FCC SAR TEST REPORT

Test File No : F690501/RF-SAR002270-A1

Equipment Under Test	Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE phone with Bluetooth, WLAN and RFID
Model No.	LGV32
Applicant	LG Electronics MobileComm U.S.A., Inc.
Address of Applicant	10101 Old Grove Road, San Diego, CA 92131
FCC ID	ZNFV32
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)	2015-03-18 ~ 2015-03-29
Date of Issue	2015-04-14

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

Remarks:

Report prepared by /
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Approved by /
Jongwon Ma
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Revision history

Revision	Date of issue	Revisions	Revised By
-	April, 09 , 2015	Initial issue	-
A1	April, 14, 2015	- Additional Front Position Test (Body Worn)	Jamie Kim

Contents

1. Testing Laboratory

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2. Details of Manufacturer

Applicant	LG Electronics MobileComm U.S.A., Inc.
Address	10101 Old Grove Road, San Diego, CA 92131
Contact Person	Heeju An
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Phone No.	82-2-2033-1103

3. Description of EUT(s)

EUT Type	Cellular/ PCS GSM/ GPRS/ EDGE/ WCDMA and LTE phone with Bluetooth, WLAN and RFID
Model	LGV32
IMEI Number	359060060006583
Mode of Operation	GSM850 / GSM1900 / WCDMA850 / LTE Band 5 / LTE Band 17 / LTE Band 41 / WLAN / Bluetooth
Duty Cycle	8.3(GPRS 1Tx Slot), 4.15(GPRS 2Tx Slot), 2.77 (GPRS 3Tx Slot), 2.075 (GPRS 4Tx Slot), 1.58 (LTE TDD), 1 (WCDMA, LTE FDD, WLAN)
Body worn Accessory	None
Tx Frequency Range	GSM850 (824.20 MHz ~ 848.80 MHz) GSM1900 (1850.20 MHz ~ 1909.80 MHz) WCDMA 850 (826.40 MHz ~ 846.60 MHz) LTE Band 5 (824.7 MHz ~ 848.3 MHz) LTE Band 17 (706.5 MHz ~ 713.5 MHz) LTE Band 41 (2498.5 MHz ~ 2687.5 MHz) 802.11b/g/n WLAN 2.4 GHz (2412.0 MHz ~ 2462.0 MHz) 802.11a/n WLAN 5.2 GHz (5180.0 MHz ~ 5240.0 MHz) 802.11a/n WLAN 5.3 GHz (5260.0 MHz ~ 5320.0 MHz) 802.11a/n WLAN 5.5 GHz (5500.0 MHz ~ 5700.0 MHz) Bluetooth (2402.0 MHz ~ 2480.0 MHz)

4. The Highest Reported SAR Values

Equipment Class	Band	Tx Frequency (MHz)	Reported 1g SAR (W/kg)		
			Head	Body-Worn	Hotspot
PCE	GSM/GPRS850	824.2 ~ 848.8	0.68	0.50	1.08
PCE	GSM/GPRS1900	1850.2 ~ 1909.8	0.36	0.20	0.38
PCE	WCDMA 850	1852.4 ~ 1907.6	0.47	0.58	0.58
PCE	LTE Band 5	824.7 ~ 848.3	0.38	0.53	0.53
PCE	LTE Band 17	706.5 ~ 713.5	0.25	0.44	0.44
PCE	LTE Band 41	2498.5 ~ 2687.5	0.16	0.73	0.73
DTS	2.4 GHz WLAN	2412.0 ~ 2462.0	0.46	0.10	0.10
NII	5.2 GHz WLAN	5180.0 ~ 5240.0	0.47	0.05	N/A
NII	5.3 GHz WLAN	5260.0 ~ 5320.0	0.37	0.04	N/A
NII	5.6 GHz WLAN	5500.0 ~ 5700.0	0.15	0.01	N/A
DSS/DTS	Bluetooth	2402.0 ~ 2480.0	N/A	N/A	N/A
Simultaneous SAR per KDB 690783 D01v01r03			1.15	0.90	1.18

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 D01v03**	**3G SAR Measurement Procedures**
☒	**KDB 941225 D05v02r03**	**SAR Evaluation Considerations for LTE Devices**
☒	**KDB 941225 D06v02**	**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 and ET3DV6 field probe is used to determine the internal electric fields. The SAR can be obtained from the equation SAR= $\sigma (|Ei|^2)/ \rho$ 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.

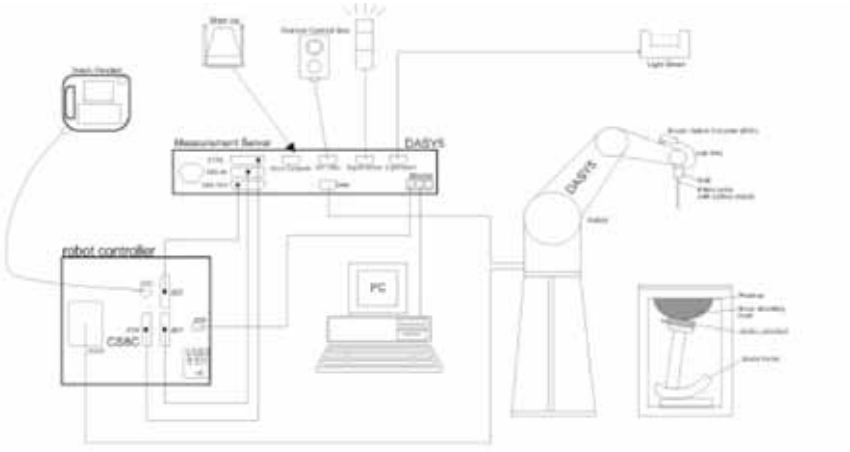


Fig a. The microwave circuit arrangement used for SAR system verification

- 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%


EX3DV4 E-Field Probe

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

Calibration : In air from 10 ㎒ to 2.5 ㎓ In brain simulating tissue (accuracy ± 8 %)

Frequency : 10 ㎒ to >6 ㎓; Linearity: ±0.2 ㏈ (30 ㎒ to 3 ㎓)

Directivity : ±0.2 ㏈ in brain tissue (rotation around probe axis)
±0.4 ㏈ in brain tissue (rotation normal to probe axis)

Dynamic Range : 5 μW/g to >100 mW/g; Linearity: ±0.2 ㏈

Srfce. Detect : ±0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces

Dimensions : Overall length: 330 mm
Tip length: 16 mm
Body diameter: 12 mm
Tip diameter: 6.8 mm
Distance from probe tip to dipole centers: 2.7 mm

Application : General dosimetry up to 3 ㎓ Compliance tests of mobile phone


ET3DV6 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 1.4 mm / 2 mm / 4 mm. 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

11.1 EAR 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

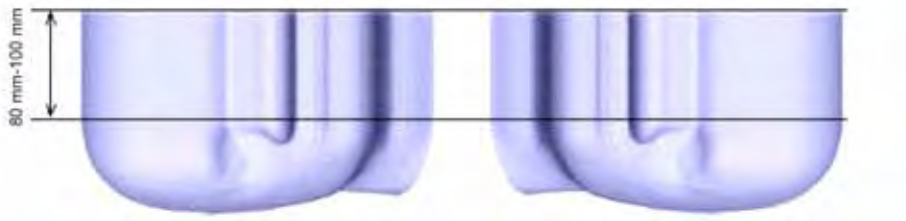


Fig 3 Sagittally bisected phantom with extended perimeter (shown placed on its side as used for device SAR tests)

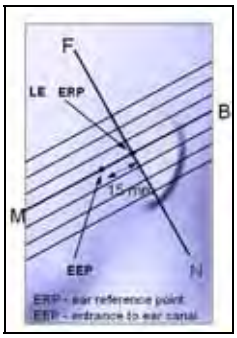


Fig 4 Close-up side view of ERP

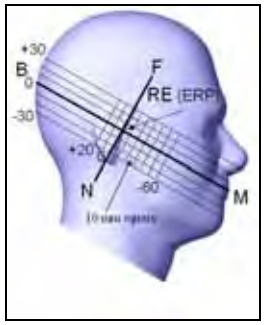


Fig 5 Side view of the phantom showing relevant markings

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.

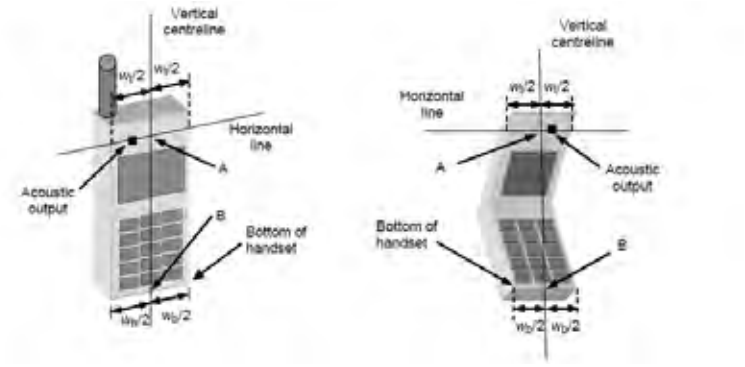


Fig 6 Handset Vertical Center & Horizontal Line Reference Points

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

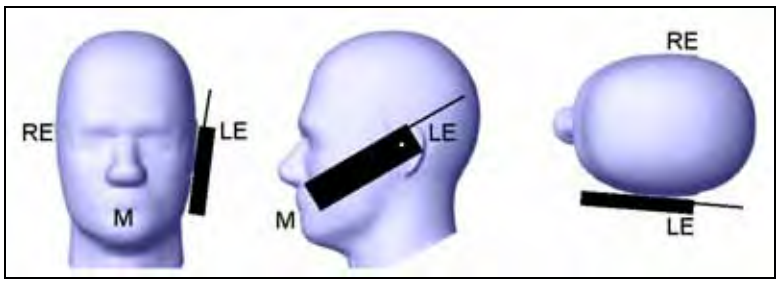


Fig 7 Cheek/Touch position of the wireless device on the left side of SAM

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).

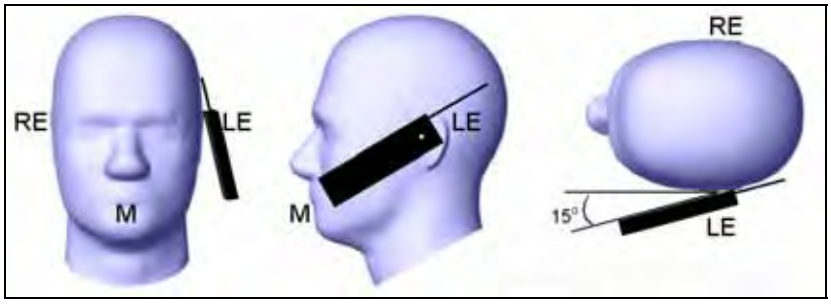


Fig 8 Ear/15˚ Tilt position of the wireless device on the left side of SAM

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.

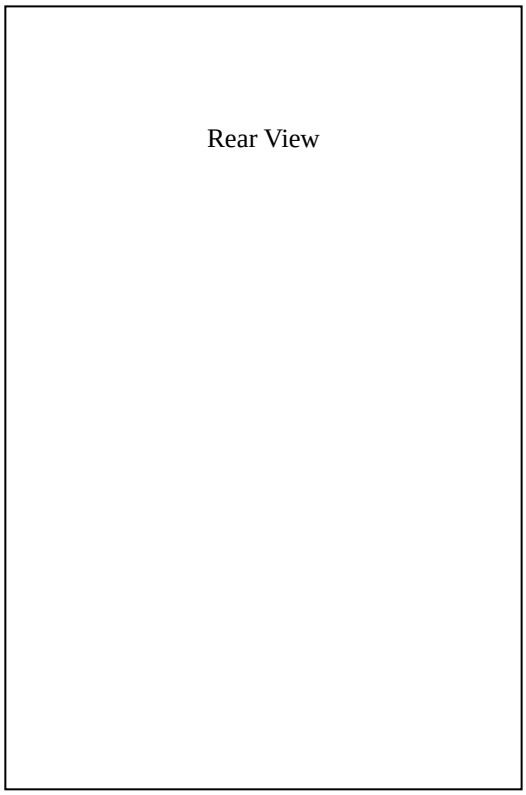
Body-worn accessories may not always be supplied of available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration where a separation distances between the back of the device and the flat phantom is used. Test position spacing was documented.

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 v02 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



Note: Exact antenna dimensions and separation distances are shown in the “Antenna Location_ZNFV32” in the FCC Filing

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
LTE 5	Yes	Yes	Yes	Yes	Yes	No
LTE 17	Yes	Yes	Yes	Yes	Yes	No
LTE 41	Yes	Yes	Yes	Yes	Yes	No
WLAN 2.4 GHz	Yes	Yes	Yes	No	No	Yes
WLAN 5 GHz	Yes	Yes	Yes	No	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 D06v02 guidance, page 2 and FCC KDB 648474 D04v01r01. The antenna document shows the distances between the transmit antennas and the edges of the device.

12. LTE Information

FCC IC	ZNFV32							
Form Factor	Portable Handset							
Frequency Range	Band 5 (824.7 MHz ~ 848.3 MHz)							
Channel Number & Frequency	Band 5							
	1.4 MHz		3 MHz		5 MHz		10 MHz	
	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)
	20407	824.7	20415	825.5	20425	826.5	20450	829.0
	20525	836.5	20525	836.5	20525	836.5	20525	836.5
	20643	848.3	20635	847.5	20625	846.5	20600	844.0
UE Category	4							
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.							

FCC IC	ZNFV32			
Form Factor	Portable Handset			
Frequency Range	Band 17 (706.5 MHz ~ 713.5 MHz)			
Channel Number & Frequency	Band 17			
	5 MHz		10 MHz	
	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)
	23755	706.5	23780	709.0
	23790	710.0	23790	710.0
	23825	713.5	23800	711.0
UE Category	4			
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.			

<table>
<tr><td>FCC IC</td><td colspan="8">ZNFV32</td></tr>
<tr><td>Form Factor</td><td colspan="8">Portable Handset</td></tr>
<tr><td>Frequency Range</td><td colspan="8">Band 41(2498.5 MHz ~ 2687.5 MHz)</td></tr>
<tr><td rowspan="5">Channel Number & Frequency</td><td colspan="8">Band 41</td></tr>
<tr><td colspan="2">5 MHz</td><td colspan="2">10 MHz</td><td colspan="2">15 MHz</td><td colspan="2">20 MHz</td></tr>
<tr><td>Ch.</td><td>Freq. (MHz)</td><td>Ch.</td><td>Freq. (MHz)</td><td>Ch.</td><td>Freq. (MHz)</td><td>Ch.</td><td>Freq. (MHz)</td></tr>
<tr><td>39675</td><td>2498.5</td><td>39700</td><td>2501.0</td><td>39725</td><td>2503.5</td><td>39750</td><td>2506.0</td></tr>
<tr><td>40620</td><td>2593.0</td><td>40620</td><td>2593.0</td><td>40620</td><td>2593.0</td><td>40620</td><td>2593.0</td></tr>
<tr><td>41565</td><td>2687.5</td><td>41540</td><td>2685.0</td><td>41515</td><td>2682.5</td><td>41490</td><td>2680.0</td></tr>
<tr><td>UE Category</td><td colspan="8">4</td></tr>
<tr><td>Uplink Modulation</td><td colspan="8">QPSK, 16QAM</td></tr>
<tr><td>LTE MPR Permanently implemented per 3GPP
TS 36.101 section 6.2.3~6.2.5?
(manufacturer attestation to be provided)</td><td colspan="8">Yes</td></tr>
<tr><td>A-MPR (Additional MPR) disabled for SAR Testing?</td><td colspan="8">Yes</td></tr>
<tr><td>Maximum average conducted output power for other wireless mode and frequency</td><td colspan="8">See Section 21.3.6 LTE Conducted power measurements in the SAR report.</td></tr>
<tr><td>Power reduction explanation</td><td colspan="8">N/A</td></tr>
<tr><td>Description of the test equipment</td><td colspan="8">LTE SAR Testing was performed using a CMW500.</td></tr>
</table>

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 750 MHz, 835 MHz, 1900 MHz, 2600 MHz, 2.4 GHz and 5.2 GHz, 5.3 GHz, 5.6 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.

