FCC SAR TEST REPORT

Test File No : F690501/RF-SAR002179-A1

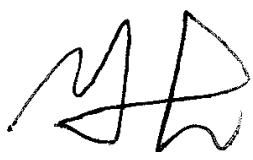
Equipment Under Test	Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID
Model No.	LG-D855
Alternative models	LGD855, D855, LG-D855k, LG-D855K, LGD855k, LGD855K, D855k, D855K
Applicant	LG Electronics MobileComm U.S.A., Inc.
Address of Applicant	10101 Old Grove Road, San Diego, CA 92131
FCC ID	ZNFD855
Device Category	Portable Device
Exposure Category	General Population/Uncontrolled Exposure
Standards	FCC 47 CFR Part 2 (2.1093) IEEE 1528, 2003 ANSI/IEEE C95.1, C95.3
Date of Test(s)	2014-04-22 ~ 2014-05-14
Date of Issue	2014-05-21

In the configuration tested, the EUT complied with the standards specified above.

Remarks:

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.
This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS Korea Co., Ltd. or testing done by SGS Korea Co., Ltd. in connection with distribution or use of the product described in this report must be approved by SGS Korea Co., Ltd. in writing.

Report prepared by /
Jongwon Ma
Test Engineer of SAR Part



Approved by /
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Revision history

Revision	Date of issue	Revisions	Revised By
-	May 21, 2014	Initial issue	-
A1	May 23, 2014	Section 4. Updated The Highest Reported SAR Values	Jongwon Ma

Contents

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2 Details of Manufacturer

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3 Description of EUT(s)

EUT Type	Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID
Model	LG-D855
Alternative models	LGD855, D855, LG-D855k, LG-D855K, LGD855k, LGD855K, D855k, D855K
Serial Number	403KPED559308
Mode of Operation	GSM850 / GSM1900 / WCDMA850 / WCDMA1900 / LTE Band 7 / 802.11a/b/g/n/ac / Bluetooth
Duty Cycle	8.3(GPRS 1Tx Slot), 4.15(GPRS 2Tx Slot), 2.77 (GPRS 3Tx Slot), 2.075 (GPRS 4Tx Slot), 1 (WCDMA, LTE, WLAN)
Body worn Accessory	None
Tx Frequency Range	GSM850 (824.20 MHz ~ 848.80 MHz) GSM1900 (1850.20 MHz ~ 1909.80 MHz) WCDMA 850 (826.4 MHz ~ 846.6 MHz) WCDMA 1900 (1852.4 MHz ~ 1907.6 MHz) LTE Band 7 (2502.5 MHz ~ 2567.5 MHz) 802.11b/g/n WLAN 2.4 GHz (2412.0 MHz ~ 2462.0 MHz) 802.11a/n/ac WLAN 5.8 GHz (5745.0 MHz ~ 5825.0 MHz) 802.11a/n/ac WLAN 5.2 GHz (5180.0 MHz ~ 5240.0 MHz) 802.11a/n/ac WLAN 5.3 GHz (5260.0 MHz ~ 5320.0 MHz) 802.11a/n/ac WLAN 5.5 GHz (5500.0 MHz ~ 5700.0 MHz) Bluetooth (2402 MHz ~ 2480 MHz)

4 The Highest Reported SAR Values

Equipment Class	Band	Tx Frequency (MHz)	Reported 1g SAR (W/kg)		
			Head	Body-Worn	Hotspot
PCE	GSM/GPRS/EDGE850	824.2 ~ 848.8	0.21	0.30	0.32
PCE	GSM/GPRS/EDGE1900	1850.2 ~ 1909.8	0.12	0.67	0.76
PCE	WCDMA 850	826.4 ~ 846.6	0.14	0.24	0.24
PCE	WCDMA 1900	1852.4 ~ 1907.6	0.13	0.68	0.74
PCE	LTE Band 7	2502.5 ~ 2567.5	0.02	0.19	0.19
DTS	2.4 GHz WLAN	2412.0 ~ 2462.0	0.12	0.06	0.06
DTS	5.8 GHz WLAN	5745.0 ~ 5825.0	0.39	0.24	0.24
NII	5.2 GHz WLAN	5180.0 ~ 5240.0	0.34	0.22	N/A
NII	5.3 GHz WLAN	5260.0 ~ 5320.0	0.36	0.27	N/A
NII	5.5 GHz WLAN	5500.0 ~ 5700.0	0.38	0.31	N/A
DSS	Bluetooth	2402.0 ~ 2480.0	N/A	N/A	N/A
Simultaneous SAR per KDB 690783 D01v01r03			0.56	0.99	0.98

5 Test Methodology

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.

Test tests documented in this report were performed in accordance with IEEE Standard 1528-2003 & IEEE 1528a-2005 and the following published KDB procedures.

In additions;

☒	**KDB 865664 D01v01r03**	**SAR Measurement Requirements for 100 MHz to 6 GHz**
☒	**KDB 447498 D01v05r02**	**Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies**
☐	KDB 447498 D02v02	SAR Measurement Procedures for USB Dongle Transmitters
☒	**KDB 248227 D01v01r02**	**SAR Measurement Procedures for 802.11a,b,g Transmitters**
☐	KDB 615223 D01v01	802.16e/WiMax SAR Measurement Guidance
☐	KDB 616217 D04v01r01	SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers
☐	KDB 643646 D01v01r01	SAR Test Reduction Considerations for Occupational PTT Radios
☒	**KDB 648474 D03v01r02**	**Evaluation and Approval Considerations for Handsets with Specific Wireless Charging Battery Covers**
☒	**KDB 648474 D04v01r02**	**SAR Evaluation Considerations for Wireless Handsets**
☐	KDB 680106 D01v02	RF Exposure Considerations for Low Power Consumer Wireless Power Transfer Applications
☒	**KDB 941225 D01v02**	**SAR Measurement Procedures for 3G Devices (CDMA 2000 / Ev-Do, WCDMA/HSDPA/HSPA)**
☒	**KDB 941225 D02v02r02**	**SAR Guidance for HSPA, HSPA+, DC-HSDPA and 1x-Advanced**
☒	**KDB 941225 D03v01**	**Recommended SAR Test Reduction Procedures for GSM/GPRS/EDGE**
☐	KDB 941225 D04v01	Evaluating SAR for GSM/(E)GPRS Dual Transfer Mode
☒	**KDB 941225 D05v02r03**	**SAR Evaluation Considerations for LTE Devices**
☒	**KDB 941225 D06v01r01**	**SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities**
☐	KDB 941225 D07v01r01	SAR Evaluation Procedures for UMPC Mini-Tablet Devices

6 Testing Environment

Ambient temperature	18°C ~ 25°C
Relative humidity	30% ~ 70%
Liquid temperature of during the test	<± 2°C
Ambient noise & Reflection	< 0.012 W/kg

7 Specific Absorption Rate (SAR)

7.1 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

7.2 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 the tissue and E is the RMS electrical field strength.

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

7.3 Test Standards and Limits

According to FCC 47CFR §2.1093(d) The limits to be used for evaluation are based generally on criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (‘‘SAR’’) in Section 4.2 of ‘‘IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 ㎑ to 300 ㎓,’’ ANSI/IEEE C95.3–2003, Copyright 2003 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in ‘‘Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields,’’ NCRP Report No. 86, Section 17.4.5. Copyright NCRP, 1986, Bethesda, Maryland 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards. The criteria to be used are specified in paragraphs (d)(1) and (d)(2) of this section and shall apply for portable devices transmitting in the

frequency range from 100 ㎑ to 6 ㎓. Portable devices that transmit at frequencies above 6 ㎓ are to be evaluated in terms of the MPE limits specified in § 1.1310 of this chapter. Measurements and calculations to demonstrate compliance with MPE field strength or power density limits for devices operating above 6 ㎓ should be made at a minimum distance of 5 cm from the radiating source.

(1) Limits for Occupational/Controlled exposure: 0.4 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 8 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 20 W/kg, as averaged over an 10 grams of tissue (defined as a tissue volume in the shape of a cube). Occupational/Controlled limits apply when persons are exposed as a consequence of their employment provided these persons are fully aware of and exercise control over their exposure. Awareness of exposure can be accomplished by use of warning labels or by specific training or education through appropriate means, such as an RF safety program in a work environment.

(2) Limits for General Population/Uncontrolled exposure: 0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 4 W/kg, as averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). General Population/Uncontrolled limits apply when the general public may be exposed, or when persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or do not exercise control over their exposure. Warning labels placed on consumer devices such as cellular telephones will not be sufficient reason to allow these devices to be evaluated subject to limits for occupational/controlled exposure in paragraph (d)(1) of this section.

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Partial Peak SAR (Partial)	1.60 m W/g	8.00 m W/g
Partial Average SAR (Whole Body)	0.08 m W/g	0.40 m W/g
Partial Peak SAR (Hands/Feet/Ankle/Wrist)	4.00 m W/g	20.00 m W/g

1. The spatial Peak value of the SAR averaged over any 1g gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
2. The spatial Average value of the SAR averaged over the whole body.
3. The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

8 The SAR Measurement System

A block diagram of the SAR measurement System is given in Fig. a. This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (SPEAG DASY 5 professional system). The model EX3DV4 field probe is used to determine the internal electric fields. The SAR can be obtained from the equation SAR= σ ($|Ei|^2$)/ ρ where σ and ρ are the conductivity and mass density of the tissue-simulant.

The DASY 5 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Staubli TX family) with controller, teach pendant and software. An arm extension is for accommodating the data acquisition electronics (DAE).
- A dosimeter 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.
- 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.

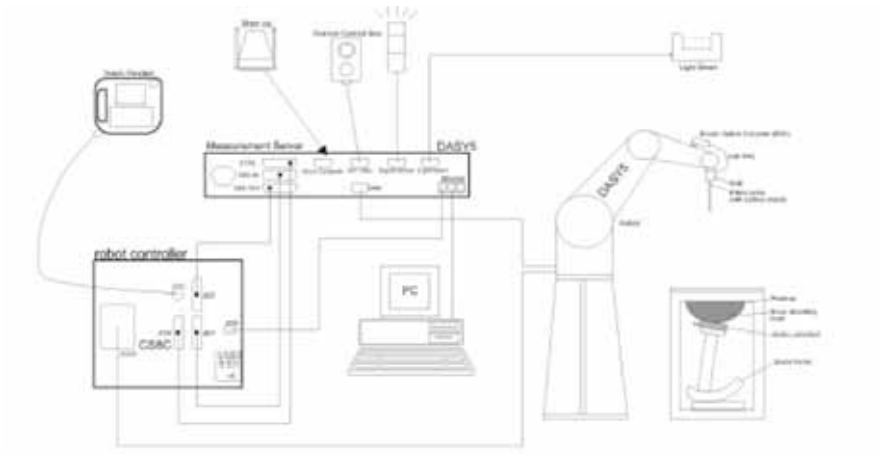


Fig a. The microwave circuit arrangement used for SAR system verification

- The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection. The EOC is connected 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.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows7
- DASY 5 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM phantom enabling testing left-hand and right-hand usage.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validate the proper functioning of the system.

9 System Components

9.1 Probe

Construction : Symmetrical design with triangular core.
Built-in shielding against static charges.
PEEK enclosure material (resistant to organic solvents, e.g., DGBE)

Calibration : Basic Broad Band Calibration in air Conversion Factors (CF) for HSL 835 and HSL1900.
Additional CF-Calibration for other liquids and frequencies upon request.

Frequency : 10 ㎒ to 6 ㎓; Linearity: ± 0.2 ㏈ (30 ㎒ to 6 ㎓)

Directivity : ± 0.3 ㏈ in HSL (rotation around probe axis)
± 0.5 ㏈ in tissue material (rotation normal to probe axis)

Dynamic Range : 10μW/g to > 100 m W/g;
Linearity: ± 0.2 ㏈(noise: typically < 1 μW/g)

Dimensions : Overall length: 337 ㎜ (Tip length: 20 ㎜)
Tip diameter: 2.5 ㎜ (Body diameter: 12 ㎜)
Distance from probe tip to dipole centers: 1 ㎜

Application : High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 ㎓ with precision of better 30%

Construction : Symmetrical design with triangular core.
Built-in shielding against static charges.
PEEK enclosure material (resistant to organic solvents, e.g., DGBE)


EX3DV4 E-Field Probe

NOTE:

1. The Probe parameters have been calibrated by the SPEAG. Please reference “APPENDIX C” for the Calibration Certification Report.

9.2 SAM Phantom

Construction : The SAM Phantom is constructed of a fiberglass shell integrated in a wooden table. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90 % of all users. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents the evaporation of the liquid. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot

Shell Thickness : 2.0 ㎜ ± 0.1 ㎜

Filling Volume : Approx. 25 liters


SAM Phantom

9.3 Device Holder

Construction: : In combination with the Twin SAM PhantomV4.0/V4.0C or Twin SAM, the Mounting Device (made from POM) enables the rotation of the mounted transmitter in spherical coordinates, whereby the rotation point is the ear opening. The devices can be easily and accurately positioned according to IEC, IEEE, CENELEC, FCC or other specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).

Device Holder

10 SAR Measurement Procedures

10.1 Normal SAR Measurement Procedure

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The Minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 2 ㎜. This distance cannot be smaller than the Distance of sensor calibration points to probe tip as defined in the probe properties.

Step 2 and 3: Area Scan & Zoom Scan Procedures

The entire evaluation of the spatial peak values is performed within the Post-processing engine (SEMCAD). The system always gives the maximum values for the 1 g and 10 g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

1. The extraction of the measured data (grid and values) from the Zoom Scan.
2. The calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
3. The generation of a high-resolution mesh within the measured volume
4. The interpolation of all measured values from the measurement grid to the high-resolution grid
5. The extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
6. The calculation of the averaged SAR within masses of 1 g and 10 g.

Step 4: Power drift measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

< Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01r03 >

			≤3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}			≤2 GHz: ≤15 mm 2 – 3 GHz: ≤12 mm	3 – 4 GHz: ≤12 mm 4 – 6 GHz: ≤10 mm
			When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤2 GHz: ≤8 mm 2 – 3 GHz: ≤5 mm*	3 – 4 GHz: ≤5 mm* 4 – 6 GHz: ≤4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤5 mm	3 – 4 GHz: ≤4 mm 4 – 5 GHz: ≤3 mm 5 – 6 GHz: ≤2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤4 mm	3 – 4 GHz: ≤3 mm 4 – 5 GHz: ≤2.5 mm 5 – 6 GHz: ≤2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥30 mm	3 – 4 GHz: ≥28 mm 4 – 5 GHz: ≥25 mm 5 – 6 GHz: ≥22 mm

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 *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 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

11 Definition of Reference

11.1EAR Reference Point

Fig 2 shows the front, back and side views of the SAM Twin Phantom. The point "M" is the reference point for the center of the mouth, "LE" is the left ear reference point (ERP), and "RE" is the right ERP. The ERPs are 15mm posterior to the entrance to the ear canal (EEC) along the B-M line (Back-Mouth), as shown in Fig 3. The plane passing through the two ear canals and M is defined as the Reference Plane. The line N-F (Neck-Front) is perpendicular to the reference plane and passing through the RE (or LE) is called the Reference Pivoting Line (see Fig 4). Line B-M is perpendicular to the N-F line. Both N-F and B-M lines are marked on the external phantom shell to facilitate handset positioning.

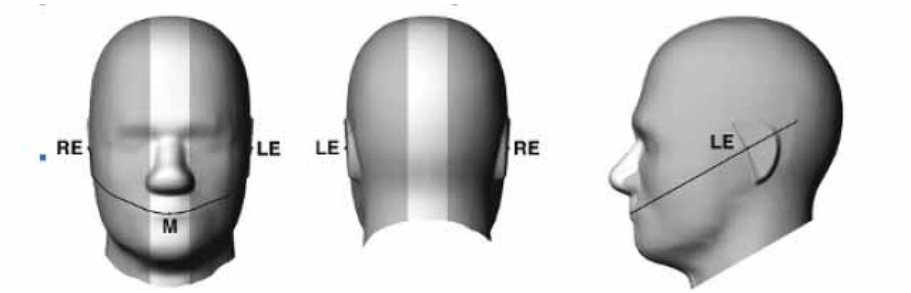


Fig 2 Front, back and side view of SAM Twin Phantom

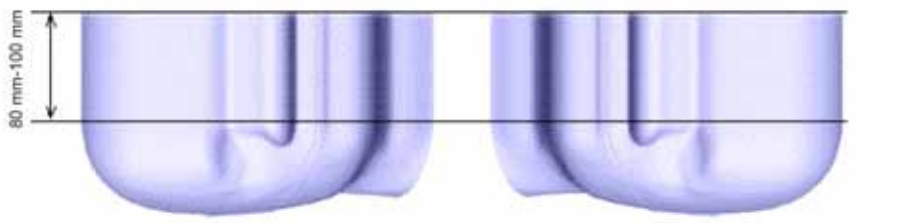


Fig 3 Sagittally bisected phantom with extended perimeter (shown placed on its side as used for device SAR tests)

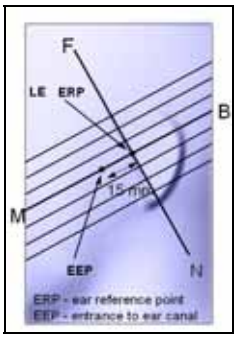


Fig 4 Close-up side view of ERP

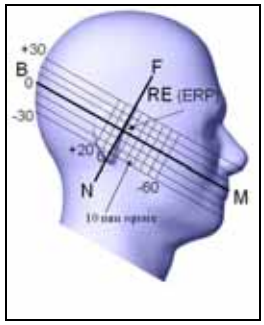


Fig 5 Side view of the phantom showing relevant markings

11.2 EUT constructions

Two imaginary lines on the handset were established: the vertical centerline and the horizontal line. The test device was placed in a normal operating position with the "test device reference point" located along the "vertical centerline" on the front of the device aligned to the "ear reference point" (see Fig. 6). The "test device reference point" was than located at the same level as the center of the ear reference point. The test device was positioned so that the "vertical centerline" was bisecting the front surface of the handset at it's top and bottom edges, positioning the "ear reference point" on the outer surface of the both the left and right head phantoms on the ear reference point.

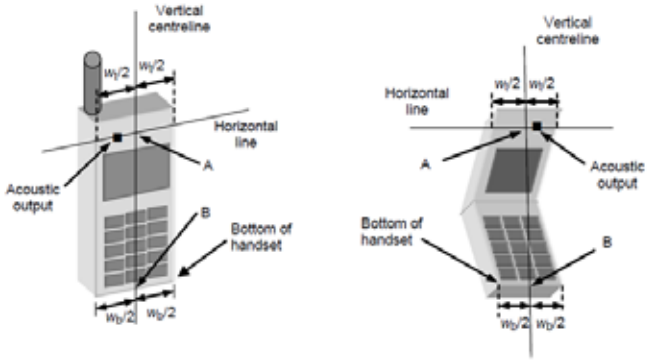


Fig 6 Handset Vertical Center & Horizontal Line Reference Points

11.3 Positioning for Touch

a) Position the device with the vertical centre line of the body of the device and the horizontal line crossing the centre of the ear piece in a plane parallel to the sagittal plane of the phantom (initial position). While maintaining the device in this plane, align the vertical centre line with the reference plane containing the three ear and mouth reference points (M, RE and LE) and align the centre of the ear piece with the line RE-LE;

b) Translate the handset towards the phantom along the line passing through RE and LE until the handset touches the ear.

c) While maintaining the device in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to MB-NF including the line MB (called the reference plane).

d) Rotate the phone around the vertical centerline until the phone (horizontal line) is ymmetrical with respect to the line NF.

e) While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE, and maintaining the phone contact with the ear, rotate the handset about the line NF until any point on the handset is in contact with a phantom point below the pinna (cheek). (see Fig. 7) The physical angles of rotation should be

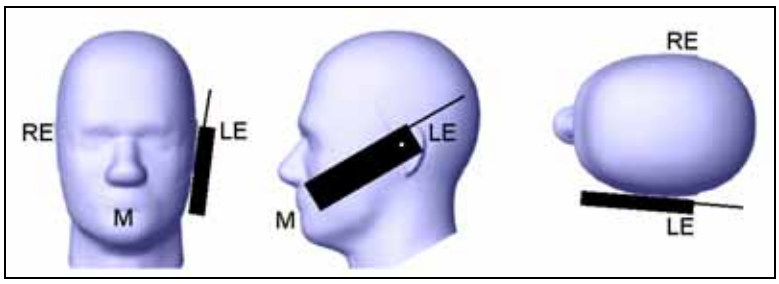


Fig 7 Cheek/Touch position of the wireless device on the left side of SAM

11.4 Positioning for Ear/15˚ Tilt

With the test device aligned in the "Cheek/Touch Position":

a) While maintain the device in the reference plane described above and pivoting against the ear, move it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost.

b) The phone was then rotated around the horizontal line by 15 degrees.

c) While maintaining the orientation of the phone, the phone was moved parallel to the reference plane until any part of the handset touched the head. (In this position, point A was located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact was at any location other than the pinna, the angle of the phone would then be reduced. In this situation, the tilted position was obtained when any part of the phone was in contact of the ear as well as a second part of the phone was in contact with the head (see Fig 8).

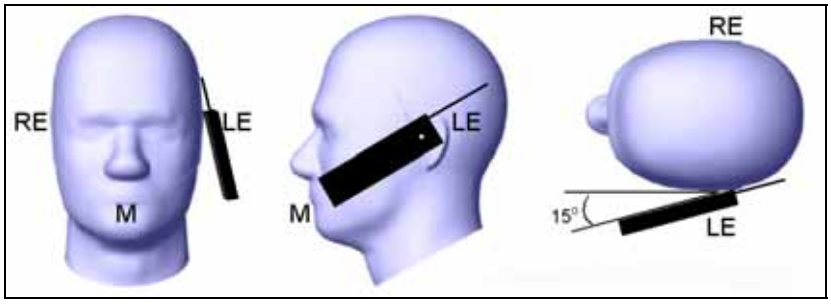


Fig 8 Ear/15˚ Tilt position of the wireless device on the left side of SAM

11.5 Body-Worn Accessory Configurations

Body-worn operation configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration. A device with a headset output is tested with a headset connected to the device.

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

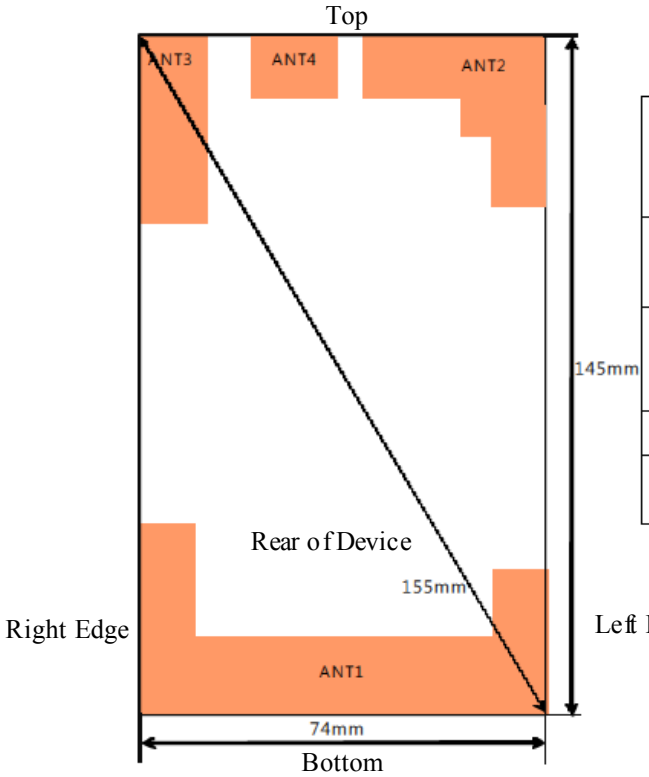
Body-worn accessories may not always be supplied of available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration where a separation distances between the back of the device and the flat phantom is used. Test position spacing was documented.

11.6 Wireless Router Configurations

Some battery-operated handsets have the capability to transmit and receive user data through simultaneous transmission of WLAN simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 v01r01 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10 mm from the front, back and edges of the device containing transmitting antennas within 2.5 cm of their edges, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WLAN transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WLAN transmitter according to FCC KDB Publication 447498 D01v05r02 publication procedures. The “Portable Hotspot” feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

11.7 DUT Antenna Locations



ANT1	GSM 850/1900 WCDMA B2/5 LTE B7
ANT2	WCDMA B5 Rx only
ANT3	GPS LTE B7 Rx only
ANT4	BT/Wi-Fi
ANT5	NFC

11.8 Mobile Hotspot sides for SAR Testing configurations

Mode	Rear	Front	Left Edge	Right Edge	Bottom	Top
GPRS 850	Yes	Yes	Yes	Yes	Yes	No
GPRS 1900	Yes	Yes	Yes	Yes	Yes	No
WCDMA 850	Yes	Yes	Yes	Yes	Yes	No
WCDMA 1900	Yes	Yes	Yes	Yes	Yes	No
WLAN 2.4 GHz	Yes	Yes	No	Yes	No	Yes
WLAN 5 GHz	Yes	Yes	No	Yes	No	Yes

Notes

Particular DUT edges were not required to be evaluated for Wireless Router SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC Publication 941225 D06v01r01 guidance, page 2. The antenna document shows the distances between the transmit antennas and the edges of the device.

