at the level of the acoustic output, and the midpoint of the width w b of the bottom of the handset.

(b) The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output. The horizontal line is also tangential to the face of the handset at point A.

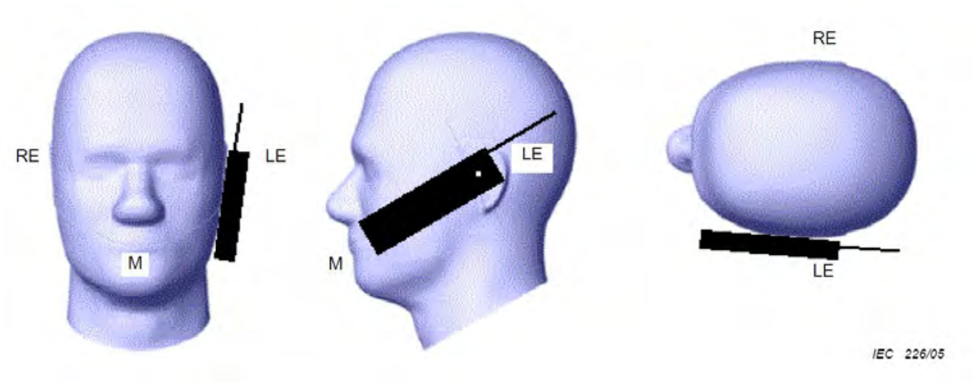
(c) The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical center line is not necessarily parallel to the front face of the handset, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.



6.1.2 Cheek Position

(a) To position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the three ear and mouth reference point (M: Mouth, RE: Right Ear, and LE: Left Ear) and align the center of the ear piece with the line RE-LE.

(b) To move the device towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost.



6.1.3 Tilted Position

(a) To position the device in the “cheek” position described above.

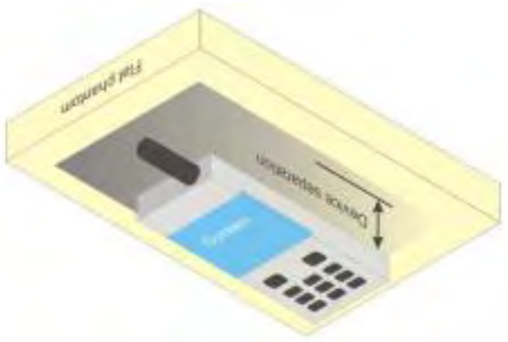
(b) While maintaining the device the reference plane described above and pivoting against the ear, moves it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost.

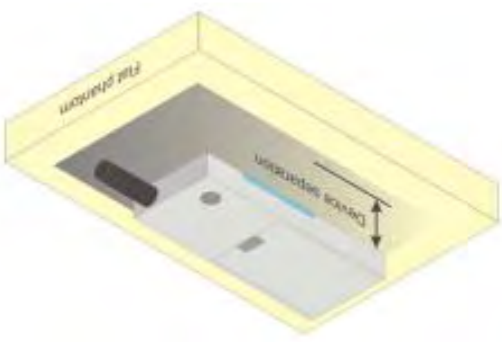
6.2 Body-worn Position Conditions

Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in EN 62209-2 are used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode. When the reported SAR for a body-worn accessory.

Body-worn accessories that do not contain metallic or conductive components may be tested according to worst-case exposure configurations, typically according to the smallest test separation distance required for the group of body-worn accessories with similar operating and exposure characteristics. All body-worn accessories containing metallic components are tested in conjunction with the host device.

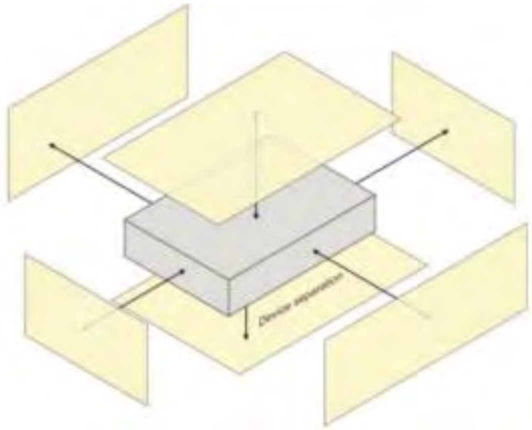
Body-worn accessory SAR compliance is based on a single minimum test separation distance for all wireless and operating modes applicable to each body-worn accessory used by the host, and according to the relevant voice and/or data mode transmissions and operations. If a body-worn accessory supports voice only operations in its normal and expected use conditions, testing of data mode for body-worn compliance is not required. A conservative minimum test separation distance for supporting off-the-shelf body-worn accessories that may be acquired by users of consumer handsets is used to test for body-worn accessory SAR compliance. This distance is determined by the handset manufacturer, according to the requirements of Supplement C 01-01. Devices that are designed to operate on the body of users using lanyards and straps, or without requiring additional body-worn accessories, will be tested using a conservative minimum test separation distance <= 5 mm to support compliance.





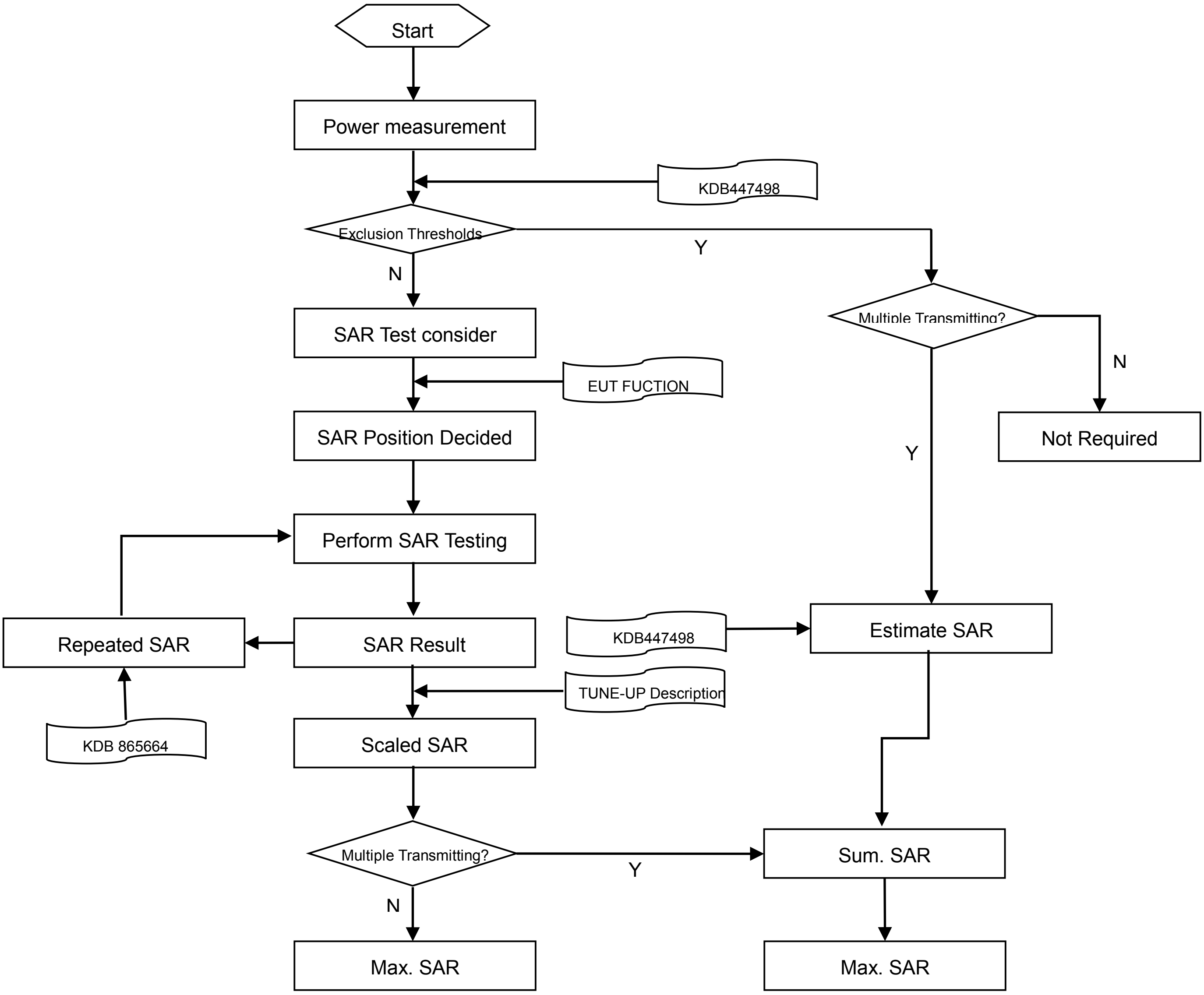
6.3 Hotspot Mode Exposure Position Conditions

For handsets that support hotspot mode operations, with wireless router capabilities and various web browsing functions, the relevant hand and body exposure conditions are tested according to the hotspot SAR procedures in KDB 941225. A test separation distance of 10 mm is required between the phantom and all surfaces and edges with a transmitting antenna located within 25 mm from that surface or edge. When the form factor of a handset is smaller than 9 cm x 5 cm, a test separation distance of 5 mm (instead of 10 mm) is required for testing hotspot mode. When the separation distance required for body-worn accessory testing is larger than or equal to that tested for hotspot mode, in the same wireless mode and for the same surface of the phone, the hotspot mode SAR data may be used to support body-worn accessory SAR compliance for that particular configuration (surface).



7 MEASUREMENT PROCEDURE

7.1 Measurement Process Diagram



7.2 SAR Scan General Requirement

Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Boththe probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe 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 1528-2013.

<table>
<tr><th colspan="3"></th><th>≤3GHz</th><th>>3GHz</th></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="7">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2" rowspan="3">uniform grid: Δz Zoom (n)</td><td rowspan="3">≤ 5 mm</td><td>3–4 GHz: ≤ 4 mm</td></tr>
<tr><td>4–5 GHz: ≤ 3 mm</td></tr>
<tr><td>5–6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="4">graded grid</td><td rowspan="3">Δz Zoom (1): between 1st two points closest to phantom surface</td><td rowspan="3">≤ 4 mm</td><td>3–4 GHz: ≤ 3 mm</td></tr>
<tr><td>4–5 GHz: ≤ 2.5 mm</td></tr>
<tr><td>5–6 GHz: ≤ 2 mm</td></tr>
<tr><td>Δz Zoom (n>1): between subsequent points</td><td colspan="2">≤ 1.5·Δz Zoom (n-1)</td></tr>
<tr><td rowspan="3">Minimum zoom scan volume</td><td colspan="2" rowspan="3">x, y, z</td><td rowspan="3">≥30 mm</td><td>3–4 GHz: ≥ 28 mm</td></tr>
<tr><td>4–5 GHz: ≥ 25 mm</td></tr>
<tr><td>5–6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">Note:
1. δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
2. * When zoom scan is required and the reported 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 3GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

7.3 Measurement Procedure

The following steps are used for each test position

a. Establish a call with the maximum output power with a base station simulator. The connection between the mobile and the base station simulator is established via air interface
b. Measurement of the local E-field value at a fixed location. This value serves as a reference value for calculating a possible power drift.
c. Measurement of the SAR distribution with a grid of 8 to 16mm * 8 to16 mm and a constant distance to the inner surface of the phantom. Since the sensors cannot directly measure at the inner phantom surface, the values between the sensors and the inner phantom surface are extrapolated. With these values the area of the maximum SAR is calculated by an interpolation scheme.
d. Around this point, a cube of 30 * 30 * 30 mm or 32 * 32 *32 mm is assessed by measuring 5 or 8 * 5 or 8*4 or 5 mm. With these data, the peak spatial-average SAR value can be calculated.

7.4 Area & Zoom Scan Procedure

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g. Area scan and zoom scan resolution setting follows KDB 865664 D01v01r04 quoted below.
When the 1 g SAR of the highest peak is within 2 dB of the SAR limit, additional zoom scans are required for other peaks within 2 dB of the highest peak that have not been included in any zoom scan to ensure there is no increase in SAR.