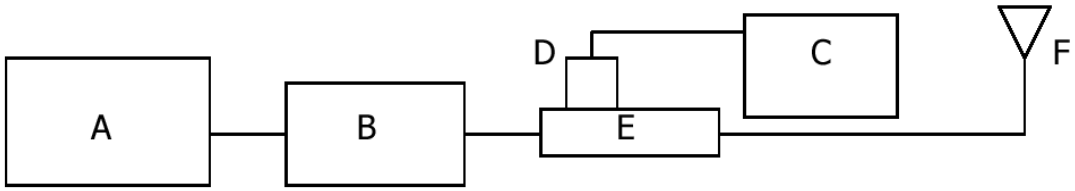


Fig 9. The microwave circuit arrangement used for SAR system verification

A. Agilent Model E8247C Signal Generator
B. EMPOWER Model 2002-BBS2C4AEL, 2001-BBS3Q7ECK, 2092-BBS5K8CAJ 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)
D750V3 SN:1096	1782	750 Head	8.39	5.47	8.25	5.43	**-1.67**	**-0.73**	2015-03-28	22.3
D750V3 SN:1096	1782	750 Body	8.60	5.71	8.30	5.52	**-3.49**	**-3.33**	2015-03-28	22.3
D835V2 SN:490	3862	835 Head	9.07	5.90	9.13	6.00	**0.66**	**1.69**	2015-03-24	22.1
D835V2 SN:490	3862	835 Body	9.49	6.20	9.27	6.19	**-2.32**	**-0.16**	2015-03-24	22.1

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:490	3862	835 Head	9.07	5.90	9.02	5.93	**-0.55**	**0.51**	2015-03-25	22.2
D835V2 SN:490	3862	835 Body	9.49	6.20	9.62	6.42	**1.37**	**3.55**	2015-03-25	22.2
D835V2 SN:490	3862	835 Body	9.49	6.20	9.73	6.48	**2.53**	**4.52**	2015-04-13	22.3
D1900V2 SN:5d033	3862	1900 Head	40.3	21.1	40.2	21.2	**-0.25**	**0.47**	2015-03-26	21.9
D1900V2 SN:5d033	3862	1900 Body	40.6	21.3	41.0	21.9	**0.99**	**2.82**	2015-03-26	21.9
D1900V2 SN:5d033	3862	1900 Body	40.6	21.3	40.5	22.2	**-0.25**	**4.23**	2015-04-13	22.2
D2450V2 SN:734	3862	2450 Head	52.2	24.3	53.1	24.6	**1.72**	**1.23**	2015-03-18	22.3
D2450V2 SN:734	3862	2450 Body	49.8	23.2	50.3	23.7	**1.00**	**2.16**	2015-03-18	22.4
D2600V2 SN:1003	3791	2600 Head	56.7	25.3	60.2	26.6	**6.17**	**5.14**	2015-03-29	21.7
D2600V2 SN:1003	3791	2600 Body	56.5	25.1	57.4	25.4	**1.59**	**1.20**	2015-03-29	21.7
D5000V2 SN:1130	3862	5200 Head	79.4	22.6	75.1	21.5	**-5.42**	**-4.87**	2015-03-19	22.4
D5000V2 SN:1130	3862	5200 Body	76.1	21.1	78.0	22.4	**2.50**	**6.16**	2015-03-19	21.8
D5000V2 SN:1130	3862	5200 Body	76.1	21.1	78.5	22.3	**3.15**	**5.69**	2015-04-13	22.4
D5000V2 SN:1130	3862	5300 Head	84.7	24.3	82.8	23.6	**-2.24**	**-2.88**	2015-03-19	22.4
D5000V2 SN:1130	3862	5300 Body	78.4	21.9	79.1	22.4	**0.89**	**2.28**	2015-03-19	21.8
D5000V2 SN:1130	3862	5300 Body	78.4	21.9	79.1	22.2	**0.89**	**1.37**	2015-04-13	22.4
D5000V2 SN:1130	3862	5600 Head	85.6	24.3	84.8	24.0	**-0.93**	**-1.23**	2015-03-20	22.3
D5000V2 SN:1130	3862	5600 Body	83.0	22.9	79.9	22.4	**-3.73**	**-2.18**	2015-03-20	22.0
D5000V2 SN:1130	3862	5600 Body	83.0	22.9	83.3	23.1	**0.36**	**0.87**	2015-04-13	22.4

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(℃)
750	Head	Measured, 2015-03-28	42.98	0.91	22.3
		Target Tissue Head	*41.90*	*0.89*	
		Deviation (%)	**2.58**	**2.25**	
750	Body	Measured, 2015-03-28	55.96	0.98	22.3
		Target Tissue Head	*55.50*	*0.96*	
		Deviation (%)	**0.83**	**2.08**	
835	Head	Measured, 2015-03-24	42.11	0.89	22.1
		Target Tissue Head	*41.50*	*0.90*	
		Deviation (%)	**1.47**	**-1.11**	
835	Body	Measured, 2015-03-24	54.77	0.95	22.1
		Target Tissue Head	*55.20*	*0.97*	
		Deviation (%)	**-0.78**	**-2.06**	
835	Head	Measured, 2015-03-25	42.59	0.90	22.2
		Target Tissue Head	*41.50*	*0.90*	
		Deviation (%)	**2.63**	**0.00**	
835	Body	Measured, 2015-03-25	55.93	0.99	22.2
		Target Tissue Head	*55.20*	*0.97*	
		Deviation (%)	**1.32**	**2.06**	
835	Body	Measured, 2015-04-13	55.18	0.95	22.3
		Target Tissue Head	*55.20*	*0.97*	
		Deviation (%)	**-0.04**	**-2.06**	
1900	Head	Measured, 2015-03-26	40.22	1.39	21.9
		Target Tissue Head	*40.00*	*1.40*	
		Deviation (%)	**0.55**	**-0.71**	
1900	Body	Measured, 2015-03-26	55.26	1.51	21.9
		Target Tissue Head	*53.30*	*1.52*	
		Deviation (%)	**3.68**	**-0.66**	
1900	Body	Measured, 2015-04-13	53.48	1.55	22.2
		Target Tissue Head	*53.30*	*1.52*	
		Deviation (%)	**0.34**	**1.97**	
2450	Head	Measured, 2015-03-18	37.55	1.85	22.3
		Target Tissue Head	*39.20*	*1.80*	
		Deviation (%)	**-4.21**	**2.78**	
2450	Body	Measured, 2015-03-18	52.62	1.97	22.4
		Target Tissue Head	*52.70*	*1.95*	
		Deviation (%)	**-0.15**	**1.03**	
2600	Head	Measured, 2015-03-29	38.94	1.99	21.7
		Target Tissue Head	*39.00*	*1.96*	
		Deviation (%)	**-0.15**	**1.53**	
2600	Body	Measured, 2015-03-29	51.77	2.17	21.7
		Target Tissue Head	52.51	2.16	
		Deviation (%)	**-1.41**	**0.46**	

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			Permittivity	Conductivity	Simulated Tissue
5200	Head	Measured, 2015-03-19	37.19	4.47	22.4
		Target Tissue Head	*36.00*	*4.66*	
		Deviation (%)	**3.31**	**-4.08**	
5200	Body	Measured, 2015-03-19	51.32	5.06	21.8
		Target Tissue Head	*49.00*	*5.30*	
		Deviation (%)	**4.73**	**-4.53**	
5200	Body	Measured, 2015-04-13	48.84	5.35	22.4
		Target Tissue Head	*49.00*	*5.30*	
		Deviation (%)	**-0.33**	**0.94**	
5300	Head	Measured, 2015-03-19	36.83	4.57	22.4
		Target Tissue Head	*35.90*	*4.76*	
		Deviation (%)	**2.59**	**-3.99**	
5300	Body	Measured, 2015-03-19	51.08	5.24	21.8
		Target Tissue Head	*48.90*	*5.42*	
		Deviation (%)	**4.46**	**-3.32**	
5300	Body	Measured, 2015-04-13	48.67	5.48	22.4
		Target Tissue Head	*48.90*	*5.42*	
		Deviation (%)	**-0.47**	**1.11**	
5600	Head	Measured, 2015-03-20	36.94	5.20	22.3
		Target Tissue Head	*35.50*	*5.07*	
		Deviation (%)	**4.06**	**2.56**	
5600	Body	Measured, 2015-03-20	50.46	5.66	22.0
		Target Tissue Head	*48.50*	*5.77*	
		Deviation (%)	**4.04**	**-1.91**	
5600	Body	Measured, 2015-04-13	49.12	5.81	22.4
		Target Tissue Head	*48.50*	*5.77*	
		Deviation (%)	**1.28**	**0.69**	

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
750	2015-03-17	1782	750	Head	42.81	0.86	PASS	PASS	PASS	OFDM	N/A	PASS
750	2015-03-17	1782	750	Body	55.45	0.93	PASS	PASS	PASS	OFDM	N/A	PASS
835	2015-03-13	3862	835	Head	41.94	0.89	PASS	PASS	PASS	GMSK	PASS	N/A
835	2015-03-13	3862	835	Body	56.31	0.95	PASS	PASS	PASS	GMSK	PASS	N/A
1900	2015-03-12	3862	1900	Head	40.11	1.39	PASS	PASS	PASS	GMSK	PASS	N/A
1900	2015-03-12	3862	1900	Body	54.66	1.51	PASS	PASS	PASS	GMSK	PASS	N/A
2450	2015-01-02	3862	2450	Head	40.59	1.85	PASS	PASS	PASS	OFDM	N/A	PASS
2450	2015-01-02	3862	2450	Body	50.87	1.96	PASS	PASS	PASS	OFDM	N/A	PASS
2600	2015-03-15	3791	2600	Head	40.27	2.03	PASS	PASS	PASS	OFDM	N/A	PASS
2600	2015-03-15	3791	2600	Body	52.37	2.08	PASS	PASS	PASS	OFDM	N/A	PASS
5200	2015-01-05	3862	5200	Head	36.31	4.44	PASS	PASS	PASS	OFDM	N/A	PASS
5200	2015-01-05	3862	5200	Body	50.11	5.09	PASS	PASS	PASS	OFDM	N/A	PASS
5300	2015-01-06	3862	5300	Head	35.84	4.56	PASS	PASS	PASS	OFDM	N/A	PASS
5300	2015-01-06	3862	5300	Body	48.26	5.90	PASS	PASS	PASS	OFDM	N/A	PASS
5600	2015-01-07	3862	5600	Head	35.22	4.93	PASS	PASS	PASS	OFDM	N/A	PASS
5600	2015-01-07	3862	5600	Body	49.87	5.69	PASS	PASS	PASS	OFDM	N/A	PASS

< SAR System Validation Summary>

Note

All measurement were performed using probes calibrated for CW signal only. Modulations in the table above represent test configurations for which the measurement system has been validated per FCC KDB Publication 865664 D01v01r03. SAR system were validated for modulated signals with a periodic duty cycle, such as GMSK, or with a high peak to average ratio (>5 dB), such as OFDM according to KDB 865664 D01v01r03.

16. Instruments List

Test Platform	SPEAG DASY5 Professional				
Location	SGS Korea Co., Ltd. 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, E&E Lab				
Manufacture	SPEAG				
Description	SAR Test System (Frequency range 300 ㎒ - 6 ㎓)				
Software Reference	DASY52: 52.8.8(1222) SEMCAD X: 14.6.10(7331)				
Hardware Reference					
Equipment	**Type**	**Serial Number**	**Cal Date**	**Cal Interval**	**Cal Due**
Robot	TX90XL	F12/5LP8A1/A/01	N/A	N/A	N/A
Phantom	SAM Phantom	TP-1720	N/A	N/A	N/A
Phantom	SAM Phantom	TP-1721	N/A	N/A	N/A
750 MHz Dipole	D750V3	1096	2014-09-19	Biennial	2016-09-19
835 MHz Dipole	D835V2	490	2014-05-16	Biennial	2016-05-16
1900 MHz Dipole	D1900V2	5d033	2014-05-19	Biennial	2016-05-19
2450 ㎒ Dipole	D2450V2	734	2014-05-20	Biennial	2016-05-20
2600 ㎒ Dipole	D2600V2	1003	2014-08-21	Biennial	2015-08-21
5 ㎓ Dipole	D5GHzV2	1130	2014-05-22	Biennial	2016-05-22
E-Field Probe	EX3DV4	3862	2014-09-15	Annual	2015-09-15
E-Field Probe	EX3DV4	3791	2014-05-21	Annual	2015-05-21
E-Field Probe	ET3DV6	1782	2015-02-24	Annual	2016-02-24
DAE	DAE4	1340	2014-05-19	Annual	2015-05-19
Network Analyzer	E5071C	MY46111535	2014-07-04	Annual	2015-07-04
Dielectric Assessment Kit	DAK-3.5	1107	2015-01-27	Annual	2016-01-27
Power Meter	E4419B	GB43311715	2014-06-25	Annual	2015-06-25
Power Sensor	E9300H	MY41495314	2014-07-02	Annual	2015-07-02
		MY41495307	2014-07-02	Annual	2015-07-02
Signal Generator	E8247C	MY43321024	2014-06-25	Annual	2015-06-25
Power Amplifier	2002-BBS2C4AEL	1029 D/C 0341	2014-12-24	Annual	2015-12-24
Power Amplifier	2001-BBS3Q7ECK	1032 D/C 0336	2014-12-24	Annual	2015-12-24
Power Amplifier	2092-BBS5K8CAJ	1010	2014-06-27	Annual	2015-06-27
Directional RF Bridges	86205A	MY31402302	2014-07-03	Annual	2015-07-03
LP Filter	LA-15N	N/A	2014-07-01	Annual	2015-07-01
LP Filter	LA-30N	N/A	2014-07-01	Annual	2015-07-01
LP Filter	LA-60N	N/A	2014-07-01	Annual	2015-07-01
Attenuator	8491B	50566	2014-07-01	Annual	2015-07-01
Hygro- Thermometer	BJ5478	12091382-1	2014-06-30	Annual	2015-06-30
Digital Thermometer	DTM3000	3027	2014-07-02	Annual	2015-07-02
Spectrum Analyzer	E4445A	MY44020523	2014-06-25	Annual	2015-06-25
Communication Tester	CMW500	144030	2015-03-02	Annual	2016-03-02
Communication Tester	CMU200	109456	2014-06-30	Annual	2015-06-30

17. 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.

18. 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.

19. 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**	**33.2**	**33.2**	**31.9**	**29.9**	**28.6**	**26.8**	**26.3**	**25.4**	**24.6**
	Nominal	32.7	32.7	31.4	29.4	28.1	26.3	25.8	24.9	24.1
PCS1900	**Maximum**	**30.2**	**30.2**	**29.9**	**27.9**	**26.5**	**25.7**	**25.2**	**24.3**	**23.2**
	Nominal	29.7	29.7	29.4	27.4	26.0	25.2	24.7	23.8	22.7
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**	**24.17**	**24.17**	**25.88**	**25.64**	**25.59**	**17.77**	**20.28**	**21.14**	**21.59**
	Nominal	23.67	23.67	25.38	25.14	25.09	17.27	19.78	20.64	21.09
PCS1900	**Maximum**	**21.17**	**21.17**	**23.88**	**23.64**	**23.49**	**16.67**	**19.18**	**20.04**	**20.19**
	Nominal	20.67	20.67	23.38	23.14	22.99	16.17	18.68	19.54	19.69
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	**Maximum**	**24.4**	-	-
	Nominal	23.9	-	-
Subtest 1	**Maximum**	-	**24.4**	**24.4**
	Nominal	-	23.9	23.9
Subtest 2	**Maximum**	-	**24.4**	**22.4**
	Nominal	-	23.9	21.9
Subtest 3	**Maximum**	-	**23.9**	**23.4**
	Nominal	-	23.4	22.9
Subtest 4	**Maximum**	-	**23.9**	**22.4**
	Nominal	-	23.4	21.9
Subtest 5	**Maximum**	-	-	**24.4**
	Nominal	-	-	23.9
Tune-up Tolerance: -1.5 dB / + 0.5 dB				

Note: This device supports HSUPA but the manufacturer only declares on the tune-up procedure that the HSUPA transmitter`s power will not exceed the R99 maximum transmit power in devices based on Qualcomm`s HSPA chipset solution.