12 LTE Information

FCC IC	ZNFD855							
Form Factor	Portable Handset							
Frequency Range	Band 7 (2502.5 MHz ~ 2567.5 MHz)							
Channel Number & Frequency	Band 7							
	5 MHz		10 MHz		15 MHz		20 MHz	
	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)
	20775	2502.5	20800	2505.0	20825	2507.5	20850	2510.0
	21100	2535.0	21100	2535.0	21100	2535.0	21100	2535.0
	21425	2567.5	21400	2565.0	21375	2562.5	21350	2560.0
UE Category	3							
Uplink Modulation	QPSK, 16QAM							
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3~6.2.5? (manufacturer attestation to be provided)	Yes							
A-MPR (Additional MPR) disabled for SAR Testing?	Yes							
Maximum average conducted output power for other wireless mode and frequency	See Section 21.3.6 LTE Conducted power measurements in the SAR report.							
Power reduction explanation	N/A							
Description of the test equipment	LTE SAR Testing was performed using a CMW500.							

13 SAR System Verification

The microwave circuit arrangement for system verification is sketched in Fig. 9. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within +/- 10% from the target SAR values. These tests were done at 835 MHz, 1900 MHz, 2.4 GHz, 5.2 GHz, 5.3 GHz, 5.6 GHz and 5.8 GHz. The tests were conducted on the same days as the measurement of the DUT. The obtained results from the system accuracy verification are displayed in the table 1. (SAR values are normalized to 1W forward power delivered to the dipole). During the tests, the ambient temperature of the laboratory was in the range (22 ± 2) ° C, the relative humidity was in the range (55 ± 5) % R.H and the liquid depth above the ear reference points was ≥ 15 cm ± 5 mm (frequency ≤ 3 GHz) or ≥ 10 cm ± 5 mm (frequency > 3 G Hz)in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.

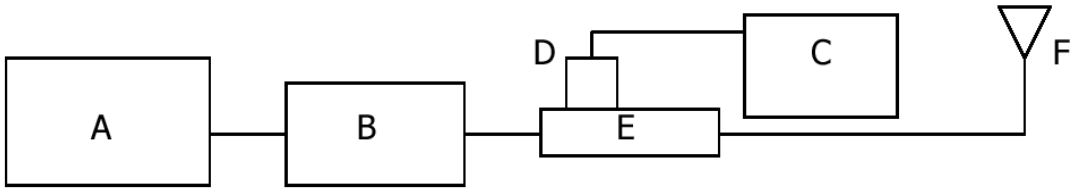


Fig 9. The microwave circuit arrangement used for SAR system verification

A. Agilent Model E8247C Signal Generator
B. EMPOWER Model 2001-BBS3Q7ECK Amplifier
EMPOWER Model 2092-BBS5K9CAJ Amplifier
C. Agilent Model E4419B Power Meter
D. Agilent Model 9300H Power Sensor
E. Agilent Model 86205A Directional RF Bridges
F. Reference dipole Antenna

Photo of the dipole Antenna

Verification Kit	Probe S/N	Tissue (MHz)	Target SAR 1 g from Standard (1 W)	Target SAR 10 g from Standard (1 W)	Normalized SAR 1 g (1 W)	Normalized SAR 10 g (1 W)	1g Deviation (%)	10g Deviation (%)	Date	Liquid Temp. (°C)
D835V2 SN:4d138	3862	835	9.44	6.16	9.75	6.4	**3.28**	**3.90**	04/22/2014	21.6
D835V2 SN:4d138	3862	835	9.32	6.16	9.68	6.46	**3.86**	**4.87**	04/22/2014	21.5
D1900V2 SN:5d158	3862	1900	40.1	21.0	38.3	19.9	**-4.49**	**-5.24**	04/23/2014	22.3
D1900V2 SN:5d158	3862	1900	39.7	21.1	39.4	20.8	**-0.76**	**-1.42**	04/23/2014	22.1
D2450V2 SN:892	3862	2450	52.4	24.4	50.4	22.8	**-3.82**	**-6.56**	04/24/2014	22.1
D2450V2 SN:892	3862	2450	50.1	23.2	51.1	23.2	**2.00**	**0.00**	04/24/2014	21.7
D2600V2 SN:1038	3972	2600	58.0	25.8	60.9	26.7	**5.00**	**3.49**	05/14/2014	21.8
D2600V2 SN:1038	3972	2600	55.9	24.9	54.9	23.8	**-1.79**	**-4.42**	05/14/2014	21.6
D5000V2 SN:1170	3862	5200	79.7	22.9	78.3	22.4	**-1.76**	**-2.18**	04/27/2014	22.1
D5000V2 SN:1106	3862	5200	74.9	20.9	73.7	20.5	**-1.60**	**-1.91**	04/26/2014	22.1
D5000V2 SN:1170	3862	5300	81.8	23.5	79.4	22.4	**-2.93**	**-4.68**	04/27/2014	22.1
D5000V2 SN:1106	3862	5300	76.8	21.5	73.1	20.5	**-4.82**	**-4.65**	04/26/2014	22.1
D5000V2 SN:1170	3862	5600	84.1	24.0	83.6	23.6	**-0.59**	**-1.67**	04/28/2014	22.3
D5000V2 SN:1106	3892	5600	81.4	22.5	82.4	23.0	**1.23**	**2.22**	04/25/2014	22.1
D5000V2 SN:1170	3862	5800	80.0	22.8	82.2	23.2	**2.75**	**1.75**	04/28/2014	22.3
D5000V2 SN:1106	3862	5800	75.1	20.7	71.8	20.1	**-4.39**	**-2.90**	04/25/2014	22.1

Table1. Results system verification

14 Tissue Simulant Fluid for the Frequency Band

The dielectric properties for this simulant fluid were measured by using the Speag Model DAK-3.5 Dielectric Probe in conjunction with Agilent E5071C Network Analyzer(300 ㎑ - 6 ㎓) by using a procedure detailed in Section V.

f (㎒)	Tissue type	Limits / Measured	Dielectric Parameters		
			Permittivity	Conductivity	Simulated Tissue Temp(℃)
835	Head	Measured, 04-22-2014	42.5	0.91	21.6
		Target Tissue Head	41.5	0.90	
		Deviation (%)	**2.41**	**1.11**	
835	Body	Measured, 04-22-2014	56.2	0.95	21.5
		Target Tissue Head	55.2	0.97	
		Deviation (%)	**1.81**	**-2.06**	
1900	Head	Measured, 04-23-2014	39.0	1.39	22.3
		Target Tissue Head	40.0	1.4	
		Deviation (%)	**-2.50**	**-0.71**	
1900	Body	Measured, 04-23-2014	54.7	1.51	22.1
		Target Tissue Head	53.3	1.52	
		Deviation (%)	**2.63**	**-0.66**	
2450	Head	Measured, 04-24-2014	40.1	1.83	22.1
		Target Tissue Head	39.2	1.80	
		Deviation (%)	**2.30**	**1.67**	
2450	Body	Measured, 04-24-2014	52.6	1.90	21.7
		Target Tissue Head	52.7	1.95	
		Deviation (%)	**-0.19**	**-2.56**	
2600	Head	Measured, 05-14-2014	39.5	2.05	21.8
		Target Tissue Head	39.0	1.96	
		Deviation (%)	**1.28**	**4.59**	
2600	Body	Measured, 05-14-2014	50.8	2.21	21.6
		Target Tissue Head	52.5	2.16	
		Deviation (%)	**-3.24**	**2.31**	
5200	Head	Measured, 04-27-2014	34.6	4.71	22.1
		Target Tissue Head	36.0	4.66	
		Deviation (%)	**-3.89**	**1.07**	
5200	Body	Measured, 04-26-2014	50.9	5.50	22.1
		Target Tissue Head	49.0	5.30	
		Deviation (%)	**3.88**	**3.77**	
5300	Head	Measured, 04-27-2014	34.4	4.84	22.1
		Target Tissue Head	35.9	4.76	
		Deviation (%)	**-4.18**	**1.68**	
5300	Body	Measured, 04-26-2014	50.7	5.64	22.1
		Target Tissue Head	48.9	5.42	
		Deviation (%)	**3.68**	**4.06**	
5600	Head	Measured, 04-28-2014	35.0	5.04	22.3
		Target Tissue Head	35.5	5.07	
		Deviation (%)	**-1.41**	**-0.59**	
5600	Body	Measured, 04-25-2014	48.0	5.75	22.1
		Target Tissue Head	48.44	5.77	
		Deviation (%)	**-0.91**	**-0.35**	
5800	Head	Measured, 04-28-2014	34.6	5.24	22.3
		Target Tissue Head	35.3	5.27	
		Deviation (%)	**-1.98**	**-0.57**	
5800	Body	Measured, 04-25-2014	47.7	6.04	22.1
		Target Tissue Head	48.2	6.00	
		Deviation (%)	**-1.04**	**0.67**	

The composition of the brain & muscle tissue simulating liquid

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Ingredients (% by weight)	Frequency (㎒)									
	450		835		915		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7
Dielectric Constant	43.42	58.0	42.54	56.1	42.0	56.8	39.9	54.0	39.8	52.5
Conductivity (S/m)	0.85	0.83	0.91	0.95	1.0	1.07	1.42	1.45	1.88	1.78

Salt: 99 $^{+}$% Pure Sodium Chloride Sugar: 98 $^{+}$% Pure Sucrose

Water: De-ionized, 16 MΩ^{+} resistivity HEC: Hydroxyethyl Cellulose

DGBE: 99 $^{+}$% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]

Triton X-100 (ultra pure): Polyethylene glycol mono [4-(1,1, 3, 3-tetramethylbutyl)phenyl]ether

Simulating Liquids for 5 ㎓, Manufactured by SPEAG

Ingredients	(% by weight)
Water	78
Mineral Oil	11
Emulsifiers	9
Additives and Salt	2

15 Test System Validation

Per FCC KDB 865664 D01v01r03, SAR system validation status should be documented to confirm measurement accuracy. The SAR systems (including SAR probes, system components and software versions) used for this device were validated against its performance specifications prior to the SAR measurements. Reference dipoles were used with the require tissue-equivalent media for system validation, according to the procedures outlined in IEEE 1528-2003 and FCC KDB 865664 D01v01r03. Since frequency within the valid frequency range of the probe calibration point, using the system that normally operates with the probe for routine SAR measurements and according to the required tissue-equivalent media.

A tabulated summary of the system validation status including the validation date(s), measurement frequencies, SAR probe and tissue dielectric parameters has been included.

f (MHz)	Date	Probe S/N	Probe Cal point	Tissue Type	Dielectric Parameters		CW Validation			Modulated Validation		
					Permittivity	Conductivity	Sensitivity	Probe Linearity	Probe Isotropy	Mod. Type	Duty Factor	PAR
835	2014-02-17	3862	835	Head	42.2	0.91	PASS	PASS	PASS	GMSK	PASS	N/A
835	2014-02-17	3862	835	Body	56.0	0.94	PASS	PASS	PASS	GMSK	PASS	N/A
1900	2014-02-18	3862	1900	Head	39.6	1.36	PASS	PASS	PASS	GMSK	PASS	N/A
1900	2014-02-18	3862	1900	Body	54.1	1.49	PASS	PASS	PASS	GMSK	PASS	N/A
2450	2014-02-14	3862	2450	Head	39.6	1.83	PASS	PASS	PASS	OFDM	N/A	PASS
2450	2014-02-14	3862	2450	Body	53.3	1.96	PASS	PASS	PASS	OFDM	N/A	PASS
2600	2014-05-11	3972	2600	Head	39.5	2.04	PASS	PASS	PASS	N/A	N/A	N/A
2600	2014-05-11	3972	2600	Body	51.2	2.21	PASS	PASS	PASS	N/A	N/A	N/A
5200	2014-02-19	3862	5200	Head	36.1	4.51	PASS	PASS	PASS	OFDM	N/A	PASS
5200	2014-02-28	3862	5200	Body	50.0	5.14	PASS	PASS	PASS	OFDM	N/A	PASS
5300	2014-02-19	3862	5300	Head	35.9	4.6	PASS	PASS	PASS	OFDM	N/A	PASS
5300	2014-02-28	3862	5300	Body	49.8	5.27	PASS	PASS	PASS	OFDM	N/A	PASS
5600	2014-02-20	3862	5600	Head	35.1	5.05	PASS	PASS	PASS	OFDM	N/A	PASS
5600	2014-03-30	3862	5600	Body	48.5	5.65	PASS	PASS	PASS	OFDM	N/A	PASS
5800	2014-02-20	3862	5800	Head	34.6	5.27	PASS	PASS	PASS	OFDM	N/A	PASS
5800	2014-03-30	3862	5800	Body	48.2	5.92	PASS	PASS	PASS	OFDM	N/A	PASS

< SAR System Validation Summary>

16 Instruments List

Manufacturer	Device	Type	Serial Number	Cal Date	Cal Interval	Cal Due
Stäubli	Robot	TX90XL	F12/5LP8A1/ A/01	N/A	N/A	N/A
SPEAG	E-Field Probe	EX3DV4	3862	01/29/2014	Annual	01/29/2015
SPEAG	E-Field Probe	EX3DV4	3972	01/28/2014	Annual	01/28/2015
SPEAG	835 MHz System Validation Dipole	D835V2	4d138	09/27/2013	Biennial	09/27/2015
SPEAG	1900 MHz System Validation Dipole	D1900V2	5d158	09/27/2013	Biennial	09/27/2015
SPEAG	2450 MHz System Validation Dipole	D2450V2	892	09/26/2013	Biennial	09/26/2015
SPEAG	2600 MHz System Validation Dipole	D2600V2	1038	05/29/2013	Biennial	05/29/2015
SPEAG	5 GHz System Validation Dipole	D5GHzV2	1106	03/15/2013	Biennial	03/15/2015
SPEAG	5 GHz System Validation Dipole	D5GHzV2	1170	01/14/2014	Biennial	01/14/2016
SPEAG	Data acquisition Electronics	DAE4	1340	05/28/2013	Annual	05/28/2014
SPEAG	Data acquisition Electronics	DAE4	614	09/20/2013	Annual	09/20/2015
SPEAG	Software	DASY5 V52	-	N/A	N/A	N/A
SPEAG	Phantom	SAM Phantom	TP-1720 TP-1721	N/A	N/A	N/A
Agilent	Network Analyzer	E5071C	MY46111535	06/27/2013	Annual	06/27/2014
SPEAG	Dielectric Assessment Kit	DAK-3.5	1107	01/19/2014	Annual	01/19/2015
Agilent	Power Meter	E4419B	GB43311715	06/26/2013	Annual	06/26/2014
Agilent	Power Sensor	E9300H	MY41495314	09/10/2013	Annual	09/10/2014
			MY41495307	09/10/2013	Annual	09/10/2014
Agilent	Signal Generator	E4421B	MY43350132	06/27/2013	Annual	06/27/2014
Agilent	Signal Generator	E8247C	MY43321024	06/26/2013	Annual	06/26/2014
Empower RF Systems	Power Amplifier	2001-BBS3Q7ECK	1032 D/C 0336	01/02/2014	Annual	01/02/2015
Empower RF Systems	Power Amplifier	2092-BBS5K8CAJ	1010	09/09/2014	Annual	09/09/2015
Agilent	Directional Bridges	86205A	MY31402302	06/29/2013	Annual	06/29/2014
Microlab	LP Filter	LA-15N	N/A	09/09/2013	Annual	09/09/2014
Microlab	LP Filter	LA-30N	N/A	09/09/2013	Annual	09/09/2014
Microlab	LP Filter	LA-60N	N/A	09/09/2013	Annual	09/09/2014
Agilent	Attenuator	8491B	50566	09/09/2013	Annual	09/09/2014
JUMBP	Hygro-Thermometer	BJ5478	12091382-1	07/02/2013	Annual	07/02/2014
LKM Electronic	Digital Thermometer	DTM3000	3027	07/01/2013	Annual	07/01/2014
Agilent	Spectrum Analyzer	E4445A	MY44020523	07/26/2013	Annual	07/26/2014
ROHDE& SCHWARZ	Communication Tester	CMW500	144030	03/03/2014	Annual	03/03/2015

17 Justification for Extended SAR Dipole Calibrations

Usage of SAR dipoles calibrated less than 3 years ago but more than 1 year ago were confirmed in maintaining return loss (< -20 dB, within 20 % of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB Publication 865664 D01v01r03:

D5GHzV2 (SN : 1106)					
5.2 GHz Body	Measurement Date	Return Loss (dB)	Δ%	Impedence (Ω)	ΔΩ
	03/15/2013	-20.6	-	50.3	-
	04/07/2014	-23.2	12.62	50.1	-0.40
5.3 GHz Body	Measurement Date	Return Loss (dB)	Δ%	Impedence (Ω)	ΔΩ
	03/15/2013	-29.8	-	50.9	-
	04/07/2014	-24.9	-16.44	48.4	-4.91
5.6 GHz Body	Measurement Date	Return Loss (dB)	Δ%	Impedence (Ω)	ΔΩ
	03/15/2013	-24.6	-	54.5	-
	04/07/2014	-22.3	-9.35	50.1	-8.07
5.8 GHz Body	Measurement Date	Return Loss (dB)	Δ%	Impedence (Ω)	ΔΩ
	03/15/2013	-27.2	-	54.4	-
	04/07/2014	-29.1	6.99	52.3	-3.86

18 FCC Power Measurement Procedures

Power measurements were performed using a base station simulator under digital average power.

The handset was placed into a simulated call using a base station simulator in shielded chamber. SAR measurements were taken with a fully charged battery. In order to verify that the device was tested and maintained at full power, this was configured with the base station simulator. The SAR measurement Software calculates a reference point at the start and end of the test to check for power drifts. If conducted power deviations of more than 5 % occurred, the tests were repeated.

19 Measured and Reported SAR

Per FCC KDB Publication 447498 D01v05r02, When SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance. For simultaneous transmission, the measured aggregate SAR must be scaled according to the sum of the differences between the maximum tune-up tolerance and actual power used to test each transmitter. When SAR is measured at or scaled to the maximum tune-up tolerance limit, the results are referred to as reported SAR. Test highest reported SAR results are identified on the grant of equipment authorization according to procedures in KDB 690783 D01v01r03.

20 Nominal and Maximum Output Power Specifications

This device operates using the following maximum and nominal output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D01v05r02.

Mode / Band		Burst Average GMSK (dBm)								
		Voice	GPRS(GMSK) Data – CS1				EDGE(8-PSK) Data- MCS7			
		GSM	1 slot	2 slot	3 slot	4 slot	1 slot	2 slot	3 slot	4 slot
GSM850	**Maximum**	**33.7**	**33.7**	**31.7**	**29.7**	**27.7**	**27.7**	**27.7**	**26.7**	**25.7**
	Nominal	33.2	33.2	31.2	29.2	27.2	27.2	27.2	26.2	25.2
PCS1900	**Maximum**	**30.7**	**30.7**	**28.7**	**27.7**	**26.7**	**26.7**	**26.7**	**25.7**	**24.7**
	Nominal	30.2	30.2	28.2	27.2	26.2	26.2	26.2	25.2	24.2
Mode / Band		**Frame Average GMSK (dBm)**								
		Voice	GPRS(GMSK) Data – CS1				EDGE(8-PSK) Data- MCS7			
		GSM	1 slot	2 slot	3 slot	4 slot	1 slot	2 slot	3 slot	4 slot
GSM850	**Maximum**	24.67	24.67	**25.67**	25.44	24.69	18.67	21.67	22.44	22.69
	Nominal	24.17	24.17	25.17	24.94	24.19	18.17	21.17	21.94	22.19
PCS1900	**Maximum**	21.67	21.67	22.67	23.44	**23.69**	17.67	20.67	21.44	21.69
	Nominal	21.17	21.17	22.17	22.94	23.19	17.17	20.17	20.94	21.19
Tune-up Tolerance: -1.5 dB / + 0.5 dB										

Mode / Band		Modulated Average (dBm)		
		3GPP Rel 99	3GPP Rel 5	3GPP Rel 6
		RMC/AMR	HSDPA	HSUPA
WCDMA850 /1900	**Maximum**	**23.7**	-	-
	Nominal	23.2	-	-
Subtest 1	**Maximum**	-	**23.7**	**23.7**
	Nominal	-	23.2	23.2
Subtest 2	**Maximum**	-	**23.7**	**21.7**
	Nominal	-	23.2	21.2
Subtest 3	**Maximum**	-	**23.2**	**22.7**
	Nominal	-	22.7	22.7
Subtest 4	**Maximum**	-	**23.2**	**21.2**
	Nominal	-	22.7	21.7
Subtest 5	**Maximum**	-	-	**23.7**
	Nominal	-	-	23.2
Tune-up Tolerance: -1.5 dB / + 0.5 dB				

Average power for Production (dBm)		
LTE Band 7	**Maximum**	**23.7**
	Nominal	23.2
Tune-up Tolerance: -1.5 dB / + 0.5 dB		

Average power for Production (dBm)					
Mode	Nominal & Maximum	b		g	n
2.4 GHz WLAN	**Maximum**	**17.0**		**14.0**	**13.0**
	Nominal	16.0		13.0	12.0
Mode	Nominal & Maximum	a		n (20 MHz)	n (40 MHz)
5 GHz WLAN	**Maximum**	**12.0**		**11.0**	**11.0**
	Nominal	11.0		10.0	10.0
Mode	Nominal & Maximum	ac (20 MHz)		ac (40 MHz)	ac (80 MHz)
802.11 ac	**Maximum**	**11.0**		**10.5**	**10.5**
	Nominal	10.0		9.5	9.5
Mode	Nominal & Maximum	GFSK	DPSK	8DPSK	LE
Bluetooth	**Maximum**	**6.5**	**4.0**	**4.0**	**2.5**
	Nominal	5.5	3.0	3.0	1.5

21 RF Conducted Power Measurement

The device in GSM, WCDMA and LTE was controlled by using a Communication tester (CMW500). The EUT was set to maximum power level during all tests. The DASY5 system measures power drift during SAR testing by comparing e-field in the same location at the beginning and at the end of measurement.

21.1 GSM Conducted Power

GSM	Channel	Frequency(㎒)	Burst -Conducted Average Power(㏈m)								
			Voice	GPRS(GMSK) Data – CS1				EDGE(8-PSK) Data- MCS7			
			GSM	1 Slot	2 Slot	3 Slot	4 Slot	1 Slot	2 Slot	3 Slot	4 Slot
GSM 850	128	824.2	33.51	33.50	31.60	29.38	27.59	27.12	27.02	26.35	25.30
	190	836.6	33.65	33.63	31.55	29.58	27.62	27.21	27.03	26.41	25.31
	251	848.8	33.68	33.68	31.58	29.57	27.65	27.37	27.22	26.62	25.46
PCS 1900	512	1850.2	30.11	30.10	28.61	27.59	26.46	25.40	25.39	24.78	23.55
	661	1880.0	30.42	30.19	28.63	27.64	26.58	25.86	25.79	25.11	23.95
	810	1909.8	29.98	29.81	28.50	27.37	26.31	25.53	25.37	24.71	23.53

GSM	Channel	Frequency(㎒)	Frame-Conducted Average Power(㏈m)								
			Voice	GPRS(GMSK) Data – CS1				EDGE(8-PSK) Data- MCS7			
			GSM	1 Slot	2 Slot	3 Slot	4 Slot	1 Slot	2 Slot	3 Slot	4 Slot
GSM 850	128	824.2	24.48	24.47	**25.57**	25.12	24.58	18.09	20.99	22.09	22.29
	190	836.6	24.62	24.60	**25.52**	25.32	24.61	18.18	21.00	22.15	22.30
	251	848.8	24.65	24.65	**25.55**	25.31	24.64	18.34	21.19	22.36	22.45
PCS 1900	512	1850.2	21.08	21.07	22.58	23.33	**23.45**	16.37	19.36	20.52	20.54
	661	1880.0	21.39	21.16	22.60	23.38	**23.57**	16.83	19.76	20.85	20.94
	810	1909.8	20.95	20.78	22.47	23.11	**23.30**	16.50	19.34	20.45	20.52

Note

1. Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged power was calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.
2. The source-based frame-averaged output power was evaluated for all GPRS slot configurations. The configuration with the highest target frame averaged output power was evaluated for wireless router SAR. When the maximum frame-averaged powers are equivalent across two or more slots (within 0.25 dB), the configuration with the most number of time slots war tested.
3. GPRS (GMSK) output powers were measured with coding scheme setting of 1 (CS1) on the base station simulator. CS1 was configured to measure GPRS output power measurements and SAR to ensure GMSK modulation in the signal. Our investigation has shown that CS1 – CS4 settings do not have any impact on the output levels or modulation in the GPRS modes.
4. EDGE (8-PSK) output powers were measured with MCS7 on the base station simulator. MCS7 coding scheme was used to measure the output powers for EDGE since investigation has shown that choosing MCS7 coding scheme will ensure 8-PSK modulation. It has been shown that MCS levels that produce 8PSK modulation do not have an impact on output power.