8 CONDUCTED RF OUPUT POWER

8.1 GSM

GSM 850 Band	Burst Average Power(dBm)			Frame-averaged power(dBm)		
Channel	128	190	251	128	190	251
GSM (GMSK, 1-Slot)	32.49	32.54	32.58	23.46	23.51	**23.55**
GPRS (GMSK, 1-Slot)	32.46	32.57	32.54	23.43	23.54	23.51
GPRS (GMSK, 2-Slots)	31.82	31.88	31.90	25.80	25.86	25.88
GPRS (GMSK, 3-Slots)	30.21	30.25	30.28	25.96	26.00	26.03
GPRS (GMSK, 4-Slots)	29.19	29.21	29.25	26.18	26.20	**26.24**
EGPRS (8PSK, 1-Slot)	32.45	32.56	32.54	23.42	23.53	23.51
EGPRS (8PSK, 2-Slots)	31.82	31.87	31.89	25.80	25.85	25.87
EGPRS (8PSK, 3-Slots)	30.20	30.24	30.27	25.95	25.99	26.02
EGPRS (8PSK, 4-Slots)	29.19	29.21	29.24	26.18	26.20	26.23
GSM 1900 Band	Burst Average Power(dBm)			Frame-averaged power(dBm)		
Channel	512	661	810	512	661	810
GSM (GMSK, 1-Slot)	29.79	29.64	29.52	**20.76**	20.61	20.49
GPRS (GMSK, 1-Slot)	29.78	29.61	29.54	20.75	20.58	20.51
GPRS (GMSK, 2-Slots)	29.07	28.94	28.87	23.05	22.92	22.85
GPRS (GMSK, 3-Slots)	27.32	27.30	27.27	23.07	23.05	23.02
GPRS (GMSK, 4-Slots)	26.26	26.21	26.20	**23.25**	23.20	23.19
EGPRS (8PSK, 1-Slot)	29.78	29.60	29.53	20.75	20.58	20.51
EGPRS (8PSK, 2-Slots)	29.06	28.93	28.87	23.05	22.92	22.85
EGPRS (8PSK, 3-Slots)	27.32	27.30	27.26	23.07	23.05	23.02
EGPRS (8PSK, 4-Slots)	26.26	26.21	26.19	23.25	23.20	23.19

Note:

1. SAR testing was performed on the maximum frame-Peaked power mode.
2. The frame-averaged power is linearly proportion to the slot number configured and it is linearly scaled the maximum burst-averaged power based on time slots. The calculated method is shown as below:

   Frame-averaged power = Burst averaged power (1 Tx Slot) – 9.03 dB

   Frame-averaged power = Burst averaged power (2 Tx Slots) – 6.02 dB

   Frame-averaged power = Burst averaged power (3 Tx Slots) - 4.25 dB

   Frame-averaged power = Burst averaged power (4 Tx Slots) – 3.01 dB

8.2 WCDMA

WCDMA Band	Band 2			Band 4		
Channel	9263	9400	9537	1662	1413	1513
RMC 12.2Kbps	23.36	**23.45**	23.34	22.96	**23.12**	22.91
HSDPA Subtest-1	22.18	22.18	22.06	21.89	22.08	21.88
HSDPA Subtest-2	22.22	22.17	22.07	21.86	22.10	21.93
HSDPA Subtest-3	22.20	22.18	22.07	21.88	22.05	21.87
HSDPA Subtest-4	22.19	22.21	22.09	21.86	22.11	21.98
HSUPA Subtest-1	20.21	20.16	20.01	20.09	20.03	19.97
HSUPA Subtest-2	20.28	20.16	20.05	20.11	20.09	20.05
HSUPA Subtest-3	21.19	21.30	21.04	21.09	21.18	21.07
HSUPA Subtest-4	19.63	19.79	19.57	19.47	19.58	19.43
HSUPA Subtest-5	22.13	22.23	22.04	21.81	20.03	21.91

Band	Band 5		
Channel	4133	4175	4232
RMC 12.2Kbps	**23.51**	23.32	23.45
HSDPA Subtest-1	22.46	22.39	22.62
HSDPA Subtest-2	22.47	22.35	22.60
HSDPA Subtest-3	22.50	22.36	22.61
HSDPA Subtest-4	22.48	22.48	22.61
HSUPA Subtest-1	20.44	20.44	20.58
HSUPA Subtest-2	20.46	20.42	20.61
HSUPA Subtest-3	21.41	21.35	21.57
HSUPA Subtest-4	20.03	19.91	20.11
HSUPA Subtest-5	22.53	22.35	22.62

8.3 LTE

FDD LTE Band 2							
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	18700	18900	19100	18700	18900	19100
20MHz	1 (RB_Pos:0)	21.98	22.30	**22.47**	21.23	21.59	21.72
	1 (RB_Pos:50)	21.90	22.22	22.43	21.21	21.42	21.68
	1 (RB_Pos:99)	21.89	22.13	22.39	21.26	21.38	21.63
	50 (RB_Pos:0)	21.05	21.30	21.55	20.08	20.38	20.61
	50 (RB_Pos:25)	21.01	21.26	21.51	20.03	20.32	20.58
	50 (RB_Pos:50)	20.98	21.23	21.47	20.02	20.29	20.54
	100 (RB_Pos:0)	21.01	21.24	21.52	20.03	20.33	20.54
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	18675	18900	19125	18675	18900	19125
15MHz	1 (RB_Pos:0)	22.13	22.29	22.37	21.43	21.62	21.67
	1 (RB_Pos:38)	22.08	22.25	22.36	21.46	21.51	21.68
	1 (RB_Pos:74)	22.09	22.19	22.34	21.49	21.45	21.61
	36 (RB_Pos:0)	22.13	22.29	22.37	21.43	21.62	21.67
	36 (RB_Pos:20)	21.29	21.38	21.52	20.33	20.46	20.61
	36 (RB_Pos:39)	21.24	21.33	21.48	20.27	20.42	20.60
	75 (RB_Pos:0)	21.21	21.32	21.45	20.25	20.36	20.52
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	18650	18900	19150	18650	18900	19150
10MHz	1 (RB_Pos:0)	22.28	22.28	22.28	21.64	21.64	21.64
	1 (RB_Pos:25)	22.25	22.25	22.25	21.58	21.58	21.58
	1 (RB_Pos:49)	22.23	22.23	22.23	21.54	21.54	21.54
	25 (RB_Pos:0)	21.34	21.34	21.34	20.42	20.42	20.42
	25 (RB_Pos:12)	21.30	21.30	21.30	20.37	20.37	20.37
	25 (RB_Pos:25)	21.28	21.28	21.28	20.35	20.35	20.35
	50 (RB_Pos:0)	21.33	21.33	21.33	20.41	20.41	20.41
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	18625	18900	19175	18625	18900	19175
5MHz	1 (RB_Pos:0)	22.14	22.27	22.29	21.41	21.57	21.56
	1 (RB_Pos:13)	22.16	22.30	22.35	21.58	21.60	21.71
	1 (RB_Pos:24)	22.19	22.26	22.35	21.61	21.54	21.64
	12 (RB_Pos:0)	21.32	21.38	21.46	20.39	20.49	20.58
	12 (RB_Pos:6)	21.31	21.37	21.46	20.35	20.47	20.59
	12 (RB_Pos:13)	21.26	21.34	21.41	20.36	20.44	20.54
	25 (RB_Pos:0)	21.27	21.32	21.44	20.30	20.42	20.47
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	18615	18900	19185	18615	18900	19185

FDD LTE Band 2							
3.0MHz	1 (RB_Pos:0)	22.22	22.36	22.34	21.48	21.65	21.62
	1 (RB_Pos:8)	22.17	22.33	22.38	21.52	21.55	21.64
	1 (RB_Pos:14)	22.22	22.25	22.33	21.56	21.50	21.58
	8 (RB_Pos:0)	21.30	21.35	21.42	20.43	20.54	20.61
	8 (RB_Pos:3)	21.29	21.36	21.44	20.43	20.51	20.61
	8 (RB_Pos:7)	21.31	21.35	21.41	20.40	20.49	20.57
	15 (RB_Pos:0)	21.30	21.35	21.47	20.34	20.46	20.51
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	18607	18900	19193	18607	18900	19193
1.4MHz	1 (RB_Pos:0)	22.35	22.39	22.53	21.61	21.80	21.96
	1 (RB_Pos:3)	22.23	22.47	22.60	21.70	21.81	21.83
	1 (RB_Pos:5)	22.28	22.42	22.48	21.68	21.78	21.71
	3 (RB_Pos:0)	22.29	22.42	22.48	21.40	21.49	21.59
	3 (RB_Pos:1)	22.33	22.41	22.47	21.36	21.48	21.59
	3 (RB_Pos:3)	22.34	22.46	22.53	21.38	21.48	21.55
	6 (RB_Pos:0)	21.29	21.42	21.45	20.24	20.60	20.60

FDD LTE Band 4							
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	20050	20175	20300	20050	20175	20300
20MHz	1 (RB_Pos:0)	22.27	22.26	22.28	21.68	21.55	21.54
	1 (RB_Pos:50)	22.37	22.42	22.27	21.67	21.69	21.57
	1 (RB_Pos:99)	**22.49**	22.43	22.37	21.74	21.76	21.62
	50 (RB_Pos:0)	21.55	21.54	21.45	20.53	20.51	20.43
	50 (RB_Pos:25)	21.56	21.55	21.43	20.54	20.52	20.41
	50 (RB_Pos:50)	21.59	21.57	21.47	20.57	20.56	20.46
	100 (RB_Pos:0)	21.54	21.55	21.45	20.51	20.50	20.42
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	20025	20175	20325	20025	20175	20325
15MHz	1 (RB_Pos:0)	22.31	22.31	22.31	21.50	21.50	21.50
	1 (RB_Pos:38)	22.27	22.27	22.27	21.53	21.53	21.53
	1 (RB_Pos:74)	22.20	22.20	22.20	21.53	21.53	21.53
	36 (RB_Pos:0)	21.60	21.60	21.60	20.59	20.59	20.59
	36 (RB_Pos:20)	21.56	21.56	21.56	20.52	20.52	20.52
	36 (RB_Pos:39)	21.55	21.55	21.55	20.53	20.53	20.53
	75 (RB_Pos:0)	21.39	21.39	21.39	20.35	20.35	20.35
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	20000	20175	20350	20000	20175	20350
10MHz	1 (RB_Pos:0)	22.35	22.29	22.15	21.68	21.49	21.50
	1 (RB_Pos:25)	22.30	22.31	22.18	21.61	21.58	21.47
	1 (RB_Pos:49)	22.43	22.34	22.28	21.70	21.67	21.54

	25 (RB_Pos:0)	21.56	21.65	21.56	20.52	20.59	20.53
	25 (RB_Pos:12)	21.57	21.51	21.40	20.51	20.46	20.37
	25 (RB_Pos:25)	21.64	21.59	21.49	20.61	20.55	20.46
	50 (RB_Pos:0)	21.55	21.52	21.44	20.52	20.47	20.41
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	19975	20175	20375	19975	20175	20375
5MHz	1 (RB_Pos:0)	22.48	22.41	22.51	21.72	21.54	21.60
	1 (RB_Pos:13)	22.32	22.35	22.24	21.60	21.58	21.52
	1 (RB_Pos:24)	22.57	22.44	22.47	21.78	21.76	21.68
	12 (RB_Pos:0)	21.63	21.55	21.55	20.55	20.48	20.47
	12 (RB_Pos:6)	21.48	21.50	21.42	20.53	20.46	20.42
	12 (RB_Pos:13)	21.61	21.52	21.51	20.56	20.51	20.47
	25 (RB_Pos:0)	21.49	21.46	21.42	20.47	20.42	20.40
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	19965	20175	20385	19965	20175	20385
3.0MHz	1 (RB_Pos:0)	22.40	22.40	22.48	21.59	21.59	21.65
	1 (RB_Pos:8)	22.31	22.31	22.21	21.53	21.53	21.47
	1 (RB_Pos:14)	22.44	22.44	22.42	21.71	21.71	21.63
	8 (RB_Pos:0)	21.52	21.52	21.47	20.49	20.49	20.48
	8 (RB_Pos:3)	21.50	21.50	21.43	20.48	20.48	20.44
	8 (RB_Pos:7)	21.52	21.52	21.46	20.54	20.54	20.50
	15 (RB_Pos:0)	21.48	21.48	21.43	20.42	20.42	20.39
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	19957	20175	20393	19957	20175	20393
1.4MHz	1 (RB_Pos:0)	22.31	22.29	22.27	21.64	21.49	21.65
	1 (RB_Pos:3)	22.23	22.28	22.31	21.58	21.59	21.64
	1 (RB_Pos:5)	22.56	22.51	22.53	21.72	21.73	21.88
	3 (RB_Pos:0)	22.29	22.27	22.37	21.32	21.28	21.40
	3 (RB_Pos:1)	22.30	22.28	22.36	21.30	21.29	21.42
	3 (RB_Pos:3)	22.32	22.31	22.42	21.35	21.33	21.49
	6 (RB_Pos:0)	21.50	21.51	21.57	20.50	20.49	20.65