Average power for Production (dBm)		
LTE Band 5	**Maximum**	**23.7**
	Nominal	23.2
LTE Band 17	**Maximum**	**23.7**
	Nominal	23.2
LTE Band 41	**Maximum**	**23.9**
	Nominal	23.4
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**	**15.00**	**14.00**	**13.00**	
	Nominal	14.00	13.00	12.00	
Mode	Nominal & Maximum	a	n	ac	
5 GHz WLAN	**Maximum**	**13.00**	**12.00**	**11.00**	
	Nominal	12.00	11.00	10.00	
Mode	Nominal & Maximum	GFSK	DPSK	8DPSK	LE
Bluetooth	**Maximum**	**9.00**	**6.00**	**6.00**	**5.00**
	Nominal	8.00	5.00	5.00	4.00

20. RF Conducted Power Measurement

The device in GSM, WCDMA, and LTE was controlled by using a Communication tester. 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.

20.1 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	32.85	33.07	31.68	29.78	28.18	26.68	26.16	25.23	24.40
	190	836.6	32.88	33.20	31.82	29.64	28.32	26.64	26.19	25.17	24.36
	251	848.8	33.00	33.12	31.72	29.80	28.51	26.75	26.22	25.33	24.53
PCS 1900	512	1850.2	29.75	30.00	29.75	27.79	26.08	25.60	25.05	24.23	23.13
	661	1880.0	30.20	29.99	29.82	27.80	26.41	25.55	25.01	24.24	23.16
	810	1909.8	30.11	30.20	29.73	27.69	26.42	25.56	25.06	24.23	23.20

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	23.82	24.04	**25.66**	25.52	25.17	17.65	20.14	20.97	21.39
	190	836.6	23.85	24.17	**25.80**	25.38	25.31	17.61	20.17	20.91	21.35
	251	848.8	23.97	24.09	**25.70**	25.54	25.50	17.72	20.20	21.07	21.52
PCS 1900	512	1850.2	20.72	20.97	**23.73**	23.53	23.07	16.57	19.03	19.97	20.12
	661	1880.0	21.17	20.96	**23.80**	23.54	23.40	16.52	18.99	19.98	20.15
	810	1909.8	21.08	21.17	**23.71**	23.43	23.41	16.53	19.04	19.97	20.19

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.

20.2 WCDMA

20.2.1 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”.

20.2.2 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 Mode.

20.2.3 Body SAR Measurements

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

20.2.4 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.

Table 1

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.

20.2.5 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.

Table 2

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} cannot 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	24.20	24.12	24.15	-
5	HSDPA	Subtest 1	23.28	23.05	23.08	0
5		Subtest 2	23.31	23.06	23.04	0
5		Subtest 3	22.78	22.58	22.47	-0.5
5		Subtest 4	22.75	22.55	22.57	-0.5
6	HSUPA	Subtest 1	23.26	22.97	22.99	0
6		Subtest 2	21.63	21.42	21.43	-2
6		Subtest 3	22.03	21.91	21.94	-1
6		Subtest 4	21.87	21.79	21.89	-2
6		Subtest 5	23.14	22.91	22.95	0

Note

- WCDMA SAR was tested under RMC 12.2 kbps with HSPA inactive per KDB Publication 941225 D01v03. 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.
- This device supports HSUPA but the manufacturer only declares on the tune-up procedure that the HSUPA transmitter`s power will not exceed the R99 maximum transmit power in devices based on Qualcomm`s HSPA chipset solution.

20.3 LTE

20.3.1 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).

20.3.2 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.

20.3.3 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

20.3.4 A-MPR

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

20.3.5 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.

20.3.6 TDD

LTE TDD is tested at highest duty factor using UL-DL configuration 0 with special subframe configuration 7 and applying the FDD LTE procedures in KDB 941225.

LTE TDD Band 41 supports 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations and Table 4.2-1 for Special subframe configurations.

Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS)

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

Table 4.2-2: Uplink-downlink configurations

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

Calculated Duty Cycle

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number										Calculated Duty Cycle (%)
		0	1	2	3	4	5	6	7	8	9	
0	5 ms	D	S	U	U	U	D	S	U	U	U	63.33
1	5 ms	D	S	U	U	D	D	S	U	U	D	43.33
2	5 ms	D	S	U	D	D	D	S	U	D	D	23.33
3	10 ms	D	S	U	U	U	D	D	D	D	D	31.67
4	10 ms	D	S	U	U	D	D	D	D	D	D	21.67
5	10 ms	D	S	U	D	D	D	D	D	D	D	11.67
6	5 ms	D	S	U	U	U	D	S	U	U	D	53.33

Calculated Duty Cycle = Extended cyclic prefix in uplink * (T_s) * # of S + # of U

Example for Calculated Duty Cycle for UL-DL configuration 0:

Calculated Duty Cycle = 5120 * [1(15000*2048)] * 2 +6 ms = 63.33%

Where T_s = 1(15000*2048) seconds

20.3.6 Conducted Power

LTE Band 5 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	829.0	20450	10	QPSK	1	0	23.44	0	0
	829.0	20450	10	QPSK	1	25	23.41	0	0
	829.0	20450	10	QPSK	1	49	23.43	0	0
	829.0	20450	10	QPSK	25	0	22.54	1	0-1
	829.0	20450	10	QPSK	25	12	22.57	1	0-1
	829.0	20450	10	QPSK	25	25	22.55	1	0-1
	829.0	20450	10	QPSK	50	0	22.45	1	0-1
	829.0	20450	10	16-QAM	1	0	22.69	1	0-1
	829.0	20450	10	16-QAM	1	25	22.66	1	0-1
	829.0	20450	10	16-QAM	1	49	22.68	1	0-1
	829.0	20450	10	16-QAM	25	0	21.45	2	0-2
	829.0	20450	10	16-QAM	25	12	21.51	2	0-2
	829.0	20450	10	16-QAM	25	25	21.53	2	0-2
	829.0	20450	10	16-QAM	50	0	21.46	2	0-2
Mid	836.5	20525	10	QPSK	1	0	23.58	0	0
	836.5	20525	10	QPSK	1	25	23.49	0	0
	836.5	20525	10	QPSK	1	49	23.57	0	0
	836.5	20525	10	QPSK	25	0	22.64	1	0-1
	836.5	20525	10	QPSK	25	12	22.60	1	0-1
	836.5	20525	10	QPSK	25	25	22.61	1	0-1
	836.5	20525	10	QPSK	50	0	22.61	1	0-1
	836.5	20525	10	16-QAM	1	0	22.66	1	0-1
	836.5	20525	10	16-QAM	1	25	22.64	1	0-1
	836.5	20525	10	16-QAM	1	49	22.69	1	0-1
	836.5	20525	10	16-QAM	25	0	21.66	2	0-2
	836.5	20525	10	16-QAM	25	12	21.64	2	0-2
	836.5	20525	10	16-QAM	25	25	21.61	2	0-2
	836.5	20525	10	16-QAM	50	0	21.62	2	0-2
High	844.0	20600	10	QPSK	1	0	23.43	0	0
	844.0	20600	10	QPSK	1	25	23.40	0	0
	844.0	20600	10	QPSK	1	49	23.42	0	0
	844.0	20600	10	QPSK	25	0	22.47	1	0-1
	844.0	20600	10	QPSK	25	12	22.48	1	0-1
	844.0	20600	10	QPSK	25	25	22.51	1	0-1
	844.0	20600	10	QPSK	50	0	22.67	1	0-1
	844.0	20600	10	16-QAM	1	0	22.65	1	0-1
	844.0	20600	10	16-QAM	1	25	22.47	1	0-1
	844.0	20600	10	16-QAM	1	49	22.55	1	0-1
	844.0	20600	10	16-QAM	25	0	21.58	2	0-2
	844.0	20600	10	16-QAM	25	12	21.61	2	0-2
	844.0	20600	10	16-QAM	25	25	21.63	2	0-2
	844.0	20600	10	16-QAM	50	0	21.62	2	0-2

LTE Band 5 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	826.5	20425	5	QPSK	1	0	23.47	0	0
	826.5	20425	5	QPSK	1	12	23.44	0	0
	826.5	20425	5	QPSK	1	24	23.46	0	0
	826.5	20425	5	QPSK	12	0	22.49	1	0-1
	826.5	20425	5	QPSK	12	6	22.47	1	0-1
	826.5	20425	5	QPSK	12	13	22.48	1	0-1
	826.5	20425	5	QPSK	25	0	22.51	1	0-1
	826.5	20425	5	16-QAM	1	0	22.57	1	0-1
	826.5	20425	5	16-QAM	1	12	22.61	1	0-1
	826.5	20425	5	16-QAM	1	24	22.59	1	0-1
	826.5	20425	5	16-QAM	12	0	21.55	2	0-2
	826.5	20425	5	16-QAM	12	6	21.59	2	0-2
	826.5	20425	5	16-QAM	12	13	21.51	2	0-2
	826.5	20425	5	16-QAM	25	0	21.47	2	0-2
Mid	836.5	20525	5	QPSK	1	0	23.59	0	0
	836.5	20525	5	QPSK	1	12	23.57	0	0
	836.5	20525	5	QPSK	1	24	23.58	0	0
	836.5	20525	5	QPSK	12	0	22.63	1	0-1
	836.5	20525	5	QPSK	12	6	22.59	1	0-1
	836.5	20525	5	QPSK	12	13	22.61	1	0-1
	836.5	20525	5	QPSK	25	0	22.63	1	0-1
	836.5	20525	5	16-QAM	1	0	22.66	1	0-1
	836.5	20525	5	16-QAM	1	12	22.65	1	0-1
	836.5	20525	5	16-QAM	1	24	22.68	1	0-1
	836.5	20525	5	16-QAM	12	0	21.61	2	0-2
	836.5	20525	5	16-QAM	12	6	21.59	2	0-2
	836.5	20525	5	16-QAM	12	13	21.60	2	0-2
	836.5	20525	5	16-QAM	25	0	21.64	2	0-2
High	846.5	20625	5	QPSK	1	0	23.64	0	0
	846.5	20625	5	QPSK	1	12	23.61	0	0
	846.5	20625	5	QPSK	1	24	23.63	0	0
	846.5	20625	5	QPSK	12	0	22.68	1	0-1
	846.5	20625	5	QPSK	12	6	22.63	1	0-1
	846.5	20625	5	QPSK	12	13	22.68	1	0-1
	846.5	20625	5	QPSK	25	0	22.52	1	0-1
	846.5	20625	5	16-QAM	1	0	22.53	1	0-1
	846.5	20625	5	16-QAM	1	12	22.46	1	0-1
	846.5	20625	5	16-QAM	1	24	22.56	1	0-1
	846.5	20625	5	16-QAM	12	0	21.55	2	0-2
	846.5	20625	5	16-QAM	12	6	21.58	2	0-2
	846.5	20625	5	16-QAM	12	13	21.55	2	0-2
	846.5	20625	5	16-QAM	25	0	21.54	2	0-2

LTE Band 5 Conducted Power – 3 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB size	RB offset	Average Power [dBm]	Target MPR [dBm]	MPR Allowed per 3GPP [dB]
Low	825.5	20415	3	QPSK	1	0	23.47	0	0
	825.5	20415	3	QPSK	1	7	23.44	0	0
	825.5	20415	3	QPSK	1	14	23.46	0	0
	825.5	20415	3	QPSK	8	0	22.49	1	0-1
	825.5	20415	3	QPSK	8	4	22.47	1	0-1
	825.5	20415	3	QPSK	8	7	22.48	1	0-1
	825.5	20415	3	QPSK	15	0	22.51	1	0-1
	825.5	20415	3	16-QAM	1	0	22.57	1	0-1
	825.5	20415	3	16-QAM	1	7	22.61	1	0-1
	825.5	20415	3	16-QAM	1	14	22.59	1	0-1
	825.5	20415	3	16-QAM	8	0	21.55	2	0-2
	825.5	20415	3	16-QAM	8	4	21.59	2	0-2
	825.5	20415	3	16-QAM	8	7	21.51	2	0-2
	825.5	20415	3	16-QAM	15	0	21.47	2	0-2
Mid	836.5	20525	3	QPSK	1	0	23.59	0	0
	836.5	20525	3	QPSK	1	7	23.57	0	0
	836.5	20525	3	QPSK	1	14	23.58	0	0
	836.5	20525	3	QPSK	8	0	22.63	1	0-1
	836.5	20525	3	QPSK	8	4	22.59	1	0-1
	836.5	20525	3	QPSK	8	7	22.61	1	0-1
	836.5	20525	3	QPSK	15	0	22.63	1	0-1
	836.5	20525	3	16-QAM	1	0	22.62	1	0-1
	836.5	20525	3	16-QAM	1	7	22.65	1	0-1
	836.5	20525	3	16-QAM	1	14	22.68	1	0-1
	836.5	20525	3	16-QAM	8	0	21.61	2	0-2
	836.5	20525	3	16-QAM	8	4	21.59	2	0-2
	836.5	20525	3	16-QAM	8	7	21.60	2	0-2
	836.5	20525	3	16-QAM	15	0	21.64	2	0-2
High	847.5	20635	3	QPSK	1	0	23.64	0	0
	847.5	20635	3	QPSK	1	7	23.61	0	0
	847.5	20635	3	QPSK	1	14	23.63	0	0
	847.5	20635	3	QPSK	8	0	22.68	1	0-1
	847.5	20635	3	QPSK	8	4	22.63	1	0-1
	847.5	20635	3	QPSK	8	7	22.58	1	0-1
	847.5	20635	3	QPSK	15	0	22.62	1	0-1
	847.5	20635	3	16-QAM	1	0	22.63	1	0-1
	847.5	20635	3	16-QAM	1	7	22.56	1	0-1
	847.5	20635	3	16-QAM	1	14	22.56	1	0-1
	847.5	20635	3	16-QAM	8	0	21.55	2	0-2
	847.5	20635	3	16-QAM	8	4	21.58	2	0-2
	847.5	20635	3	16-QAM	8	7	21.55	2	0-2
	847.5	20635	3	16-QAM	15	0	21.54	2	0-2

LTE Band 5 Conducted Power – 1.4 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB size	RB offset	Average Power [dBm]	Target MPR [dBm]	MPR Allowed per 3GPP [dB]
Low	824.7	20407	1.4	QPSK	1	0	23.49	0	0
	824.7	20407	1.4	QPSK	1	2	23.42	0	0
	824.7	20407	1.4	QPSK	1	5	23.44	0	0
	824.7	20407	1.4	QPSK	3	0	23.43	0	0
	824.7	20407	1.4	QPSK	3	2	23.46	0	0
	824.7	20407	1.4	QPSK	3	3	23.43	0	0
	824.7	20407	1.4	QPSK	6	0	22.53	1	0-1
	824.7	20407	1.4	16-QAM	1	0	22.52	1	0-1
	824.7	20407	1.4	16-QAM	1	2	22.59	1	0-1
	824.7	20407	1.4	16-QAM	1	5	22.55	1	0-1
	824.7	20407	1.4	16-QAM	3	0	22.68	1	0-1
	824.7	20407	1.4	16-QAM	3	2	22.56	1	0-1
	824.7	20407	1.4	16-QAM	3	3	22.53	1	0-1
	824.7	20407	1.4	16-QAM	6	0	21.55	2	0-2
Mid	836.5	20525	1.4	QPSK	1	0	23.66	0	0
	836.5	20525	1.4	QPSK	1	2	23.61	0	0
	836.5	20525	1.4	QPSK	1	5	23.65	0	0
	836.5	20525	1.4	QPSK	3	0	23.32	0	0
	836.5	20525	1.4	QPSK	3	2	23.35	0	0
	836.5	20525	1.4	QPSK	3	3	23.35	0	0
	836.5	20525	1.4	QPSK	6	0	22.63	1	0-1
	836.5	20525	1.4	16-QAM	1	0	22.61	1	0-1
	836.5	20525	1.4	16-QAM	1	2	22.61	1	0-1
	836.5	20525	1.4	16-QAM	1	5	22.64	1	0-1
	836.5	20525	1.4	16-QAM	3	0	22.68	1	0-1
	836.5	20525	1.4	16-QAM	3	2	22.61	1	0-1
	836.5	20525	1.4	16-QAM	3	3	22.62	1	0-1
	836.5	20525	1.4	16-QAM	6	0	21.65	2	0-2
High	848.3	20643	1.4	QPSK	1	0	23.28	0	0
	848.3	20643	1.4	QPSK	1	2	23.23	0	0
	848.3	20643	1.4	QPSK	1	5	23.24	0	0
	848.3	20643	1.4	QPSK	3	0	23.17	0	0
	848.3	20643	1.4	QPSK	3	2	23.14	0	0
	848.3	20643	1.4	QPSK	3	3	23.12	0	0
	848.3	20643	1.4	QPSK	6	0	22.30	1	0-1
	848.3	20643	1.4	16-QAM	1	0	22.56	1	0-1
	848.3	20643	1.4	16-QAM	1	2	22.67	1	0-1
	848.3	20643	1.4	16-QAM	1	5	22.64	1	0-1
	848.3	20643	1.4	16-QAM	3	0	22.69	1	0-1
	848.3	20643	1.4	16-QAM	3	2	22.68	1	0-1
	848.3	20643	1.4	16-QAM	3	3	22.67	1	0-1
	848.3	20643	1.4	16-QAM	6	0	21.30	2	0-2