21.2 WCDMA

21.2.1 Output Power Verification

Maximum output power is measured on the High, Middle and Low channels for each applicable transmission band according to the general descriptions in section 5.2 of 3GPP TS 34.121, using the appropriate RMC or AMR with TPC (transmit power control) set to all "1s".

21.2.2 Head SAR Measurements

SAR for head exposure configurations is measured using the 12.2 kbps RMC with TPC bits configured to all "1s". SAR in AMR configurations is not required when the maximum average output of each RF channel for 12.2 kbps AMR is less than ¼ dB higher than that measured in 12.2 kbps RMC. Otherwise, SAR is measured on the maximum output channel in 12.2 AMR with a 3.4 kbps SRB (signaling radio bearer using the exposure configuration that results in the highest SAR for that RF channel in 12.2 RMC.

21.2.3 Body SAR Measurements

SAR for body exposure configurations is measured using the 12.2 kbps RMC with the TPC bits all "1s".

21.2.4 Procedures Used to Establish RF Signal for SAR HSDPA Data Devices

Body SAR is not required for handsets with HSDPA capabilities when the maximum average output of each RF channel with HSDPA active is less than ¼ dB higher than that measured without HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMC is ≤ 75 % of the SAR limit. Otherwise, SAR is Measured for HSDPA, using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration in 12.2 kbps RMC without HSDPA, on the maximum output channel with the body exposure configuration that results in the highest SAR in 12.2 kbps RMC for that RF channel.

Sub-Test 1 Setup for Release 5 HSDPA

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

Note 1: Δ_{ACK}, Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$
Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15.
Note 3: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d = 15/15.

21.2.5 SAR Measurements for Conditions for HSUPA Data Devices

Body SAR is not required for handsets with HSPA capabilities when the maximum average output of each RF channel with HSUPA/HSDPA active is less than ¼ dB higher than that measured without HSUPA/HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMC is ≤ 75 % of the SAR limit. Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 with power control algorithm 2, according to the highest body SAR configuration in 12.1 kbps RMC without HSPA. When VOIP is applicable for head exposure, SAR is not required when the maximum output of each RF channel with HSPA is less than ¼ dB higher than that measured using 12.2 kbps RMC; otherwise, the same HSPA configuration used for body measurement should be used to test for head exposure.

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs}(1)	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM(2) (dB)	MPR (dB)	AG(4) Index	E-TFCI
1	11/15(3)	15/15(3)	64	11/15(3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1}: 47/15 β_{ed2}: 47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15(4)	15/15(4)	64	15/15(4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.
Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.
Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.
Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 14/15 and β_d = 15/15.
Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.
Note 6: β_{ed} can not be set directly; it is set by Absolute Grant Value.

3GPP Release Version	Mode / Channel	3GPP 34.121 Subtest	Cellular Band (dBm)			3GPP MPR(dB)
			4132	4183	4233	
99	WCDMA	12.2 kbps RMC	23.36	23.45	23.45	-
5	HSDPA	Subtest 1	23.37	23.48	23.45	0
5		Subtest 2	23.35	23.47	23.44	0
5		Subtest 3	23.04	23.14	23.17	-0.5
5		Subtest 4	23.04	23.12	23.15	-0.5
6	HSUPA	Subtest 1	23.09	23.15	23.13	0
6		Subtest 2	21.01	21.18	21.31	-2
6		Subtest 3	21.87	22.00	21.98	-1
6		Subtest 4	21.09	21.29	21.18	-2
6		Subtest 5	22.94	23.32	23.28	0

3GPP Release Version	Mode / Channel	3GPP 34.121 Subtest	PCS Band (dBm)			3GPP MPR(dB)
			9262	9400	9538	
99	WCDMA	12.2 kbps RMC	23.23	23.49	23.37	-
5	HSDPA	Subtest 1	23.23	23.49	23.35	0
5		Subtest 2	23.21	23.43	23.37	0
5		Subtest 3	22.92	23.15	23.09	-0.5
5		Subtest 4	22.93	23.17	23.10	-0.5
6	HSUPA	Subtest 1	22.74	22.95	22.72	0
6		Subtest 2	21.28	21.42	21.36	-2
6		Subtest 3	22.24	22.58	22.42	-1
6		Subtest 4	21.16	21.37	21.14	-2
6		Subtest 5	23.24	23.49	23.26	0

Note

1. WCDMA SAR was tested under RMC 12.2 kbps with HSPA inactive per KDB Publication 941225 D01v02. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg

21.3 LTE

21.3.1 SAR measurement Conditions for LTE

LTE modes were tested according to FCC KDB 941225 D05v02r03 publication. Please see notes after the tabulated SAR data for required test configurations. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluation SAR. The R&S CMW500 was used for LTE output power measurements and SAR testing. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

21.3.2 Spectrum Plots for RB Configurations

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

21.3.3 MPR

MPR is permanently implemented for this device by the manufacture. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3.-1

21.3.4 A-MPR

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

21.3.5 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05V02r03

a. Per Section 5.2.1, SAR is required for QPSK 1 RB Allocation for the largest bandwidth
   i. The required channel and offset combination with the highest maximum output power is required for SAR.
   ii. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required. Otherwise, SAR is required for the remaining required test channels using the RB offset configuration with highest output power for that channel
   iii. When the reported SAR for a required test channel is > 1.45 W/kg, SAR is required for all RB offset configurations for that channel.

b. Per Section 5.2.2, SAR is required for 50% RB allocation using the largest bandwidth following the same procedures outlined in Section 5.2.1.

c. Per Section 5.2.3, QPSK SAR is not required for the 100% allocation when the highest maximum output power for the 100% allocation is less than the highest maximum output power of the 1 RB and 50% RB allocations and the reported SAR for the 1 RB and 50% RB allocations is < 0.8 W/kg.

d. Per Section 5.2.4 and 5.3, SAR tests for higher order modulations and lower bandwidths configurations are not required when the conducted power of the required test configurations determined by Section 5.2.1, through 5.2.3 is less than or equal to 1/2 dB higher than the equivalent configuration using QPSK modulation and when the QPSK SAR for those configurations is < 1.45 W/kg.

21.3.6 Conducted Power

LTE Band 7 Conducted Power – 20 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB size	RB offset	Average Power [dBm]	Target MPR [dBm]	MPR Allowed per 3GPP [dB]
Low	2510.0	20850	20	QPSK	1	0	23.21	0	0
	2510.0	20850	20	QPSK	1	50	23.20	0	0
	2510.0	20850	20	QPSK	1	99	23.18	0	0
	2510.0	20850	20	QPSK	50	0	22.19	1	0-1
	2510.0	20850	20	QPSK	50	25	22.16	1	0-1
	2510.0	20850	20	QPSK	50	50	22.18	1	0-1
	2510.0	20850	20	QPSK	100	0	22.16	1	0-1
	2510.0	20850	20	16-QAM	1	0	22.27	1	0-1
	2510.0	20850	20	16-QAM	1	50	22.20	1	0-1
	2510.0	20850	20	16-QAM	1	99	22.21	1	0-1
	2510.0	20850	20	16-QAM	50	0	21.23	2	0-2
	2510.0	20850	20	16-QAM	50	25	21.23	2	0-2
	2510.0	20850	20	16-QAM	50	50	21.26	2	0-2
	2510.0	20850	20	16-QAM	100	0	21.24	2	0-2
Mid	2535.0	21100	20	QPSK	1	0	23.11	0	0
	2535.0	21100	20	QPSK	1	50	23.15	0	0
	2535.0	21100	20	QPSK	1	99	23.12	0	0
	2535.0	21100	20	QPSK	50	0	22.17	1	0-1
	2535.0	21100	20	QPSK	50	25	22.16	1	0-1
	2535.0	21100	20	QPSK	50	50	22.14	1	0-1
	2535.0	21100	20	QPSK	100	0	22.25	1	0-1
	2535.0	21100	20	16-QAM	1	0	22.40	1	0-1
	2535.0	21100	20	16-QAM	1	50	22.43	1	0-1
	2535.0	21100	20	16-QAM	1	99	22.44	1	0-1
	2535.0	21100	20	16-QAM	50	0	21.33	2	0-2
	2535.0	21100	20	16-QAM	50	25	21.36	2	0-2
	2535.0	21100	20	16-QAM	50	50	21.35	2	0-2
	2535.0	21100	20	16-QAM	100	0	21.30	2	0-2
High	2560.0	21350	20	QPSK	1	0	23.23	0	0
	2560.0	21350	20	QPSK	1	50	23.21	0	0
	2560.0	21350	20	QPSK	1	99	23.18	0	0
	2560.0	21350	20	QPSK	50	0	22.28	1	0-1
	2560.0	21350	20	QPSK	50	25	22.26	1	0-1
	2560.0	21350	20	QPSK	50	50	22.24	1	0-1
	2560.0	21350	20	QPSK	100	0	22.19	1	0-1
	2560.0	21350	20	16-QAM	1	0	22.26	1	0-1
	2560.0	21350	20	16-QAM	1	50	22.27	1	0-1
	2560.0	21350	20	16-QAM	1	99	22.23	1	0-1
	2560.0	21350	20	16-QAM	50	0	21.39	2	0-2
	2560.0	21350	20	16-QAM	50	25	21.33	2	0-2
	2560.0	21350	20	16-QAM	50	50	21.29	2	0-2
	2560.0	21350	20	16-QAM	100	0	21.25	2	0-2

LTE Band 7 Conducted Power – 15 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB size	RB offset	Average Power [dBm]	Target MPR [dBm]	MPR Allowed per 3GPP [dB]
Low	2507.5	20825	15	QPSK	1	0	23.18	0	0
	2507.5	20825	15	QPSK	1	36	23.14	0	0
	2507.5	20825	15	QPSK	1	74	23.10	0	0
	2507.5	20825	15	QPSK	36	0	22.16	1	0-1
	2507.5	20825	15	QPSK	36	18	22.12	1	0-1
	2507.5	20825	15	QPSK	36	37	22.11	1	0-1
	2507.5	20825	15	QPSK	75	0	22.14	1	0-1
	2507.5	20825	15	16-QAM	1	0	22.01	1	0-1
	2507.5	20825	15	16-QAM	1	36	21.98	1	0-1
	2507.5	20825	15	16-QAM	1	74	21.94	1	0-1
	2507.5	20825	15	16-QAM	36	0	21.13	2	0-2
	2507.5	20825	15	16-QAM	36	18	21.11	2	0-2
	2507.5	20825	15	16-QAM	36	37	21.15	2	0-2
	2507.5	20825	15	16-QAM	75	0	21.23	2	0-2
Mid	2535.0	21100	15	QPSK	1	0	23.08	0	0
	2535.0	21100	15	QPSK	1	36	23.08	0	0
	2535.0	21100	15	QPSK	1	74	23.08	0	0
	2535.0	21100	15	QPSK	36	0	22.34	1	0-1
	2535.0	21100	15	QPSK	36	18	22.37	1	0-1
	2535.0	21100	15	QPSK	36	37	22.29	1	0-1
	2535.0	21100	15	QPSK	75	0	22.28	1	0-1
	2535.0	21100	15	16-QAM	1	0	22.48	1	0-1
	2535.0	21100	15	16-QAM	1	36	22.49	1	0-1
	2535.0	21100	15	16-QAM	1	74	22.47	1	0-1
	2535.0	21100	15	16-QAM	36	0	21.43	2	0-2
	2535.0	21100	15	16-QAM	36	18	21.38	2	0-2
	2535.0	21100	15	16-QAM	36	37	21.34	2	0-2
	2535.0	21100	15	16-QAM	75	0	21.34	2	0-2
High	2562.5	21375	15	QPSK	1	0	23.30	0	0
	2562.5	21375	15	QPSK	1	36	23.25	0	0
	2562.5	21375	15	QPSK	1	74	23.13	0	0
	2562.5	21375	15	QPSK	36	0	22.21	1	0-1
	2562.5	21375	15	QPSK	36	18	22.23	1	0-1
	2562.5	21375	15	QPSK	36	37	22.21	1	0-1
	2562.5	21375	15	QPSK	75	0	22.26	1	0-1
	2562.5	21375	15	16-QAM	1	0	22.08	1	0-1
	2562.5	21375	15	16-QAM	1	36	22.07	1	0-1
	2562.5	21375	15	16-QAM	1	74	22.01	1	0-1
	2562.5	21375	15	16-QAM	36	0	21.25	2	0-2
	2562.5	21375	15	16-QAM	36	18	21.25	2	0-2
	2562.5	21375	15	16-QAM	36	37	21.25	2	0-2
	2562.5	21375	15	16-QAM	75	0	21.28	2	0-2

LTE Band 7 Conducted Power – 10 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB size	RB offset	Average Power [dBm]	Target MPR [dBm]	MPR Allowed per 3GPP [dB]
Low	2505.0	20800	10	QPSK	1	0	23.18	0	0
	2505.0	20800	10	QPSK	1	25	23.06	0	0
	2505.0	20800	10	QPSK	1	49	23.09	0	0
	2505.0	20800	10	QPSK	25	0	22.15	1	0-1
	2505.0	20800	10	QPSK	25	12	22.14	1	0-1
	2505.0	20800	10	QPSK	25	25	22.09	1	0-1
	2505.0	20800	10	QPSK	50	0	22.14	1	0-1
	2505.0	20800	10	16-QAM	1	0	22.03	1	0-1
	2505.0	20800	10	16-QAM	1	25	21.94	1	0-1
	2505.0	20800	10	16-QAM	1	49	21.93	1	0-1
	2505.0	20800	10	16-QAM	25	0	21.33	2	0-2
	2505.0	20800	10	16-QAM	25	12	21.26	2	0-2
	2505.0	20800	10	16-QAM	25	25	21.25	2	0-2
	2505.0	20800	10	16-QAM	50	0	21.19	2	0-2
Mid	2535.0	21100	10	QPSK	1	0	23.13	0	0
	2535.0	21100	10	QPSK	1	25	23.10	0	0
	2535.0	21100	10	QPSK	1	49	23.10	0	0
	2535.0	21100	10	QPSK	25	0	22.34	1	0-1
	2535.0	21100	10	QPSK	25	12	22.34	1	0-1
	2535.0	21100	10	QPSK	25	25	22.24	1	0-1
	2535.0	21100	10	QPSK	50	0	22.34	1	0-1
	2535.0	21100	10	16-QAM	1	0	22.08	1	0-1
	2535.0	21100	10	16-QAM	1	25	22.09	1	0-1
	2535.0	21100	10	16-QAM	1	49	22.04	1	0-1
	2535.0	21100	10	16-QAM	25	0	21.28	2	0-2
	2535.0	21100	10	16-QAM	25	12	21.26	2	0-2
	2535.0	21100	10	16-QAM	25	25	21.25	2	0-2
	2535.0	21100	10	16-QAM	50	0	21.33	2	0-2
High	2565.0	21400	10	QPSK	1	0	23.18	0	0
	2565.0	21400	10	QPSK	1	25	23.14	0	0
	2565.0	21400	10	QPSK	1	49	23.11	0	0
	2565.0	21400	10	QPSK	25	0	22.18	1	0-1
	2565.0	21400	10	QPSK	25	12	22.16	1	0-1
	2565.0	21400	10	QPSK	25	25	22.16	1	0-1
	2565.0	21400	10	QPSK	50	0	22.21	1	0-1
	2565.0	21400	10	16-QAM	1	0	22.01	1	0-1
	2565.0	21400	10	16-QAM	1	25	22.01	1	0-1
	2565.0	21400	10	16-QAM	1	49	21.97	1	0-1
	2565.0	21400	10	16-QAM	25	0	21.32	2	0-2
	2565.0	21400	10	16-QAM	25	12	21.34	2	0-2
	2565.0	21400	10	16-QAM	25	25	21.38	2	0-2
	2565.0	21400	10	16-QAM	50	0	21.28	2	0-2

LTE Band 7 Conducted Power – 5 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB size	RB offset	Average Power [dBm]	Target MPR [dBm]	MPR Allowed per 3GPP [dB]
Low	2502.5	20775	5	QPSK	1	0	23.28	0	0
	2502.5	20775	5	QPSK	1	12	23.18	0	0
	2502.5	20775	5	QPSK	1	24	23.15	0	0
	2502.5	20775	5	QPSK	12	0	22.19	1	0-1
	2502.5	20775	5	QPSK	12	6	22.17	1	0-1
	2502.5	20775	5	QPSK	12	13	22.19	1	0-1
	2502.5	20775	5	QPSK	25	0	22.20	1	0-1
	2502.5	20775	5	16-QAM	1	0	22.09	1	0-1
	2502.5	20775	5	16-QAM	1	12	22.02	1	0-1
	2502.5	20775	5	16-QAM	1	24	22.05	1	0-1
	2502.5	20775	5	16-QAM	12	0	21.25	2	0-2
	2502.5	20775	5	16-QAM	12	6	21.24	2	0-2
	2502.5	20775	5	16-QAM	12	13	21.21	2	0-2
	2502.5	20775	5	16-QAM	25	0	21.24	2	0-2
Mid	2535.0	21100	5	QPSK	1	0	23.16	0	0
	2535.0	21100	5	QPSK	1	12	23.21	0	0
	2535.0	21100	5	QPSK	1	24	23.22	0	0
	2535.0	21100	5	QPSK	12	0	22.35	1	0-1
	2535.0	21100	5	QPSK	12	6	22.34	1	0-1
	2535.0	21100	5	QPSK	12	13	22.33	1	0-1
	2535.0	21100	5	QPSK	25	0	22.35	1	0-1
	2535.0	21100	5	16-QAM	1	0	22.27	1	0-1
	2535.0	21100	5	16-QAM	1	12	22.20	1	0-1
	2535.0	21100	5	16-QAM	1	24	22.20	1	0-1
	2535.0	21100	5	16-QAM	12	0	21.32	2	0-2
	2535.0	21100	5	16-QAM	12	6	21.31	2	0-2
	2535.0	21100	5	16-QAM	12	13	21.31	2	0-2
	2535.0	21100	5	16-QAM	25	0	21.30	2	0-2
High	2567.5	21425	5	QPSK	1	0	23.20	0	0
	2567.5	21425	5	QPSK	1	12	23.08	0	0
	2567.5	21425	5	QPSK	1	24	23.08	0	0
	2567.5	21425	5	QPSK	12	0	22.24	1	0-1
	2567.5	21425	5	QPSK	12	6	22.20	1	0-1
	2567.5	21425	5	QPSK	12	13	22.14	1	0-1
	2567.5	21425	5	QPSK	25	0	22.21	1	0-1
	2567.5	21425	5	16-QAM	1	0	22.41	1	0-1
	2567.5	21425	5	16-QAM	1	12	22.36	1	0-1
	2567.5	21425	5	16-QAM	1	24	22.39	1	0-1
	2567.5	21425	5	16-QAM	12	0	21.43	2	0-2
	2567.5	21425	5	16-QAM	12	6	21.40	2	0-2
	2567.5	21425	5	16-QAM	12	13	21.41	2	0-2
	2567.5	21425	5	16-QAM	25	0	21.29	2	0-2

21.4 WLAN

21.4.1 General Device Setup

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

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

20.4.2 Frequency Channel Configurations

802.11 a/b/g and 4.9 ㎓ operating modes are tested independently according to the service requirements in each frequency band. 802.11 b/g modes are tested on channel 1, 6, and 11. 802.11a is tested for UNII operations on channels 36 and 48 in the 5.15 ~ 5.25 ㎓ band, channels 52 and 64 in the 5.25 ~ 5.35 ㎓ band, channels 104, 116, 124 and 136 in the 5.470 ~ 5.725 ㎓ band, and channels 149 and 161 in the 5.8 ㎓ band. When 5.8 ㎓ §15.247 is also available, channels 149, 157 and 165 should be tested instead of the UNII channels. 802.11g mode was evaluated only if the output power was 0.25 ㏈ higher than the 802.11b mode.

Mode		GHz	Channel	Turbo Channel	"Default Test Channels" §15.247 802.11b	§15.247 802.11g	UNII	
802.11 b/g		2.412	1#		√	∇		
		2.437	6	6	√	∇		
		2.462	11#		√	∇		
802.11a	UNII	5.18	36				√	
		5.20	40	42 (5.21 GHz)				•
		5.22	44					•
		5.24	48	50 (5.25 GHz)			√	
		5.26	52				√	
		5.28	56	58 (5.29 GHz)				•
		5.30	60					•
		5.32	64				√	
		5.500	100	Unknown				•
		5.520	104				√	
		5.540	108					•
		5.560	112					•
		5.580	116				√	
		5.600	120					•
		5.620	124				√	
		5.640	128					•
		5.660	132					•
		5.680	136				√	
		5.700	140					•
	UNII or §15.247	5.745	149		√		√	
		5.765	153	152 (5.76 GHz)		•		•
		5.785	157		√			•
		5.805	161	160 (5.80 GHz)		•	√	
	§15.247	5.825	165		√			

- √ = "default test channels"
- • = possible 802.11a channels with maximum average output > the "default test channels"
- ∇ = possible 802.11g channels with maximum average output ¼ ㏈ ≥ the "default test channels"
- # = when output power is reduced for channel 1 and/or 11 to meet restricted band requirements the highest output channels closest to each of these channels should be tested

21.4.3 WLAN Conducted Powers

IEEE 802.11b Average RF Power

Mode	Frequency	Channel	802.11b (2.4 GHz) Conducted Power (dBm)			
			Data Rate (Mbps)			
			1	2	5.5	11
802.11b	2412	1	15.70	15.75	15.90	15.82
	2437	6	15.95	16.01	16.10	16.06
	2462	11	16.16	16.16	16.27	16.23

IEEE 802.11g Average RF Power

Mode	Frequency	Channel	802.11g (2.4 GHz) Conducted Power (dBm)							
			Data Rate (Mbps)							
			6	9	12	18	24	36	48	54
802.11g	2412	1	12.77	12.78	12.75	12.80	12.82	12.61	12.62	12.59
	2437	6	12.88	12.94	12.96	12.99	12.93	12.86	12.97	12.87
	2462	11	13.06	13.09	13.15	13.11	13.08	13.06	13.13	13.07

IEEE 802.11n Average RF Power 20 MHz Bandwidth

Mode	Frequency	Channel	802.11n (2.4 GHz) Conducted Power (dBm)							
			Data Rate (Mbps)							
			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11n	2412	1	11.71	11.71	11.71	11.71	11.71	11.71	11.71	11.71
	2437	6	11.83	11.83	11.83	11.83	11.83	11.83	11.83	11.83
	2462	11	12.18	12.18	12.18	12.18	12.18	12.18	12.18	12.18

IEEE 802.11a Average RF Power

Mode	Frequency	Channel	802.11a (5 GHz) Conducted Power (dBm)							
			Data Rate (Mbps)							
			6	9	12	18	24	36	48	54
802.11a	5180	36	11.34	11.39	11.42	11.49	11.47	11.31	11.37	11.39
	5200	40	11.46	11.46	11.48	11.45	11.37	11.32	11.36	11.38
	5220	44	11.48	11.44	11.46	11.52	11.52	11.42	11.46	11.46
	5240	48	11.30	11.36	11.39	11.47	11.42	11.34	11.38	11.29
	5260	52	11.32	11.39	11.42	11.48	11.38	11.29	11.35	11.38
	5280	56	11.12	11.11	11.12	11.18	11.16	11.14	11.06	11.10
	5300	60	11.07	11.12	11.12	11.15	10.99	10.96	10.95	10.96
	5320	64	11.03	11.07	11.06	11.10	11.07	11.08	11.10	11.02
	5500	100	10.64	10.64	10.67	10.58	10.56	10.41	10.44	10.45
	5520	104	10.48	10.52	10.48	10.50	10.37	10.39	10.54	10.49
	5540	108	10.53	10.56	10.54	10.60	10.57	10.57	10.60	10.62
	5560	112	10.53	10.54	10.55	10.59	10.56	10.53	10.53	10.39
	5580	116	10.30	10.26	10.28	10.33	10.31	10.32	10.35	10.37
	5660	132	10.33	10.40	10.43	10.47	10.44	10.43	10.28	10.26
	5680	136	10.36	10.37	10.39	10.43	10.41	10.41	10.25	10.21
	5700	140	10.56	10.59	10.59	10.64	10.61	10.61	10.63	10.65
	5745	149	10.54	10.59	10.59	10.49	10.34	10.36	10.39	10.39
	5765	153	10.34	10.37	10.36	10.37	10.39	10.40	10.19	10.20
	5785	157	10.79	10.76	10.78	10.83	10.80	10.83	10.97	10.66
	5805	161	10.47	10.51	10.41	10.46	10.44	10.30	10.33	10.35
	5825	165	10.35	10.37	10.38	10.41	10.39	10.40	10.43	10.44