FDD LTE Band 5							
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	20450	20525	20600	20450	20525	20600
10MHz	1 (RB_Pos:0)	22.92	22.90	22.95	22.16	22.18	22.33
	1 (RB_Pos:25)	22.93	22.91	22.87	22.13	22.25	22.04
	1 (RB_Pos:49)	22.84	**23.01**	22.79	22.10	22.31	22.03
	25 (RB_Pos:0)	21.89	21.99	21.95	20.88	20.99	20.93
	25 (RB_Pos:12)	21.86	21.83	21.89	20.86	20.98	20.88
	25 (RB_Pos:25)	21.88	21.96	21.87	20.84	20.96	20.84
	50 (RB_Pos:0)	21.89	22.01	21.90	20.89	21.01	20.87

Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	20425	20525	20625	20425	20525	20625
5MHz	1 (RB_Pos:0)	23.09	22.95	23.11	22.29	22.20	22.47
	1 (RB_Pos:13)	23.09	22.99	23.07	22.31	22.33	22.23
	1 (RB_Pos:24)	22.96	23.00	22.88	22.26	22.37	22.20
	12 (RB_Pos:0)	22.12	22.10	22.16	21.07	21.07	21.13
	12 (RB_Pos:6)	22.21	22.08	22.25	21.10	21.09	21.11
	12 (RB_Pos:13)	22.13	22.11	22.09	21.06	21.08	21.07
	25 (RB_Pos:0)	22.02	22.03	22.04	21.01	21.03	21.00
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	20415	20525	20635	20415	20525	20635
3.0 MHz	1 (RB_Pos:0)	23.13	23.03	23.21	22.47	22.39	22.53
	1 (RB_Pos:8)	23.16	23.05	23.13	22.35	22.38	22.30
	1 (RB_Pos:14)	23.06	23.00	22.89	22.36	22.33	22.33
	8 (RB_Pos:0)	22.10	22.11	22.18	21.18	21.19	21.27
	8 (RB_Pos:3)	22.25	22.13	22.31	21.17	21.21	21.25
	8 (RB_Pos:7)	22.07	22.10	22.09	21.15	21.17	21.18
	15 (RB_Pos:0)	22.09	22.11	22.14	21.08	21.11	21.09
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	20407	20525	20643	20407	20525	20643
1.4MHz	1 (RB_Pos:0)	23.05	23.05	23.11	22.35	22.37	22.54
	1 (RB_Pos:3)	23.15	23.14	23.10	22.35	22.48	22.43
	1 (RB_Pos:5)	23.16	23.05	23.12	22.35	22.42	22.45
	3 (RB_Pos:0)	23.00	23.11	23.06	22.03	22.14	22.10
	3 (RB_Pos:1)	23.14	23.12	23.18	22.06	22.20	22.12
	3 (RB_Pos:3)	23.04	23.17	23.04	22.10	22.22	22.11
	6 (RB_Pos:0)	22.04	22.16	22.07	21.10	21.23	21.09

8.4 Rated RF Power Output

Mode	Range(dBm)
GSM850	32.40-32.70
GPRS850(1 Slot)	32.40-32.65
GPRS850(2 Slots)	31.75-32.00
GPRS850(3 Slots)	30.10-30.40
GPRS850(4 Slots)	21.10-29.40
GSM1900	29.45-29.90
GPRS1900(1 Slot)	29.50-29.85
GPRS1900(2 Slots)	28.80-29.20
GPRS1900(3 Slots)	27.20-27.40
GPRS1900(4 Slots)	26.10-26.40
WCDMA Band 2 RMC	23.30-23.60

HSDPA Band 2	22.00-22.30
HSUPA Band 2	19.50-22.30
WCDMA Band 4 RMC	22.90-23.30
HSDPA Band 4	21.95-22.30
HSUPA Subtest1	19.90-20.20
HSUPA Subtest2	19.95-20.20
HSUPA Subtest3	20.95-21.30
HSUPA Subtest4	19.30-19.70
HSUPA Subtest5	21.70-22.15
WCDMA Band 5 RMC	23.25-23.60
HSDPA Band 5	21.75-22.20
HSUPA Subtest1	19.85-20.20
HSUPA Subtest2	19.95-20.20
HSUPA Subtest3	21.95-21.30
HSUPA Subtest4	19.30-19.70
HSUPA Subtest5	21.70-22.15

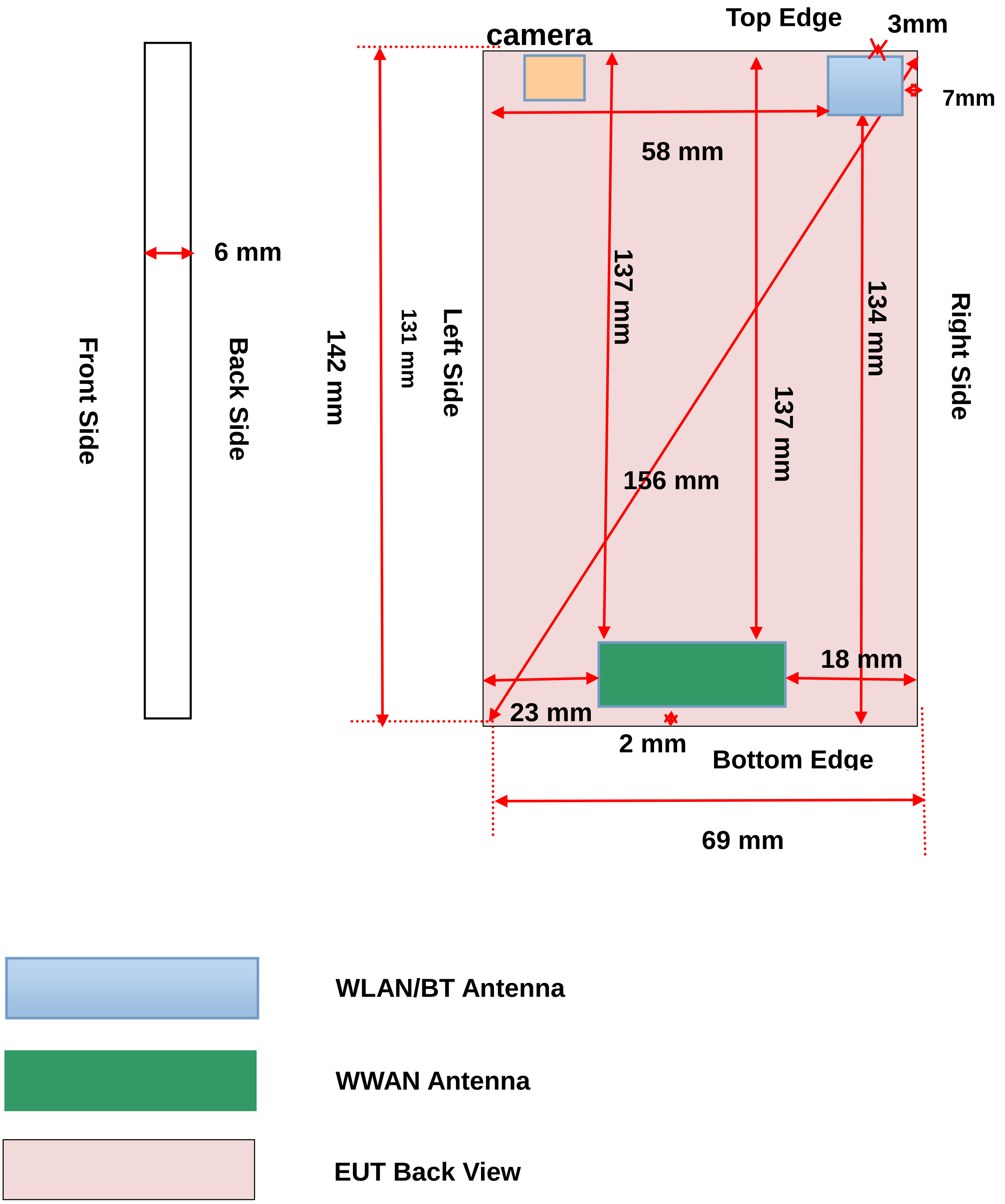
Mode	Bandwidth	RB	Modulation	Range(dBm)
LTE Band 2	20 MHz	1	QPSK	21.80-22.55
		50		20.90-21.60
		100		20.90-21.60
		1	16QAM	21.15-21.80
		50		19.90-20.70
		100		20.00-20.60
	15 MHz	1	QPSK	22.00-22.45
		36		21.15-21.60
		75		21.20-21.60
		1	16QAM	21.40-21.80
		36		20.20-20.70
		75		20.20-20.60
	10 MHz	1	QPSK	22.20-22.35
		25		21.20-21.40
		50		21.30-21.40
		1	16QAM	21.50-21.70
		25		20.30-20.50
		50		20.35-20.50
	5 MHz	1	QPSK	22.10-22.40
		12		21.20-21.50
		25		21.20-21.50
		1	16QAM	21.35-21.80
		12		20.30-20.70
		25		20.20-20.55
	3 MHz	1	QPSK	22.10-22.45
		8		21.20-21.50
		15		21.20-21.60
		1	16QAM	21.40-21.70
		8		20.30-20.70
		15		20.30-20.60
	1.4 MHz	1	QPSK	22.20-22.70
		3		22.20-22.60
		6		21.20-21.50
		1	16QAM	21.55-22.00
		3		21.30-21.70
		6		20.20-20.70
LTE Band 4	20 MHz	1	QPSK	22.20-22.60
		50		21.40-21.70
		100		21.40-21.60
		1	16QAM	21.50-21.80

Mode	Bandwidth	RB	Modulation	Range(dBm)
LTE Band 2	20 MHz	1	QPSK	21.80-22.55
		50		20.90-21.60
		100		20.90-21.60
		1	16QAM	21.15-21.80
		50		19.90-20.70
		100		20.00-20.60
	15 MHz	1	QPSK	22.00-22.45
		36		21.15-21.60
		75		21.20-21.60
		1	16QAM	21.40-21.80
		36		20.20-20.70
		75		20.20-20.60
	10 MHz	1	QPSK	22.20-22.35
		25		21.20-21.40
		50		21.30-21.40
		1	16QAM	21.50-21.70
		25		20.30-20.50
		50		20.35-20.50
	5 MHz	1	QPSK	22.10-22.40
		12		21.20-21.50
		25		21.20-21.50
		1	16QAM	21.35-21.80
		12		20.30-20.70
		25		20.20-20.55
	3 MHz	1	QPSK	22.10-22.45
		8		21.20-21.50
		15		21.20-21.60
		1	16QAM	21.40-21.70
		8		20.30-20.70
		15		20.30-20.60
	1.4 MHz	1	QPSK	22.20-22.70
		3		22.20-22.60
		6		21.20-21.50
		1	16QAM	21.55-22.00
		3		21.30-21.70
		6		20.20-20.70
LTE Band 4	20 MHz	1	QPSK	22.20-22.60
		50		21.40-21.70
		100		21.40-21.60
		1	16QAM	21.50-21.80
		50		20.35-20.65
		100		20.40-20.60
	15 MHz	1	QPSK	22.10-22.40
		36		21.50-21.70
		75		21.30-21.45