LTE Band 17 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]
Mid	710.0	23790	10	QPSK	1	0	23.54	0	0
	710.0	23790	10	QPSK	1	25	23.52	0	0
	710.0	23790	10	QPSK	1	49	23.43	0	0
	710.0	23790	10	QPSK	25	0	22.57	1	0-1
	710.0	23790	10	QPSK	25	12	22.55	1	0-1
	710.0	23790	10	QPSK	25	25	22.54	1	0-1
	710.0	23790	10	QPSK	50	0	22.55	1	0-1
	710.0	23790	10	16-QAM	1	0	22.62	1	0-1
	710.0	23790	10	16-QAM	1	25	22.63	1	0-1
	710.0	23790	10	16-QAM	1	49	22.56	1	0-1
	710.0	23790	10	16-QAM	25	0	21.53	2	0-2
	710.0	23790	10	16-QAM	25	12	21.53	2	0-2
	710.0	23790	10	16-QAM	25	25	21.50	2	0-2
	710.0	23790	10	16-QAM	50	0	21.54	2	0-2

Note: LTE Band 17 at 10 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

LTE Band 17 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]
Mid	710.0	23790	5	QPSK	1	0	23.53	0	0
	710.0	23790	5	QPSK	1	12	23.51	0	0
	710.0	23790	5	QPSK	1	24	23.48	0	0
	710.0	23790	5	QPSK	12	0	22.54	1	0-1
	710.0	23790	5	QPSK	12	6	22.49	1	0-1
	710.0	23790	5	QPSK	12	13	22.58	1	0-1
	710.0	23790	5	QPSK	25	0	22.47	1	0-1
	710.0	23790	5	16-QAM	1	0	22.68	1	0-1
	710.0	23790	5	16-QAM	1	12	22.66	1	0-1
	710.0	23790	5	16-QAM	1	24	22.59	1	0-1
	710.0	23790	5	16-QAM	12	0	21.55	2	0-2
	710.0	23790	5	16-QAM	12	6	21.48	2	0-2
	710.0	23790	5	16-QAM	12	13	21.56	2	0-2
	710.0	23790	5	16-QAM	25	0	21.53	2	0-2

Note: LTE Band 17 at 5 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

LTE Band 41 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	2506.0	39750	20	QPSK	1	0	23.01	0	0
	2506.0	39750	20	QPSK	1	49	23.20	0	0
	2506.0	39750	20	QPSK	1	99	23.02	0	0
	2506.0	39750	20	QPSK	50	0	21.96	1	0-1
	2506.0	39750	20	QPSK	50	24	22.01	1	0-1
	2506.0	39750	20	QPSK	50	49	22.03	1	0-1
	2506.0	39750	20	QPSK	100	0	22.16	1	0-1
	2506.0	39750	20	16-QAM	1	0	22.33	1	0-1
	2506.0	39750	20	16-QAM	1	49	22.30	1	0-1
	2506.0	39750	20	16-QAM	1	99	22.42	1	0-1
	2506.0	39750	20	16-QAM	50	0	20.96	2	0-2
	2506.0	39750	20	16-QAM	50	24	20.96	2	0-2
	2506.0	39750	20	16-QAM	50	49	20.98	2	0-2
	2506.0	39750	20	16-QAM	100	0	21.11	2	0-2
Mid	2593.0	40620	20	QPSK	1	0	23.28	0	0
	2593.0	40620	20	QPSK	1	49	22.94	0	0
	2593.0	40620	20	QPSK	1	99	22.93	0	0
	2593.0	40620	20	QPSK	50	0	21.95	1	0-1
	2593.0	40620	20	QPSK	50	24	22.00	1	0-1
	2593.0	40620	20	QPSK	50	49	22.01	1	0-1
	2593.0	40620	20	QPSK	100	0	22.02	1	0-1
	2593.0	40620	20	16-QAM	1	0	22.55	1	0-1
	2593.0	40620	20	16-QAM	1	49	22.18	1	0-1
	2593.0	40620	20	16-QAM	1	99	22.34	1	0-1
	2593.0	40620	20	16-QAM	50	0	20.99	2	0-2
	2593.0	40620	20	16-QAM	50	24	20.96	2	0-2
	2593.0	40620	20	16-QAM	50	49	20.97	2	0-2
	2593.0	40620	20	16-QAM	100	0	21.04	2	0-2
High	2680.0	41490	20	QPSK	1	0	23.20	0	0
	2680.0	41490	20	QPSK	1	49	23.08	0	0
	2680.0	41490	20	QPSK	1	99	23.23	0	0
	2680.0	41490	20	QPSK	50	0	22.06	1	0-1
	2680.0	41490	20	QPSK	50	24	22.07	1	0-1
	2680.0	41490	20	QPSK	50	49	22.09	1	0-1
	2680.0	41490	20	QPSK	100	0	22.20	1	0-1
	2680.0	41490	20	16-QAM	1	0	22.53	1	0-1
	2680.0	41490	20	16-QAM	1	49	22.44	1	0-1
	2680.0	41490	20	16-QAM	1	99	22.51	1	0-1
	2680.0	41490	20	16-QAM	50	0	21.16	2	0-2
	2680.0	41490	20	16-QAM	50	24	21.20	2	0-2
	2680.0	41490	20	16-QAM	50	49	21.23	2	0-2
	2680.0	41490	20	16-QAM	100	0	21.24	2	0-2

LTE Band 41 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	2503.5	39725	15	QPSK	1	0	23.02	0	0
	2503.5	39725	15	QPSK	1	37	23.22	0	0
	2503.5	39725	15	QPSK	1	74	23.27	0	0
	2503.5	39725	15	QPSK	36	0	21.94	1	0-1
	2503.5	39725	15	QPSK	36	16	21.96	1	0-1
	2503.5	39725	15	QPSK	36	35	21.97	1	0-1
	2503.5	39725	15	QPSK	75	0	22.13	1	0-1
	2503.5	39725	15	16-QAM	1	0	22.18	1	0-1
	2503.5	39725	15	16-QAM	1	37	22.15	1	0-1
	2503.5	39725	15	16-QAM	1	74	22.20	1	0-1
	2503.5	39725	15	16-QAM	36	0	20.95	2	0-2
	2503.5	39725	15	16-QAM	36	16	20.96	2	0-2
	2503.5	39725	15	16-QAM	36	35	21.02	2	0-2
	2503.5	39725	15	16-QAM	75	0	21.17	2	0-2
Mid	2593.0	40620	15	QPSK	1	0	23.21	0	0
	2593.0	40620	15	QPSK	1	37	22.98	0	0
	2593.0	40620	15	QPSK	1	74	23.04	0	0
	2593.0	40620	15	QPSK	36	0	21.96	1	0-1
	2593.0	40620	15	QPSK	36	16	21.95	1	0-1
	2593.0	40620	15	QPSK	36	35	21.97	1	0-1
	2593.0	40620	15	QPSK	75	0	22.04	1	0-1
	2593.0	40620	15	16-QAM	1	0	22.17	1	0-1
	2593.0	40620	15	16-QAM	1	37	22.00	1	0-1
	2593.0	40620	15	16-QAM	1	74	22.04	1	0-1
	2593.0	40620	15	16-QAM	36	0	20.94	2	0-2
	2593.0	40620	15	16-QAM	36	16	20.90	2	0-2
	2593.0	40620	15	16-QAM	36	35	20.92	2	0-2
	2593.0	40620	15	16-QAM	75	0	21.02	2	0-2
High	2682.5	41515	15	QPSK	1	0	23.22	0	0
	2682.5	41515	15	QPSK	1	37	23.17	0	0
	2682.5	41515	15	QPSK	1	74	23.14	0	0
	2682.5	41515	15	QPSK	36	0	22.06	1	0-1
	2682.5	41515	15	QPSK	36	16	22.07	1	0-1
	2682.5	41515	15	QPSK	36	35	22.04	1	0-1
	2682.5	41515	15	QPSK	75	0	22.23	1	0-1
	2682.5	41515	15	16-QAM	1	0	22.23	1	0-1
	2682.5	41515	15	16-QAM	1	37	22.30	1	0-1
	2682.5	41515	15	16-QAM	1	74	22.28	1	0-1
	2682.5	41515	15	16-QAM	36	0	21.09	2	0-2
	2682.5	41515	15	16-QAM	36	16	21.10	2	0-2
	2682.5	41515	15	16-QAM	36	35	21.13	2	0-2
	2682.5	41515	15	16-QAM	75	0	21.18	2	0-2

LTE Band 41 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	2501.0	39700	10	QPSK	1	0	23.22	0	0
	2501.0	39700	10	QPSK	1	25	23.15	0	0
	2501.0	39700	10	QPSK	1	49	23.06	0	0
	2501.0	39700	10	QPSK	25	0	22.02	1	0-1
	2501.0	39700	10	QPSK	25	12	22.06	1	0-1
	2501.0	39700	10	QPSK	25	25	22.05	1	0-1
	2501.0	39700	10	QPSK	50	0	22.01	1	0-1
	2501.0	39700	10	16-QAM	1	0	22.46	1	0-1
	2501.0	39700	10	16-QAM	1	25	22.45	1	0-1
	2501.0	39700	10	16-QAM	1	49	22.28	1	0-1
	2501.0	39700	10	16-QAM	25	0	20.99	2	0-2
	2501.0	39700	10	16-QAM	25	12	20.97	2	0-2
	2501.0	39700	10	16-QAM	25	25	20.98	2	0-2
	2501.0	39700	10	16-QAM	50	0	21.06	2	0-2
Mid	2593.0	40620	10	QPSK	1	0	23.10	0	0
	2593.0	40620	10	QPSK	1	25	23.12	0	0
	2593.0	40620	10	QPSK	1	49	23.09	0	0
	2593.0	40620	10	QPSK	25	0	21.98	1	0-1
	2593.0	40620	10	QPSK	25	12	21.95	1	0-1
	2593.0	40620	10	QPSK	25	25	21.90	1	0-1
	2593.0	40620	10	QPSK	50	0	22.05	1	0-1
	2593.0	40620	10	16-QAM	1	0	22.40	1	0-1
	2593.0	40620	10	16-QAM	1	25	22.38	1	0-1
	2593.0	40620	10	16-QAM	1	49	22.23	1	0-1
	2593.0	40620	10	16-QAM	25	0	21.00	2	0-2
	2593.0	40620	10	16-QAM	25	12	21.04	2	0-2
	2593.0	40620	10	16-QAM	25	25	20.98	2	0-2
	2593.0	40620	10	16-QAM	50	0	20.99	2	0-2
High	2685.0	41540	10	QPSK	1	0	23.26	0	0
	2685.0	41540	10	QPSK	1	25	23.25	0	0
	2685.0	41540	10	QPSK	1	49	23.13	0	0
	2685.0	41540	10	QPSK	25	0	22.02	1	0-1
	2685.0	41540	10	QPSK	25	12	22.16	1	0-1
	2685.0	41540	10	QPSK	25	25	22.00	1	0-1
	2685.0	41540	10	QPSK	50	0	22.11	1	0-1
	2685.0	41540	10	16-QAM	1	0	22.43	1	0-1
	2685.0	41540	10	16-QAM	1	25	22.16	1	0-1
	2685.0	41540	10	16-QAM	1	49	22.33	1	0-1
	2685.0	41540	10	16-QAM	25	0	21.05	2	0-2
	2685.0	41540	10	16-QAM	25	12	21.10	2	0-2
	2685.0	41540	10	16-QAM	25	25	21.07	2	0-2
	2685.0	41540	10	16-QAM	50	0	21.15	2	0-2

LTE Band 41 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	2498.5	39675	5	QPSK	1	0	23.08	0	0
	2498.5	38675	5	QPSK	1	12	23.13	0	0
	2498.5	38675	5	QPSK	1	24	23.15	0	0
	2498.5	38675	5	QPSK	12	0	21.96	1	0-1
	2498.5	38675	5	QPSK	12	6	21.98	1	0-1
	2498.5	38675	5	QPSK	12	13	22.00	1	0-1
	2498.5	38675	5	QPSK	25	0	21.97	1	0-1
	2498.5	38675	5	16-QAM	1	0	22.00	1	0-1
	2498.5	38675	5	16-QAM	1	12	22.03	1	0-1
	2498.5	38675	5	16-QAM	1	24	22.40	1	0-1
	2498.5	38675	5	16-QAM	12	0	21.05	2	0-2
	2498.5	38675	5	16-QAM	12	6	21.11	2	0-2
	2498.5	38675	5	16-QAM	12	13	21.10	2	0-2
	2498.5	38675	5	16-QAM	25	0	21.11	2	0-2
Mid	2593.0	40620	5	QPSK	1	0	23.10	0	0
	2593.0	40620	5	QPSK	1	12	23.06	0	0
	2593.0	40620	5	QPSK	1	24	23.03	0	0
	2593.0	40620	5	QPSK	12	0	21.94	1	0-1
	2593.0	40620	5	QPSK	12	6	21.97	1	0-1
	2593.0	40620	5	QPSK	12	13	21.96	1	0-1
	2593.0	40620	5	QPSK	25	0	21.94	1	0-1
	2593.0	40620	5	16-QAM	1	0	21.95	1	0-1
	2593.0	40620	5	16-QAM	1	12	21.92	1	0-1
	2593.0	40620	5	16-QAM	1	24	21.93	1	0-1
	2593.0	40620	5	16-QAM	12	0	21.10	2	0-2
	2593.0	40620	5	16-QAM	12	6	21.12	2	0-2
	2593.0	40620	5	16-QAM	12	13	21.02	2	0-2
	2593.0	40620	5	16-QAM	25	0	21.01	2	0-2
High	2687.5	41565	5	QPSK	1	0	23.16	0	0
	2687.5	41565	5	QPSK	1	12	23.24	0	0
	2687.5	41565	5	QPSK	1	24	23.20	0	0
	2687.5	41565	5	QPSK	12	0	22.08	1	0-1
	2687.5	41565	5	QPSK	12	6	22.06	1	0-1
	2687.5	41565	5	QPSK	12	13	22.03	1	0-1
	2687.5	41565	5	QPSK	25	0	22.01	1	0-1
	2687.5	41565	5	16-QAM	1	0	22.16	1	0-1
	2687.5	41565	5	16-QAM	1	12	22.07	1	0-1
	2687.5	41565	5	16-QAM	1	24	22.05	1	0-1
	2687.5	41565	5	16-QAM	12	0	21.11	2	0-2
	2687.5	41565	5	16-QAM	12	6	21.16	2	0-2
	2687.5	41565	5	16-QAM	12	13	21.05	2	0-2
	2687.5	41565	5	16-QAM	25	0	21.03	2	0-2

20.4 WLAN

20.4.1 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 dB ≥ 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

20.4.3 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	13.68	13.71	13.73	13.74
	2437	6	**14.21**	14.19	14.28	14.30
	2462	11	13.87	13.83	13.71	13.91

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	12.52	12.31	12.40	12.61	12.72	12.72	12.73	12.77
	2437	6	12.68	12.65	12.94	12.80	13.05	13.19	12.97	13.20
	2462	11	12.70	12.63	12.75	12.95	12.84	12.95	12.95	13.06

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	11.55	11.52	11.38	11.81	11.52	11.66	11.39	11.91
	2437	6	11.49	11.48	11.44	12.06	11.77	11.94	11.73	12.08
	2462	11	11.47	11.41	11.42	11.87	11.77	11.81	11.56	11.92