IEEE 802.11n Average RF Power 20 MHz Bandwidth

Mode	Frequency	Channel	802.11n (5 GHz) Conducted Power (dBm)							
			Data Rate (Mbps)							
			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11n	5180	36	10.42	10.46	10.47	10.45	10.47	10.51	10.52	10.53
	5200	40	10.43	10.27	10.34	10.37	10.33	10.53	10.57	10.59
	5220	44	10.53	10.41	10.45	10.40	10.34	10.56	10.58	10.64
	5240	48	10.40	10.39	10.47	10.47	10.60	10.46	10.43	10.46
	5260	52	10.42	10.38	10.45	10.45	10.21	10.44	10.49	10.52
	5280	56	10.18	10.16	10.27	10.29	10.13	10.23	10.27	10.30
	5300	60	10.08	10.01	10.09	10.13	10.05	10.27	10.27	10.31
	5320	64	10.25	10.20	10.19	10.13	10.09	10.34	10.37	10.38
	5500	100	9.54	9.44	9.44	9.47	9.41	9.64	9.68	9.68
	5520	104	9.74	9.71	9.79	9.78	9.63	9.78	9.69	9.74
	5540	108	9.57	9.56	9.62	9.47	9.41	9.61	9.64	9.65
	5560	112	9.37	9.33	9.43	9.46	9.37	9.46	9.42	9.45
	5580	116	9.39	9.38	9.44	9.47	9.41	9.61	9.65	9.66
	5660	132	9.32	9.31	9.36	9.36	9.19	9.31	9.35	9.38
	5680	136	9.48	9.47	9.38	9.51	9.28	9.47	9.51	9.55
	5700	140	9.63	9.38	9.50	9.53	9.46	9.67	9.69	9.71
	5745	149	9.27	9.25	9.32	9.34	9.30	9.52	9.43	9.51
	5765	153	9.22	9.22	9.33	9.37	9.29	9.29	9.32	9.35
	5785	157	9.40	9.39	9.30	9.31	9.25	9.45	9.48	9.50
	5805	161	9.22	9.18	9.26	9.31	9.23	9.43	9.43	9.48
	5825	165	9.27	9.26	9.38	9.36	9.30	9.50	9.52	9.53

IEEE 802.11ac Average RF Power 20 MHz Bandwidth

Mode	Frequency	Channel	802.11ac (5 GHz) Conducted Power (dBm)								
			Data Rate (Mbps)								
			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
802.11ac	5180	36	10.70	10.63	10.68	10.70	10.49	10.82	10.61	10.56	10.84
	5200	40	10.61	10.67	10.58	10.60	10.37	10.68	10.61	10.57	10.89
	5220	44	10.54	10.69	10.65	10.57	10.48	10.77	10.62	10.56	10.87
	5240	48	10.53	10.58	10.43	10.55	10.47	10.84	10.63	10.61	10.89
	5260	52	10.52	10.51	10.46	10.62	10.40	10.77	10.56	10.48	10.71
	5280	56	10.23	10.30	10.24	10.22	10.25	10.64	10.46	10.29	10.62
	5300	60	10.23	10.30	10.25	10.23	10.06	10.46	10.27	10.23	10.55
	5320	64	10.28	10.35	10.33	10.42	10.26	10.58	10.32	10.33	10.54
	5500	100	9.61	9.68	9.62	9.75	9.46	9.84	9.66	9.61	9.93
	5520	104	9.81	9.83	9.70	9.81	9.68	9.97	9.82	9.79	10.11
	5540	108	10.49	9.95	9.92	10.16	9.91	10.11	10.03	10.02	10.34
	5560	112	9.49	9.53	9.47	9.53	9.31	9.70	9.50	9.44	9.79
	5580	116	9.55	9.59	9.53	9.68	9.58	9.88	9.65	9.60	9.89
	5660	132	9.43	9.30	9.32	9.38	9.29	9.66	9.47	9.43	9.76
	5680	136	9.57	9.66	9.42	9.61	9.45	9.82	9.63	9.59	9.87
	5700	140	9.64	9.61	9.57	9.69	9.62	9.99	9.83	9.55	9.88
	5745	149	9.49	9.50	9.47	9.57	9.35	9.74	9.51	9.44	9.73
	5765	153	9.47	9.49	9.45	9.40	9.23	9.61	9.44	9.38	9.71
	5785	157	9.54	9.51	9.34	9.52	9.42	9.81	9.58	9.46	9.86
	5805	161	9.37	9.43	9.39	9.51	9.42	9.62	9.42	9.32	9.60
	5825	165	9.47	9.52	9.47	9.58	9.47	9.66	9.44	9.39	9.71

IEEE 802.11n Average RF Power 40 MHz Bandwidth

Mode	Frequency	Channel	802.11n (5 GHz) Conducted Power (dBm)							
			Data Rate (Mbps)							
			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11n	5190	38	9.90	9.95	9.83	9.99	10.07	10.12	9.83	10.06
	5230	46	9.91	9.87	9.94	9.83	9.98	10.11	9.88	10.19
	5270	54	9.81	9.84	9.78	9.81	9.83	9.97	9.73	10.04
	5310	62	9.66	9.69	9.56	9.66	9.66	10.64	9.56	9.88
	5510	102	9.04	9.15	9.10	8.97	9.10	9.22	9.00	9.30
	5550	110	9.08	9.20	9.18	9.27	9.38	9.29	9.01	9.32
	5670	134	9.12	9.19	8.97	9.04	9.14	9.27	9.04	9.35
	5755	151	8.93	9.00	8.93	9.07	9.15	9.27	9.06	9.10
	5795	159	9.16	9.26	9.00	9.11	9.21	9.33	9.09	9.40

IEEE 802.11ac Average RF Power 40 MHz Bandwidth

Mode	Frequency	Channel	802.11ac (5 GHz) Conducted Power (dBm)									
			Data Rate (Mbps)									
			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
802.11ac	5190	38	9.77	9.79	9.80	9.56	9.55	9.70	9.77	9.65	9.75	9.74
	5230	46	9.65	9.68	9.87	9.70	9.75	9.82	9.95	9.80	9.92	9.87
	5270	54	9.66	9.65	9.63	9.43	9.58	9.61	9.79	9.62	9.73	9.60
	5310	62	9.45	9.47	9.52	9.31	9.29	9.42	9.56	9.35	9.51	9.40
	5510	102	8.79	8.79	8.81	8.50	8.79	8.72	8.85	8.96	8.87	8.84
	5550	110	8.89	9.06	9.03	8.74	8.64	8.77	8.89	8.96	9.12	8.92
	5670	134	8.66	8.82	8.87	8.74	8.85	8.96	8.90	8.64	8.82	8.57
	5755	151	8.77	8.34	8.36	8.27	8.60	8.73	8.60	8.46	8.59	8.56
	5795	159	8.46	8.55	8.84	8.20	8.27	8.93	9.09	8.41	8.53	8.54

IEEE 802.11ac Average RF Power 80 MHz Bandwidth

Mode	Frequency	Channel	802.11ac (5 GHz) Conducted Power (dBm)									
			Data Rate (Mbps)									
			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
802.11ac	5210	42	10.05	10.23	10.04	10.15	10.02	10.04	10.18	10.22	10.11	10.39
	5290	58	9.79	9.99	9.86	9.90	9.73	9.79	10.02	9.96	9.83	10.34
	5530	106	9.36	9.61	9.49	9.50	9.38	9.30	9.65	9.51	9.40	10.05
	5775	155	9.31	9.59	9.02	9.08	8.89	9.32	9.18	9.20	9.03	9.75

Bluetooth

Channel	Frequency (MHz)	GFSK (dBm)	PI/4DQPSK (dBm)	8DPSK (dBm)	LE (dBm)
Low	2402	3.06	0.65	0.66	-0.72
Middle	2441	6.13	3.69	3.72	2.19
High	2480	4.60	2.08	2.10	0.59

22 SAR Test Exclusions Applied

Per FCC KDB 447498 D01v05r02, the SAR exclusion threshold for distances < 50 ㎜ is defined by the following equation:

$$\frac{\text{Max Power of Channel (mW)}}{\text{Test Separation Distance (mm)}} * \sqrt{\text{Frequency(GHz)}} \leq 3.0$$

Mode	Frequency	Maximum Allowed Power	Separation Distance	≤ 3.0
	[MHz]	[mW]	[mm]	
Bluetooth	2480	4	5	1.26
			10	0.63

Based on the maximum tune-up tolerance limit of Bluetooth the antenna to use separation distance, Bluetooth SAR was not required [(4/5)*√2.480] = 2.83 < 3.0.

Bluetooth LE SAR was not required [(2/5)*√2.480] = 0.63 < 3.0.

Notes

Bluetooth LE conducted power is not calculated on the SAR test exclusions table. Because Bluetooth LE conducted power is lower than Bluetooth conducted Power.

23 SAR Data Summary

23.1 Head SAR Data

GSM850 Head SAR

Head	EUT Position	Mode	Battery	Traffic Channel		Power(dBm)		1-g SAR (W/kg)		Plot No
				Frequency (MHz)	Channel	Measured Power	Tune-Up Limit	Measured SAR	Scaled SAR	
Right	Touch	GSM Voice	Standard	836.6	190	33.65	33.7	0.167	0.169	-
	Tilt		Standard	836.6	190	33.65	33.7	0.094	0.095	-
Left	Touch		Standard	836.6	190	33.65	33.7	0.141	0.143	-
	Tilt		Standard	836.6	190	33.65	33.7	0.097	0.098	-
Right	Touch	GPRS 2Tx	Standard	836.6	190	31.55	31.7	0.202	**0.209**	17
	Tilt		Standard	836.6	190	31.55	31.7	0.126	0.130	-
Left	Touch		Standard	836.6	190	31.55	31.7	0.170	0.176	-
	Tilt		Standard	836.6	190	31.55	31.7	0.101	0.105	-
ANSI / IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure / General Population						Head 1.6 W/kg (mW/g) Averaged over 1 gram				

GSM1900 Head SAR

Head	EUT Position	Mode	Battery	Traffic Channel		Power(dBm)		1-g SAR (W/kg)		Plot No
				Frequency (MHz)	Channel	Measured Power	Tune-Up Limit	Measured SAR	Scaled SAR	
Right	Touch	GSM Voice	Standard	1880.0	661	30.42	30.7	0.075	0.080	-
	Tilt		Standard	1880.0	661	30.42	30.7	0.025	0.027	-
Left	Touch		Standard	1880.0	661	30.42	30.7	0.059	0.063	-
	Tilt		Standard	1880.0	661	30.42	30.7	0.036	0.038	-
Right	Touch	GPRS 4Tx	Standard	1880.0	661	26.58	26.7	0.114	**0.117**	18
	Tilt		Standard	1880.0	661	26.58	26.7	0.043	0.044	-
Left	Touch		Standard	1880.0	661	26.58	26.7	0.088	0.090	-
	Tilt		Standard	1880.0	661	26.58	26.7	0.052	0.053	-
ANSI / IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure / General Population						Head 1.6 W/kg (mW/g) Averaged over 1 gram				

WCDMA Band V Head SAR

Head	EUT Position	Mode	Battery	Traffic Channel		Power(dBm)		1-g SAR (W/kg)		Plot No
				Frequency (MHz)	Channel	Measured Power	Tune-Up Limit	Measured SAR	Scaled SAR	
Right	Touch	RMC	Standard	836.6	4183	23.45	23.7	0.128	**0.136**	19
	Tilt		Standard	836.6	4183	23.45	23.7	0.079	0.084	-
Left	Touch		Standard	836.6	4183	23.45	23.7	0.103	0.109	-
	Tilt		Standard	836.6	4183	23.45	23.7	0.074	0.078	-
ANSI / IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure / General Population						Head 1.6 W/kg (mW/g) Averaged over 1 gram				

WCDMA Band II Head SAR

Head	EUT Position	Mode	Battery	Traffic Channel		Power(dBm)		1-g SAR (W/kg)		Plot No
				Frequency (MHz)	Channel	Measured Power	Tune-Up Limit	Measured SAR	Scaled SAR	
Right	Touch	RMC	Standard	1880.0	9400	23.49	23.7	0.126	**0.132**	20
	Tilt		Standard	1880.0	9400	23.49	23.7	0.045	0.047	-
Left	Touch		Standard	1880.0	9400	23.49	23.7	0.116	0.122	-
	Tilt		Standard	1880.0	9400	23.49	23.7	0.061	0.064	-
ANSI / IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure / General Population						Head 1.6 W/kg (mW/g) Averaged over 1 gram				

LTE Band 7 Bandwidth 20 MHz Head SAR

Head	EUT Position	Mod	Battery	Traffic Channel		RB Size	RB Offset	Power(dBm)		1-g SAR (W/kg)		Plot No
				Frequency (MHz)	Channel			Measured Power	Tune-Up Limit	Measured SAR	Scaled SAR	
Right	Touch	QPSK	Standard	2560.0	21350	1	0	23.23	23.7	0.019	**0.021**	21
		QPSK	Standard	2560.0	21350	50	0	22.28	22.7	0.013	0.014	-
	Tilt	QPSK	Standard	2560.0	21350	1	0	23.23	23.7	0.001	0.001	-
		QPSK	Standard	2560.0	21350	50	0	22.28	22.7	0.001	0.001	-
Left	Touch	QPSK	Standard	2560.0	21350	1	0	23.23	23.7	0.008	0.009	-
		QPSK	Standard	2560.0	21350	50	0	22.28	22.7	0.004	0.004	-
	Tilt	QPSK	Standard	2560.0	21350	1	0	23.23	23.7	0.001	0.001	-
		QPSK	Standard	2560.0	21350	50	0	22.28	22.7	0.001	0.001	-
ANSI / IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure / General Population								Head 1.6 W/kg (mW/g) Averaged over 1 gram				

WLAN 2.4 GHz Head SAR

Head	EUT Position	Mode	Battery	Traffic Channel		Power(dBm)		1-g SAR (W/kg)		Plot No
				Frequency (MHz)	Channel	Measured Power	Tune-Up Limit	Measured SAR	Scaled SAR	
Right	Touch	802.11b	Standard	2462.0	11	16.16	17.0	0.069	0.084	-
	Tilt		Standard	2462.0	11	16.16	17.0	0.069	0.084	-
Left	Touch		Standard	2462.0	11	16.16	17.0	0.092	0.112	-
	Tilt		Standard	2462.0	11	16.16	17.0	0.102	**0.124**	22
ANSI / IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure / General Population						Head 1.6 W/kg (mW/g) Averaged over 1 gram				

WLAN 5.2 GHz Head SAR

Head	EUT Position	Mode	Battery	Traffic Channel		Power(dBm)		1-g SAR (W/kg)		Plot No
				Frequency (MHz)	Channel	Measured Power	Tune-Up Limit	Measured SAR	Scaled SAR	
Right	Touch	802.11a	Standard	5220.0	44	11.48	12.0	0.202	0.228	-
	Tilt		Standard	5220.0	44	11.48	12.0	0.259	0.292	-
Left	Touch		Standard	5220.0	44	11.48	12.0	0.251	0.283	-
	Tilt		Standard	5220.0	44	11.48	12.0	0.289	**0.326**	23
Left	Tilt	802.11ac	Standard	5210.0	42	10.05	10.5	0.102	0.113	-
ANSI / IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure / General Population						Head 1.6 W/kg (mW/g) Averaged over 1 gram				

WLAN 5.3 GHz Head SAR

Head	EUT Position	Mode	Battery	Traffic Channel		Power(dBm)		1-g SAR (W/kg)		Plot No
				Frequency (MHz)	Channel	Measured Power	Tune-Up Limit	Measured SAR	Scaled SAR	
Right	Touch	802.11a	Standard	5260.0	52	11.32	12.0	0.221	0.258	-
	Tilt		Standard	5260.0	52	11.32	12.0	0.300	0.351	-
Left	Touch		Standard	5260.0	52	11.32	12.0	0.276	0.323	-
	Tilt		Standard	5260.0	52	11.32	12.0	0.308	**0.360**	24
Left	Tilt	802.11ac	Standard	5290.0	58	9.79	10.5	0.143	0.168	-
ANSI / IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure / General Population						Head 1.6 W/kg (mW/g) Averaged over 1 gram				

WLAN 5.5 GHz Head SAR

Head	EUT Position	Mode	Battery	Traffic Channel		Power(dBm)		1-g SAR (W/kg)		Plot No
				Frequency (MHz)	Channel	Measured Power	Tune-Up Limit	Measured SAR	Scaled SAR	
Right	Touch	802.11a	Standard	5500.0	100	10.64	12.0	0.221	0.302	-
	Tilt		Standard	5500.0	100	10.64	12.0	0.275	**0.376**	25
Left	Touch		Standard	5500.0	100	10.64	12.0	0.219	0.300	-
	Tilt		Standard	5500.0	100	10.64	12.0	0.274	0.375	-
Left	Tilt	802.11ac	Standard	5530.0	106	9.36	10.5	0.105	0.137	-
ANSI / IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure / General Population						Head 1.6 W/kg (mW/g) Averaged over 1 gram				

WLAN 5.8 GHz Head SAR

Head	EUT Position	Mode	Battery	Traffic Channel		Power(dBm)		1-g SAR (W/kg)		Plot No
				Frequency (MHz)	Channel	Measured Power	Tune-Up Limit	Measured SAR	Scaled SAR	
Right	Touch	802.11a	Standard	5785.0	157	10.79	12.5	0.229	0.339	-
	Tilt		Standard	5785.0	157	10.79	12.5	0.225	0.334	-
Left	Touch		Standard	5785.0	157	10.79	12.5	0.257	0.381	-
	Tilt		Standard	5785.0	157	10.79	12.5	0.264	**0.391**	26
Left	Tilt	802.11ac	Standard	5775.0	155	9.31	10.5	0.114	0.150	-
ANSI / IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure / General Population						Head 1.6 W/kg (mW/g) Averaged over 1 gram				

23.2 Body-Worn SAR Data

GSM/WCDMA/LTE Band Body-Worn SAR

EUT Position	Mode	Battery	Traffic Channel		Separation Distance (mm)	Power(dBm)		1-g SAR (W/kg)		Plot No
			Frequency (MHz)	Channel		Measured Power	Tune-Up Limit	Measured SAR	Scaled SAR	
Rear	GSM850	Standard	836.6	190	10	33.65	33.7	0.297	**0.300**	27
Rear	GSM1900	Standard	1880.0	661	10	30.42	30.7	0.629	**0.671**	28
Rear	WCDMA 850	Standard	836.6	4183	10	23.45	23.7	0.224	**0.237**	29
Rear	WCDMA 1900	Standard	1880.0	9400	10	23.49	23.7	0.645	**0.677**	30
Rear	LTE Band 7	Standard	2560.0	21350	10	23.23	23.7	0.171	**0.191**	31
ANSI / IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure / General Population						Body 1.6 W/kg (mW/g) Averaged over 1 gram				

WLAN Body-Worn SAR

EUT Position	Mode	Battery	Traffic Channel		Separation Distance (mm)	Power(dBm)		1-g SAR (W/kg)		Plot No
			Frequency (MHz)	Channel		Measured Power	Tune-Up Limit	Measured SAR	Scaled SAR	
Rear	802.11b 2.4 GHz	Standard	2462.0	11	10	16.16	17.0	0.048	**0.058**	32
Rear	802.11a 5.8 GHz	Standard	5785.0	157	10	10.79	12.0	0.179	**0.237**	33
Rear	802.11ac 5.8 GHz	Standard	5775.0	155	10	9.31	10.5	0.092	0.121	-
Rear	802.11a 5.2 GHz	Standard	5220.0	44	10	11.48	12.0	0.193	**0.218**	34
Rear	802.11ac 5.2 GHz	Standard	5210.0	42	10	10.05	10.5	0.073	0.081	-
Rear	802.11a 5.3 GHz	Standard	5260.0	52	10	11.32	12.0	0.234	**0.274**	35
Rear	802.11ac 5.3 GHz	Standard	5290.0	58	10	9.79	10.5	0.105	0.124	-
Rear	802.11a 5.5 GHz	Standard	5500.0	100	10	10.64	12.0	0.226	**0.309**	36
Rear	802.11ac 5.5 GHz	Standard	5530.0	106	10	9.36	10.5	0.108	0.140	-
ANSI / IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure / General Population						Body 1.6 W/kg (mW/g) Averaged over 1 gram				

23.3 Hotspot SAR Data

GSM850 Hotspot SAR

EUT Position	Mode	Battery	Traffic Channel		Separation Distance (mm)	Power(dBm)		1-g SAR (W/kg)		Plot No
			Frequency (MHz)	Channel		Measured Power	Tune-Up Limit	Measured SAR	Scaled SAR	
Front	GPRS 2Tx	Standard	836.6	190	10	31.55	31.7	0.219	0.227	-
Rear		Standard	836.6	190	10	31.55	31.7	0.309	**0.320**	37
Right Edge		Standard	836.6	190	10	31.55	31.7	0.299	0.310	-
Left Edge		Standard	836.6	190	10	31.55	31.7	0.165	0.171	-
Bottom		Standard	836.6	190	10	31.55	31.7	0.231	0.239	-
ANSI / IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure / General Population					Body 1.6 W/kg (mW/g) Averaged over 1 gram					

GSM1900 Hotspot SAR

EUT Position	Mode	Battery	Traffic Channel		Separation Distance (mm)	Power(dBm)		1-g SAR (W/kg)		Plot No
			Frequency (MHz)	Channel		Measured Power	Tune-Up Limit	Measured SAR	Scaled SAR	
Front	GPRS 4Tx	Standard	1880.0	661	10	26.58	26.7	0.354	0.364	-
Rear		Standard	1880.0	661	10	26.58	26.7	0.722	0.742	-
Right Edge		Standard	1880.0	661	10	26.58	26.7	0.106	0.109	-
Left Edge		Standard	1880.0	661	10	26.58	26.7	0.062	0.064	-
Bottom		Standard	1880.0	661	10	26.58	26.7	0.739	**0.760**	38
ANSI / IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure / General Population					Body 1.6 W/kg (mW/g) Averaged over 1 gram					

WCDMA Band V Hotspot SAR

EUT Position	Mode	Battery	Traffic Channel		Separation Distance (mm)	Power(dBm)		1-g SAR (W/kg)		Plot No
			Frequency (MHz)	Channel		Measured Power	Tune-Up Limit	Measured SAR	Scaled SAR	
Front	RMC	Standard	836.6	4183	10	23.45	23.7	0.133	0.141	-
Rear		Standard	836.6	4183	10	23.45	23.7	0.224	**0.237**	39
Right Edge		Standard	836.6	4183	10	23.45	23.7	0.205	0.217	-
Left Edge		Standard	836.6	4183	10	23.45	23.7	0.109	0.115	-
Bottom		Standard	836.6	4183	10	23.45	23.7	0.175	0.185	-
ANSI / IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure / General Population					Body 1.6 W/kg (mW/g) Averaged over 1 gram					

WCDMA Band II Hotspot SAR

EUT Position	Mode	Battery	Traffic Channel		Separation Distance (mm)	Power(dBm)		1-g SAR (W/kg)		Plot No
			Frequency (MHz)	Channel		Measured Power	Tune-Up Limit	Measured SAR	Scaled SAR	
Front	RMC	Standard	1880.0	9400	10	23.49	23.7	0.342	0.359	-
Rear		Standard	1880.0	9400	10	23.49	23.7	0.645	0.677	-
Right Edge		Standard	1880.0	9400	10	23.49	23.7	0.123	0.129	-
Left Edge		Standard	1880.0	9400	10	23.49	23.7	0.068	0.071	-
Bottom		Standard	1880.0	9400	10	23.49	23.7	0.705	**0.740**	40
ANSI / IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure / General Population					Body 1.6 W/kg (mW/g) Averaged over 1 gram					

LTE Band 7 Bandwidth 20 MHz Hotspot SAR

EUT Position	Mode	Battery	Traffic Channel		RB Size	RB Offset	Separation Distance (mm)	Power(dBm)		1-g SAR (W/kg)		Plot No
			Frequency (MHz)	Channel				Measured Power	Tune-Up Limit	Measured SAR	Scaled SAR	
Front	QPSK	Standard	2560.0	21350	1	0	10	23.23	23.7	0.069	0.077	-
	QPSK	Standard	2560.0	21350	50	0	10	22.28	22.7	0.051	0.056	-
Rear	QPSK	Standard	2560.0	21350	1	0	10	23.23	23.7	0.171	**0.191**	31
	QPSK	Standard	2560.0	21350	50	0	10	22.28	22.7	0.139	0.153	-
Right Edge	QPSK	Standard	2560.0	21350	1	0	10	23.23	23.7	0.019	0.021	-
	QPSK	Standard	2560.0	21350	50	0	10	22.28	22.7	0.015	0.017	-
Left Edge	QPSK	Standard	2560.0	21350	1	0	10	23.23	23.7	0.128	0.143	-
	QPSK	Standard	2560.0	21350	50	0	10	22.28	22.7	0.105	0.116	-
Bottom	QPSK	Standard	2560.0	21350	1	0	10	23.23	23.7	0.145	0.162	-
	QPSK	Standard	2560.0	21350	50	0	10	22.28	22.7	0.115	0.127	-
ANSI / IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure / General Population							Body 1.6 W/kg (mW/g) Averaged over 1 gram					

WLAN 2.4 GHz Hotspot SAR

EUT Position	Mode	Battery	Traffic Channel		Separation Distance (mm)	Power(dBm)		1-g SAR (W/kg)		Plot No
			Frequency (MHz)	Channel		Measured Power	Tune-Up Limit	Measured SAR	Scaled SAR	
Front	802.11b 2.4 GHz	Standard	2462.0	11	10	16.16	17.0	0.028	0.034	-
Rear	802.11b 2.4 GHz	Standard	2462.0	11	10	16.16	17.0	0.048	**0.058**	32
Right Edge	802.11b 2.4 GHz	Standard	2462.0	11	10	16.16	17.0	0.011	0.013	-
Top	802.11b 2.4 GHz	Standard	2462.0	11	10	16.16	17.0	0.045	0.055	-
ANSI / IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure / General Population					Body 1.6 W/kg (mW/g) Averaged over 1 gram					

WLAN 5.8 GHz Hotspot SAR

EUT Position	Mode	Battery	Traffic Channel		Separation Distance (mm)	Power(dBm)		1-g SAR (W/kg)		Plot No
			Frequency (MHz)	Channel		Measured Power	Tune-Up Limit	Measured SAR	Scaled SAR	
Front	802.11a 5.8 GHz	Standard	5785.0	157	10	10.79	12.0	0.031	0.041	-
Rear	802.11a 5.8 GHz	Standard	5785.0	157	10	10.79	12.0	0.179	**0.237**	33
Right Edge	802.11a 5.8 GHz	Standard	5785.0	157	10	10.79	12.0	0.001	0.001	-
Top	802.11a 5.8 GHz	Standard	5785.0	157	10	10.79	12.0	0.171	0.226	-
Rear	802.11ac 5.8 GHz	Standard	5785.0	155	10	9.31	10.5	0.092	0.121	-
ANSI / IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure / General Population					Body 1.6 W/kg (mW/g) Averaged over 1 gram					

General Notes

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2003, FCC KDB Publication 865664 D01v02r03 and FCC KDB Publication 447498 D01v05r02.