		1	16QAM	21.40-21.60
		36		20.50-20.70
		75		20.30-20.40
	10 MHz	1	QPSK	22.10-22.50
		25		21.30-21.70
		50		21.40-21.60
		1	16QAM	21.40-21.80
		25		20.30-20.70
		50		20.35-20.60
	5 MHz	1	QPSK	22.20-22.60
		12		21.40-21.70
		25		21.40-21.55
		1	16QAM	21.50-21.85
		12		20.35-20.60
		25		20.30-20.55
	3 MHz	1	QPSK	22.10-22.60
		8		21.40-21.60
		15		21.40-21.60
		1	16QAM	21.40-21.90
		8		20.40-20.60
		15		20.30-20.50
	1.4 MHz	1	QPSK	22.20-22.60
		8		22.20-22.50
		15		21.40-21.65
		1	16QAM	21.40-21.95
		8		21.20-21.60
		15		20.40-20.70
LTE Band 5	10 MHz	1	QPSK	22.70-23.20
		25		21.75-22.10
		50		21.80-22.10
		1	16QAM	22.00-22.40
		25		20.80-21.10
		50		20.80-21.10
	5 MHz	1	QPSK	22.80-23.20
		12		22.00-22.30
		25		21.90-22.10
		1	16QAM	22.10-22.50
		12		21.00-21.20
		25		20.90-21.10
	3 MHz	1	QPSK	22.80-23.30
		8		22.00-22.40
		15		22.00-22.20
		1	16QAM	22.20-22.60
		8		21.10-21.40
		15		21.00-21.20
	1.4 MHz	1	QPSK	23.00-23.20

		8		22.90-23.30
		15		22.00-22.20
		1	16QAM	22.30-22.60
		8		22.00-22.30
		15		21.00-21.30

9 TEST EXCLUSION CONSIDERATION



9.1 SAR Test Exclusion Consideration Table

According with FCC KDB 447498 D01, Appendix A, <SAR Test Exclusion Thresholds for 100 MHz－6 GHz and ≤ 50 mm> Table, this Device SAR test configurations consider as following :

Band	Mode	Max. Peak Power		Test Position Configurations					
		dBm	mW	Head	Front/ Back	Left Edge	Right Edge	Top Edge	Bottom Edge
GSM 850	Distance to User			<5mm	<5 mm	23 mm	18 mm	137 mm	<5mm
	Voice	32.70	1862.09	Yes	Yes	Yes	Yes	No	Yes
	Data	29.40	870.96	Yes	Yes	Yes	Yes	No	Yes
GSM 1900	Distance to User			<5mm	<5 mm	23 mm	18 mm	137 mm	<5mm
	Voice	29.90	977.24	Yes	Yes	Yes	Yes	No	Yes
	Data	26.40	436.52	Yes	Yes	Yes	Yes	No	Yes
WCDMA Band 2	Distance to User			<5mm	<5 mm	23 mm	18 mm	137 mm	<5mm
	RMC	23.60	229.09	Yes	Yes	Yes	Yes	No	Yes
WCDMA Band 4	Distance to User			<5mm	<5 mm	23 mm	18 mm	137 mm	<5mm
	RMC	22.20	165.60	Yes	Yes	Yes	Yes	No	Yes
WCDMA Band 5	Distance to User			<5mm	<5 mm	23 mm	18 mm	137 mm	<5mm
	RMC	23.60	229.09	Yes	Yes	Yes	Yes	No	Yes
LTE Band 2	Distance to User			<5mm	<5 mm	23 mm	18 mm	137 mm	<5mm
	QPSK	22.55	179.89	Yes	Yes	Yes	Yes	No	Yes
LTE Band 4	Distance to User			<5mm	<5 mm	23 mm	18 mm	137 mm	<5mm
	QPSK	21.70	147.91	Yes	Yes	Yes	Yes	No	Yes
LTE Band 5	Distance to User			<5mm	<5 mm	23 mm	18 mm	137 mm	<5mm
	QPSK	22.60	181.97	Yes	Yes	Yes	Yes	No	Yes

Note:

1. Maximum power is the source-based time-average power and represents the maximum RF output power among production units.
2. Per KDB 447498 D01, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
3. Per KDB 447498 D01, standalone SAR test exclusion threshold is applied; If the distance of the antenna to the user is < 5mm, 5mm is used to determine SAR exclusion threshold
4. Per KDB 447498 D01, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] ·[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR

a. f(GHz) is the RF channel transmit frequency in GHz

b. Power and distance are rounded to the nearest mW and mm before calculation

c. The result is rounded to one decimal place for comparison

d. For < 50 mm distance, we just calculate mW of the exclusion threshold value (3.0) to do compare.

This formula is [3.0] / [√f(GHz)] ·[(min. test separation distance, mm)] = exclusion threshold of mW.

5. Per KDB 447498 D01, at 100 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following:

a. [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·(f(MHz)/150)] mW, at 100 MHz to 1500 MHz

b. [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz

6. Per KDB 941225 D01, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA /HSUPA /DC-HSDPA output power is < 0.25dB higher than RMC12.2Kbps, or reported SAR with RMC 12.2kbps setting is ≤ 1.2W/kg, HSDPA/HSUPA/DC-HSDPA SAR evaluation can be excluded.

7. Per KDB 248227 D01 , choose the highest output power channel to test SAR and determine further SAR exclusion.8. For each frequency band, testing at higher data rates and higher order modulations is not required when the maximum average output power for each of these configurations is less than 1/4dB higher than those measured at the lowest data rate

8. Apply the test exclusion rule in KDB 248227 D01 v02 11g, 11n-HT20 and HT40 output power is less than 1/4dB higher than 11b mode, thus the SAR can be excluded.

10 TEST RESULT

10.1 GSM 850

Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	1 g Meas. SAR (W/Kg)	Meas. Power (dBm)	Max. tune-up Power(dBm)	Scaling Factor	1 g Scaled SAR (W/Kg)	Meas. No.
Head											
Voice	Left Cheek	0	251	848.80	3.28	0.119	32.58	32.70	1.03	0.122	1#
	Left Tilt	0	251	848.80	3.99	0.080	32.58	32.70	1.03	0.082	2#
	Right Cheek	0	251	848.80	0.93	0.162	32.58	32.70	1.03	**0.167**	3#
	Right Tilt	0	251	848.80	2.33	0.089	32.58	32.70	1.03	0.091	4#
Body-worn Accessory											
Voice	Front Side	10	251	848.80	-1.60	0.107	32.58	32.70	1.03	0.110	5#
	Back Side	10	251	848.80	-0.69	0.129	32.58	32.70	1.03	**0.133**	6#
Hotspot											
GPRS 4 slots	Front Side	10	251	848.80	0.69	0.215	29.25	29.40	1.04	0.223	7#
	Back Side	10	251	848.80	-0.23	0.262	29.25	29.40	1.04	0.271	8#
	Left Edge	10	251	848.80	0.00	0.374	29.25	29.40	1.04	**0.387**	9#
	Right Edge	10	251	848.80	1.62	0.148	29.25	29.40	1.04	0.153	10#
	Bottom Edge	10	251	848.80	2.57	0.122	29.25	29.40	1.04	0.126	11#

10.2 GSM 1900

Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	1 g Meas. SAR (W/Kg)	Meas. Power (dBm)	Max. tune-up Power(dBm)	Scaling Factor	1 g Scaled SAR (W/Kg)	Meas. No.
Head											
Voice	Left Cheek	0	512	1850.20	3.04	0.253	29.79	29.90	1.03	**0.259**	12#
	Left Tilt	0	512	1850.20	0.93	0.087	29.79	29.90	1.03	0.089	13#
	Right Cheek	0	512	1850.20	3.75	0.129	29.79	29.90	1.03	0.132	14#
	Right Tilt	0	512	1850.20	3.04	0.075	29.79	29.90	1.03	0.077	15#
Body-worn Accessory											
Voice	Front Side	10	512	1850.20	0.69	0.314	29.79	29.90	1.03	**0.322**	16#
	Back Side	10	512	1850.20	-2.95	0.188	29.79	29.90	1.03	0.193	17#
Hotspot											
GPRS 4 slots	Front Side	10	512	1850.20	-0.23	0.513	26.26	26.40	1.03	**0.530**	18#
	Back Side	10	512	1850.20	-0.23	0.307	26.26	26.40	1.03	0.317	19#
	Left Edge	10	512	1850.20	2.80	0.021	26.26	26.40	1.03	0.022	20#
	Right Edge	10	512	1850.20	3.99	0.287	26.26	26.40	1.03	0.296	21#
	Bottom Edge	10	512	1850.20	3.99	0.397	26.26	26.40	1.03	0.410	22#

10.3 WCDMA Band 2

Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	1 g Meas. SAR (W/Kg)	Meas. Power (dBm)	Max. tune-up Power(dBm)	Scaling Factor	1 g Scaled SAR (W/Kg)	Meas. No.
Head											
RMC	Left Cheek	0	9400	1880.00	0.46	0.451	23.45	23.55	1.02	**0.462**	23#
	Left Tilt	0	9400	1880.00	3.51	0.136	23.45	23.55	1.02	0.139	24#
	Right Cheek	0	9400	1880.00	-3.84	0.263	23.45	23.55	1.02	0.269	25#
	Right Tilt	0	9400	1880.00	4.71	0.155	23.45	23.55	1.02	0.159	26#
Body-worn Accessory & Hotspot											
RMC	Front Side	10	9400	1880.00	1.62	0.569	23.45	23.55	1.02	**0.582**	27#
	Back Side	10	9400	1880.00	2.80	0.315	23.45	23.55	1.02	0.322	28#
Hotspot											
RMC	Left Edge	10	9400	1880.00	3.28	0.046	23.45	23.55	1.02	0.047	29#
	Right Edge	10	9400	1880.00	1.16	0.330	23.45	23.55	1.02	0.338	30#
	Bottom Edge	10	9400	1880.00	1.16	0.402	23.45	23.55	1.02	0.411	31#

10.4 WCDMA Band 4

Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	1 g Meas. SAR (W/Kg)	Meas. Power (dBm)	Max. tune-up Power(dBm)	Scaling Factor	1 g Scaled SAR (W/Kg)	Meas. No.
Head											
RMC	Left Cheek	0	1412	1732.40	4.47	0.180	23.12	23.30	1.04	**0.188**	32#
	Left Tilt	0	1412	1732.40	1.62	0.079	23.12	23.30	1.04	0.082	33#
	Right Cheek	0	1412	1732.40	3.28	0.079	23.12	23.30	1.04	0.082	34#
	Right Tilt	0	1412	1732.40	4.23	0.047	23.12	23.30	1.04	0.049	35#
Body-worn Accessory & Hotspot											
RMC	Front Side	10	1412	1732.40	0.93	0.410	23.12	23.30	1.04	**0.427**	36#
	Back Side	10	1412	1732.40	0.00	0.172	23.12	23.30	1.04	0.179	37#
Hotspot											
RMC	Left Edge	10	1412	1732.40	1.86	0.012	23.12	23.30	1.04	0.013	38#
	Right Edge	10	1412	1732.40	-2.28	0.110	23.12	23.30	1.04	0.115	39#
	Bottom Edge	10	1412	1732.40	2.33	0.209	23.12	23.30	1.04	0.218	40#