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	**12.08**	11.57	11.65	11.74	11.77	11.76	11.75	11.69
	5200	40	11.86	11.57	11.55	11.65	11.68	11.76	11.77	11.73
	5220	44	11.98	11.54	11.64	11.74	11.63	11.65	11.80	11.64
	5240	48	11.87	11.52	11.54	11.75	11.68	11.66	11.60	11.64
	5260	52	11.91	11.56	11.50	11.74	11.77	11.70	11.77	11.60
	5280	56	**12.03**	11.42	11.65	11.75	11.70	11.72	11.78	11.67
	5300	60	11.87	11.47	11.59	11.77	11.71	11.65	11.62	11.57
	5320	64	11.70	11.40	11.34	11.47	11.38	11.50	11.61	11.49
	5500	100	11.98	11.82	11.80	11.90	11.82	11.79	11.95	11.83
	5520	104	11.91	11.43	11.69	11.79	11.70	11.80	11.74	11.61
	5540	108	11.78	11.61	11.52	11.59	11.82	11.63	11.67	11.61
	5560	112	11.84	11.46	11.59	11.70	11.76	11.80	11.79	11.66
	5580	116	**12.06**	11.46	11.62	11.76	11.75	11.80	11.75	11.57
	5660	132	11.89	11.60	11.50	11.75	11.78	11.78	11.80	11.62
	5680	136	11.91	11.57	11.67	11.73	11.79	11.81	11.72	11.68
	5700	140	11.82	11.33	11.60	11.70	11.60	11.71	11.65	11.51

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	11.81	11.54	11.61	11.52	11.56	11.39	11.59	11.63
	5200	40	11.83	11.59	11.64	11.45	11.47	11.34	11.56	11.65
	5220	44	11.78	11.45	11.65	11.44	11.47	11.24	11.44	11.58
	5240	48	11.83	11.57	11.47	11.55	11.42	11.25	11.61	11.59
	5260	52	11.79	11.40	11.58	11.40	11.56	11.28	11.52	11.61
	5280	56	11.83	11.49	11.47	11.42	11.46	11.36	11.45	11.63
	5300	60	11.84	11.58	11.64	11.46	11.51	11.40	11.45	11.54
	5320	64	11.69	11.33	11.23	11.30	11.46	11.36	11.51	11.51
	5500	100	11.58	11.29	11.22	11.00	11.37	11.22	11.22	11.24
	5520	104	11.67	11.54	11.55	11.55	11.56	11.41	11.46	11.60
	5540	108	11.86	11.41	11.63	11.49	11.56	11.33	11.46	11.67
	5560	112	11.66	11.43	11.52	11.43	11.50	11.25	11.47	11.48
	5580	116	11.77	11.42	11.55	11.53	11.41	11.32	11.56	11.66
	5660	132	11.76	11.44	11.50	11.54	11.46	11.38	11.55	11.55
	5680	136	11.80	11.52	11.65	11.37	11.60	11.34	11.57	11.65
	5700	140	11.58	11.44	11.45	11.46	11.47	11.32	11.36	11.51

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	11.80	11.34	11.42	11.42	11.42	11.62	11.42	11.35
	5230	46	11.73	11.29	11.27	11.47	11.42	11.54	11.33	11.32
	5270	54	11.78	11.19	11.37	11.28	11.30	11.49	11.35	11.35
	5310	62	11.55	11.42	11.37	11.36	11.34	11.35	11.36	11.34
	5510	102	11.08	10.65	10.96	11.00	10.93	10.79	10.89	10.66
	5550	110	11.84	11.33	11.42	11.29	11.33	11.56	11.28	11.33
	5670	134	10.89	10.35	10.65	10.51	10.54	10.45	10.27	10.25

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	10.39	9.99	10.07	10.22	10.14	10.20	10.32	10.26	10.35
	5200	40	10.42	9.85	10.03	10.16	10.15	10.06	10.17	10.26	10.29
	5220	44	10.33	9.98	10.06	10.07	10.03	10.09	10.28	10.18	10.19
	5240	48	10.36	10.03	10.06	10.23	10.02	10.23	10.22	10.14	10.34
	5260	52	10.30	9.92	10.02	10.25	10.19	10.06	10.36	10.21	10.15
	5280	56	10.39	9.95	10.08	10.19	10.14	10.19	10.27	10.15	10.28
	5300	60	10.44	10.02	10.04	10.18	10.09	10.08	10.37	10.19	10.38
	5320	64	10.50	10.31	10.16	10.36	13.36	10.15	10.19	9.93	10.28
	5500	100	10.66	10.44	10.39	10.27	10.56	10.46	10.25	10.28	10.59
	5520	104	10.36	10.04	10.12	10.12	10.19	10.12	10.24	10.31	10.33
	5540	108	10.33	9.98	9.92	10.10	10.14	10.21	10.35	10.16	10.30
	5560	112	10.43	9.85	10.03	10.23	10.00	10.24	10.20	10.13	10.34
	5580	116	10.43	9.89	9.98	10.10	10.17	10.17	10.35	10.20	10.37
	5660	132	10.39	9.98	9.92	10.19	10.00	10.18	10.25	10.26	10.28
	5680	136	10.25	9.91	10.03	10.07	10.04	10.06	10.32	10.21	10.33
	5700	140	10.27	9.94	10.03	10.02	10.10	10.03	10.15	10.21	10.23

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	10.73	10.25	10.29	10.43	10.29	10.21	10.37	10.25	10.44	10.46
	5230	46	10.58	10.14	10.25	10.47	10.14	10.10	10.40	10.18	10.39	10.33
	5270	54	10.62	10.14	10.26	10.32	10.34	10.19	10.35	10.19	10.47	10.38
	5310	62	10.82	10.71	10.40	10.40	10.67	10.20	10.50	10.37	10.49	10.57
	5510	102	10.25	10.02	9.96	9.77	9.93	9.94	10.01	9.91	10.08	10.16
	5550	110	10.78	10.20	10.31	10.31	10.26	10.13	10.37	10.30	10.38	10.47
	5670	134	9.89	9.74	9.74	9.57	9.52	9.59	9.82	9.59	9.62	9.74

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	10.11	10.06	9.76	9.86	10.09	9.70	9.72	9.86	9.86	10.06
	5290	58	10.35	10.08	10.18	10.04	10.30	10.09	10.08	10.03	9.96	10.13
	5530	106	10.56	10.25	10.27	10.13	10.46	10.26	10.19	10.19	10.18	10.23
	5690	138	10.02	9.95	9.58	9.70	9.69	9.59	9.70	9.81	9.71	9.92

Bluetooth

Channel	Frequency (MHz)	GFSK (dBm)	PI/4DQPSK (dBm)	8DPSK (dBm)	LE (dBm)
Low	2402	7.18	4.16	4.14	3.17
Middle	2441	**8.67**	5.23	5.25	4.60
High	2480	7.03	4.14	4.13	3.27

21. 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	8	5	2.52
			10	1.26

Based on the maximum tune-up tolerance limit of Bluetooth the antenna to use separation distance, Bluetooth SAR was not required [(8/5)*√2.480] = 2.52 < 3.0.

Bluetooth LE SAR was not required [(3/5)*√2.480] = 0.94 < 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.

22. SAR Data Summary

22.1 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	32.88	33.20	0.380	0.409	-
	Tilt		Standard	836.6	190	32.88	33.20	0.201	0.216	-
Left	Touch		Standard	836.6	190	32.88	33.20	0.292	0.314	-
	Tilt		Standard	836.6	190	32.88	33.20	0.169	0.182	-
Right	Touch	GPRS 2Tx	Standard	836.6	190	31.82	31.90	**0.663**	**0.675**	24
	Tilt		Standard	836.6	190	31.82	31.90	0.374	0.381	-
Left	Touch		Standard	836.6	190	31.82	31.90	0.498	0.507	-
	Tilt		Standard	836.6	190	31.82	31.90	0.288	0.293	-
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	30.20	30.20	0.112	0.112	-
	Tilt		Standard	1880.0	661	30.20	30.20	0.079	0.079	-
Left	Touch		Standard	1880.0	661	30.20	30.20	0.233	0.233	-
	Tilt		Standard	1880.0	661	30.20	30.20	0.081	0.081	-
Right	Touch	GPRS 2Tx	Standard	1880.0	661	29.82	29.90	0.180	0.183	-
	Tilt		Standard	1880.0	661	29.82	29.90	0.151	0.154	-
Left	Touch		Standard	1880.0	661	29.82	29.90	**0.352**	**0.359**	27
	Tilt		Standard	1880.0	661	29.82	29.90	0.120	0.122	-
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	24.12	24.40	**0.436**	**0.465**	30
	Tilt		Standard	836.6	4183	24.12	24.40	0.225	0.240	-
Left	Touch		Standard	836.6	4183	24.12	24.40	0.324	0.346	-
	Tilt		Standard	836.6	4183	24.12	24.40	0.193	0.206	-
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 5 Bandwidth 10 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	836.5	20525	1	0	23.58	23.70	**0.370**	**0.380**	32
		QPSK	Standard	836.5	20525	25	0	22.64	22.70	0.298	0.302	-
	Tilt	QPSK	Standard	836.5	20525	1	0	23.58	23.70	0.208	0.214	-
		QPSK	Standard	836.5	20525	25	0	22.64	22.70	0.167	0.169	-
Left	Touch	QPSK	Standard	836.5	20525	1	0	23.58	23.70	0.287	0.295	-
		QPSK	Standard	836.5	20525	25	0	22.64	22.70	0.227	0.230	-
	Tilt	QPSK	Standard	836.5	20525	1	0	23.58	23.70	0.173	0.178	-
		QPSK	Standard	836.5	20525	25	0	22.64	22.70	0.143	0.145	-
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 17 Bandwidth 10 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	710.0	23790	1	0	23.54	23.70	**0.241**	**0.250**	34
		QPSK	Standard	710.0	23790	25	0	22.57	22.70	0.196	0.202	-
	Tilt	QPSK	Standard	710.0	23790	1	0	23.54	23.70	0.119	0.123	-
		QPSK	Standard	710.0	23790	25	0	22.57	22.70	0.099	0.102	-
Left	Touch	QPSK	Standard	710.0	23790	1	0	23.54	23.70	0.186	0.193	-
		QPSK	Standard	710.0	23790	25	0	22.57	22.70	0.153	0.158	-
	Tilt	QPSK	Standard	710.0	23790	1	0	23.54	23.70	0.111	0.115	-
		QPSK	Standard	710.0	23790	25	0	22.57	22.70	0.091	0.094	-
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 41 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	2593.0	40620	1	0	23.28	23.90	0.117	0.135	-
		QPSK	Standard	2593.0	40620	50	0	21.95	22.90	0.098	0.122	-
	Tilt	QPSK	Standard	2593.0	40620	1	0	23.28	23.90	0.040	0.046	-
		QPSK	Standard	2593.0	40620	50	0	21.95	22.90	0.028	0.035	-
Left	Touch	QPSK	Standard	2593.0	40620	1	0	23.28	23.90	**0.139**	**0.160**	36
		QPSK	Standard	2593.0	40620	50	0	21.95	22.90	0.110	0.137	-
	Tilt	QPSK	Standard	2593.0	40620	1	0	23.28	23.90	0.047	0.054	-
		QPSK	Standard	2593.0	40620	50	0	21.95	22.90	0.040	0.050	-
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	2437.0	6	14.21	15.00	**0.470**	**0.456**	38
	Tilt		Standard	2437.0	6	14.21	15.00	0.301	0.241	-
Left	Touch		Standard	2437.0	6	14.21	15.00	0.183	0.350	-
	Tilt		Standard	2437.0	6	14.21	15.00	0.146	0.203	-
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	5180.0	36	12.08	13.00	**0.381**	**0.471**	40
	Touch		Standard	5220.0	44	11.98	13.00	0.366	0.463	-
	Tilt		Standard	5180.0	36	12.08	13.00	0.233	0.288	-
Left	Touch		Standard	5180.0	36	12.08	13.00	0.135	0.167	-
	Tilt		Standard	5180.0	36	12.08	13.00	0.094	0.116	-
Right	Touch	802.11ac	Standard	5210.0	42	10.11	11.00	0.163	0.200	
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	5280.0	56	12.03	13.00	**0.298**	**0.373**	42
	Tilt		Standard	5280.0	56	12.03	13.00	0.170	0.213	-
Left	Touch		Standard	5280.0	56	12.03	13.00	0.085	0.106	-
	Tilt		Standard	5280.0	56	12.03	13.00	0.071	0.089	-
Right	Touch	802.11ac	Standard	5290.0	58	10.35	11.00	0.129	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				

WLAN 5.6 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	5580.0	116	12.06	13.00	**0.119**	**0.148**	44
	Tilt		Standard	5580.0	116	12.06	13.00	0.067	0.083	-
Left	Touch		Standard	5580.0	116	12.06	13.00	0.036	0.045	-
	Tilt		Standard	5580.0	116	12.06	13.00	0.029	0.036	-
Right	Touch	802.11ac	Standard	5530.0	106	10.56	11.00	0.016	0.018	
ANSI / IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure / General Population						Head 1.6 W/kg (mW/g) Averaged over 1 gram				

22.2 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	
Front	GSM850	Standard	836.6	190	10	32.88	33.20	**0.463**	**0.498**	25
Rear	GSM850	Standard	836.6	190	10	32.88	33.20	0.431	0.464	-
Front	GSM1900	Standard	1880.0	661	10	30.20	30.20	**0.196**	**0.196**	28
Rear	GSM1900	Standard	1880.0	661	10	30.20	30.20	0.159	0.159	-
Rear	WCDMA V	Standard	836.6	4183	10	24.12	24.40	**0.548**	**0.584**	31
Rear	WCDMA V	Standard	836.6	4183	10	24.12	24.40	0.524	0.559	-
Front	LTE Band 5	Standard	836.5	20525	10	23.58	23.70	**0.516**	**0.530**	33
Rear	LTE Band 5	Standard	836.5	20525	10	23.58	23.70	0.461	0.474	-
Front	LTE Band 17	Standard	710.0	23790	10	23.54	23.70	**0.421**	**0.437**	35
Rear	LTE Band 17	Standard	710.0	23790	10	23.54	23.70	0.351	0.364	-
Front	LTE Band 41	Standard	2593.0	40620	10	23.28	23.9	0.274	0.316	-
Rear	LTE Band 41	Standard	2593.0	40620	10	23.28	23.90	**0.636**	**0.734**	37
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	
Front	802.11b 2.4 GHz	Standard	2437.0	6	10	14.21	15.00	**0.080**	**0.096**	39
Rear	802.11b 2.4 GHz	Standard	2437.0	6	10	14.21	15.00	0.066	0.079	-
Front	802.11a 5.2 GHz	Standard	5180.0	36	10	12.08	13.00	**0.040**	**0.049**	41
Rear	802.11a 5.2 GHz	Standard	5180.0	36	10	12.08	13.00	0.027	0.033	-
Front	802.11ac 5.2 GHz	Standard	5210.0	42	10	10.11	11.00	0.019	0.023	-
Front	802.11a 5.3 GHz	Standard	5280.0	56	10	12.03	13.00	**0.033**	**0.041**	43
Rear	802.11a 5.3 GHz	Standard	5280.0	56	10	12.03	13.00	0.032	0.040	-
Front	802.11ac 5.3 GHz	Standard	5290.0	58	10	10.35	11.00	0.015	0.017	-
Front	802.11a 5.6 GHz	Standard	5580.0	116	10	12.06	13.00	N/A	N/A	-
Rear	802.11a 5.6 GHz	Standard	5580.0	116	10	12.06	13.00	**0.010**	**0.012**	45
Rear	802.11ac 5.6 GHz	Standard	5530.0	106	10	10.56	11.00	N/A	N/A	-
ANSI / IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure / General Population					Body 1.6 W/kg (mW/g) Averaged over 1 gram					