2. All modes of operation were investigated, and worst-case results are reported.

3. The EUT is tested 2nd hot-spot peak, if it is less than 2 dB below the highest peak.

4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.

5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v05r02.

6. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 10 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.

7. Per FCC KDB Publication 648474 D04v01r02, body worn SAR was evaluated without a headset connected to the device. Since the standalone reported SAR was ≤ 1.2 W/kg, no additional body worn SAR evaluations using a headset cable were required.

8. Per FCC KDB Publication 865664 D01v01r03, variability SAR tests were performed when the measured SAR results for a frequency band were greater than 0.8 W/kg. Please see section 24 for variability analysis.

GSM Notes

1. Body-Worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.

2. Justification for reduced test configurations per KDB Publication 941225 D03v01: The source-based time-averaged output power was evaluated for all multi-slot operations. The multi-slot configuration with the highest frame averaged output power was evaluated for SAR.

3. Per FCC KDB Publication 447498 D01v05r02, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > 1/2 dB, instead of the middle channel, the highest output power channel must be used.

WCDMA Notes

1. WCDMA mode in Body SAR was tested under RMC 12.2 kbps with HSPA inactive per KDB Publication 941225 D01v02. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.

2. Per FCC KDB Publication 447498 D01v05r02, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > 1/2 dB, instead of the middle channel, the highest output power channel must be used

LTE Notes

1. LTE Considerations: LTE test configurations are determined according to SAR Evaluation Considerations for LTE Devices in FCC KDB Publication 941225 D05v02r03. The general test procedures used for testing can be found in Section 8.4.4.

2. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to under Table 6.2.3-1.

3. A-MPR was disabled for all SAR tests by setting NS=01 on the base station simulator.

WLAN Notes

1. For 2.4 GHz, justification for reduced test configuration for WIFI channels per KDB Publication 248227 and April 2010 FCC/TCB Meeting Notes: Highest average RF output power channel for the lowest data rate were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11g/n) were not investigated since the average output powers were not greater than 0.25 dB than that of the corresponding channel in the lowest data rate IEEE 802.11b modes.

2. For 5 GHz, justification for reduced test configuration for WIFI channels per KDB Publication 248227 and April 2010 FCC/TCB Meeting Notes: Highest average RF output power channel for the lowest data rate were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11n HT20 MHz and HT40, VHT20, VHT40) were not investigated since the average output powers were not greater than 0.25 dB than that of the corresponding channel in the lowest data rate IEEE 802.11a modes.

3. Per. 2013 TCB Workshop notes, full SAR test for all IEEE 802.11ac configurations were not required because the average output power was not more than 0.25 dB higher than IEEE 802.11a mod. IEEE 802.11ac was evaluated for the highest IEEE 802.11a configuration in each 5 GHz band and exposure condition.

4. When wireless router is enabled, 5 GHz (5.2 GHz, 5.3 GHz and 5.5 GHz) bands are disabled.

5. This device can operate in the 2.4 GHz and 5.8 GHz bands using WLAN Direct Go capability. Per FCC KDB 941225, 5.8 GHz WLAN Direct Go is evaluated for SAR using wireless reuter SAR evaluation procedures.

6. Since the maximum extrapolated peak SAR of the zoom scan for the maximum output channel was ≤ 1.6 W/kg and the reported 1g averaged SAR was < 0.8 W/kg, SAR testing on other default channels was not required.

7. WLAN transmission was verified using a spectrum analyzer.

24 SAR Measurement Variability

24.1 Measurement Variability

Per FCC KDB Publication 865664 D01v01r03, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

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

1. When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
2. A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
3. A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
4. **Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg**

24.2 Measurement Uncertainty

The measured SAR was < 1.5 W/kg for all frequency bands. Therefore, per KDB Publication 865664 D01v01r03, the extended measurement uncertainty analysis per IEEE 1528-2003 was not required.

25 FCC Multi-TX and Antenna SAR considerations

25.1 Introduction

The following procedures adopted from FCC KDB Publication 447498 D01v05r02 are applicable to handsets with built-in unlicensed transmitters such as 802.11a/b/g/n/ac and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

25.2 Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01v05r02 IV.C.1iii, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤ 1.6 W/kg. When standalone SAR is not required to be measured per FCC KDB 447498 D01v05r02 4.3.2.2), the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission involving that transmitter.

$$\text{Estimated SAR} = \frac{\sqrt{f(GHz)}}{7.5} * \frac{(\text{Max Power of channel, mW})}{\text{Min. Separation Distance, mm}}$$

Mode	Frequency	Maximum Allowed Power	Separation Distance	Estimated SAR
	[MHz]	[mW]	[mm]	[W/kg]
Bluetooth	2480	4	5	0.168
			10	0.084

25. 3 Simultaneous Transmission Scenarios

No	Capable Transmit Configuration	Head	Body-Worn	Wireless Router
1	GSM 850 Voice + WLAN 2.4 GHz	Yes	Yes	N/A
2	GSM 1900 Voice + WLAN 2.4 GHz	Yes	Yes	N/A
3	GSM 850 Voice + WLAN 5 GHz	Yes	Yes	N/A
4	GSM 1900 Voice + WLAN 5 GHz	Yes	Yes	N/A
5	GSM 850 Voice + Bluetooth	Yes	Yes	N/A
6	GSM 1900 Voice + Bluetooth	Yes	Yes	N/A
7	GPRS/EDGE 850 + WLAN 2.4 GHz	Yes	Yes	Yes
8	GPRS/EDGE 1900 + WLAN 2.4 GHz	Yes	Yes	Yes
9	GPRS/EDGE 850 + WLAN 5 GHz	Yes	Yes	Yes
10	GPRS/EDGE 1900 + WLAN 5 GHz	Yes	Yes	Yes
11	GPRS/EDGE 850 + Bluetooth	Yes	Yes	N/A
12	GPRS/EDGE 1900 + Bluetooth	Yes	Yes	N/A
13	WCDMA 850 + WLAN 2.4 GHz	Yes	Yes	Yes
14	WCDMA 1900 + WLAN 2.4 GHz	Yes	Yes	Yes
15	WCDMA 850 + WLAN 5 GHz	Yes	Yes	Yes
16	WCDMA 1900 + WLAN 5 GHz	Yes	Yes	Yes
17	WCDMA 850 + Bluetooth	Yes	Yes	N/A
18	WCDMA 1900 + Bluetooth	Yes	Yes	N/A
19	LTE Band 7 + WLAN 2.4 GHz	Yes	Yes	Yes
20	LTE Band 7 + WLAN 5 GHz	Yes	Yes	Yes
21	LTE Band 7 + Bluetooth	Yes	Yes	N/A

Notes

1. WLAN direct GC/GO in 5.8 GHz is supported.

2. Bluetooth and WLAN share the same antenna and cannot transmit simultaneously.

3. GSM/GPRS/EDGE, WCDMA and LTE share the same antenna and cannot transmit simultaneously.

25.4 Head SAR Simultaneous Transmission Analysis

Simultaneous Transmission Summation Scenario with 2.4 GHz WLAN (Head to Ear)

Simultaneous TX	Configuration	GSM850 Band Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
Head	Right Touch	0.169	0.084	0.253
	Right Tilt	0.095	0.084	0.179
	Left Touch	0.143	0.112	0.255
	Left Tilt	0.098	0.124	0.222
	Configuration	GPRS850 Band Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.209	0.084	**0.293**
	Right Tilt	0.130	0.084	0.214
	Left Touc	0.176	0.112	0.288
	Left Tilt	0.105	0.124	0.229
	Configuration	GSM1900 Band Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.080	0.084	0.164
	Right Tilt	0.027	0.084	0.111
	Left Touch	0.063	0.112	0.175
	Left Tilt	0.038	0.124	0.162
	Configuration	GPRS1900 Band Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.117	0.084	0.201
	Right Tilt	0.044	0.084	0.128
	Left Touch	0.090	0.112	0.202
	Left Tilt	0.053	0.124	0.177
	configuration	WCDMA Band V Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.136	0.084	0.220
	Right Tilt	0.084	0.084	0.168
	Left Touch	0.109	0.112	0.221
	Left Tilt	0.078	0.124	0.202
	configuration	WCDMA Band II Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.132	0.084	0.216
	Right Tilt	0.047	0.084	0.131
	Left Touch	0.122	0.112	0.234
	Left Tilt	0.064	0.124	0.188
	configuration	LTE Band 7 Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.021	0.084	0.105
	Right Tilt	0.001	0.084	0.085
	Left Touch	0.009	0.112	0.121
	Left Tilt	0.001	0.124	0.125

Simultaneous Transmission Summation Scenario with 5 GHz WLAN (Head to Ear)

Simultaneous TX	Configuration	GSM850 Band Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
Head	Right Touch	0.169	0.339	0.508
	Right Tilt	0.095	0.376	0.471
	Left Touch	0.143	0.381	0.524
	Left Tilt	0.098	0.391	0.489
	Configuration	GPRS850 Band Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.209	0.339	0.548
	Right Tilt	0.130	0.376	0.506
	Left Touch	0.176	0.381	**0.557**
	Left Tilt	0.105	0.391	0.496
	Configuration	GSM1900 Band Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.080	0.339	0.419
	Right Tilt	0.027	0.376	0.403
	Left Touch	0.063	0.381	0.444
	Left Tilt	0.038	0.391	0.429
	Configuration	GPRS1900 Band Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.117	0.339	0.456
	Right Tilt	0.044	0.376	0.420
	Left Touch	0.090	0.381	0.471
	Left Tilt	0.053	0.391	0.444
	configuration	WCDMA Band V Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.136	0.339	0.475
	Right Tilt	0.084	0.376	0.460
	Left Touch	0.109	0.381	0.490
	Left Tilt	0.078	0.391	0.469
	configuration	WCDMA Band II Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.132	0.339	0.471
	Right Tilt	0.047	0.376	0.423
	Left Touch	0.122	0.381	0.503
	Left Tilt	0.064	0.391	0.455
	configuration	LTE Band 7 Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.021	0.339	0.360
	Right Tilt	0.001	0.376	0.377
	Left Touch	0.009	0.381	0.390
	Left Tilt	0.001	0.391	0.392

Simultaneous Transmission Summation Scenario with Bluetooth (Head to Ear)

Simultaneous TX	Configuration	GSM850 Band Scaled SAR(W/kg)	Bluetooth SAR (W/kg)	∑SAR (W/kg)
Head	Right Touch	0.169	0.168	0.337
	Right Tilt	0.095	0.168	0.263
	Left Touch	0.143	0.168	0.311
	Left Tilt	0.098	0.168	0.266
	Configuration	GPRS850 Band Scaled SAR(W/kg)	Bluetooth SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.209	0.168	**0.377**
	Right Tilt	0.130	0.168	0.298
	Left Touch	0.176	0.168	0.344
	Left Tilt	0.105	0.168	0.273
	Configuration	GSM1900 Band Scaled SAR(W/kg)	Bluetooth SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.080	0.168	0.248
	Right Tilt	0.027	0.168	0.195
	Left Touch	0.063	0.168	0.231
	Left Tilt	0.038	0.168	0.206
	Configuration	GPRS1900 Band Scaled SAR(W/kg)	Bluetooth SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.117	0.168	0.285
	Right Tilt	0.044	0.168	0.212
	Left Touch	0.090	0.168	0.258
	Left Tilt	0.053	0.168	0.221
	configuration	WCDMA Band V Scaled SAR(W/kg)	Bluetooth SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.136	0.168	0.304
	Right Tilt	0.084	0.168	0.252
	Left Touch	0.109	0.168	0.277
	Left Tilt	0.078	0.168	0.246
	configuration	WCDMA Band II Scaled SAR(W/kg)	Bluetooth SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.132	0.168	0.300
	Right Tilt	0.047	0.168	0.215
	Left Touch	0.122	0.168	0.290
	Left Tilt	0.064	0.168	0.232
	configuration	LTE Band 7 Scaled SAR(W/kg)	Bluetooth SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.021	0.168	0.189
	Right Tilt	0.001	0.168	0.169
	Left Touch	0.009	0.168	0.177
	Left Tilt	0.001	0.168	0.169

Note

Bluetooth SAR was not required to be measured pre FCC KDB 447498 D01v05r02. Estimated SAR results were used in the above table to determine simultaneous transmission SAR test exclusion.

25.5 Body-Won SAR Simultaneous Transmission Analysis

Simultaneous Transmission Summation Scenario with 2.4 GHz WLAN (Body-Worn at 10 mm)

Simultaneous TX	configuration	GSM850 Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
Body-Worn	Rear	0.300	0.058	0.358
	configuration	GSM1900 Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Rear	0.671	0.058	0.729
	configuration	WCDMA Band V Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Rear	0.237	0.058	0.295
	configuration	WCDMA Band II Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Rear	0.677	0.058	**0.735**
	configuration	LTE Band 7 Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Rear	0.191	0.058	0.249

Simultaneous Transmission Summation Scenario with 5 GHz WLAN (Body-Worn at 10 mm)

Simultaneous TX	configuration	GSM850 Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
Body-Worn	Rear	0.300	0.309	0.609
	configuration	GSM1900 Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Rear	0.671	0.309	0.980
	configuration	WCDMA Band V Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Rear	0.237	0.309	0.546
	configuration	WCDMA Band II Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Rear	0.677	0.309	**0.986**
	configuration	LTE Band 7 Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Rear	0.191	0.309	0.500

Simultaneous Transmission Summation Scenario with Bluetooth (Body-Worn at 10 mm)

Simultaneous TX	configuration	GSM850 Scaled SAR(W/kg)	Bluetooth SAR (W/kg)	∑SAR (W/kg)
Body-Worn	Rear	0.300	0.084	0.384
	configuration	GSM1900 Scaled SAR(W/kg)	Bluetooth SAR (W/kg)	∑SAR (W/kg)
	Rear	0.671	0.084	0.755
	configuration	WCDMA Band V Scaled SAR(W/kg)	Bluetooth SAR (W/kg)	∑SAR (W/kg)
	Rear	0.237	0.084	0.321
	configuration	WCDMA Band II Scaled SAR(W/kg)	Bluetooth SAR (W/kg)	∑SAR (W/kg)
	Rear	0.677	0.084	**0.761**
	configuration	LTE Band 7 Scaled SAR(W/kg)	Bluetooth SAR (W/kg)	∑SAR (W/kg)
	Rear	0.191	0.084	0.275

Note

Bluetooth SAR was not required to be measured pre FCC KDB 447498 D01v05r02. Estimated SAR results were used in the above table to determine simultaneous transmission SAR test exclusion.

25.6 Hotspot SAR Simultaneous Transmission Analysis

Simultaneous Transmission Summation Scenario with 2.4 GHz WLAN (Hotspot at 10 mm)

Simultaneous TX	configuration	GPRS850 Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
Hotspot	Front	0.227	0.034	0.261
	Rear	0.320	0.058	0.378
	Right Edge	0.310	0.013	0.323
	Left Edge	0.171	-	0.171
	Top	-	0.055	0.055
	Bottom	0.239	-	0.239
	configuration	GPRS1900 Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.364	0.034	0.398
	Rear	0.742	0.058	**0.800**
	Right Edge	0.109	0.013	0.122
	Left Edge	0.064	-	0.064
	Top	-	0.055	0.055
	Bottom	0.760	-	0.760
	configuration	WCDMA Band V Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.141	0.034	0.175
	Rear	0.237	0.058	0.295
	Right Edge	0.217	0.013	0.230
	Left Edge	0.115	-	0.115
	Top	-	0.055	0.055
	Bottom	0.185	-	0.185
	configuration	WCDMA Band II Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.359	0.034	0.393
	Rear	0.677	0.058	0.735
	Right Edge	0.129	0.013	0.142
	Left Edge	0.071	-	0.071
	Top	-	0.055	0.055
	Bottom	0.740	-	0.740
	configuration	LTE Band 7 Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.077	0.034	0.111
	Rear	0.191	0.058	0.249
	Right Edge	0.021	0.013	0.034
	Left Edge	0.143	-	0.143
	Top	-	0.055	0.055
	Bottom	0.162	-	0.162

Simultaneous Transmission Summation Scenario with 5 GHz WLAN (Hotspot at 10 mm)

Simultaneous TX	configuration	GPRS850 Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
Hotspot	Front	0.227	0.041	0.268
	Rear	0.320	0.237	0.557
	Right Edge	0.310	0.001	0.311
	Left Edge	0.171	-	0.171
	Top	-	0.226	0.226
	Bottom	0.239	-	0.239
	configuration	GPRS1900 Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.364	0.041	0.405
	Rear	0.742	0.237	**0.979**
	Right Edge	0.109	0.001	0.110
	Left Edge	0.064	-	0.064
	Top	-	0.226	0.226
	Bottom	0.760	-	0.760
	configuration	WCDMA Band V Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.141	0.041	0.182
	Rear	0.237	0.237	0.474
	Right Edge	0.217	0.001	0.218
	Left Edge	0.115	-	0.115
	Top	-	0.226	0.226
	Bottom	0.185	-	0.185
	configuration	WCDMA Band II Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.359	0.041	0.400
	Rear	0.677	0.237	0.914
	Right Edge	0.129	0.001	0.130
	Left Edge	0.071	-	0.071
	Top	-	0.226	0.226
	Bottom	0.740	-	0.740
	configuration	LTE Band 7 Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.077	0.041	0.118
	Rear	0.191	0.237	0.428
	Right Edge	0.021	0.001	0.022
	Left Edge	0.143	-	0.143
	Top	-	0.226	0.226
	Bottom	0.162	-	0.162

Notes.

1. The above numerical summed SAR was below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit. Therefore, no volumetric SAR summation is required since the numerical sums are below the limit.
2. Hotspot Mode Per FCC KDB Publication 941225 D06v01r01, the devices edges with antennas more than 2.5 ㎝ from edge are not required to be evaluated for SAR ("-").

Appendixes List

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Appendix B	B.1 Uncertainty Analysis
Appendix C	C.1 Calibration certificate for Probe C.2 Calibration certificate for DAE C.3 Calibration certificate for Dipole

Appendix A.1 Verification Test Plots for 835 MHz_Head

Date: 2014-04-22

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 835MHz Head System Verification.da53:0

Input Power : 100 mW

Ambient Temp : 23.4 ℃ Tissue Temp : 21.6 ℃

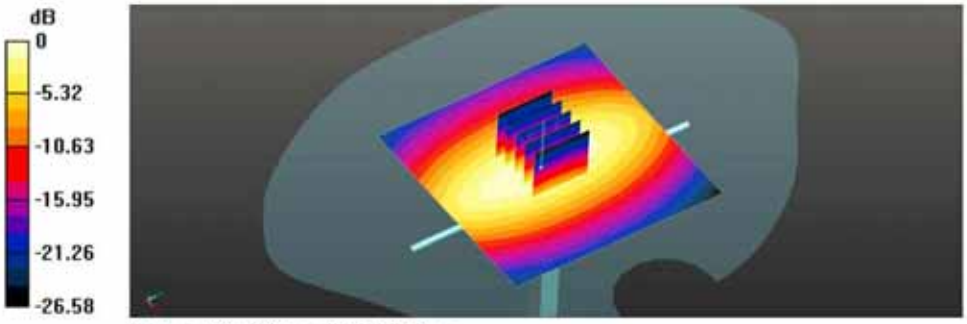
DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: 4d138

Communication System: UID 0, CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.908 S/m; ε_r = 42.544; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(9.76, 9.76, 9.76); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

System Verification/835MHz Head System Verification/Area Scan (81x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.24 W/kg

System Verification/835MHz Head System Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 37.197 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.43 W/kg
SAR(1 g) = 0.975 W/kg; SAR(10 g) = 0.640 W/kg
Maximum value of SAR (measured) = 1.23 W/kg



0 dB = 1.24 W/kg = 0.93 dBW/kg

Appendix A.1 Verification Test Plots for 835 MHz_Body

Date: 2014-04-22

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 835MHz Body System Verification da53:0

Input Power : 100 mW

Ambient Temp : 23.2 ℃ Tissue Temp : 21.5 ℃

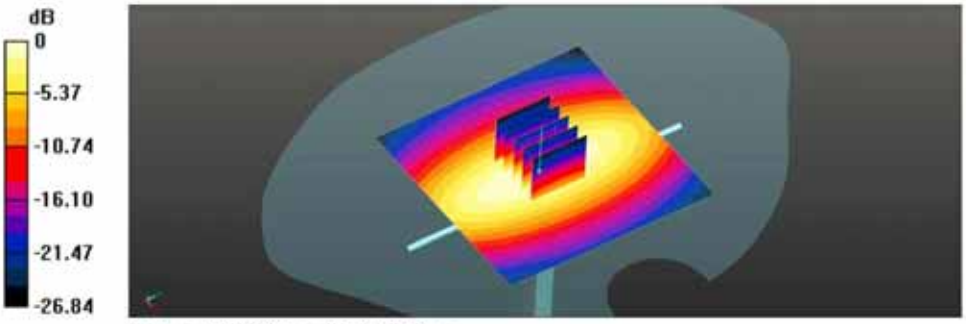
DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: 4d138

Communication System: UID 0, CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.953 S/m; ε_r = 56.159; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(9.52, 9.52, 9.52); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

System Verification/835MHz Body System Verification/Area Scan (81x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.20 W/kg

System Verification/835MHz Body System Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 36.045 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.40 W/kg
SAR(1 g) = 0.968 W/kg; SAR(10 g) = 0.646 W/kg
Maximum value of SAR (measured) = 1.21 W/kg



0 dB = 1.20 W/kg = 0.79 dBW/kg

Appendix A.2 Verification Test Plots for 1900 MHz_Head

Date: 2014-04-23

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 1900MHz Head System Verification.da53:0

Input Power : 100 mW

Ambient Temp : 23.7 ℃ Tissue Temp : 22.3 ℃

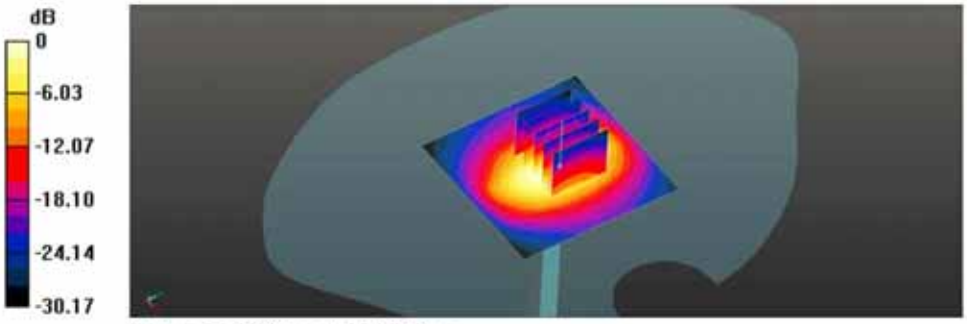
DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2 - SN:5d158

Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.389 S/m; ε_r = 38.97; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(8.15, 8.15, 8.15); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1720
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Verification/1900MHz Head System Verification/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 5.63 W/kg

Verification/1900MHz Head System Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 63.574 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 7.05 W/kg
SAR(1 g) = 3.83 W/kg; SAR(10 g) = 1.99 W/kg
Maximum value of SAR (measured) = 5.38 W/kg



0 dB = 5.63 W/kg = 7.51 dBW/kg

Appendix A.2 Verification Test Plots for 1900 MHz_Body

Date: 2014-04-23

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 1900MHz Body System Verification.da53:0