10.5 WCDMA Band 5

Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	1 g Meas. SAR (W/Kg)	Meas. Power (dBm)	Max. tune-up Power(dBm)	Scaling Factor	1 g Scaled SAR (W/Kg)	Meas. No.
Head											
RMC	Left Cheek	0	4132	826.40	3.75	0.114	23.51	23.60	1.02	0.116	41#
	Left Tilt	0	4132	826.40	3.04	0.086	23.51	23.60	1.02	0.088	42#
	Right Cheek	0	4132	826.40	-4.06	0.129	23.51	23.60	1.02	**0.132**	43#
	Right Tilt	0	4132	826.40	1.39	0.074	23.51	23.60	1.02	0.076	44#
Body-worn Accessory & Hotspot											
RMC	Front Side	10	4132	826.40	1.62	0.136	23.51	23.60	1.02	0.139	45#
	Back Side	10	4132	826.40	0.46	0.185	23.51	23.60	1.02	**0.189**	46#
Hotspot											
RMC	Left Edge	10	4132	826.40	1.16	0.270	23.51	23.60	1.02	**0.276**	47#
	Right Edge	10	4132	826.40	1.16	0.132	23.51	23.60	1.02	0.135	48#
	Bottom Edge	10	4132	826.40	-2.73	0.056	23.51	23.60	1.04	0.058	49#

10.6 LTE Band 2 (20MHz Bandwidth)

Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	RB Num.	RB Start	Power Drift (%)	1 g Meas. SAR (W/Kg)	Meas. Power (dBm)	Max. tune-up Power (dBm)	Scaling Factor	1 g Scaled SAR (W/Kg)	Meas. No.
Head													
QPSK	Left Cheek	0	19100	1900.00	1	High	4.47	0.411	22.47	22.55	1.02	**0.419**	50#
			19100	1900.00	50%	High	2.80	0.327	21.55	21.60	1.01	0.331	51#
	Left Tilt	0	19100	1900.00	1	High	0.93	0.118	22.47	22.55	1.02	0.120	52#
			19100	1900.00	50%	High	4.23	0.084	21.55	21.60	1.27	0.107	53#
	Right Cheek	0	19100	1900.00	1	High	3.04	0.191	22.47	22.55	1.02	0.195	54#
			19100	1900.00	50%	High	4.47	0.150	21.55	21.60	1.01	0.152	55#
	Right Tilt	0	19100	1900.00	1	High	-2.50	0.131	22.47	22.55	1.02	0.133	56#
			19100	1900.00	50%	High	3.04	0.101	21.55	21.60	1.01	0.102	57#
Body-worn Accessory& Hotspot													
QPSK	Front Side	10	19100	1900.00	1	High	4.71	0.595	22.47	22.55	1.02	**0.606**	58#
			19100	1900.00	50%	High	-0.23	0.486	21.55	21.60	1.01	0.492	59#
	Back Side	10	19100	1900.00	1	High	-2.95	0.341	22.47	22.55	1.02	0.347	60#
			19100	1900.00	50%	High	-1.37	0.271	21.55	21.60	1.01	0.274	61#
Hotspot													
QPSK	Left Edge	10	19100	1900.00	1	High	-2.73	0.033	22.47	22.55	1.02	0.034	62#
			19100	1900.00	50%	High	2.80	0.023	21.55	21.60	1.01	0.023	63#
	Right Edge	10	19100	1900.00	1	High	-2.95	0.369	22.47	22.55	1.02	0.376	64#
			19100	1900.00	50%	High	4.71	0.274	21.55	21.60	1.01	0.277	65#
	Bottom Edge	10	19100	1900.00	1	High	-0.23	0.346	22.47	22.55	1.02	0.352	66#
			19100	1900.00	50%	High	1.39	0.281	21.55	21.60	1.01	0.284	67#

10.7 LTE Band 4 (20MHz Bandwidth)

Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	RB Num.	RB Start	Power Drift (%)	1 g Meas. SAR (W/Kg)	Meas. Power (dBm)	Max. tune-up Power (dBm)	Scaling Factor	1 g Scaled SAR (W/Kg)	Meas. No.
Head													
QPSK	Left Cheek	0	20050	1720.0	1	Low	1.86	0.173	22.49	22.60	1.03	**0.177**	68#
			20050	1720.0	50%	Low	-2.50	0.107	21.59	21.70	1.03	0.110	69#
	Left Tilt	0	20050	1720.0	1	Low	2.80	0.048	22.49	22.60	1.03	0.049	70#
			20050	1720.0	50%	Low	-1.37	0.038	21.59	22.70	1.03	0.039	71#
	Right Cheek	0	20050	1720.0	1	Low	4.23	0.050	22.49	22.60	1.03	0.051	72#
			20050	1720.0	50%	Low	3.99	0.039	21.59	21.70	1.03	0.040	73#
	Right Tilt	0	20050	1720.0	1	Low	2.80	0.062	22.49	22.60	1.03	0.064	74#
			20050	1720.0	50%	Low	2.33	0.029	21.59	21.70	1.03	0.030	75#
Body-worn Accessory& Hotspot													
QPSK	Front Side	10	20050	1720.0	1	Low	0.46	0.315	22.49	22.60	1.03	**0.323**	76#
			20050	1720.0	50%	Low	0.00	0.250	21.59	21.70	1.03	0.256	77#
	Back Side	10	20050	1720.0	1	Low	3.28	0.172	22.49	22.60	1.03	0.176	78#
			20050	1720.0	50%	Low	3.75	0.134	21.59	21.70	1.03	0.137	79#
Hotspot													
QPSK	Left Edge	10	20050	1720.0	1	Low	-1.83	0.011	22.49	22.60	1.03	0.011	80#
			20050	1720.0	50%	Low	2.80	0.007	21.59	21.70	1.03	0.007	81#
	Right Edge	10	20050	1720.0	1	Low	-1.14	0.128	22.49	22.60	1.03	0.131	82#
			20050	1720.0	50%	Low	1.16	0.099	21.59	21.70	1.03	0.102	83#
	Bottom Edge	10	20050	1720.0	1	Low	1.16	0.287	22.49	22.60	1.03	0.294	84#
			20050	1720.0	50%	Low	0.69	0.219	21.59	21.70	1.03	0.221	85#

10.8 LTE Band 5 (10MHz Bandwidth)

Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	RB Num.	RB Start	Power Drift (%)	1 g Meas. SAR (W/Kg)	Meas. Power (dBm)	Max. tune-up Power (dBm)	Scaling Factor	1 g Scaled SAR (W/Kg)	Meas. No.
Head													
QPSK	Left Cheek	0	20525	836.5	1	Low	3.51	0.125	23.01	23.20	1.04	0.131	86#
			20525	836.5	50%	High	3.28	0.097	21.99	22.10	1.03	0.099	87#
	Left Tilt	0	20525	836.5	1	Low	-3.84	0.087	23.01	23.20	1.04	0.091	88#
			20525	836.5	50%	High	3.75	0.064	21.99	22.10	1.03	0.066	89#
	Right Cheek	0	20525	836.5	1	Low	3.99	0.139	23.01	23.20	1.04	**0.145**	90#
			20525	836.5	50%	High	3.99	0.117	21.99	22.10	1.03	0.120	91#
	Right Tilt	0	20525	836.5	1	Low	2.80	0.066	23.01	23.20	1.04	0.069	92#
			20525	836.5	50%	High	-3.62	0.052	21.99	22.10	1.03	0.053	93#
Body-worn Accessory& Hotspot													
QPSK	Front Side	10	20525	836.5	1	Low	0.69	0.147	23.01	23.20	1.04	0.154	94#
			20525	836.5	50%	High	0.93	0.095	21.99	22.10	1.03	0.097	95#
	Back Side	10	20525	836.5	1	Low	0.69	0.152	23.01	23.20	1.04	**0.159**	96#
			20525	836.5	50%	High	0.69	0.122	21.99	22.10	1.03	0.125	97#
Hotspot													
QPSK	Left Edge	10	20525	836.5	1	Low	0.93	0.217	23.01	23.20	1.04	**0.227**	98#
			20525	836.5	50%	High	0.23	0.178	21.99	22.10	1.03	0.183	99#
	Right Edge	10	20525	836.5	1	Low	1.39	0.109	23.01	23.20	1.04	0.114	100#
			20525	836.5	50%	High	1.16	0.100	21.99	22.10	1.32	0.132	101#
	Bottom Edge	10	20525	836.5	1	Low	-2.95	0.043	23.01	23.20	1.04	0.045	102#
			20525	836.5	50%	High	-0.46	0.036	21.99	22.10	1.03	0.037	103#

11 SAR Measurement Variability

According to KDB 865664 D01, SAR measurement variability was 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. Alternatively, if the highest measured SAR for both head and body tissue-equivalent media are ≤ 1.45 W/kg and the ratio of these highest SAR values, i.e., largest divided by smallest value, is ≤ 1.10, the highest SAR configuration for either head or body tissue-equivalent medium may be used to perform the repeated measurement. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR repeated measurement procedure:

1. When the highest measured SAR is < 0.80 W/kg, repeated measurement is not required.
2. When the highest measured SAR is >= 0.80 W/kg, repeat that measurement once.
3. 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, perform a second repeated measurement.
4. If the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20, and the original, first or second repeated measurement is >= 1.5 W/kg, perform a third repeated measurement.

SAR Repeated Measurement

The highest measured SAR is 0.451 W/kg, which is less than 0.80 W/kg, repeated measurement is not required.

12 SIMULTANEOUS TRANSMISSION

The evaluation of simultaneous transmission was conducted in BALUN report BL-SZ1640189-704.

13 TEST EQUIPMENT LIST

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
PC	Dell	N/A	N/A	N/A	N/A
835MHz Validation Dipole	Speag	D835V2	SN: 4d187	2014/11/26	2017/11/25
1750MHz Validation Dipole	Speag	D1750V2	SN: 1130	2014/11/28	2017/11/27
1900MHz Validation Dipole	Speag	D1900V2	SN: 5d193	2014/11/28	2017/11/27
E-Field Probe	Speag	EX3DV4	SN: 7340	2015/12/10	2016/12/09
Phantom1	Speag	SAM	SN: 1859	N/A	N/A
Phantom2	Speag	SAM	SN: 1857	N/A	N/A
Data acquisition electronics	Speag	DAE4	SN: 1454	2015/12/08	2016/12/08
Signal Generator	R&S	SMBV100A	260592	2015/07/16	2016/07/15
Power Meter	Agilent	E4419B	GB40201833	2015/10/14	2016/10/13
Power Sensor	R&S	NRP-Z21	103971	2015/07/16	2016/07/15
Power Amplifier	SATIMO	6552B	22374	2015/07/16	2016/07/15
Dielectric Probe Kit	SATIMO	SCLMP	SN 25/13 OCPG56	2015/08/17	2016/08/16
Wireless Communication Test Set	R&S	CMW 500	138884	2015/07/16	2016/07/15
Network Analyzer	R&S	ZVL-6	EMY46103472	2015/07/16	2016/07/15
Attenuator	COM-MW	ZA-S1-31	1305003187	N/A	N/A
Directional coupler	AA-MCS	AAMCS-UDC	000272	N/A	N/A

Note:

Per KDB 865664 D01, Dipole SAR Validation Verification, BALUN LAB has adopted 3 years calibration intervals. On annual basis, every measurement dipole has been evaluated and is in compliance with the following criteria:

1. There is no physical damage on the dipole;
2. System validation with specific dipole is within 10% of calibrated value;
3. Return-loss in within 20% of calibrated measurement.

ANNEX A SIMULATING LIQUID VERIFICATION RESULT

The dielectric parameters of the liquids were verified prior to the SAR evaluation using an SCLMP Dielectric Probe Kit.

Date	Liquid Type	Fre. (MHz)	Temp. (℃)	Meas. Conductivity (σ) (S/m)	Meas. Permittivity (ε)	Target Conductivity (σ) (S/m)	Target Permittivity (ε)	Conductivity Tolerance (%)	Permittivity Tolerance (%)
2016.04.22	Head	835	21.5	0.91	41.49	0.90	41.50	1.11	-0.02
2016.04.25	Body	835	21.1	0.96	55.89	0.97	55.20	-1.03	1.25
2016.04.24	Head	1750	21.4	1.38	39.23	1.37	40.10	0.73	-2.17
2016.04.28	Body	1750	21.5	1.48	53.13	1.49	53.40	-0.67	-0.51
2016.04.23	Head	1900	21.2	1.45	39.75	1.40	40.00	3.57	-0.63
2016.04.27	Body	1900	21.6	1.57	51.05	1.52	53.30	3.29	-4.22
Note: The tolerances limit of Conductivity and Permittivity is ± 5%.									