22.3 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	31.82	31.90	**1.060**	**1.080**	26
Rear		Standard	836.6	190	10	31.82	31.90	0.744	0.758	-
Right Edge		Standard	836.6	190	10	31.82	31.90	0.885	0.901	-
Left Edge		Standard	836.6	190	10	31.82	31.90	0.606	0.617	-
Bottom		Standard	836.6	190	10	31.82	31.90	0.523	0.533	-
Front		Standard	824.2	128	10	31.68	31.90	0.953	1.003	-
Front		Standard	848.8	251	10	31.72	31.90	0.983	1.025	-
Right Edge		Standard	824.2	128	10	31.68	31.90	0.781	0.822	
Right Edge		Standard	848.8	251	10	31.72	31.90	0.911	0.950	
Repeated Test										
Front	GPRS 2Tx	Standard	836.6	190	10	31.82	31.90	0.900	0.917	
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 2Tx	Standard	1880.0	661	10	29.82	29.90	0.354	0.361	-
Rear		Standard	1880.0	661	10	29.82	29.90	0.287	0.292	-
Right Edge		Standard	1880.0	661	10	29.82	29.90	0.085	0.087	-
Left Edge		Standard	1880.0	661	10	29.82	29.90	**0.368**	**0.375**	29
Bottom		Standard	1880.0	661	10	29.82	29.90	0.257	0.262	-
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	24.12	24.40	**0.548**	**0.584**	31
Rear		Standard	836.6	4183	10	24.12	24.40	0.524	0.559	-
Right Edge		Standard	836.6	4183	10	24.12	24.40	0.530	0.565	-
Left Edge		Standard	836.6	4183	10	24.12	24.40	0.432	0.461	-
Bottom		Standard	836.6	4183	10	24.12	24.40	0.347	0.370	-
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 5 Bandwidth 10 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	836.5	20525	1	0	10	23.58	23.70	**0.516**	**0.530**	33
	QPSK	Standard	836.5	20525	25	0	10	22.64	22.70	0.427	0.433	-
Rear	QPSK	Standard	836.5	20525	1	0	10	23.58	23.70	0.461	0.474	-
	QPSK	Standard	836.5	20525	25	0	10	22.64	22.70	0.375	0.380	-
Right Edge	QPSK	Standard	836.5	20525	1	0	10	23.58	23.70	0.511	0.525	-
	QPSK	Standard	836.5	20525	25	0	10	22.64	22.70	0.412	0.418	-
Left Edge	QPSK	Standard	836.5	20525	1	0	10	23.58	23.70	0.381	0.392	-
	QPSK	Standard	836.5	20525	25	0	10	22.64	22.70	0.305	0.309	-
Bottom	QPSK	Standard	836.5	20525	1	0	10	23.58	23.70	0.299	0.307	
	QPSK	Standard	836.5	20525	25	0	10	22.64	22.70	0.260	0.264	
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 17 Bandwidth 10 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	710.0	23790	1	0	10	23.54	23.70	**0.421**	**0.437**	35
	QPSK	Standard	710.0	23790	25	0	10	22.57	22.70	0.337	0.347	-
Rear	QPSK	Standard	710.0	23790	1	0	10	23.54	23.70	0.351	0.364	-
	QPSK	Standard	710.0	23790	25	0	10	22.57	22.70	0.274	0.282	-
Right Edge	QPSK	Standard	710.0	23790	1	0	10	23.54	23.70	0.289	0.300	-
	QPSK	Standard	710.0	23790	25	0	10	22.57	22.70	0.219	0.226	-
Left Edge	QPSK	Standard	710.0	23790	1	0	10	23.54	23.70	0.234	0.243	-
	QPSK	Standard	710.0	23790	25	0	10	22.57	22.70	0.180	0.185	-
Bottom	QPSK	Standard	710.0	23790	1	0	10	23.54	23.70	0.162	0.168	
	QPSK	Standard	710.0	23790	25	0	10	22.57	22.70	0.135	0.139	
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 41 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	2593.0	40620	1	0	10	23.28	23.9	0.274	0.316	-
	QPSK	Standard	2593.0	40620	50	0	10	21.95	22.9	0.231	0.287	-
Rear	QPSK	Standard	2593.0	40620	1	0	10	23.28	23.9	**0.636**	**0.734**	37
	QPSK	Standard	2593.0	40620	50	0	10	21.95	22.9	0.542	0.675	-
Right Edge	QPSK	Standard	2593.0	40620	1	0	10	23.28	23.9	0.226	0.261	-
	QPSK	Standard	2593.0	40620	50	0	10	21.95	22.9	0.187	0.233	-
Left Edge	QPSK	Standard	2593.0	40620	1	0	10	23.28	23.9	0.062	0.072	-
	QPSK	Standard	2593.0	40620	50	0	10	21.95	22.9	0.049	0.061	-
Bottom	QPSK	Standard	2593.0	40620	1	0	10	23.28	23.9	0.297	0.343	
	QPSK	Standard	2593.0	40620	50	0	10	21.95	22.9	0.250	0.311	
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	2437.0	6	10	14.21	15.00	**0.080**	**0.096**	39
Rear	802.11b 2.4 GHz	Standard	2437.0	6	10	14.21	15.00	0.066	0.079	-
Left Edge	802.11b 2.4 GHz	Standard	2437.0	6	10	14.21	15.00	0.054	0.065	-
Top	802.11b 2.4 GHz	Standard	2437.0	6	10	14.21	15.00	0.033	0.040	-
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.
9. The “N/A” means there is no SAR value or the SAR is too low to be measured.

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 D01v03: 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 D01v03. 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 D01v01r02 and October 2012 FCC/TCB Meeting Notes for 2.4 GHz WIFI operations: Highest average RF output power channel for the lowest data rate were selected for SAR evaluation in 802.11b. 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. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02 and October 2012 FCC/TCB Meeting Notes for 5 GHz WIFI operations: Highest average RF output power channel for the lowest data rate were selected for SAR evaluation in 802.11a. Other IEEE 802.11 modes (including 802.11n 20MHz and 40MHz bandwidths) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11a mode.
3. 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.
4. WLAN transmission was verified using a spectrum analyzer.

23. SAR Measurement Variability

23.1 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

EUT Position	Mode	Traffic Channel		Separation Distance (mm)	Measured 1g SAR (W/kg)	1st Repeated 1g SAR(W/kg)	Ratio	2st Repeated 1g SAR(W/kg)	Ratio	3st Repeated 1g SAR(W/kg)	Ratio
		Frequency (MHz)	Channel								
Front	GPRS 2Tx	836.6	190	10	1.060	0.900	1.00	N/A	N/A	N/A	N/A

23.2 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.

24. FCC Multi-TX and Antenna SAR considerations

24.1 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.

24.2 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	8	5	0.336
			10	0.168

24.3 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	N/A
10	GPRS/EDGE 1900 + WLAN 5 GHz	Yes	Yes	N/A
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 850 + WLAN 5 GHz	Yes	Yes	N/A
15	WCDMA 850 + Bluetooth	Yes	Yes	N/A
16	LTE Band 5 + WLAN 2.4 GHz	Yes	Yes	Yes
17	LTE Band 5 + WLAN 5 GHz	Yes	Yes	N/A
18	LTE Band 5 + Bluetooth	Yes	Yes	N/A
19	LTE Band 17 + WLAN 2.4 GHz	Yes	Yes	Yes
20	LTE Band 17 + WLAN 5 GHz	Yes	Yes	N/A
21	LTE Band 17 + Bluetooth	Yes	Yes	N/A
22	LTE Band 41 + WLAN 2.4 GHz	Yes	Yes	Yes
23	LTE Band 41 + WLAN 5 GHz	Yes	Yes	N/A
24	LTE Band 41 + Bluetooth	Yes	Yes	N/A

Notes

1. GSM/GPRS, WCDMA share the same antenna and cannot transmit simultaneously.

24.4 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	0.409	0.456	0.865
	Right Tilt	0.216	0.241	0.457
	Left Touch	0.314	0.350	0.664
	Left Tilt	0.182	0.203	0.385
	Configuration	GPRS850 Band Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.675	0.456	**1.131**
	Right Tilt	0.381	0.241	0.622
	Left Touch	0.507	0.350	0.857
	Left Tilt	0.293	0.203	0.496
	Configuration	GSM1900 Band Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.112	0.456	0.568
	Right Tilt	0.079	0.241	0.320
	Left Touch	0.233	0.350	0.583
	Left Tilt	0.081	0.203	0.284
	Configuration	GPRS1900 Band Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.183	0.456	0.639
	Right Tilt	0.154	0.241	0.395
	Left Touch	0.359	0.350	0.709
	Left Tilt	0.122	0.203	0.325
	configuration	WCDMA Band V Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.465	0.456	0.921
	Right Tilt	0.240	0.241	0.481
	Left Touch	0.346	0.350	0.696
	Left Tilt	0.206	0.203	0.409
	configuration	LTE Band 5 Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.380	0.456	0.836
	Right Tilt	0.214	0.241	0.455
	Left Touch	0.295	0.350	0.645
	Left Tilt	0.178	0.203	0.381
	configuration	LTE Band 17 Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.250	0.456	0.706
	Right Tilt	0.123	0.241	0.364
	Left Touch	0.193	0.350	0.543
	Left Tilt	0.115	0.203	0.318

Head	configuration	LTE Band 41 Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.135	0.456	0.591
	Right Tilt	0.046	0.241	0.287
	Left Touch	0.160	0.350	0.510
	Left Tilt	0.054	0.203	0.257

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	0.409	0.471	0.880
	Right Tilt	0.216	0.288	0.504
	Left Touch	0.314	0.167	0.481
	Left Tilt	0.182	0.116	0.298
	Configuration	GPRS850 Band Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.675	0.471	**1.146**
	Right Tilt	0.381	0.288	0.669
	Left Touch	0.507	0.167	0.674
	Left Tilt	0.293	0.116	0.409
	Configuration	GSM1900 Band Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.112	0.471	0.583
	Right Tilt	0.079	0.288	0.367
	Left Touch	0.233	0.167	0.400
	Left Tilt	0.081	0.116	0.197
	Configuration	GPRS1900 Band Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.183	0.471	0.654
	Right Tilt	0.154	0.288	0.442
	Left Touch	0.359	0.167	0.526
	Left Tilt	0.122	0.116	0.238
	configuration	WCDMA Band V Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.465	0.471	0.936
	Right Tilt	0.240	0.288	0.528
	Left Touch	0.346	0.167	0.513
	Left Tilt	0.206	0.116	0.322
	configuration	LTE Band 5 Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.380	0.471	0.851
	Right Tilt	0.214	0.288	0.502
	Left Touch	0.295	0.167	0.462
	Left Tilt	0.178	0.116	0.294

Head	configuration	LTE Band 17 Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.250	0.471	0.721
	Right Tilt	0.123	0.288	0.411
	Left Touch	0.193	0.167	0.360
	Left Tilt	0.115	0.116	0.231
	configuration	LTE Band 41 Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.135	0.471	0.606
	Right Tilt	0.046	0.288	0.334
	Left Touch	0.160	0.167	0.327
	Left Tilt	0.054	0.116	0.170

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	0.409	0.336	0.745
	Right Tilt	0.216	0.336	0.552
	Left Touch	0.314	0.336	0.650
	Left Tilt	0.182	0.336	0.518
	Configuration	GPRS850 Band Scaled SAR(W/kg)	Bluetooth SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.675	0.336	**1.011**
	Right Tilt	0.381	0.336	0.717
	Left Touch	0.507	0.336	0.843
	Left Tilt	0.293	0.336	0.629
	Configuration	GSM1900 Band Scaled SAR(W/kg)	Bluetooth SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.112	0.336	0.448
	Right Tilt	0.079	0.336	0.415
	Left Touch	0.233	0.336	0.569
	Left Tilt	0.081	0.336	0.417
	Configuration	GPRS1900 Band Scaled SAR(W/kg)	Bluetooth SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.183	0.336	0.519
	Right Tilt	0.154	0.336	0.490
	Left Touch	0.359	0.336	0.695
	Left Tilt	0.122	0.336	0.458
	configuration	WCDMA Band V Scaled SAR(W/kg)	Bluetooth SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.465	0.336	0.801
	Right Tilt	0.240	0.336	0.576
	Left Touch	0.346	0.336	0.682
	Left Tilt	0.206	0.336	0.542

Head	configuration	LTE Band 5 Scaled SAR(W/kg)	Bluetooth SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.380	0.336	0.716
	Right Tilt	0.214	0.336	0.550
	Left Touch	0.295	0.336	0.631
	Left Tilt	0.178	0.336	0.514
	configuration	LTE Band 17 Scaled SAR(W/kg)	Bluetooth SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.250	0.336	0.586
	Right Tilt	0.123	0.336	0.459
	Left Touch	0.193	0.336	0.529
	Left Tilt	0.115	0.336	0.451
	configuration	LTE Band 41 Scaled SAR(W/kg)	Bluetooth SAR (W/kg)	∑SAR (W/kg)
	Right Touch	0.135	0.336	0.471
	Right Tilt	0.046	0.336	0.382
	Left Touch	0.160	0.336	0.496
	Left Tilt	0.054	0.336	0.390

24.5 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	Front	0.498	0.096	0.594
	Rear	0.464	0.079	0.543
	configuration	GSM1900 Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.196	0.096	0.292
	Rear	0.159	0.079	0.238
	configuration	WCDMA Band V Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.584	0.096	0.680
	Rear	0.559	0.079	0.638
	configuration	LTE Band 5 Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.530	0.096	0.626
	Rear	0.474	0.079	0.553
	configuration	LTE Band 17 Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.437	0.096	0.533
	Rear	0.364	0.079	0.443
	configuration	LTE Band 41 Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.316	0.096	0.412
	Rear	0.734	0.079	**0.813**

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	Front	0.498	0.049	0.547
	Rear	0.464	0.040	0.504
	configuration	GSM1900 Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.196	0.049	0.245
	Rear	0.159	0.040	0.199
	configuration	WCDMA Band V Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.584	0.049	0.633
	Rear	0.559	0.040	0.599
	configuration	LTE Band 5 Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.530	0.049	0.579
	Rear	0.474	0.040	0.514
	configuration	LTE Band 17 Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.437	0.049	0.486
	Rear	0.364	0.040	0.404
	configuration	LTE Band 41 Scaled SAR(W/kg)	5 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.316	0.049	0.365
	Rear	0.734	0.040	**0.774**

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

Simultaneous TX	configuration	GSM850 Scaled SAR(W/kg)	Bluetooth Scaled SAR (W/kg)	∑SAR (W/kg)
Body-Worn	Front	0.498	0.168	0.666
	Rear	0.464	0.168	0.632
	configuration	GSM1900 Scaled SAR(W/kg)	Bluetooth Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.196	0.168	0.364
	Rear	0.159	0.168	0.327
	configuration	WCDMA Band V Scaled SAR(W/kg)	Bluetooth Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.584	0.168	0.752
	Rear	0.559	0.168	0.727
	configuration	LTE Band 5 Scaled SAR(W/kg)	Bluetooth Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.530	0.168	0.698
	Rear	0.474	0.168	0.642
	configuration	LTE Band 17 Scaled SAR(W/kg)	Bluetooth Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.437	0.168	0.605
	Rear	0.364	0.168	0.532
	configuration	LTE Band 41 Scaled SAR(W/kg)	Bluetooth Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.316	0.168	0.484
	Rear	0.734	0.168	**0.902**

24.6 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	1.080	0.096	**1.176**
	Rear	0.758	0.079	0.837
	Right Edge	0.950	-	0.950
	Left Edge	0.617	0.065	0.682
	Top	-	0.040	0.040
	Bottom	0.533	-	0.533
	configuration	GPRS1900 Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.361	0.096	0.457
	Rear	0.292	0.079	0.371
	Right Edge	0.087	-	0.087
	Left Edge	0.375	0.065	0.440
	Top	-	0.040	0.040
	Bottom	0.262	-	0.262
	configuration	WCDMA Band V Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.584	0.096	0.680
	Rear	0.559	0.079	0.638
	Right Edge	0.565	-	0.565
	Left Edge	0.461	0.065	0.526
	Top	-	0.040	0.040
	Bottom	0.370	-	0.370
	configuration	LTE Band 5 Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.530	0.096	0.626
	Rear	0.474	0.079	0.553
	Right Edge	0.525	-	0.525
	Left Edge	0.392	0.065	0.575
	Top	-	0.040	0.040
	Bottom	0.307	-	0.307
	configuration	LTE Band 17 Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.437	0.096	0.533
	Rear	0.364	0.079	0.443
	Right Edge	0.300	-	0.300
	Left Edge	0.243	0.065	0.308
	Top	-	0.040	0.040
	Bottom	0.168	-	0.168
	configuration	LTE Band 41 Scaled SAR(W/kg)	2.4 GHz WLAN Scaled SAR (W/kg)	∑SAR (W/kg)
	Front	0.316	0.096	0.412
	Rear	0.734	0.079	0.813
	Right Edge	0.261	-	0.261
	Left Edge	0.072	0.065	0.137
	Top	-	0.040	0.040
	Bottom	0.343	-	0.343

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 D06v02, the devices edges with antennas more than 2.5 ㎝ from edge are not required to be evaluated for SAR ("-").