Input Power : 100 mW

Ambient Temp : 23.6 ℃ Tissue Temp : 22.1 ℃

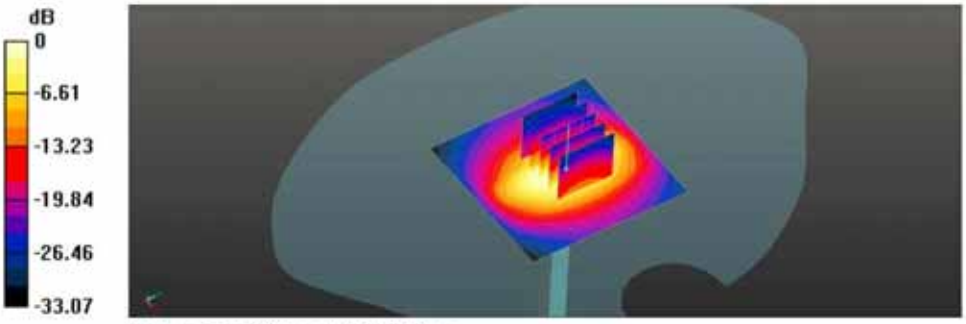
DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2 - SN:5d158

Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.511 S/m; ε_r = 54.666; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(7.63, 7.63, 7.63); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1720
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Verification/1900MHz Body System Verification/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 5.56 W/kg

Verification/1900MHz Body System Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 60.999 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 6.95 W/kg
SAR(1 g) = 3.94 W/kg; SAR(10 g) = 2.08 W/kg
Maximum value of SAR (measured) = 5.39 W/kg



0 dB = 5.56 W/kg = 7.45 dBW/kg

Appendix A.3 Verification Test Plots for 2600 MHz_Head

Date: 2014-05-14

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 2600MHz Head System Verification.da53:0

Input Power : 100 mW

Ambient Temp : 23.6 ℃ Tissue Temp : 21.8 ℃

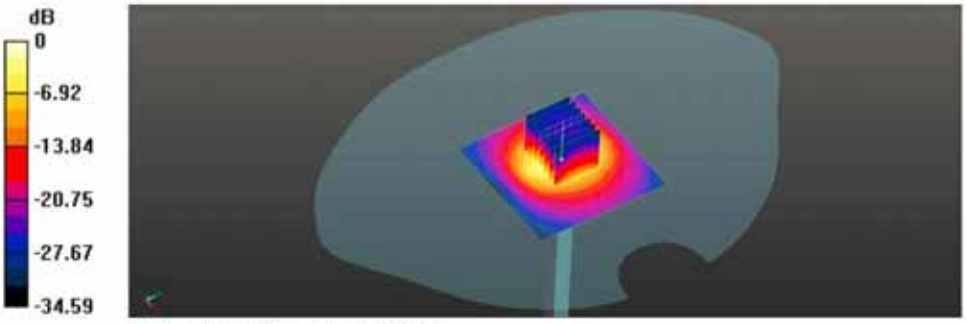
DUT: Dipole 2600 MHz D2600V2; Type: D2600V2; Serial: D2600V2 - SN:1038

Communication System: UID 0, CW (0); Frequency: 2600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2600 MHz; σ = 2.054 S/m; ε_r = 39.497; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3972; ConvF(6.97, 6.97, 6.97); Calibrated: 2014-01-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn614; Calibrated: 2013-09-20
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

2600MHz Head System Verification/2600MHz Head System Verification/Area Scan (71x71x1):
Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 9.94 W/kg

2600MHz Head System Verification/2600MHz Head System Verification/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 68.631 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 13.6 W/kg
SAR(1 g) = 6.09 W/kg; SAR(10 g) = 2.67 W/kg
Maximum value of SAR (measured) = 9.69 W/kg



0 dB = 9.94 W/kg = 9.97 dBW/kg

Appendix A.3 Verification Test Plots for 2600 MHz_Body

Date: 2014-05-14

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 2600MHz Body System Verification.da53:0

Input Power : 100 mW

Ambient Temp : 23.5 ℃ Tissue Temp : 21.6 ℃

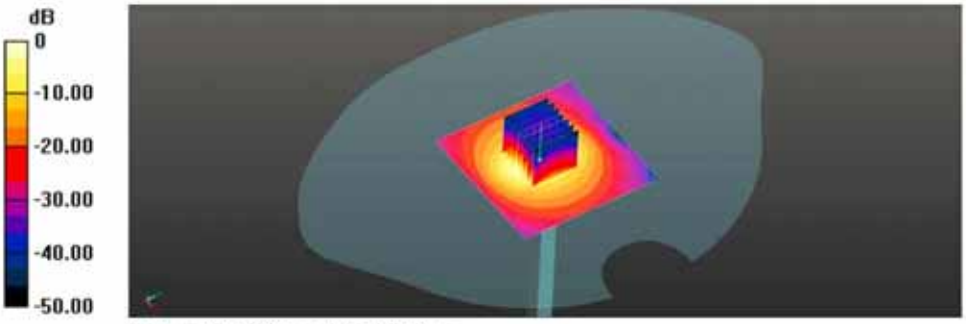
DUT: Dipole 2600 MHz D2600V2; Type: D2600V2; Serial: D2600V2 - SN:1038

Communication System: UID 0, CW (0); Frequency: 2600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2600 MHz; σ = 2.208 S/m; ε_r = 50.764; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3972; ConvF(6.96, 6.96, 6.96); Calibrated: 2014-01-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn614; Calibrated: 2013-09-20
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

2600MHz Body System Verification/2600MHz Body System Verification/Area Scan (91x91x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 8.74 W/kg

2600MHz Body System Verification/2600MHz Body System Verification/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 60.151 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 12.5 W/kg
SAR(1 g) = 5.49 W/kg; SAR(10 g) = 2.38 W/kg
Maximum value of SAR (measured) = 8.80 W/kg



0 dB = 8.74 W/kg = 9.42 dBW/kg

Appendix A.4 Verification Test Plots for 2450 MHz_Head

Date: 2014-04-24

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 2450MHz Head System Verification.da53:0

Input Power : 100 mW

Ambient Temp : 23.5 ℃ Tissue Temp : 22.1 ℃

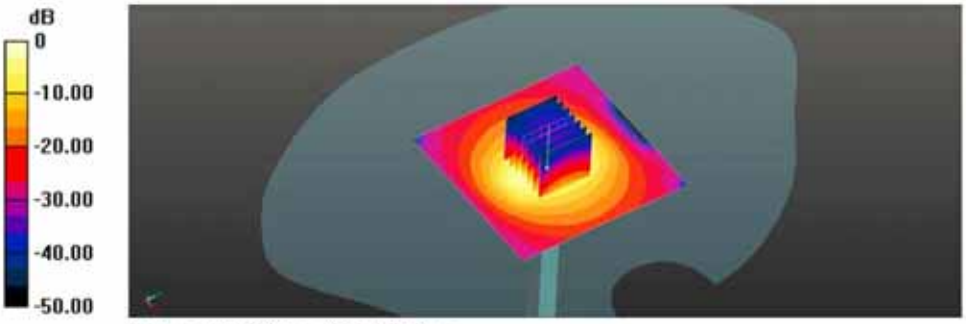
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:892

Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.834 S/m; ε_r = 40.097; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(7.24, 7.24, 7.24); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1720
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Verification/2450MHz Head System Verification/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 7.87 W/kg

Verification/2450MHz Head System Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 66.478 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 11.0 W/kg
SAR(1 g) = 5.04 W/kg; SAR(10 g) = 2.28 W/kg
Maximum value of SAR (measured) = 7.88 W/kg



0 dB = 7.87 W/kg = 8.96 dBW/kg

Appendix A.4 Verification Test Plots for 2450 MHz_Body

Date: 2014-04-24

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 2450MHz Body System Verification.da53:0

Input Power : 100 mW

Ambient Temp : 23.3 ℃ Tissue Temp : 21.7 ℃

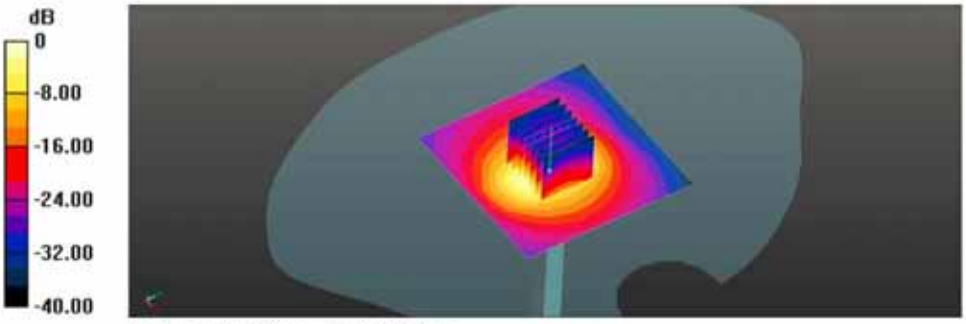
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:892

Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.904 S/m; ε_r = 52.578; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(7.17, 7.17, 7.17); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Verification/2450MHz Body System Verification/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 7.71 W/kg

Verification/2450MHz Body System Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 60.961 V/m; Power Drift = 0.38 dB
Peak SAR (extrapolated) = 11.1 W/kg
SAR(1 g) = 5.11 W/kg; SAR(10 g) = 2.32 W/kg
Maximum value of SAR (measured) = 7.98 W/kg



0 dB = 7.71 W/kg = 8.87 dBW/kg

Appendix A.5 Verification Test Plots for 5200 MHz_Head

Date: 2014-04-27

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 5200MHz Head System Verification.da53:0

Input Power : 100 mW

Ambient Temp : 23.6 ℃ Tissue Temp : 22.1 ℃

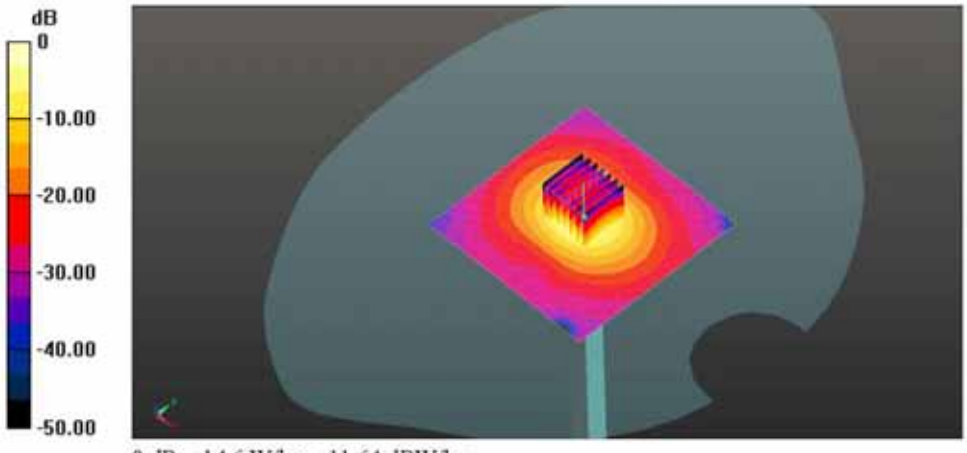
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1170

Communication System: UID 0, CW (0); Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 4.705 S/m; ε_r = 34.594; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.89, 4.89, 4.89); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1720
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

System Verification/5200MHz Head System Verification/Area Scan (91x91x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 14.6 W/kg

System Verification/5200MHz Head System Verification/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 57.354 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 31.9 W/kg
SAR(1 g) = 7.83 W/kg; SAR(10 g) = 2.24 W/kg
Maximum value of SAR (measured) = 16.2 W/kg



0 dB = 14.6 W/kg = 11.64 dBW/kg

Appendix A.5 Verification Test Plots for 5200 MHz_Body

Date: 2014-04-26

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 5200MHz Body System Verification.da53:0

Input Power : 100 mW

Ambient Temp : 23.8 ℃ Tissue Temp : 22.1 ℃

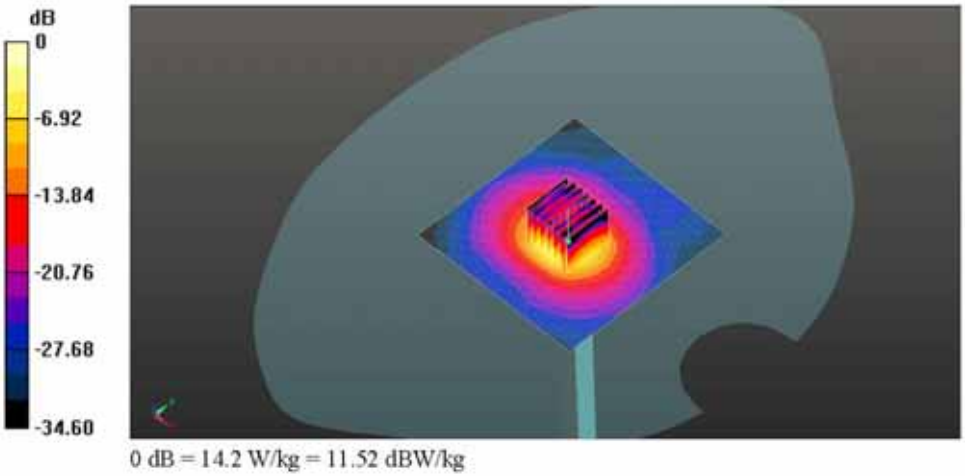
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1106

Communication System: UID 0, CW (0); Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 5.504 S/m; ε_r = 50.944; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.46, 4.46, 4.46); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

System Verification/5200MHz Body System Verification/Area Scan (91x91x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 14.2 W/kg

System Verification/5200MHz Body System Verification/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 50.147 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 31.4 W/kg
SAR(1 g) = 7.37 W/kg; SAR(10 g) = 2.05 W/kg
Maximum value of SAR (measured) = 15.2 W/kg



0 dB = 14.2 W/kg = 11.52 dBW/kg

Appendix A.6 Verification Test Plots for 5300 MHz_Head

Date: 2014-04-27

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 5300MHz Head System Verification.da53:0

Input Power : 100 mW

Ambient Temp : 23.6 ℃ Tissue Temp : 22.1 ℃

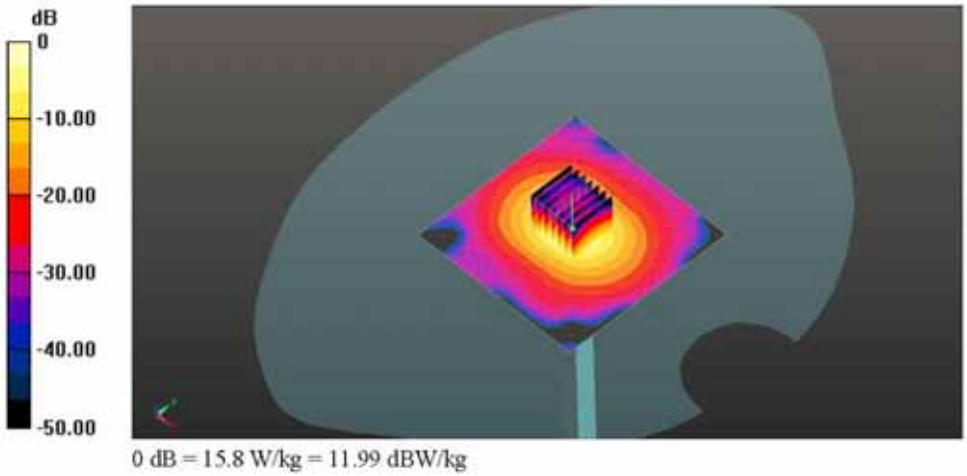
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1170

Communication System: UID 0, CW (0); Frequency: 5300 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5300 MHz; σ = 4.839 S/m; ε_r = 34.377; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.77, 4.77, 4.77); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1720
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

System Verification/5300MHz Head System Verification/Area Scan (91x91x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 15.8 W/kg

System Verification/5300MHz Head System Verification/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 60.146 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 36.5 W/kg
SAR(1 g) = 7.94 W/kg; SAR(10 g) = 2.24 W/kg
Maximum value of SAR (measured) = 16.8 W/kg



0 dB = 15.8 W/kg = 11.99 dBW/kg

Appendix A.6 Verification Test Plots for 5300 MHz_Body

Date: 2014-04-26

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 5300MHz Body System Verification.da53:0

Input Power : 100 mW

Ambient Temp : 23.8 ℃ Tissue Temp : 22.1 ℃

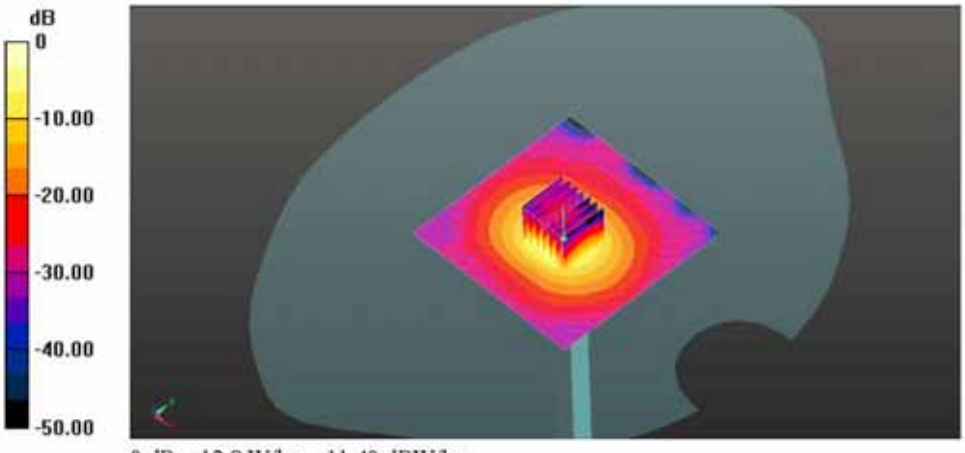
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1106

Communication System: UID 0, CW (0); Frequency: 5300 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5300 MHz; σ = 5.638 S/m; ε_r = 50.737; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.21, 4.21, 4.21); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

System Verification/5300MHz Body System Verification/Area Scan (91x91x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 13.8 W/kg

System Verification/5300MHz Body System Verification/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 49.340 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 30.8 W/kg
SAR(1 g) = 7.31 W/kg; SAR(10 g) = 2.05 W/kg
Maximum value of SAR (measured) = 15.3 W/kg



0 dB = 13.8 W/kg = 11.40 dBW/kg

Appendix A.7 Verification Test Plots for 5600 MHz_Head

Date: 2014-04-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 5600MHz Head System Verification.da53:0

Input Power : 100 mW

Ambient Temp : 23.9 ℃ Tissue Temp : 22.3 ℃

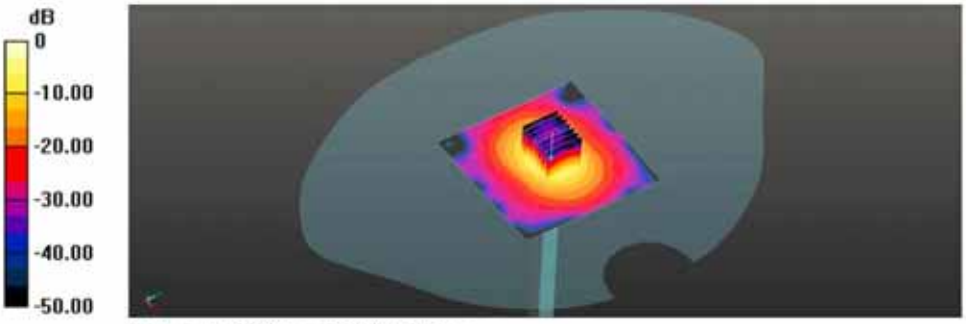
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1170

Communication System: UID 0, CW (0); Frequency: 5600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5600 MHz; σ = 5.039 S/m; ε_r = 35.021; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.59, 4.59, 4.59); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1720
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

System Verification/5600MHz Head System Verification/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 16.2 W/kg

System Verification/5600MHz Head System Verification/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 61.122 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 39.1 W/kg
SAR(1 g) = 8.36 W/kg; SAR(10 g) = 2.36 W/kg
Maximum value of SAR (measured) = 18.0 W/kg



0 dB = 16.2 W/kg = 12.10 dBW/kg

Appendix A.7 Verification Test Plots for 5600 MHz_Body

Date: 2014-04-25

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 5600MHz Body System Verification.da53:0

Input Power : 100 mW

Ambient Temp : 23.7 ℃ Tissue Temp : 22.1 ℃

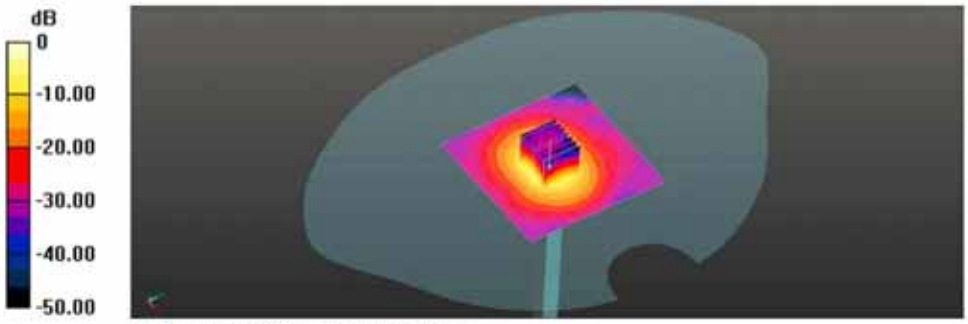
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1106

Communication System: UID 0, CW (0); Frequency: 5600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5600 MHz; σ = 5.752 S/m; ε_r = 48.033; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.06, 4.06, 4.06); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

System Verification/5600MHz Body System Verification/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 16.0 W/kg

System Verification/5600MHz Body System Verification/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 51.181 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 37.5 W/kg
SAR(1 g) = 8.24 W/kg; SAR(10 g) = 2.3 W/kg
Maximum value of SAR (measured) = 17.3 W/kg



0 dB = 16.0 W/kg = 12.04 dBW/kg

Appendix A.8 Verification Test Plots for 5800 MHz_Head

Date: 2014-04-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 5800MHz Head System Verification.da53:0

Input Power : 100 mW

Ambient Temp : 23.9 ℃ Tissue Temp : 22.3 ℃

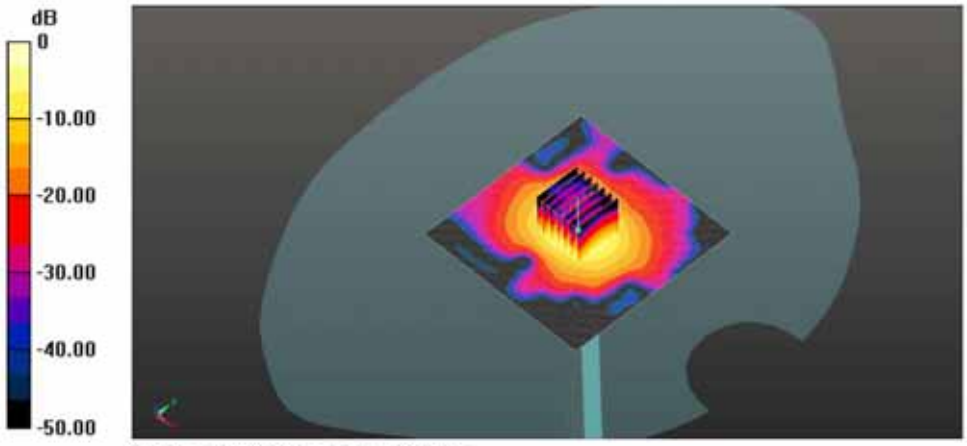
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1170

Communication System: UID 0, CW (0); Frequency: 5800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5800 MHz; σ = 5.242 S/m; ε_r = 34.56; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.25, 4.25, 4.25); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1720
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

System Verification/5800MHz Head System Verification/Area Scan (91x91x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 16.4 W/kg

System Verification/5800MHz Head System Verification/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 60.902 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 37.4 W/kg
SAR(1 g) = 8.22 W/kg; SAR(10 g) = 2.32 W/kg
Maximum value of SAR (measured) = 17.6 W/kg



0 dB = 16.4 W/kg = 12.15 dBW/kg

Appendix A.8 Verification Test Plots for 5800 MHz_Body

Date: 2014-04-25

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 5800MHz Body System Verification.da53:0

Input Power : 100 mW

Ambient Temp : 23.7 ℃ Tissue Temp : 22.1 ℃

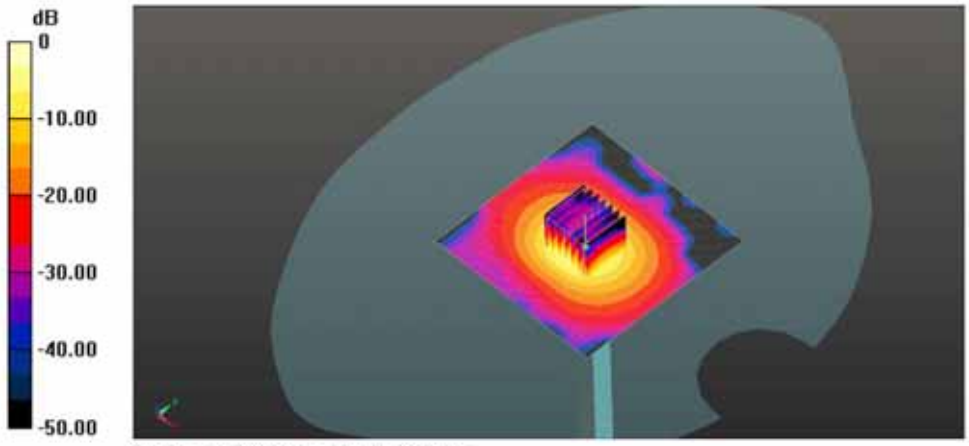
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1106