ANNEX B SYSTEM CHECK RESULT

Comparing to the original SAR value provided by SPEAG, the validation data should be within itsspecification of 10 %(for 1 g).

Date	Liquid Type	Freq. (MHz)	Power (mW)	Measured SAR (W/kg)	Normalized SAR (W/kg)	DipoleSAR (W/kg)	Tolerance (%)	Targeted SAR(W/kg)	Tolerance (%)
2016.04.22	Head	835	100	0.962	9.62	9.15	5.14	9.56	0.63
2016.04.25	Body	835	100	0.981	9.81	9.17	6.98	9.56	2.62
2016.04.24	Head	1750	100	3.700	37.00	36.40	1.65	36.40	1.65
2016.04.28	Body	1750	100	3.730	37.30	37.30	0.00	36.40	2.47
2016.04.23	Head	1900	100	3.860	38.60	40.60	-4.93	39.70	-2.77
2016.04.27	Body	1900	100	4.170	41.70	40.30	3.47	39.70	5.04
Note: The tolerance limit of System validation is ±10%.									

System Performance Check Data (835MHz Head)

Date/Time: 4/22/2016

Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz;

Medium parameters used: f = 835 MHz; σ = 0.91 S/m; ε_r = 41.49; ρ = 1000 kg/m^3

Phantom section: Flat Section

Ambient Temperature:22.1 Liquid Temperature:21.5

DASY5 Configuration:

- Probe: EX3DV4 - SN7340; ConvF(9.56, 9.56, 9.56); Calibrated: 12/10/2015;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1454; Calibrated: 12/8/2015
- Phantom: SAM (30deg probe tilt) with CRP v5.0 on left 1859; Type: QD000P40CD; Serial: TP:1859
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CW 835 100mW HEAD/Area Scan (61x81x1):

Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 1.03 W/kg

Configuration/CW 835 100mW HEAD/Zoom Scan (7x7x7)/Cube 0:

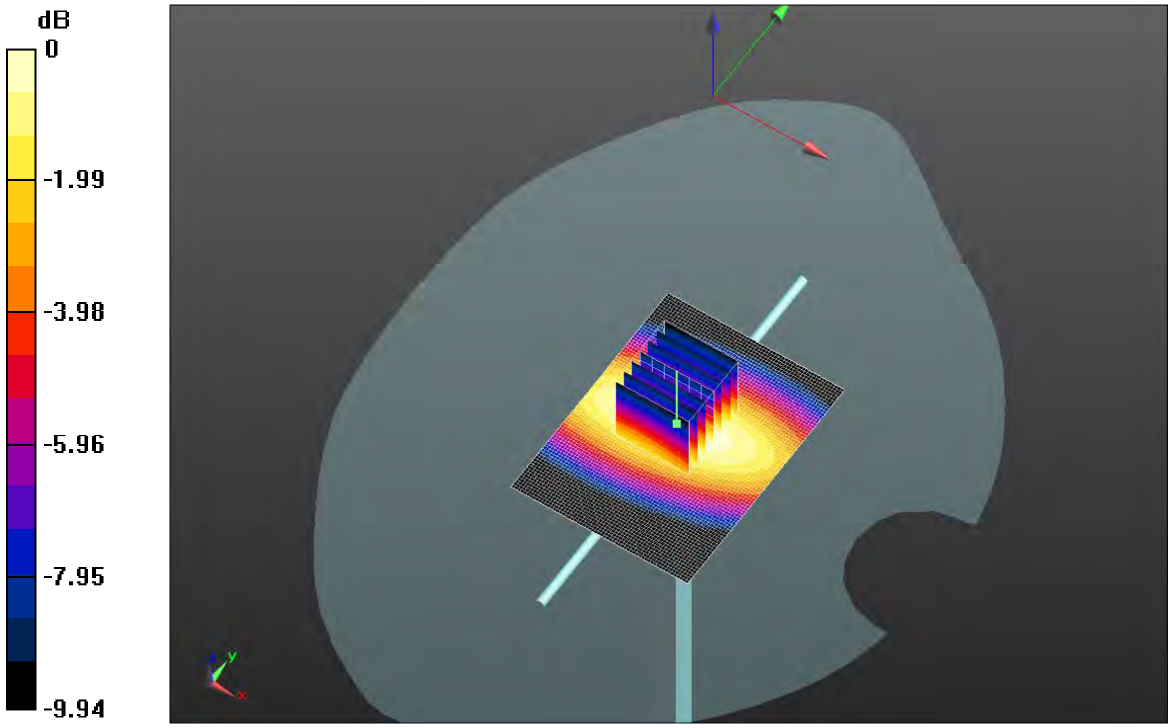
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 32.34 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 1.46 W/kg

SAR(1 g) = 0.962 W/kg; SAR(10 g) = 0.627 W/kg

Maximum value of SAR (measured) = 1.04 W/kg



0 dB = 0.898 W/kg = -0.47 dBW/kg

System Performance Check Data (835MHz Body)

Date/Time: 4/25/2016

Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz;Duty Cycle: 1:1

Medium parameters used: f = 835 MHz; σ = 0.96 S/m; ε_r = 55.87; ρ = 1000 kg/m^3

Phantom section: Flat Section

Ambient Temperature:21.8 Liquid Temperature:21.1

DASY5 Configuration:

- Probe: EX3DV4 - SN7340; ConvF(9.83, 9.83, 9.83); Calibrated: 12/10/2015;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1454; Calibrated: 12/8/2015
- Phantom: SAM (30deg probe tilt) with CRP v5.0 Right 1857; Type: QD000P40CD; Serial: TP1857
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/CW 835 100mW BODY/Area Scan (61x81x1):

Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.994 W/kg

Configuration/CW 835 100mW BODY/Zoom Scan (7x7x7)/Cube 0:

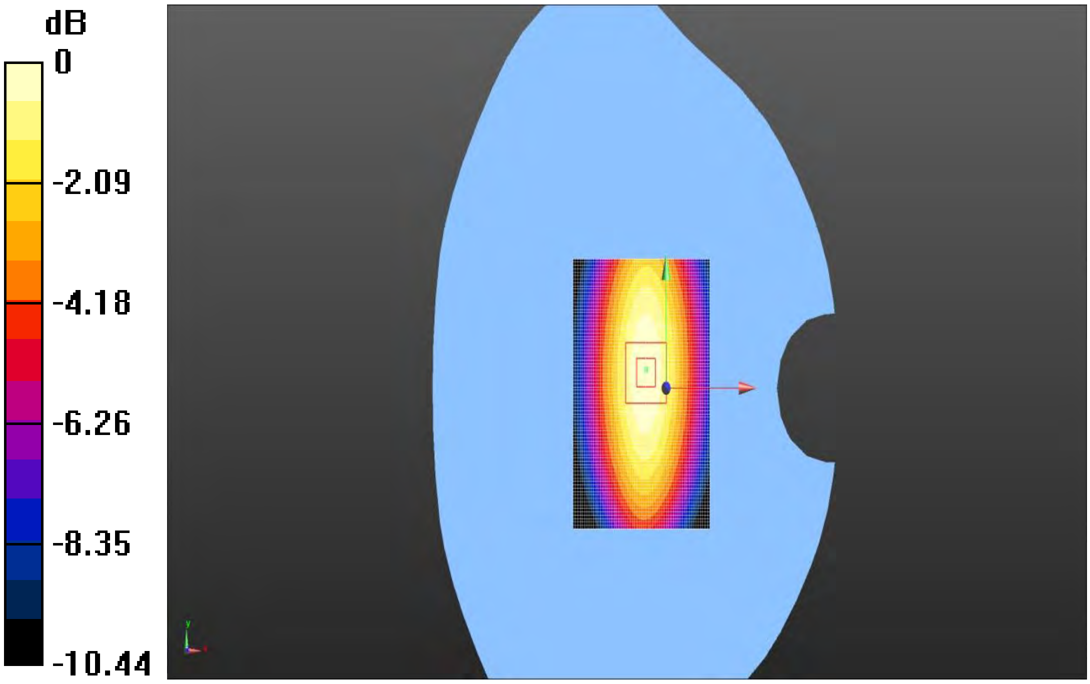
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 31.39 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 1.56 W/kg

SAR(1 g) = 0.981 W/kg; SAR(10 g) = 0.647 W/kg

Maximum value of SAR (measured) = 0.996 W/kg



0 dB = 0.996 W/kg = -0.02 dBW/kg

System Performance Check Data (1750MHz Head)

Date/Time: 4/24/2016

Communication System Band: D1750 (1750.0 MHz); Frequency: 1750 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1750 MHz; σ = 1.38 S/m; ε_r = 39.23; ρ = 1000 kg/m^3

Phantom section: Flat Section

Ambient Temperature:21.9 Liquid Temperature:21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN7340; ConvF(8.22, 8.22, 8.22); Calibrated: 12/10/2015;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1454; Calibrated: 12/8/2015
- Phantom: SAM (30deg probe tilt) with CRP v5.0 Right 1857; Type: QD000P40CD; Serial: TP1857
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW 1750MHz/CW1750 HEAD 100mw/Area Scan (101x101x1):

Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 4.18 W/kg

CW 1750MHz/CW1750 HEAD 100mw/Zoom Scan (7x7x7)/Cube 0:

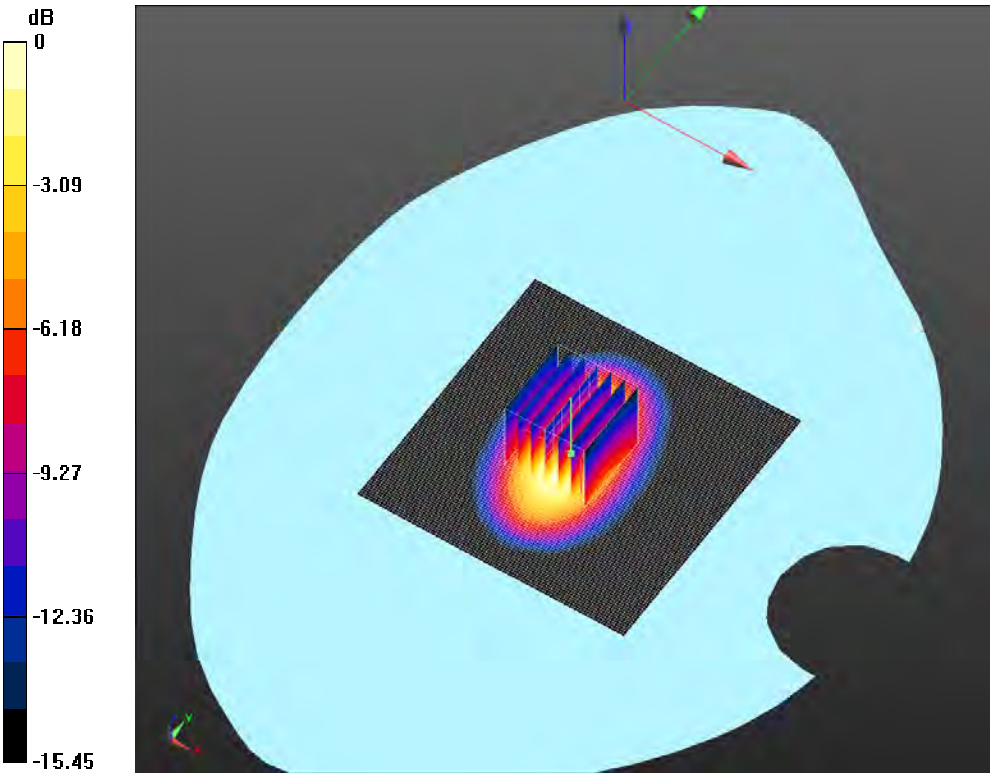
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.69 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 6.49 W/kg