Communication System: UID 0, CW (0); Frequency: 5800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5800 MHz; σ = 6.035 S/m; ε_r = 47.656; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.08, 4.08, 4.08); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

System Verification/5800MHz Body System Verification/Area Scan (91x91x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 14.2 W/kg

System Verification/5800MHz Body System Verification/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 48.927 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 31.9 W/kg
SAR(1 g) = 7.18 W/kg; SAR(10 g) = 2.01 W/kg
Maximum value of SAR (measured) = 15.3 W/kg



0 dB = 14.2 W/kg = 11.52 dBW/kg

Appendix A.9 SAR Test Plots for GSM850 Band (Head SAR)

Date: 2014-04-22

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: GPRS 850_Right Touch_CH190.da53:0

Ambient Temp : 23.4 ℃ Tissue Temp : 21.6 ℃

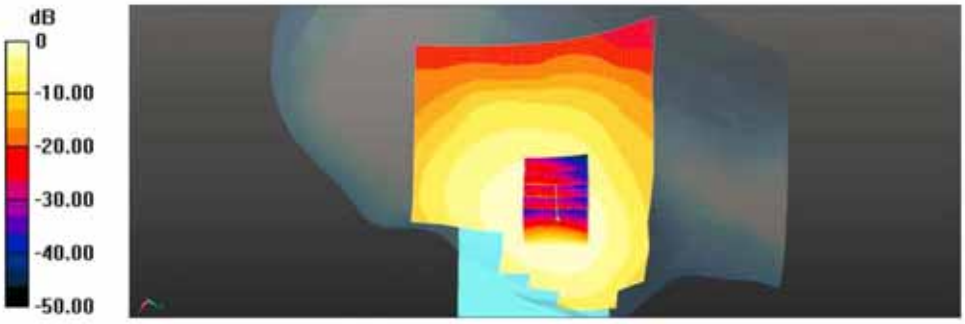
DUT: LG-D855; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 403KPED559308

Communication System: UID 0, GPRS850 2TX (0); Frequency: 836.6 MHz;Duty Cycle: 1:4.14954
Medium parameters used: f = 837 MHz; σ = 0.909 S/m; ε_r = 42.514; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(9.76, 9.76, 9.76); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Head/GPRS 850_Right Touch_CH190/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.229 W/kg

Head/GPRS 850_Right Touch_CH190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.612 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.252 W/kg
SAR(1 g) = 0.202 W/kg; SAR(10 g) = 0.156 W/kg
Maximum value of SAR (measured) = 0.231 W/kg



0 dB = 0.229 W/kg = -6.40 dBW/kg

Appendix A.9 SAR Test Plots for GSM850 Band (Body-Worn SAR)

Date: 2014-04-22

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: GSM 850_Rear_CH190.da53:0

Ambient Temp : 23.2 ℃ Tissue Temp : 21.5 ℃

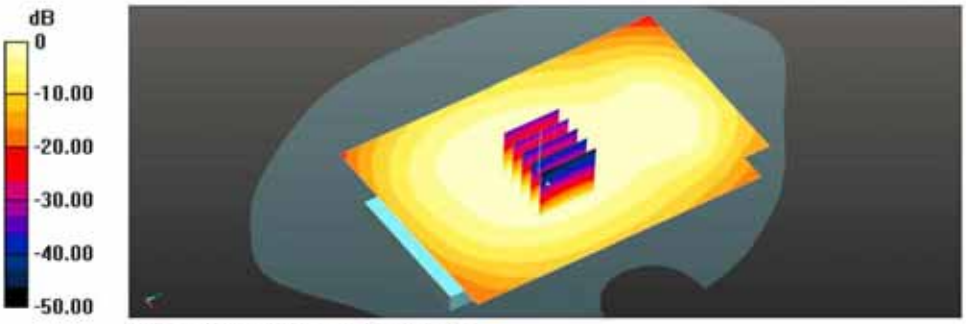
DUT: LG-D855; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 403KPED559308

Communication System: UID 0, GSM850 (0); Frequency: 836.6 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 837 MHz; σ = 0.955 S/m; ε_r = 56.137; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(9.52, 9.52, 9.52); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Body/GSM 850_Rear_CH190/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.342 W/kg

Body/GSM 850_Rear_CH190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.555 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.371 W/kg
SAR(1 g) = 0.297 W/kg; SAR(10 g) = 0.225 W/kg
Maximum value of SAR (measured) = 0.338 W/kg



0 dB = 0.342 W/kg = -4.66 dBW/kg

Appendix A.9 SAR Test Plots for GSM850 Band (Hotspot SAR)

Date: 2014-04-22

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: GPRS 850_Rear_CH190.da53:0

Ambient Temp : 23.2 ℃ Tissue Temp : 21.5 ℃

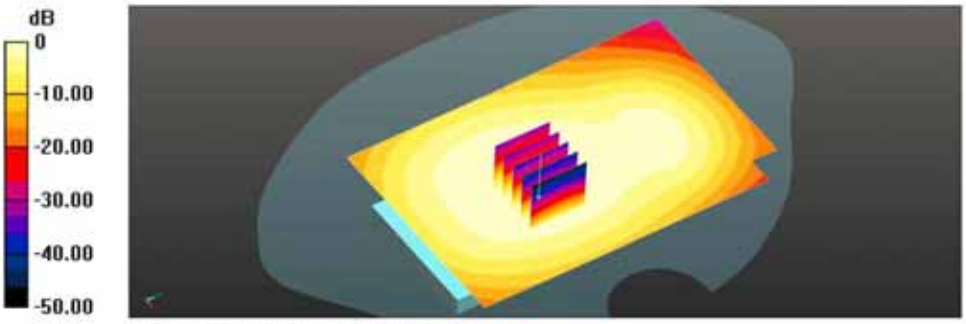
DUT: LG-D855; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 403KPED559308

Communication System: UID 0, GPRS850 2TX (0); Frequency: 836.6 MHz;Duty Cycle: 1:4.14954
Medium parameters used: f = 837 MHz; σ = 0.955 S/m; ε_r = 56.137; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(9.52, 9.52, 9.52); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Body/GPRS 850_Rear_CH190/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.356 W/kg

Body/GPRS 850_Rear_CH190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.081 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 0.389 W/kg
SAR(1 g) = 0.309 W/kg; SAR(10 g) = 0.241 W/kg
Maximum value of SAR (measured) = 0.354 W/kg



0 dB = 0.356 W/kg = -4.49 dBW/kg

Appendix A.10 SAR Test Plots for GSM1900 Band (Head SAR)

Date: 2014-04-23

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: GPRS 1900_Right Touch_CH661.da53:0

Ambient Temp : 23.7 ℃ Tissue Temp : 22.3 ℃

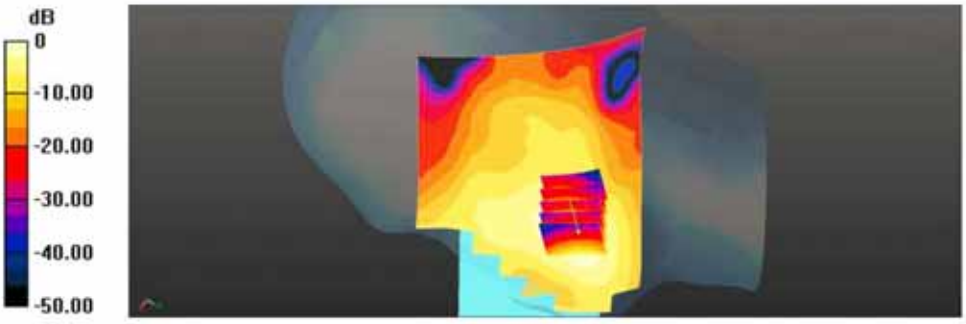
DUT: LG-D855; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 403KPED559308

Communication System: UID 0, GPRS1900 4TX (0); Frequency: 1880 MHz;Duty Cycle: 1:2.07491
Medium parameters used: f = 1880 MHz; σ = 1.371 S/m; ε_r = 39.035; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(8.15, 8.15, 8.15); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1720
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Head/GPRS 1900_Right Touch_CH661/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.156 W/kg

Head/GPRS 1900_Right Touch_CH661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.290 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.168 W/kg
SAR(1 g) = 0.114 W/kg; SAR(10 g) = 0.072 W/kg
Maximum value of SAR (measured) = 0.142 W/kg



0 dB = 0.156 W/kg = -8.07 dBW/kg

Appendix A.10 SAR Test Plots for GSM1900 Band (Body-Worn)

Date: 2014-04-23

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: GSM 1900_Rear_CH661.da53:0

Ambient Temp : 23.6 ℃ Tissue Temp : 22.1 ℃

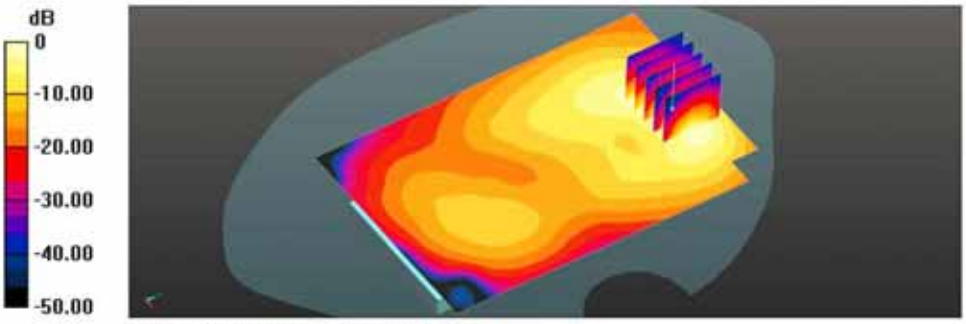
DUT: LG-D855; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 403KPED559308

Communication System: UID 0, PCS1900 (0); Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; σ = 1.487 S/m; ε_r = 54.707; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(7.63, 7.63, 7.63); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Body/GSM 1900_Rear_CH661/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.787 W/kg

Body/GSM 1900_Rear_CH661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.966 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.13 W/kg
SAR(1 g) = 0.629 W/kg; SAR(10 g) = 0.324 W/kg
Maximum value of SAR (measured) = 0.867 W/kg



0 dB = 0.787 W/kg = -1.04 dBW/kg

Appendix A.10 SAR Test Plots for GSM1900 Band (Hotspot SAR)

Date: 2014-04-23

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: GPRS 1900_Bottom_CH661.da53:0

Ambient Temp : 23.6 ℃ Tissue Temp : 22.1 ℃

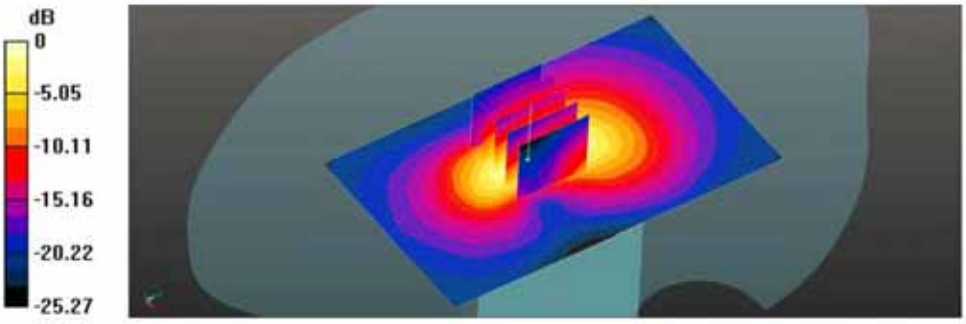
DUT: LG-D855; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 403KPED559308

Communication System: UID 0, GPRS1900 4TX (0); Frequency: 1880 MHz;Duty Cycle: 1:2.07491
Medium parameters used: f = 1880 MHz; σ = 1.487 S/m; ε_r = 54.707; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(7.63, 7.63, 7.63); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1720
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Body/GPRS 1900_Bottom_CH661/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.05 W/kg

Body/GPRS 1900_Bottom_CH661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.597 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.28 W/kg
SAR(1 g) = 0.739 W/kg; SAR(10 g) = 0.378 W/kg
Maximum value of SAR (measured) = 1.04 W/kg



0 dB = 1.05 W/kg = 0.21 dBW/kg

Appendix A.11 SAR Test Plots for WCDMA850 Band (Head SAR)

Date: 2014-04-22

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WCDMA 5_Right Touch_CH4183.da53:0

Ambient Temp : 23.4 ℃ Tissue Temp : 21.6 ℃

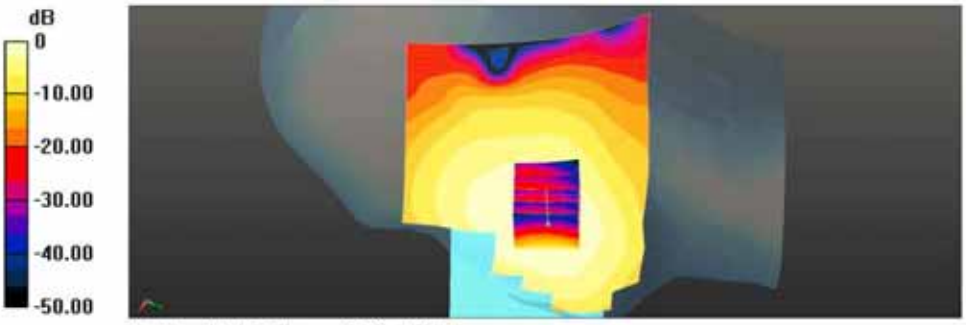
DUT: LG-D855; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 403KPED559308

Communication System: UID 0, WCDMA5 (0); Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.909 S/m; ε_r = 42.514; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(9.76, 9.76, 9.76); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Head/WCDMA 5_Right Touch_CH4183/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.148 W/kg

Head/WCDMA 5_Right Touch_CH4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.491 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.158 W/kg
SAR(1 g) = 0.128 W/kg; SAR(10 g) = 0.100 W/kg
Maximum value of SAR (measured) = 0.144 W/kg



0 dB = 0.148 W/kg = -8.30 dBW/kg

Appendix A.11 SAR Test Plots for WCDMA850 Band (Body-Worn and Hotspot SAR)

Date: 2014-04-22

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WCDMA 5_Rear_CH4183.da53:0

Ambient Temp : 23.3 ℃ Tissue Temp : 21.2 ℃

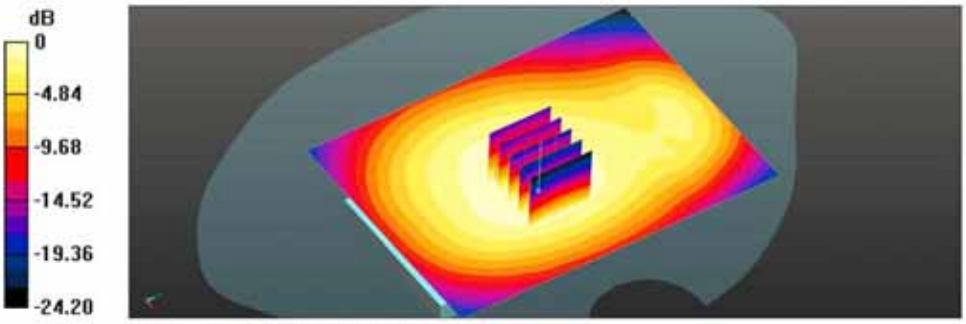
DUT: LG-D855; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 403KPED559308

Communication System: UID 0, WCDMA5 (0); Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.955 S/m; ε_r = 56.137; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(9.52, 9.52, 9.52); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Body/WCDMA 5_Rear_CH4183/Area Scan (81x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.261 W/kg

Body/WCDMA 5_Rear_CH4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.996 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.285 W/kg
SAR(1 g) = 0.224 W/kg; SAR(10 g) = 0.171 W/kg
Maximum value of SAR (measured) = 0.259 W/kg



0 dB = 0.261 W/kg = -5.83 dBW/kg

Appendix A.12 SAR Test Plots for WCDMA1900 Band (Head SAR)

Date: 2014-04-23

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WCDMA 2_Right Touch_CH9400.da53:0

Ambient Temp : 23.7 ℃ Tissue Temp : 22.3 ℃

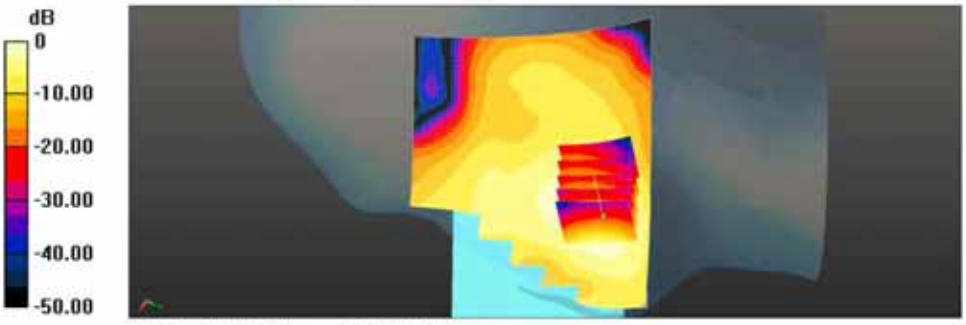
DUT: LG-D855; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 403KPED559308

Communication System: UID 0, WCDMA2 (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.371 S/m; ε_r = 39.035; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(8.15, 8.15, 8.15); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1720
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Head/WCDMA 2_Right Touch_CH9400/Area Scan (71x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.168 W/kg

Head/WCDMA 2_Right Touch_CH9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.883 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.185 W/kg
SAR(1 g) = 0.126 W/kg; SAR(10 g) = 0.080 W/kg
Maximum value of SAR (measured) = 0.156 W/kg



0 dB = 0.168 W/kg = -7.75 dBW/kg

Appendix A.12 SAR Test Plots for WCDMA1900 Band (Body-Worn)

Date: 2014-04-23

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WCDMA 2_Rear_CH9400.da53:0

Ambient Temp : 23.6 ℃ Tissue Temp : 22.1 ℃

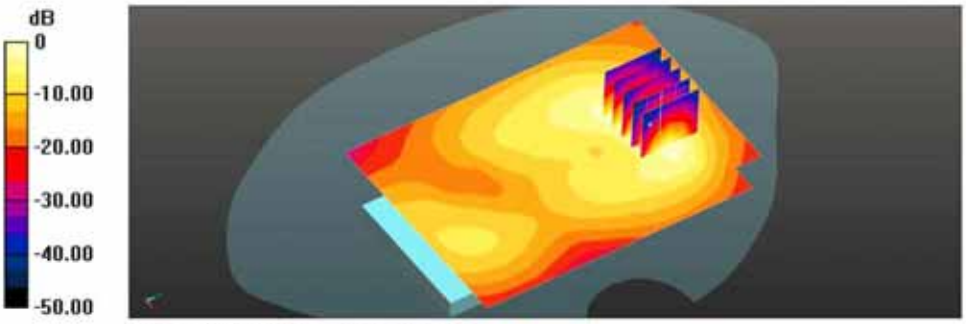
DUT: LG-D855; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 403KPED559308

Communication System: UID 0, WCDMA2 (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.487 S/m; ε_r = 54.707; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(7.63, 7.63, 7.63); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1720
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Body/WCDMA 2_Rear_CH9400/Area Scan (81x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.780 W/kg

Body/WCDMA 2_Rear_CH9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.345 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 1.11 W/kg
SAR(1 g) = 0.645 W/kg; SAR(10 g) = 0.337 W/kg
Maximum value of SAR (measured) = 0.841 W/kg



0 dB = 0.780 W/kg = -1.08 dBW/kg

Appendix A.12 SAR Test Plots for WCDMA1900 Band (Hotspot SAR)

Date: 2014-04-23

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WCDMA 2_Bottom_CH9400.da53:0

Ambient Temp : 23.6 ℃ Tissue Temp : 22.1 ℃

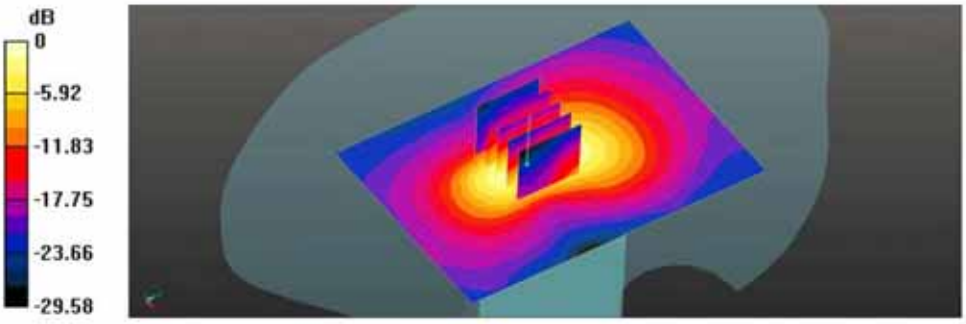
DUT: LG-D855; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 403KPED559308

Communication System: UID 0, WCDMA2 (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.487 S/m; ε_r = 54.707; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(7.63, 7.63, 7.63); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1720
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Body/WCDMA 2_Bottom_CH9400/Area Scan (71x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.926 W/kg

Body/WCDMA 2_Bottom_CH9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.465 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.24 W/kg
SAR(1 g) = 0.705 W/kg; SAR(10 g) = 0.357 W/kg
Maximum value of SAR (measured) = 0.978 W/kg



0 dB = 0.926 W/kg = -0.33 dBW/kg

Appendix A.13 SAR Test Plots for LTE Band 7 (Head SAR)

Date: 2014-05-14

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: LTE Band7_20MHz_1RB 0 Offset_QPSK_Right Touch_CH21350.da53:0

Ambient Temp : 23.6 ℃ Tissue Temp : 21.8 ℃

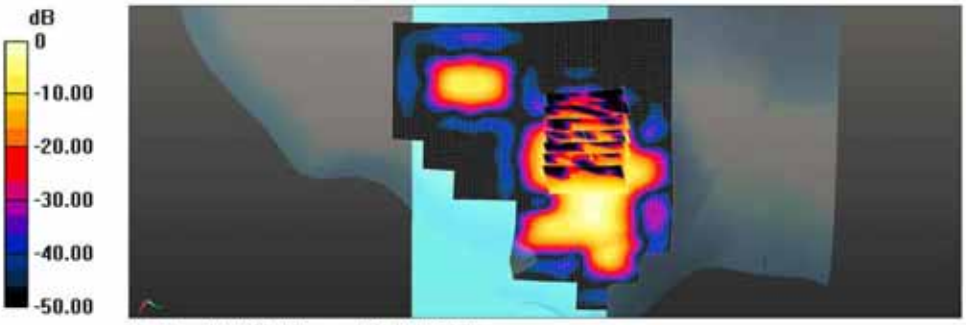
DUT: LG-D855; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 403KPED559308

Communication System: UID 0, LTE Band 7 (0); Frequency: 2560 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2560 MHz; σ = 2.008 S/m; ε_r = 39.636; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3972; ConvF(6.97, 6.97, 6.97); Calibrated: 2014-01-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn614; Calibrated: 2013-09-20
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Head/LTE Band7_20MHz_1RB 0 Offset_QPSK_Right Touch_CH21350/Area Scan (91x111x1):
Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.0490 W/kg

Head/LTE Band7_20MHz_1RB 0 Offset_QPSK_Right Touch_CH21350/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.675 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.0390 W/kg
SAR(1 g) = 0.019 W/kg; SAR(10 g) = 0.00812 W/kg
Maximum value of SAR (measured) = 0.0291 W/kg



0 dB = 0.0490 W/kg = -13.10 dBW/kg

Appendix A.13 SAR Test Plots for LTE Band 7 (Body-Worn and Hotspot SAR)

Date: 2014-05-14

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: LTE Band7_20MHz_1RB 0 Offset_QPSK_Rear_CH21350.da53:0

Ambient Temp : 23.5 ℃ Tissue Temp : 21.6 ℃

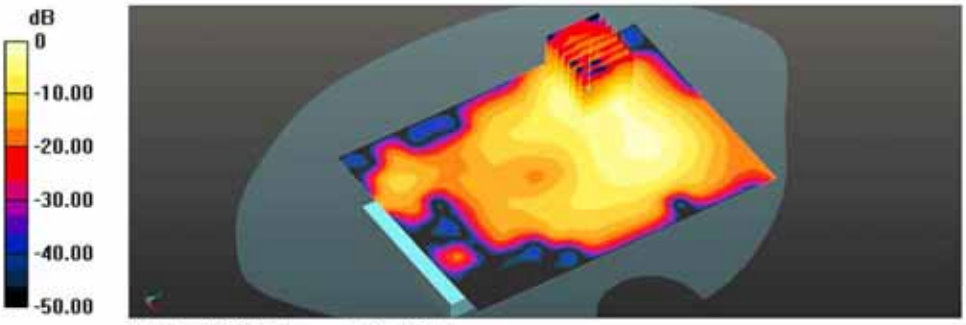
DUT: LG-D855; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 403KPED559308