SAR(1 g) = 3.7 W/kg; SAR(10 g) = 2.01 W/kg

Maximum value of SAR (measured) = 4.17 W/kg



0 dB = 4.17 W/kg = 6.20 dBW/kg

System Performance Check Data (1750MHz Body)

Date/Time: 4/28/2016

Communication System Band: D1750 (1750.0 MHz); Frequency: 1750 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1750 MHz; σ = 1.48 S/m; ε_r = 53.13; ρ = 1000 kg/m^3

Phantom section: Flat Section

Ambient Temperature:22.0 Liquid Temperature:21.5

DASY5 Configuration:

- Probe: EX3DV4 - SN7340; ConvF(7.87, 7.87, 7.87); Calibrated: 12/10/2015;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1454; Calibrated: 12/8/2015
- Phantom: SAM (30deg probe tilt) with CRP v5.0 Right 1857; Type: QD000P40CD; Serial: TP1857
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/17500MHz Body System check /Area Scan (101x101x1):

Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 4.23 W/kg

Configuration/17500MHz Body System check /Zoom Scan (7x7x7)/Cube 0:

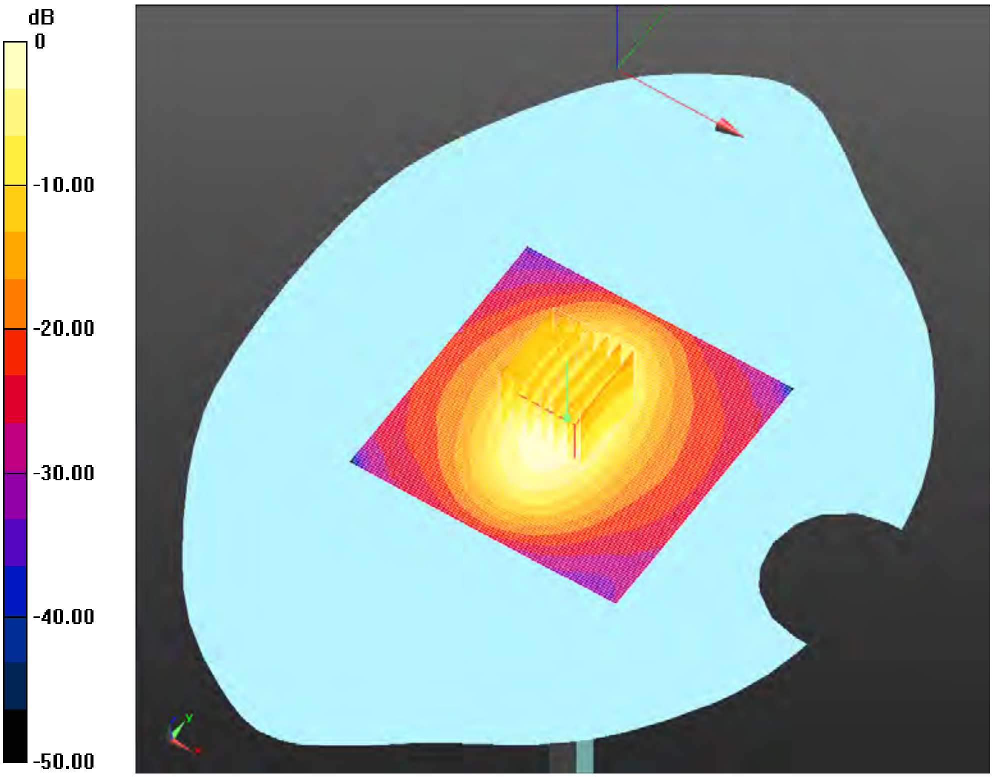
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 51.59 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 6.54 W/kg

SAR(1 g) = 3.73 W/kg; SAR(10 g) = 2.03 W/kg

Maximum value of SAR (measured) = 4.20 W/kg



0 dB = 4.23 W/kg = 6.26 dBW/kg

System Performance Check Data (1900MHz Head)

Date/Time: 4/23/2016

Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1900 MHz; σ = 1.45 S/m; ε_r = 39.75; ρ = 1000 kg/m^3

Phantom section: Flat Section

Ambient Temperature:21.8 Liquid Temperature:21.2

DASY5 Configuration:

- Probe: EX3DV4 - SN7340; ConvF(8.15, 8.15, 8.15); Calibrated: 12/10/2015;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1454; Calibrated: 12/8/2015
- Phantom: SAM (30deg probe tilt) with CRP v5.0 Right 1857; Type: QD000P40CD; Serial: TP1857
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW 1900MHz/1900MHz Head System check /Area Scan (81x81x1):

Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 4.47 W/kg

CW 1900MHz/1900MHz Head System check /Zoom Scan (7x7x7)/Cube 0:

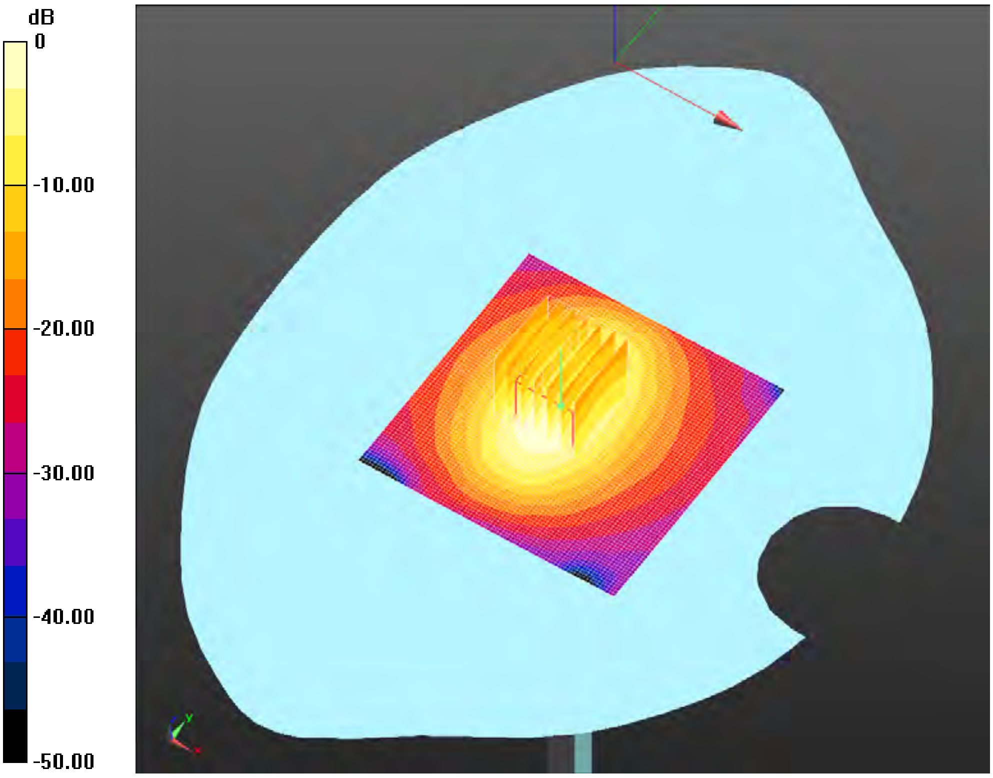
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 51.29 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 7.01 W/kg

SAR(1 g) = 3.86 W/kg; SAR(10 g) = 2.02 W/kg

Maximum value of SAR (measured) = 4.36 W/kg



0 dB = 4.47 W/kg = 6.50 dBW/kg

System Performance Check Data (1900MHz Body)

Date/Time: 4/27/2016

Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1900 MHz; σ = 1.57 S/m; ε_r = 51.05; ρ = 1000 kg/m^3

Phantom section: Flat Section

Ambient Temperature:22.3 Liquid Temperature:21.6

DASY5 Configuration:

- Probe: EX3DV4 - SN7340; ConvF(7.51, 7.51, 7.51); Calibrated: 12/10/2015;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1454; Calibrated: 12/8/2015
- Phantom: SAM (30deg probe tilt) with CRP v5.0 Right 1857; Type: QD000P40CD; Serial: TP1857
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/1900MHz Body System check /Area Scan (81x81x1):

Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 4.84 W/kg

Configuration/1900MHz Body System check /Zoom Scan (7x7x7)/Cube 0:

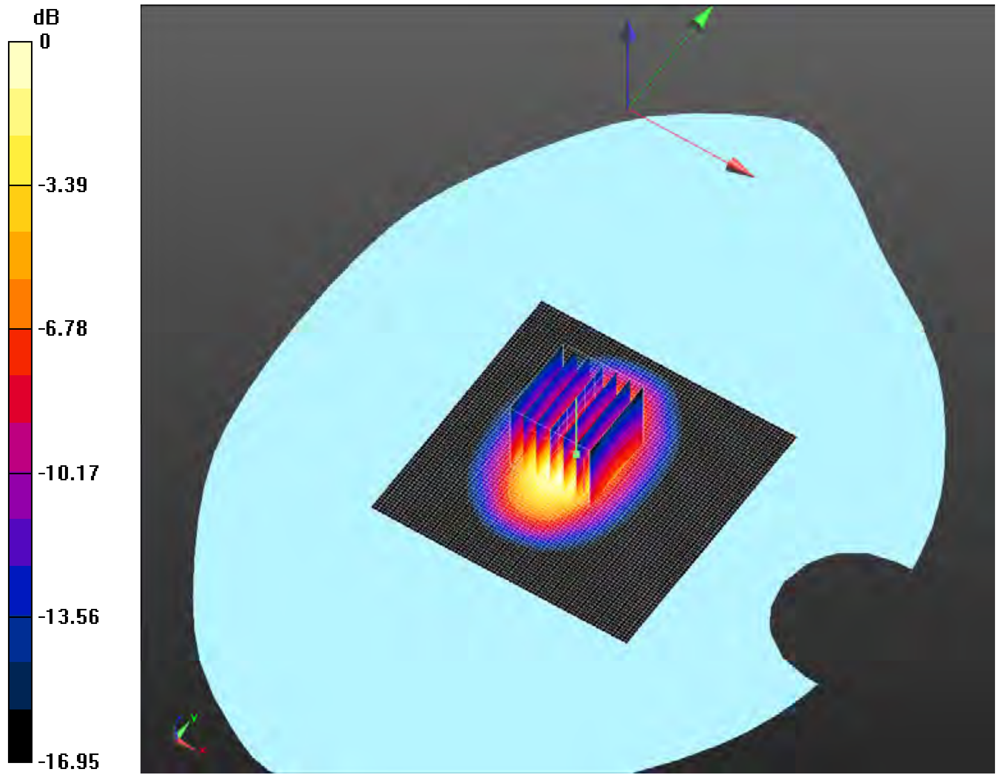
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 51.05 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 7.54 W/kg

SAR(1 g) = 4.17 W/kg; SAR(10 g) = 2.18 W/kg

Maximum value of SAR (measured) = 4.73 W/kg



0 dB = 4.73 W/kg = 6.75 dBW/kg

ANNEX C TEST DATA

Please refer the document “BL-SZ1640189-703-Test Data.pdf”.

ANNEX D EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ1640189-AW.pdf”.

ANNEX E SAR TEST SETUP PHOTOS

Please refer the document “BL-SZ1640189-703-AS.pdf”.

ANNEX F CALIBRATION REPORT

F.1 E-Field Probe

TTL In Collaboration with s p e a g CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2218 Fax: +86-10-62304633-2209
E-mail: cttl@chinattl.com Http://www.chinattl.cn

ilac-MRA CNAS CALIBRATION No. L0570

Client: baluntek

Certificate No: Z15-97196

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:7340
Calibration Procedure(s)	FD-Z11-2-004-01 Calibration Procedures for Dosimetric E-field Probes
Calibration date:	December 10, 2015

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	01-Jul-15 (CTTL, No.J15X04256)	Jun-16
Power sensor NRP-Z91	101547	01-Jul-15 (CTTL, No.J15X04256)	Jun-16
Power sensor NRP-Z91	101548	01-Jul-15 (CTTL, No.J15X04256)	Jun-16
Reference10dBAttenuator	18N50W-10dB	13-Mar-14(TMC,No.JZ14-1103)	Mar-16
Reference20dBAttenuator	18N50W-20dB	13-Mar-14(TMC,No.JZ14-1104)	Mar-16
Reference Probe EX3DV4	SN 7307	27-Feb-15(SPEAG,No.EX3-7307_Feb15)	Feb-16
DAE4	SN 771	27-Jan-15(SPEAG, No.DAE4-771_Jan15)	Jan -16
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
SignalGeneratorMG3700A	6201052605	01-Jul-15 (CTTL, No.J15X04255)	Jun-16
Network Analyzer E5071C	MY46110673	03-Feb-15 (CTTL, No.J15X00728)	Feb-16

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

Issued: December 11, 2015

Certificate No: Z15-97196 Page 1 of 11

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s p e a g
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Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A,B,C,D	modulation dependent linearization parameters
Polarization Φ	Φ rotation around probe axis
Polarization θ	θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i θ=0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3GHz)", February 2005

Methods Applied and Interpretation of Parameters:

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

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Probe EX3DV4

SN: 7340

Calibrated: December 10, 2015

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 7340

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm(μV/(V/m)^2)[A]	0.51	0.48	0.45	±10.8%
DCP(mV)[B]	100.7	101.8	105.1	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	194.7	±2.2%
		Y	0.0	0.0	1.0		188.5	
		Z	0.0	0.0	1.0		183.1	

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of Norm X, Y, Z do not affect the E^2-field uncertainty inside TSL (see Page 5 and Page 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainly is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 7340

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz][C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (k=2)
850	41.5	0.92	9.56	9.56	9.56	0.12	1.42	±12%
1750	40.1	1.37	8.22	8.22	8.22	0.22	1.08	±12%
1900	40.0	1.40	8.15	8.15	8.15	0.21	1.09	±12%
2450	39.2	1.80	7.62	7.62	7.62	0.48	0.72	±12%
2600	39.0	1.96	7.42	7.42	7.42	0.34	0.98	±12%
5200	36.0	4.66	5.33	5.33	5.33	0.39	1.21	±13%
5600	35.5	5.07	4.70	4.70	4.70	0.39	1.20	±13%
5800	35.3	5.27	4.68	4.68	4.68	0.39	1.25	±13%

[C] Frequency validity of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequency below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 7340

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz][C]	Relative Permittivity[F]	Conductivity (S/m)[F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (k=2)
850	55.2	0.99	9.83	9.83	9.83	0.15	1.46	±12%
1750	53.4	1.49	7.87	7.87	7.87	0.20	1.16	±12%
1900	53.3	1.52	7.51	7.51	7.51	0.18	1.30	±12%
2450	52.7	1.95	7.38	7.38	7.38	0.35	0.97	±12%
2600	52.5	2.16	6.99	6.99	6.99	0.34	1.02	±12%
5200	49.0	5.30	4.56	4.56	4.56	0.45	1.31	±13%
5600	48.5	5.77	3.98	3.98	3.98	0.48	1.33	±13%
5800	48.2	6.00	4.15	4.15	4.15	0.50	1.18	±13%

[C] Frequency validity of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequency below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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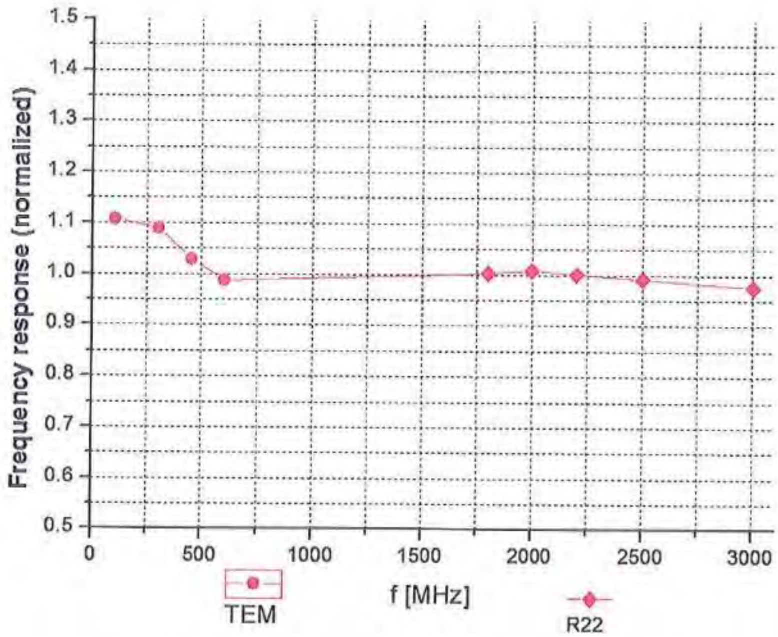
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ±7.5% (k=2)

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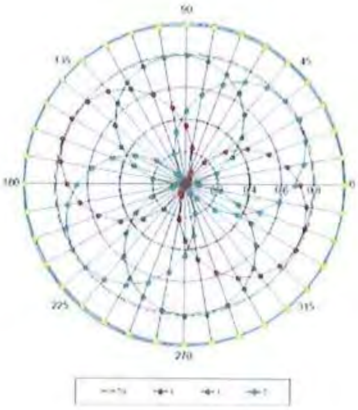
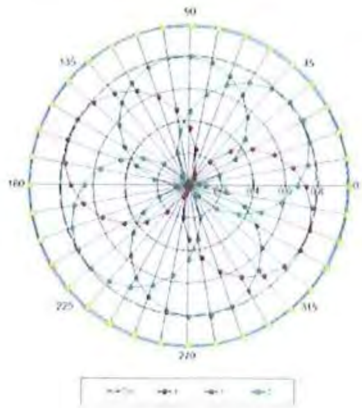
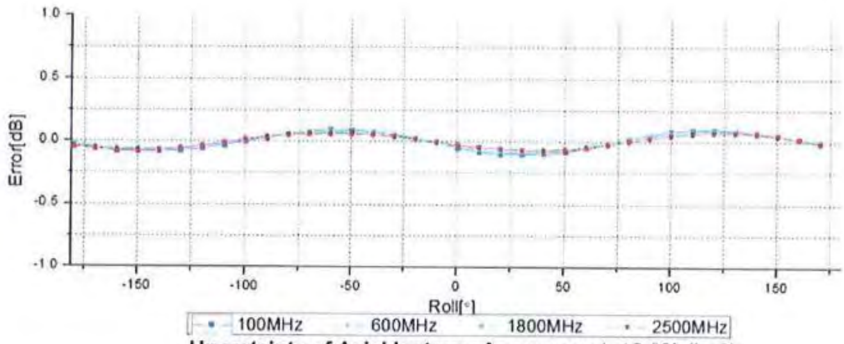
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM

f=1800 MHz, R22







Uncertainty of Axial Isotropy Assessment: ±0.9% (k=2)

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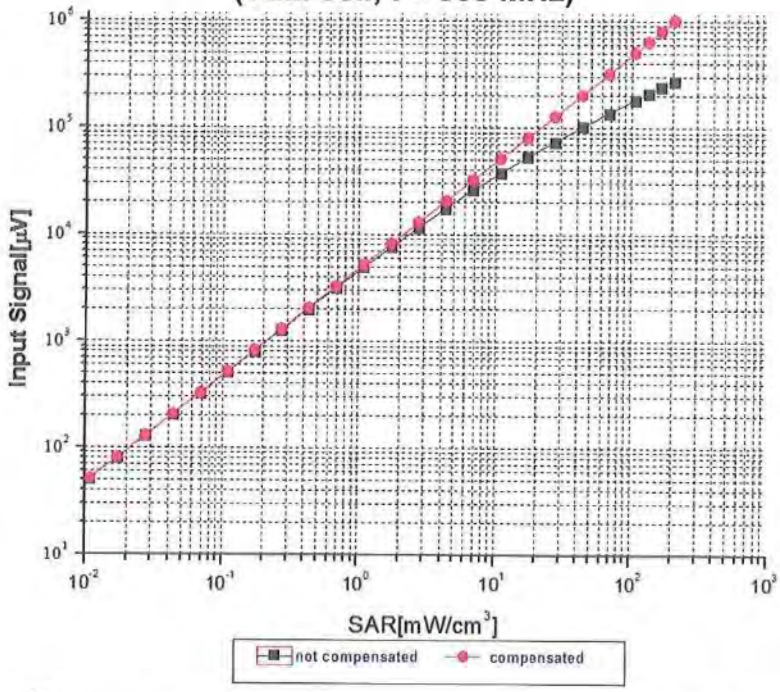
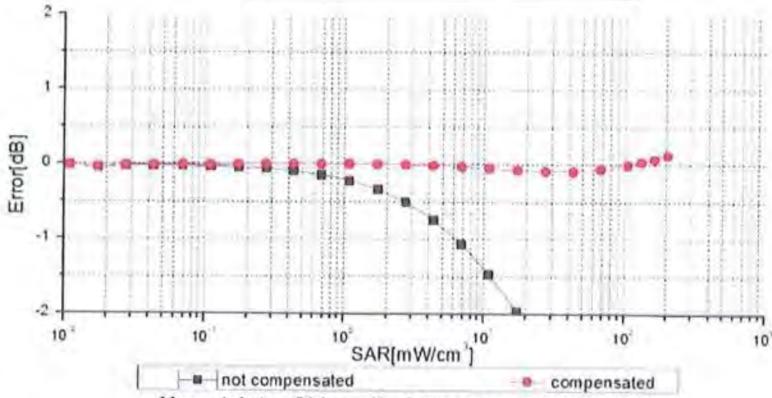
Dynamic Range f(SAR_{head})
(TEM cell, f = 900 MHz)





Uncertainty of Linearity Assessment: ±0.9% (k=2)

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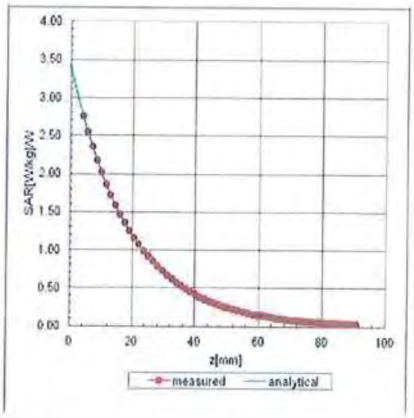
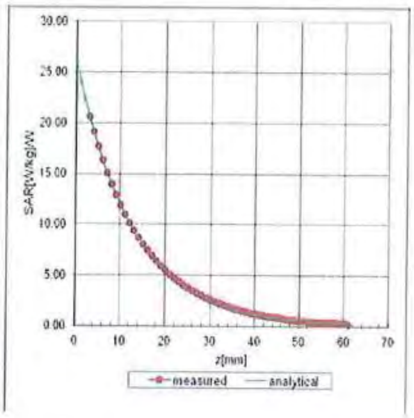
Conversion Factor Assessment

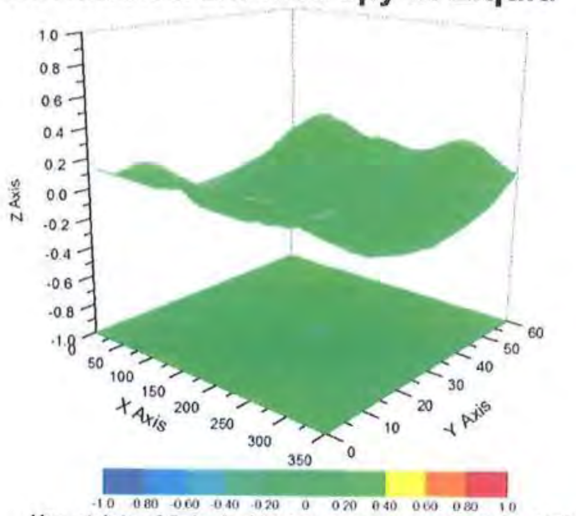
f=850 MHz, WGLS R9(H_convF)



f=1750 MHz, WGLS R22(H_convF)



Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment: ±2.8% (K=2)

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