Communication System: UID 0, LTE Band 7 (0); Frequency: 2560 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2560 MHz; σ = 2.161 S/m; ε_r = 50.877; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3972; ConvF(6.96, 6.96, 6.96); Calibrated: 2014-01-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn614; Calibrated: 2013-09-20
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Body/LTE Band7_20MHz_1RB 0 Offset_QPSK_Rear_CH21350/Area Scan (101x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.280 W/kg

Body/LTE Band7_20MHz_1RB 0 Offset_QPSK_Rear_CH21350/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.942 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.383 W/kg
SAR(1 g) = 0.171 W/kg; SAR(10 g) = 0.077 W/kg
Maximum value of SAR (measured) = 0.264 W/kg



0 dB = 0.280 W/kg = -5.53 dBW/kg

Appendix A.14 SAR Test Plots for WLAN 2.4 GHz Band (Head SAR)

Date: 2014-04-24

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WLAN_802.11b_1Mbps_Left Tilt_CH11.da53:0

Ambient Temp : 23.5 ℃ Tissue Temp : 22.1 ℃

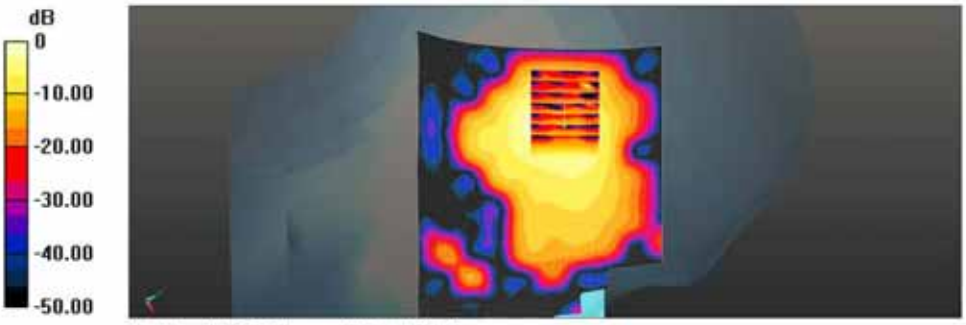
DUT: LG-D855; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 403KPED559308

Communication System: UID 0, WLAN 2.45GHz (0); Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.845 S/m; ε_r = 40.116; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(7.24, 7.24, 7.24); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1720
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Head/WLAN_802.11b_1Mbps_Left Tilt_CH11/Area Scan (91x131x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.157 W/kg

Head/WLAN_802.11b_1Mbps_Left Tilt_CH11/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.678 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.398 W/kg
SAR(1 g) = 0.102 W/kg; SAR(10 g) = 0.044 W/kg
Maximum value of SAR (measured) = 0.166 W/kg



0 dB = 0.157 W/kg = -8.04 dBW/kg

Appendix A.14 SAR Test Plots for WLAN 2.4 GHz Band (Body-Worn and Hotspot SAR)

Date: 2014-04-24

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WLAN_802.11b_1Mbps_Rear_CH11.da53:0

Ambient Temp : 23.3 ℃ Tissue Temp : 21.7 ℃

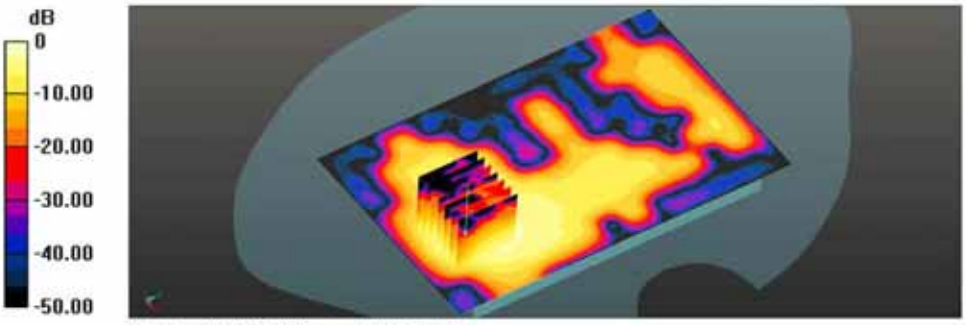
DUT: LG-D855; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 403KPED559308

Communication System: UID 0, WLAN 2.45GHz (0); Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.92 S/m; ε_r = 52.534; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(7.17, 7.17, 7.17); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Body/WLAN_802.11b_1Mbps_Rear_CH11/Area Scan (91x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.0748 W/kg

Body/WLAN_802.11b_1Mbps_Rear_CH11/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.364 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.104 W/kg
SAR(1 g) = 0.048 W/kg; SAR(10 g) = 0.022 W/kg
Maximum value of SAR (measured) = 0.0734 W/kg



0 dB = 0.0748 W/kg = -11.26 dBW/kg

Appendix A.15 SAR Test Plots for WLAN 5.2 GHz Band (Head SAR)

Date: 2014-04-27

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WLAN_802.11a_6Mbps_Left Tilt_CH44.da53:0

Ambient Temp : 23.6 ℃ Tissue Temp : 22.1 ℃

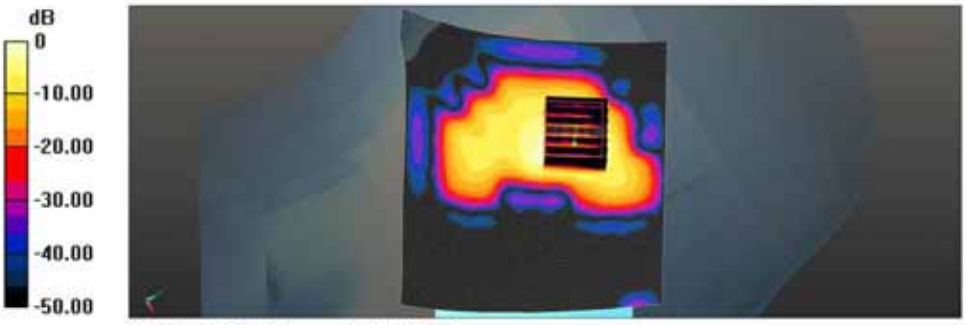
DUT: LG-D855; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 403KPED559308

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5220 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5220 MHz; σ = 4.731 S/m; ε_r = 34.557; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.89, 4.89, 4.89); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1720
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Head/WLAN_802.11a_6Mbps_Left Tilt_CH44/Area Scan (101x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.566 W/kg

Head/WLAN_802.11a_6Mbps_Left Tilt_CH44/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 5.901 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.289 W/kg; SAR(10 g) = 0.086 W/kg
Maximum value of SAR (measured) = 0.585 W/kg



0 dB = 0.566 W/kg = -2.47 dBW/kg

Appendix A.15 SAR Test Plots for WLAN 5.2 GHz Band (Body-Worn SAR)

Date: 2014-04-26

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WLAN_802.11a_6Mbps_Rear_CH44.da53:0

Ambient Temp : 23.8 ℃ Tissue Temp : 22.1 ℃

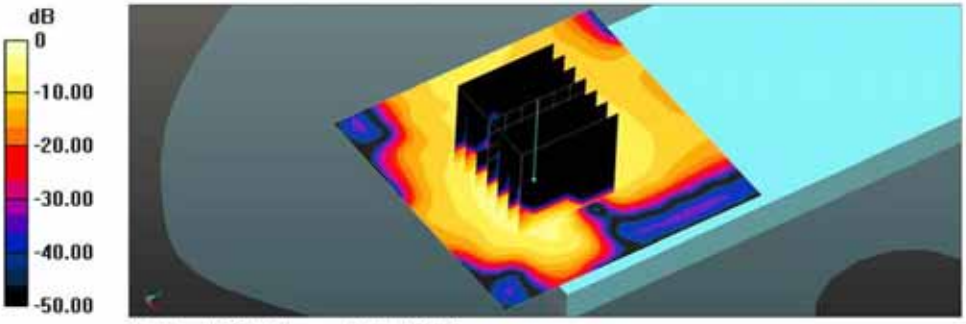
DUT: LG-D855; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 403KPED559308

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5220 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5220 MHz; σ = 5.522 S/m; ε_r = 50.893; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.46, 4.46, 4.46); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Body/WLAN_802.11a_6Mbps_Rear_CH44/Area Scan (81x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.392 W/kg

Body/WLAN_802.11a_6Mbps_Rear_CH44/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.227 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.654 W/kg
SAR(1 g) = 0.193 W/kg; SAR(10 g) = 0.062 W/kg
Maximum value of SAR (measured) = 0.411 W/kg



0 dB = 0.392 W/kg = -4.07 dBW/kg

Appendix A.16 SAR Test Plots for WLAN 5.3 GHz Band (Head SAR)

Date: 2014-04-27

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WLAN_802.11a_6Mbps_Left Tilt_CH52.da53:0

Ambient Temp : 23.6 ℃ Tissue Temp : 22.1 ℃

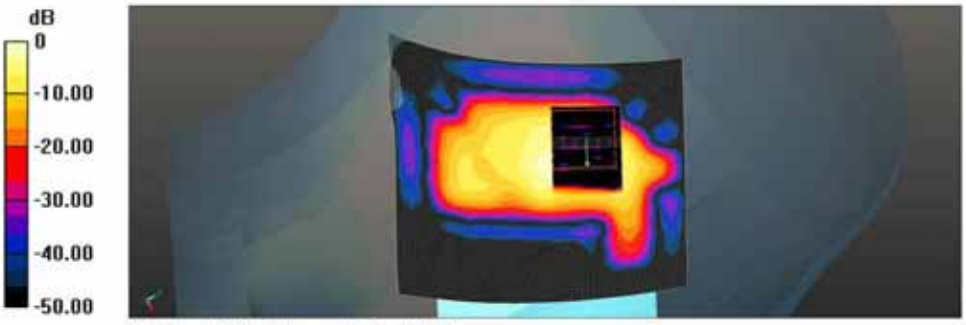
DUT: LG-D855; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 403KPED559308

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5260 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5260 MHz; σ = 4.791 S/m; ε_r = 34.456; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.77, 4.77, 4.77); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1720
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Head/WLAN_802.11a_6Mbps_Left Tilt_CH52/Area Scan (101x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.632 W/kg

Head/WLAN_802.11a_6Mbps_Left Tilt_CH52/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 6.853 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 1.24 W/kg
SAR(1 g) = 0.308 W/kg; SAR(10 g) = 0.091 W/kg
Maximum value of SAR (measured) = 0.620 W/kg



0 dB = 0.632 W/kg = -1.99 dBW/kg

Appendix A.16 SAR Test Plots for WLAN 5.3 GHz Band (Body-Worn SAR)

Date: 2014-04-26

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WLAN_802.11a_6Mbps_Rear_CH52.da53:0

Ambient Temp : 23.8 ℃ Tissue Temp : 22.1 ℃

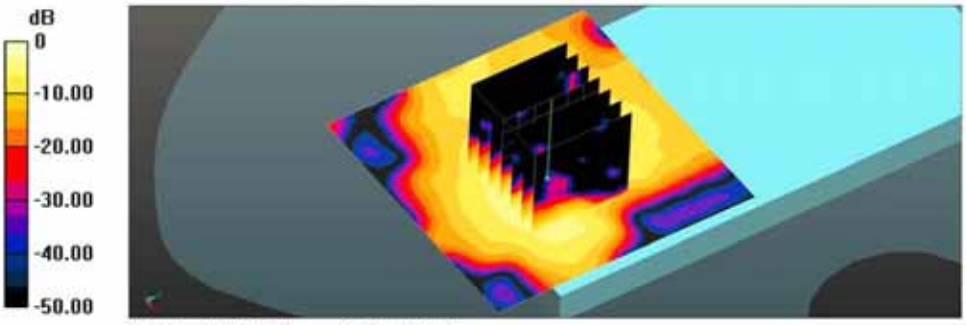
DUT: LG-D855; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 403KPED559308

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5260 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5260 MHz; σ = 5.597 S/m; ε_r = 50.804; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.21, 4.21, 4.21); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Body/WLAN_802.11a_6Mbps_Rear_CH52/Area Scan (81x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.443 W/kg

Body/WLAN_802.11a_6Mbps_Rear_CH52/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.643 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.775 W/kg
SAR(1 g) = 0.234 W/kg; SAR(10 g) = 0.075 W/kg
Maximum value of SAR (measured) = 0.500 W/kg



0 dB = 0.443 W/kg = -3.54 dBW/kg

Appendix A.17 SAR Test Plots for WLAN 5.5 GHz Band (Head SAR)

Date: 2014-04-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WLAN_802.11a_6Mbps_Right Tilt_CH100.da53:0

Ambient Temp : 23.9 ℃ Tissue Temp : 22.3 ℃

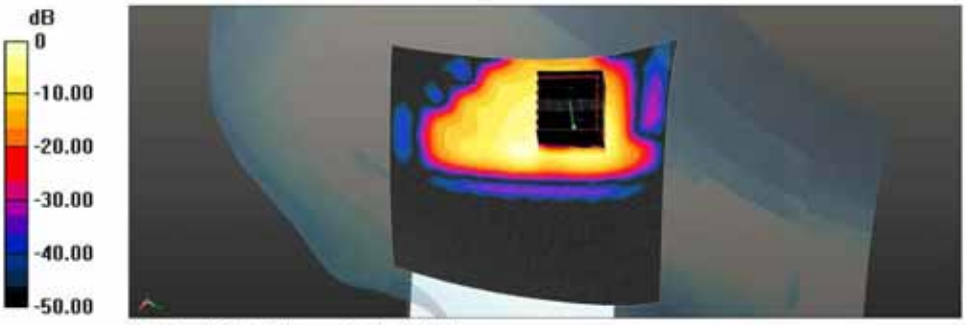
DUT: LG-D855; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 403KPED559308

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5500 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5500 MHz; σ = 4.938 S/m; ε_r = 35.239; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.72, 4.72, 4.72); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1720
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Head/WLAN_802.11a_6Mbps_Right Tilt_CH100/Area Scan (101x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.571 W/kg

Head/WLAN_802.11a_6Mbps_Right Tilt_CH100/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 7.281 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 1.06 W/kg
SAR(1 g) = 0.275 W/kg; SAR(10 g) = 0.088 W/kg
Maximum value of SAR (measured) = 0.545 W/kg



0 dB = 0.571 W/kg = -2.43 dBW/kg

Appendix A.17 SAR Test Plots for WLAN 5.5 GHz Band (Body-Worn SAR)

Date: 2014-04-25

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WLAN_802.11a_6Mbps_Rear_CH100.da53:0

Ambient Temp : 23.7 ℃ Tissue Temp : 22.1 ℃

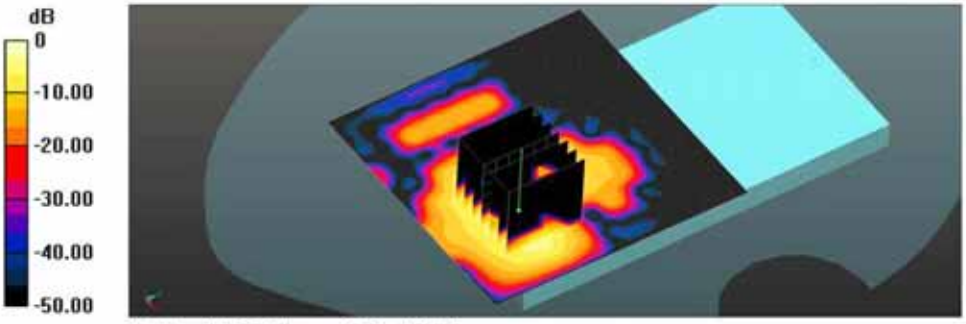
DUT: LG-D855; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 403KPED559308

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5500 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5500 MHz; σ = 5.613 S/m; ε_r = 48.214; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.04, 4.04, 4.04); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Body/WLAN_802.11a_6Mbps_Rear_CH100/Area Scan (101x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.475 W/kg

Body/WLAN_802.11a_6Mbps_Rear_CH100/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.317 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.794 W/kg
SAR(1 g) = 0.226 W/kg; SAR(10 g) = 0.070 W/kg
Maximum value of SAR (measured) = 0.491 W/kg



0 dB = 0.475 W/kg = -3.23 dBW/kg

Appendix A.18 SAR Test Plots for WLAN 5.8 GHz Band (Head SAR)

Date: 2014-04-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WLAN_802.11a_6Mbps_Left Tilt_CH157.da53:0

Ambient Temp : 23.9 ℃ Tissue Temp : 22.3 ℃

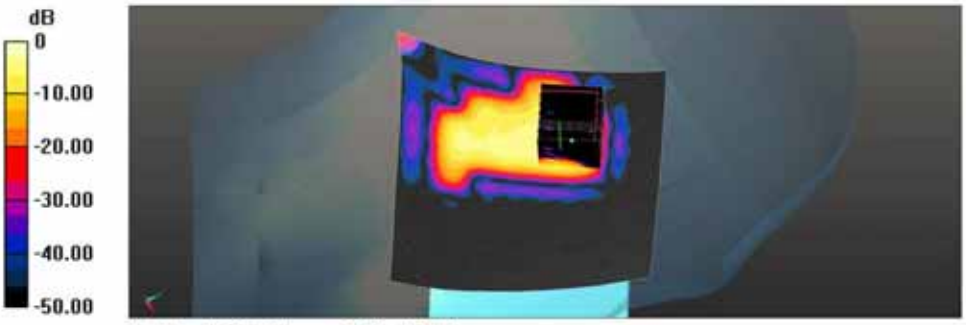
DUT: LG-D855; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 403KPED559308

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5785 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5785 MHz; σ = 5.219 S/m; ε_r = 34.592; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.25, 4.25, 4.25); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1720
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Head/WLAN_802.11a_6Mbps_Left Tilt_CH157/Area Scan (101x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.586 W/kg

Head/WLAN_802.11a_6Mbps_Left Tilt_CH157/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 5.045 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.07 W/kg
SAR(1 g) = 0.264 W/kg; SAR(10 g) = 0.066 W/kg
Maximum value of SAR (measured) = 0.574 W/kg



0 dB = 0.586 W/kg = -2.32 dBW/kg

Appendix A.18 SAR Test Plots for WLAN 5.8 GHz Band (Body-Worn and Hotspot SAR)

Date: 2014-04-25

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WLAN_802.11a_6Mbps_Rear_CH157.da53:0

Ambient Temp : 23.7 ℃ Tissue Temp : 22.1 ℃

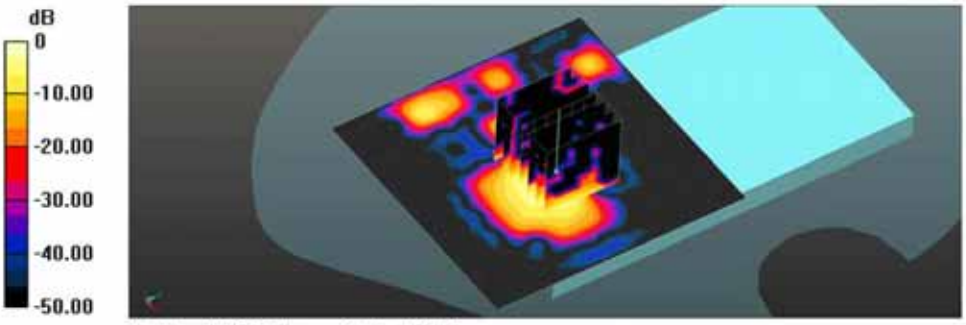
DUT: LG-D855; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 403KPED559308

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5785 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5785 MHz; σ = 6.012 S/m; ε_r = 47.657; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.08, 4.08, 4.08); Calibrated: 2014-01-29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2013-05-28
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.7(1137)SEMCAD X 14.6.10(7164)

Body/WLAN_802.11a_6Mbps_Rear_CH157/Area Scan (101x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.489 W/kg

Body/WLAN_802.11a_6Mbps_Rear_CH157/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.406 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 1.07 W/kg
SAR(1 g) = 0.179 W/kg; SAR(10 g) = 0.058 W/kg
Maximum value of SAR (measured) = 0.367 W/kg



0 dB = 0.489 W/kg = -3.11 dBW/kg

Appendix B.1 Uncertainty Analysis

Measurement uncertainty for 300 MHz to 3 GHz averaged over 1 gram

a	b	c	d	e = f(d,k)	g	i = cxg/e	k
Uncertainty Component	Section in P1528	Tol (%)	Prob . Dist.	Div.	Ci (1g)	1g ui (%)	Vi (Veff)
Probe calibration	E.2.1	6.0	N	1	1	6.0	∞
Axial isotropy	E.2.2	4.7	R	1.73	0.71	1.93	∞
hemispherical isotropy	E.2.2	9.6	R	1.73	0.71	3.94	∞
Boundary effect	E.2.3	1.0	R	1.73	1	0.58	∞
Linearity	E.2.4	4.7	R	1.73	1	2.72	∞
System detection limit	E.2.5	0.3	R	1.73	1	0.17	∞
Readout electronics	E.2.6	0.3	N	1	1	0.30	∞
Response time	E.2.7	0.5	R	1.73	1	0.29	∞
Integration time	E.2.8	2.6	R	1.73	1	1.50	∞
RF ambient Condition -Noise	E.6.1	3	R	1.73	1	1.73	∞
RF ambient Condition - reflections	E.6.1	3	R	1.73	1	1.73	∞
Probe positioning- mechanical tolerance	E.6.2	1.5	R	1.73	1	0.87	∞
Probe positioning- with respect to phantom	E.6.3	2.9	R	1.73	1	1.68	∞
Max. SAR evaluation	E.5.2	1.0	R	1.73	1	0.58	∞
Test sample positioning	E.4.2	1.32	N	1	1	1.32	9
Device holder uncertainty	E.4.1	3.6	N	1	1	3.60	4
Output power variation -SAR drift measurement	6.6.3	5	R	1.73	1	2.89	∞
Phantom uncertainty (shape and thickness tolerances)	E.3.1	4	R	1.73	1	2.31	∞
Liquid conductivity – deviation from target values	E.3.2	5	R	1.73	0.64	1.85	∞
Liquid conductivity - measurement uncertainty	E.3.2	0.38	N	1	0.64	0.24	9
Liquid permittivity – deviation from target values	E.3.3	5	R	1.73	0.6	1.73	∞
Liquid permittivity – deviation from target values	E.3.3	0.27	N	1	0.6	0.16	9
Combined standard uncertainty				RSS		10.82	287
Expanded uncertainty (95% CONFIDENCE INTERVAL)				*k*=2		**21.00**	

Measurement uncertainty for 3 GHz to 6 GHz averaged over 1 gram

a	b	c	d	e = f(d,k)	g	i = cxg/e	k
Uncertainty Component	Section in P1528	Tol (%)	Prob . Dist.	Div.	Ci (1g)	1g ui (%)	Vi (Veff)
Probe calibration	E.2.1	6.55	N	1	1	6.55	∞
Axial isotropy	E.2.2	4.7	R	1.73	0.71	1.93	∞
hemispherical isotropy	E.2.2	9.6	R	1.73	0.71	3.94	∞
Boundary effect	E.2.3	1.0	R	1.73	1	0.58	∞
Linearity	E.2.4	4.7	R	1.73	1	2.72	∞
System detection limit	E.2.5	0.3	R	1.73	1	0.17	∞
Readout electronics	E.2.6	0.3	N	1	1	0.30	∞
Response time	E.2.7	0.5	R	1.73	1	0.29	∞
Integration time	E.2.8	2.6	R	1.73	1	1.50	∞
RF ambient Condition -Noise	E.6.1	3	R	1.73	1	1.73	∞
RF ambient Condition - reflections	E.6.1	3	R	1.73	1	1.73	∞
Probe positioning- mechanical tolerance	E.6.2	1.5	R	1.73	1	0.87	∞
Probe positioning- with respect to phantom	E.6.3	2.9	R	1.73	1	1.68	∞
Max. SAR evaluation	E.5.2	1.0	R	1.73	1	0.58	∞
Test sample positioning	E.4.2	1.32	N	1	1	1.32	9
Device holder uncertainty	E.4.1	3.6	N	1	1	3.60	4
Output power variation -SAR drift measurement	6.6.3	5	R	1.73	1	2.89	∞
Phantom uncertainty (shape and thickness tolerances)	E.3.1	4	R	1.73	1	2.31	∞
Liquid conductivity – deviation from target values	E.3.2	5	R	1.73	0.64	1.85	∞
Liquid conductivity - measurement uncertainty	E.3.2	0.38	N	1	0.64	0.24	9
Liquid permittivity – deviation from target values	E.3.3	5	R	1.73	0.6	1.73	∞
Liquid permittivity – deviation from target values	E.3.3	0.27	N	1	0.6	0.16	9
Combined standard uncertainty				RSS		10.82	324
Expanded uncertainty (95% CONFIDENCE INTERVAL)				*k*=2		**21.64**	