Appendixes List

Appendix A	A.1 Verification Test Plots for 750 MHz (Plots No 1,2)
	A.2 Verification Test Plots for 835 MHz (Plots No 3,4,5,6,7)
	A.3 Verification Test Plots for 1900 MHz (Plots No 8,9,10)
	A.4 Verification Test Plots for 2450 MHz (Plots No 11,12)
	A.5 Verification Test Plots for 2600 MHz (Plots No 13,14)
	A.6 Verification Test Plots for 5200 MHz (Plots No 15,16,17)
	A.7 Verification Test Plots for 5300 MHz (Plots No 18,19,20)
	A.8 Verification Test Plots for 5600 MHz (Plots No 21,22,23)
	A.9 SAR Test Plots for GSM850 Band (Plots No 24,25,26)
	A.10 SAR Test Plots for GSM1900 Band (Plots No 27,28,29)
	A.11 SAR Test Plots for WCDMA850 Band (Plots No 30,31)
	A.12 SAR Test Plots for LTE Band 5 (Plots No 32,33)
	A.13 SAR Test Plots for LTE Band 17 (Plots No 34,35)
	A.14 SAR Test Plots for LTE Band 41 (Plots No 36,37)
	A.15 SAR Test Plots for WLAN 2.4 GHz (Plots No 38,39)
	A.16 SAR Test Plots for WLAN 5.2 GHz (Plots No 40,41)
	A.17 SAR Test Plots for WLAN 5.3 GHz (Plots No 42,43)
	A.18 SAR Test Plots for WLAN 5.6 GHz (Plots No 44,45)
Appendix B	B.1 Uncertainty Analysis
Appendix C	C.1 Calibration certificate for Probe (SN: 3862)
	C.2 Calibration certificate for Probe (SN: 3791)
	C.3 Calibration certificate for Probe (SN: 1782)
	C.4 Calibration certificate for DAE
	C.5 Calibration certificate for Dipole

Appendix A.1 Verification Test Plots for 750 MHz

Head

Date: 2015-03-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 750MHz Head System Verification.da53:0

Input Power : 100 mW

Ambient Temp : 22.7 ℃ Tissue Temp : 22.3 ℃

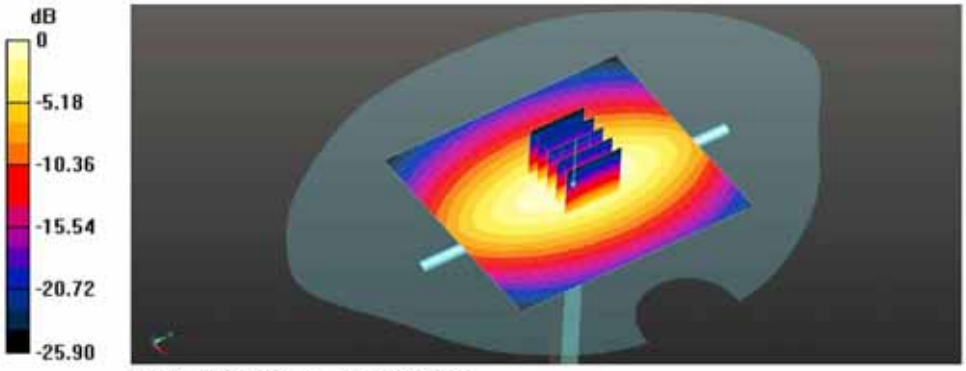
DUT: Dipole 750 MHz D750V3; Type: D750V3; Serial: D750V3 - SN:1096

Communication System: UID 0, CW (0); Frequency: 750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 750 MHz; σ = 0.914 S/m; ε_r = 42.98; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.52, 6.52, 6.52); Calibrated: 2015-02-24;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

System Verification/750MHz Head System Verification/Area Scan (81x91x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.896 W/kg

System Verification/750MHz Head System Verification/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 32.51 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 1.20 W/kg
SAR(1 g) = 0.825 W/kg; SAR(10 g) = 0.543 W/kg
Maximum value of SAR (measured) = 0.885 W/kg



0 dB = 0.896 W/kg = -0.48 dBW/kg

Body

Date: 2015-03-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 750MHz Body System Verification.da53:0

Input Power : 100 mW

Ambient Temp : 22.7 ℃ Tissue Temp : 22.3 ℃

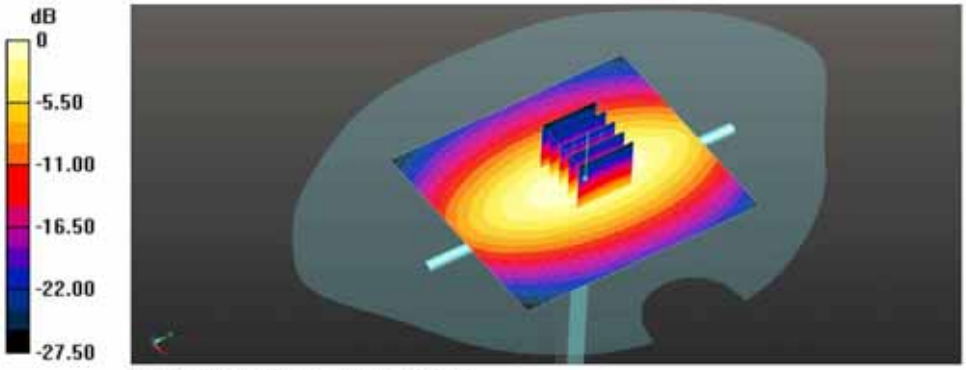
DUT: Dipole 750 MHz D750V3; Type: D750V3; Serial: D750V3 - SN:1096

Communication System: UID 0, CW (0); Frequency: 750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 750 MHz; σ = 0.979 S/m; ε_r = 55.962; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.02, 6.02, 6.02); Calibrated: 2015-02-24;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

System Verification/750MHz Body System Verification/Area Scan (81x91x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.901 W/kg

System Verification/750MHz Body System Verification/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.50 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.18 W/kg
SAR(1 g) = 0.830 W/kg; SAR(10 g) = 0.552 W/kg
Maximum value of SAR (measured) = 0.892 W/kg



0 dB = 0.901 W/kg = -0.45 dBW/kg

Appendix A.2 Verification Test Plots for 835 MHz

Head

Date: 2015-03-24

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

Input Power : 100 mW

Ambient Temp : 22.5 ℃ Tissue Temp : 22.1 ℃

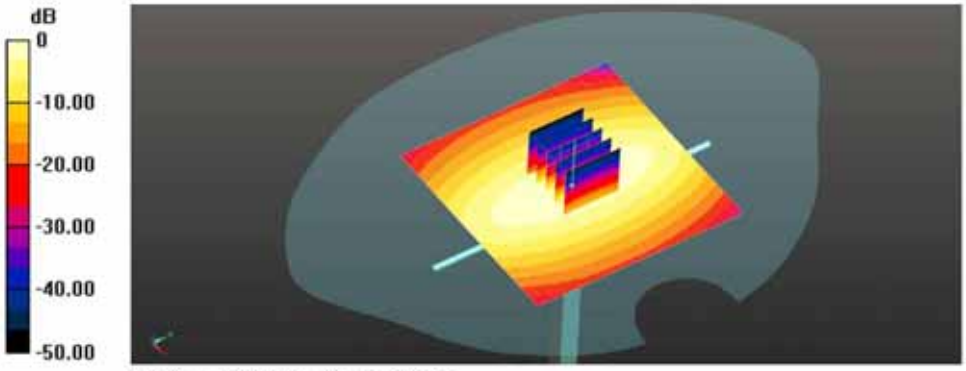
DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:490

Communication System: UID 0, CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.885 S/m; ε_r = 42.106; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(9.47, 9.47, 9.47); Calibrated: 2014-09-15;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

System Verification/835MHz Head System Verification/Area Scan (81x81x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.16 W/kg

System Verification/835MHz Head System Verification/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 37.41 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 1.33 W/kg
SAR(1 g) = 0.913 W/kg; SAR(10 g) = 0.600 W/kg
Maximum value of SAR (measured) = 1.15 W/kg



0 dB = 1.16 W/kg = 0.64 dBW/kg

Body

Date: 2015-03-24

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

Input Power : 100 mW

Ambient Temp : 22.5 ℃ Tissue Temp : 22.1 ℃

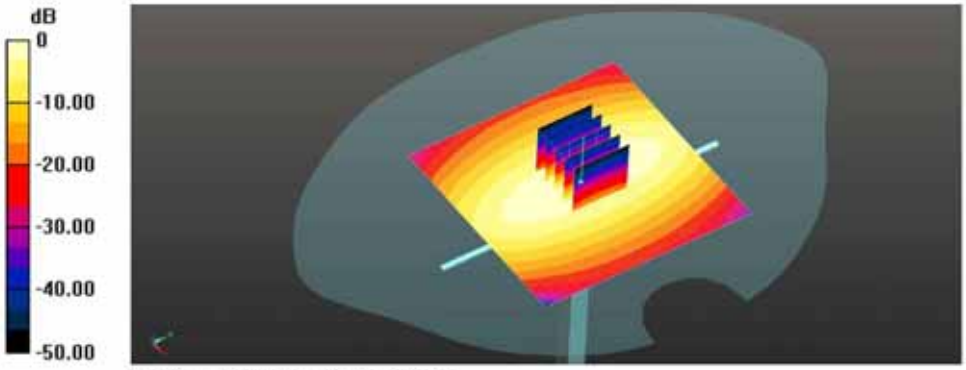
DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:490

Communication System: UID 0, CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.952 S/m; ε_r = 54.766; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(9.54, 9.54, 9.54); Calibrated: 2014-09-15;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

System Verification/835MHz Body System Verification/Area Scan (81x81x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.15 W/kg

System Verification/835MHz Body System Verification/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 35.31 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.33 W/kg
SAR(1 g) = 0.927 W/kg; SAR(10 g) = 0.619 W/kg
Maximum value of SAR (measured) = 1.16 W/kg



0 dB = 1.15 W/kg = 0.61 dBW/kg

Head

Date: 2015-03-25

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

Input Power : 100 mW

Ambient Temp : 22.6 ℃ Tissue Temp : 22.2 ℃

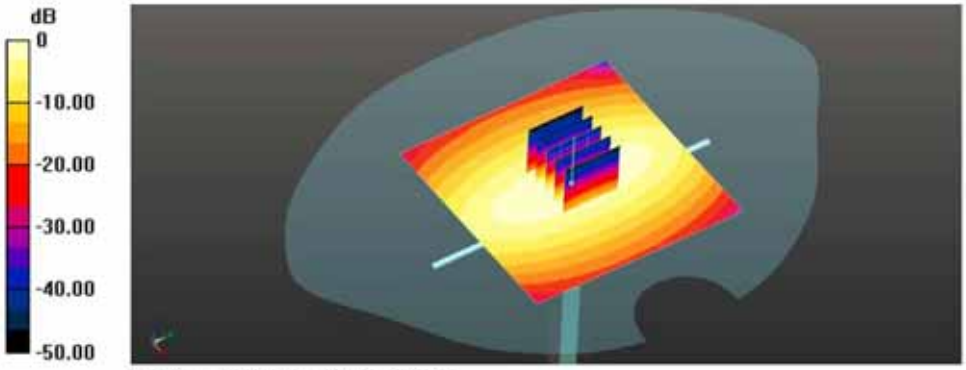
DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:490

Communication System: UID 0, CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.898 S/m; ε_r = 42.593; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(9.47, 9.47, 9.47); Calibrated: 2014-09-15;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

System Verification/835MHz Head System Verification/Area Scan (81x81x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.14 W/kg

System Verification/835MHz Head System Verification/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 36.58 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.31 W/kg
SAR(1 g) = 0.902 W/kg; SAR(10 g) = 0.593 W/kg
Maximum value of SAR (measured) = 1.13 W/kg



0 dB = 1.14 W/kg = 0.57 dBW/kg

Body

Date: 2015-03-25

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

Input Power : 100 mW

Ambient Temp : 22.6 ℃ Tissue Temp : 22.2 ℃

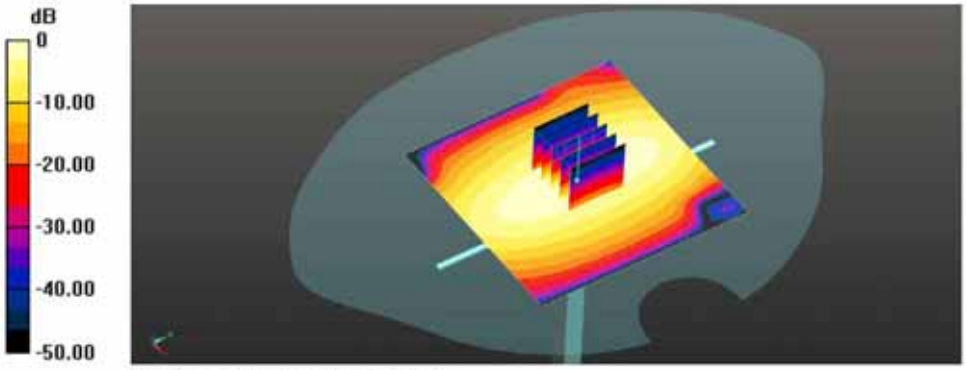
DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:490

Communication System: UID 0, CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.991 S/m; ε_r = 55.931; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(9.54, 9.54, 9.54); Calibrated: 2014-09-15;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

System Verification/835MHz Body System Verification/Area Scan (81x81x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.19 W/kg

System Verification/835MHz Body System Verification/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 34.83 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 1.38 W/kg
SAR(1 g) = 0.962 W/kg; SAR(10 g) = 0.642 W/kg
Maximum value of SAR (measured) = 1.20 W/kg



0 dB = 1.19 W/kg = 0.76 dBW/kg

Body

Date: 2015-04-13

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

Input Power : 100 mW

Ambient Temp : 22.8 ℃ Tissue Temp : 22.3 ℃

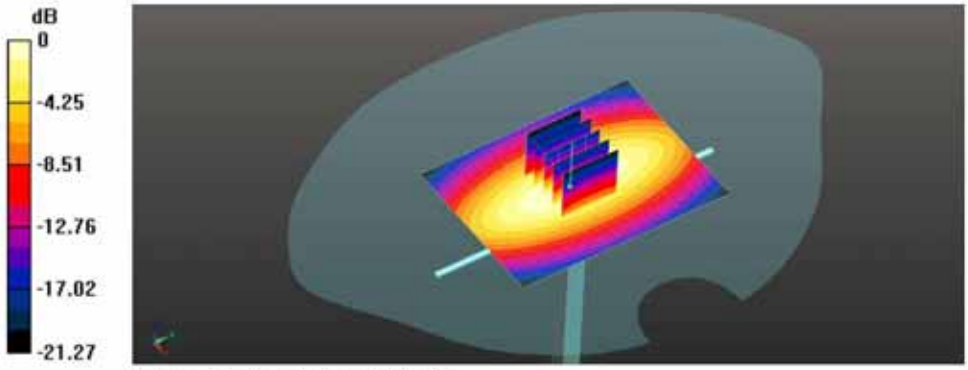
DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:490

Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.95 S/m; ε_r = 55.175; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3791; ConvF(8.63, 8.63, 8.63); Calibrated: 2014-05-21;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Verification/835MHz Body System Verification/Area Scan (61x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.23 W/kg

Verification/835MHz Body System Verification/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 37.06 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 1.42 W/kg
SAR(1 g) = 0.973 W/kg; SAR(10 g) = 0.648 W/kg
Maximum value of SAR (measured) = 1.22 W/kg



0 dB = 1.23 W/kg = 0.90 dBW/kg

Appendix A.3 Verification Test Plots for 1900 MHz

Head

Date: 2015-03-26

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

Input Power : 100 mW

Ambient Temp : 22.4 ℃ Tissue Temp : 21.9 ℃

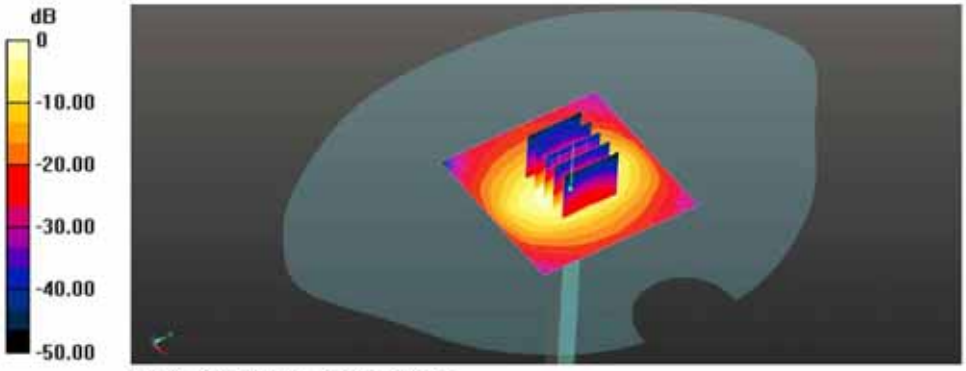
DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2 - SN:5d033

Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.391 S/m; ε_r = 40.217; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(7.99, 7.99, 7.99); Calibrated: 2014-09-15;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

System Verification/1900MHz Head System Verification/Area Scan (61x61x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 5.69 W/kg

System Verification/1900MHz Head System Verification/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 63.83 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 7.20 W/kg
SAR(1 g) = 4.02 W/kg; SAR(10 g) = 2.12 W/kg
Maximum value of SAR (measured) = 5.72 W/kg



0 dB = 5.69 W/kg = 7.55 dBW/kg

Body

Date: 2015-03-26

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

Input Power : 100 mW

Ambient Temp : 22.4 ℃ Tissue Temp : 21.9 ℃

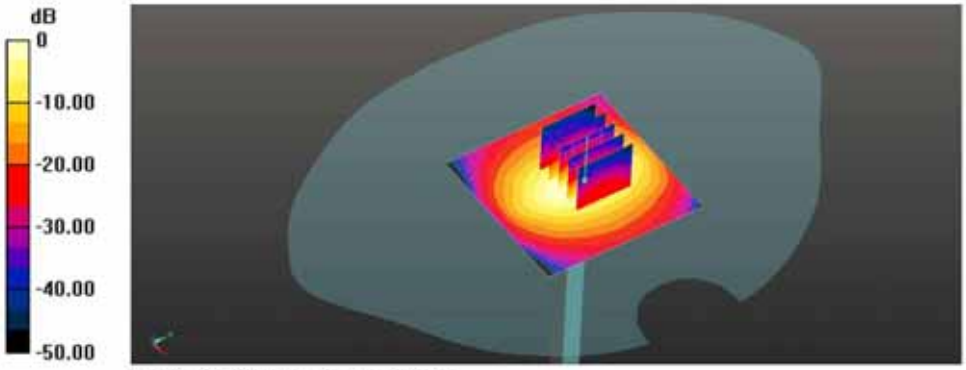
DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2 - SN:5d033

Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.514 S/m; ε_r = 55.262; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(7.61, 7.61, 7.61); Calibrated: 2014-09-15;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

System Verification/1900MHz Body System Verification/Area Scan (61x61x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 5.78 W/kg

System Verification/1900MHz Body System Verification/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 61.48 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 7.08 W/kg
SAR(1 g) = 4.1 W/kg; SAR(10 g) = 2.19 W/kg
Maximum value of SAR (measured) = 5.70 W/kg



0 dB = 5.78 W/kg = 7.62 dBW/kg

Body

Date: 2015-04-13

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

Input Power : 100 mW

Ambient Temp : 22.8 ℃ Tissue Temp : 22.2 ℃

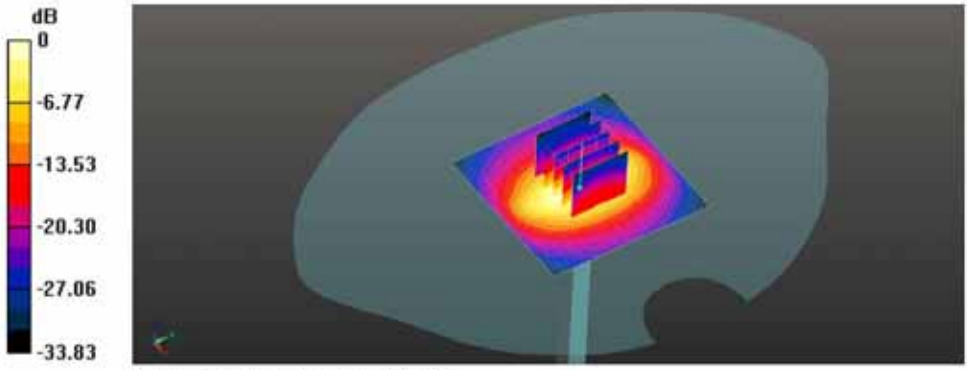
DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2 - SN:5d033

Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.549 S/m; ε_r = 53.477; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3791; ConvF(7.04, 7.04, 7.04); Calibrated: 2014-05-21;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Verification/1900MHz Body System Verification/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 6.00 W/kg

Verification/1900MHz Body System Verification/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 63.57 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 7.52 W/kg
SAR(1 g) = 4.25 W/kg; SAR(10 g) = 2.22 W/kg
Maximum value of SAR (measured) = 5.97 W/kg



0 dB = 6.00 W/kg = 7.78 dBW/kg

Appendix A.4 Verification Test Plots for 2450 MHz

Head

Date: 2015-03-18

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

Input Power : 100 mW

Ambient Temp : 22.6 ℃ Tissue Temp : 22.3 ℃

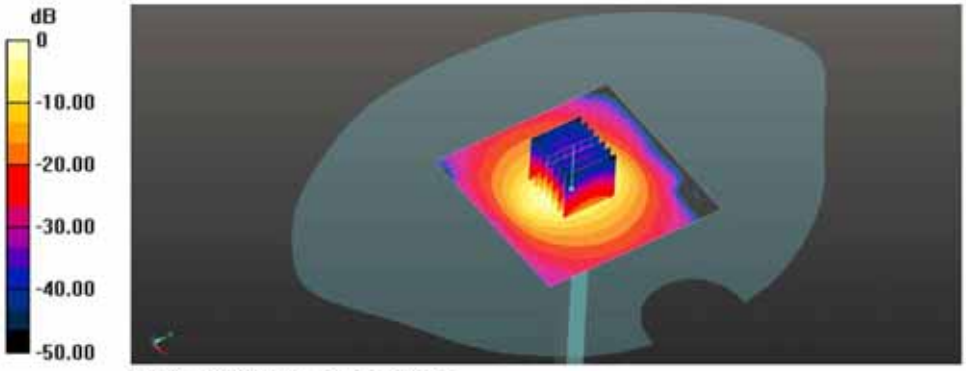
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:734

Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.853 S/m; ε_r = 37.549; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(7.24, 7.24, 7.24); Calibrated: 2014-09-15;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

System Verification/2450MHz Head System Verification/Area Scan (101x101x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 8.28 W/kg

System Verification/2450MHz Head System Verification/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 65.68 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 11.0 W/kg
SAR(1 g) = 5.31 W/kg; SAR(10 g) = 2.46 W/kg
Maximum value of SAR (measured) = 8.18 W/kg



0 dB = 8.28 W/kg = 9.18 dBW/kg

Body

Date: 2015-03-18

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

Input Power : 100 mW

Ambient Temp : 22.6 ℃ Tissue Temp : 22.4 ℃

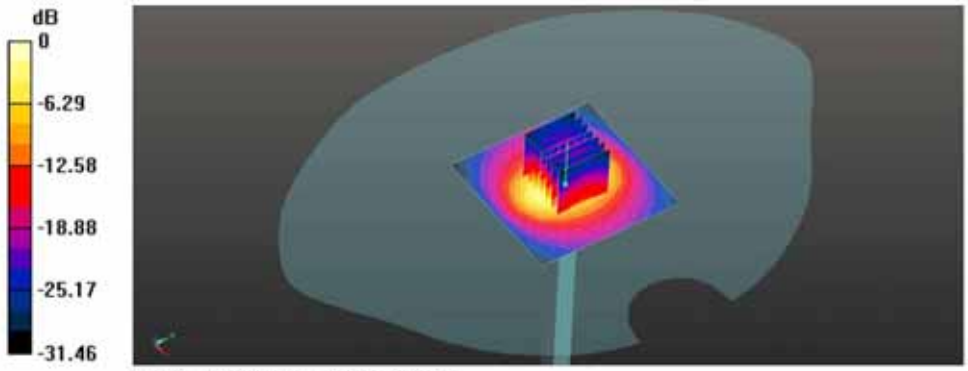
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:734

Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.965 S/m; ε_r = 52.62; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(7.21, 7.21, 7.21); Calibrated: 2014-09-15;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

System Verification/2450MHz Body System Verification/Area Scan (81x81x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 7.66 W/kg

System Verification/2450MHz Body System Verification/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 63.03 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 10.2 W/kg
SAR(1 g) = 5.03 W/kg; SAR(10 g) = 2.37 W/kg
Maximum value of SAR (measured) = 7.63 W/kg



0 dB = 7.66 W/kg = 8.84 dBW/kg

Appendix A.5 Verification Test Plots for 2600 MHz

Head

Date: 2015-03-29

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

Input Power : 100 mW

Ambient Temp : 22.2 ℃ Tissue Temp : 21.7 ℃

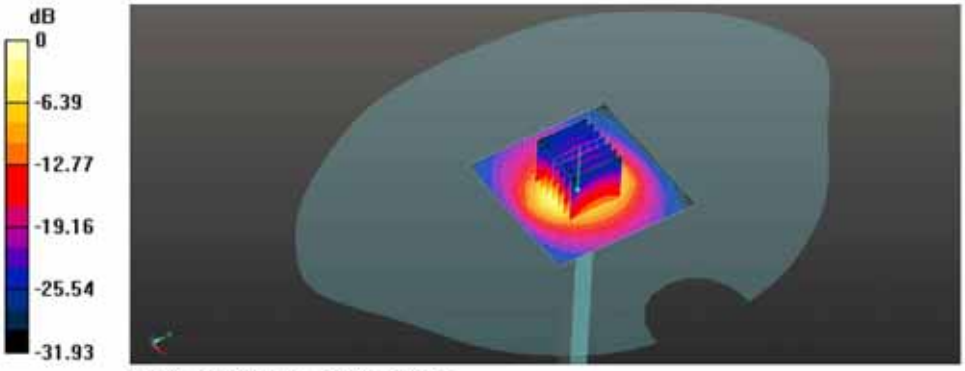
DUT: Dipole 2600 MHz D2600V2; Type: D2600V2; Serial: D2600V2 - SN:1003

Communication System: UID 0, CW (0); Frequency: 2600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2600 MHz; σ = 1.987 S/m; ε_r = 38.944; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3791; ConvF(6.41, 6.41, 6.41); Calibrated: 2014-05-21;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

System Verification/2600MHz Head System Verification/Area Scan (81x81x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 9.59 W/kg

System Verification/2600MHz Head System Verification/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 68.34 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 13.3 W/kg
SAR(1 g) = 6.02 W/kg; SAR(10 g) = 2.66 W/kg
Maximum value of SAR (measured) = 9.51 W/kg



0 dB = 9.59 W/kg = 9.82 dBW/kg

Body

Date: 2015-03-29

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

Input Power : 100 mW

Ambient Temp : 22.2 ℃ Tissue Temp : 21.7 ℃

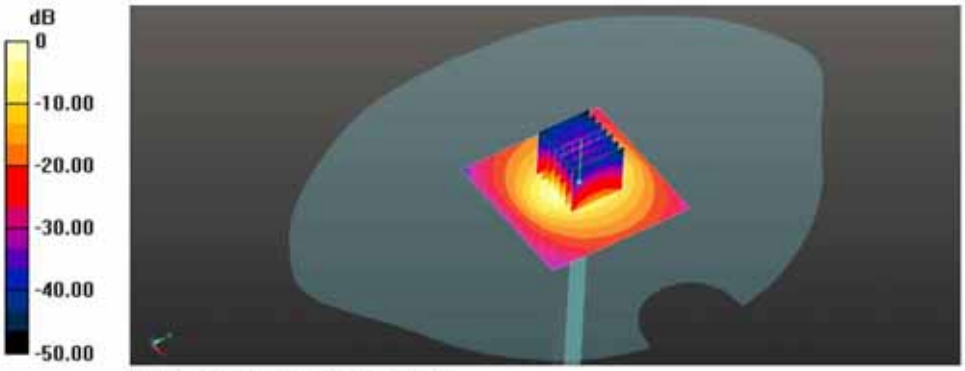
DUT: Dipole 2600 MHz D2600V2; Type: D2600V2; Serial: D2600V2 - SN:1003

Communication System: UID 0, CW (0); Frequency: 2600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2600 MHz; σ = 2.171 S/m; ε_r = 51.769; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3791; ConvF(6.36, 6.36, 6.36); Calibrated: 2014-05-21;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

System Verification/2600MHz Body System Verification/Area Scan (81x81x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 9.30 W/kg

System Verification/2600MHz Body System Verification/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 62.11 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 12.7 W/kg
SAR(1 g) = 5.74 W/kg; SAR(10 g) = 2.54 W/kg
Maximum value of SAR (measured) = 9.06 W/kg



0 dB = 9.30 W/kg = 9.68 dBW/kg

Appendix A.6 Verification Test Plots for 5200 MHz

Head

Date: 2015-03-19

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

Input Power : 100 mW

Ambient Temp : 22.8 ℃ Tissue Temp : 22.4 ℃

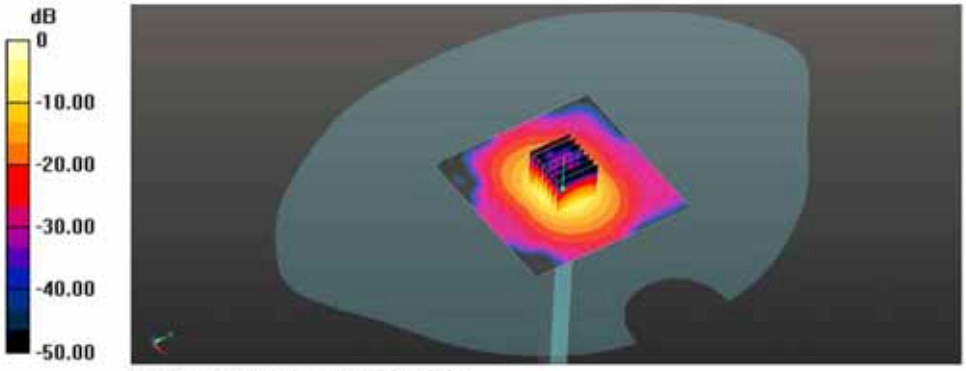
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1130

Communication System: UID 0, CW (0); Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 4.472 S/m; ε_r = 37.189; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(5.43, 5.43, 5.43); Calibrated: 2014-09-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

System Verification/5200MHz Head System Verification/Area Scan (91x91x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 17.2 W/kg

System Verification/5200MHz Head System Verification/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 68.20 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 29.7 W/kg
SAR(1 g) = 7.51 W/kg; SAR(10 g) = 2.15 W/kg
Maximum value of SAR (measured) = 18.7 W/kg



0 dB = 17.2 W/kg = 12.36 dBW/kg

Body

Date: 2015-03-19

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

Input Power : 100 mW

Ambient Temp : 22.8 ℃ Tissue Temp : 21.8 ℃

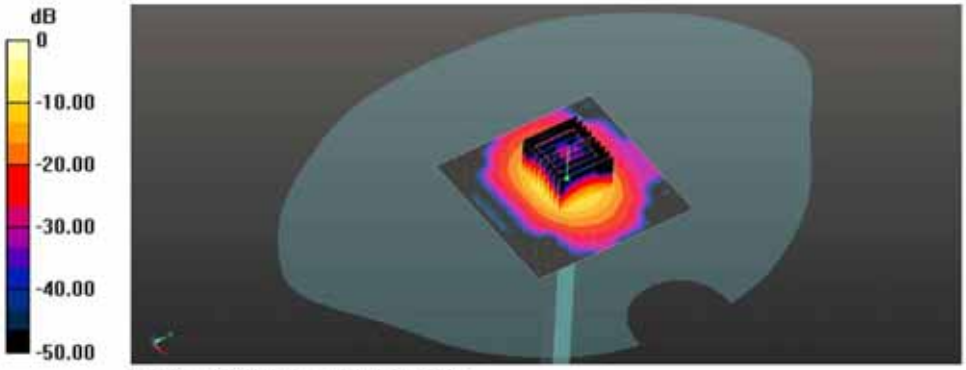
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1130

Communication System: UID 0, CW (0); Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 5.063 S/m; ε_r = 51.315; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.49, 4.49, 4.49); Calibrated: 2014-09-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

System Verification/5200MHz Body System Verification/Area Scan (91x91x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 18.2 W/kg

System Verification/5200MHz Body System Verification/Zoom Scan (9x9x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 58.14 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 28.6 W/kg
SAR(1 g) = 7.8 W/kg; SAR(10 g) = 2.24 W/kg
Maximum value of SAR (measured) = 18.8 W/kg



0 dB = 18.2 W/kg = 12.60 dBW/kg

Body

Date: 2015-04-13

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

Input Power : 100 mW

Ambient Temp : 22.8 ℃ Tissue Temp : 22.4 ℃

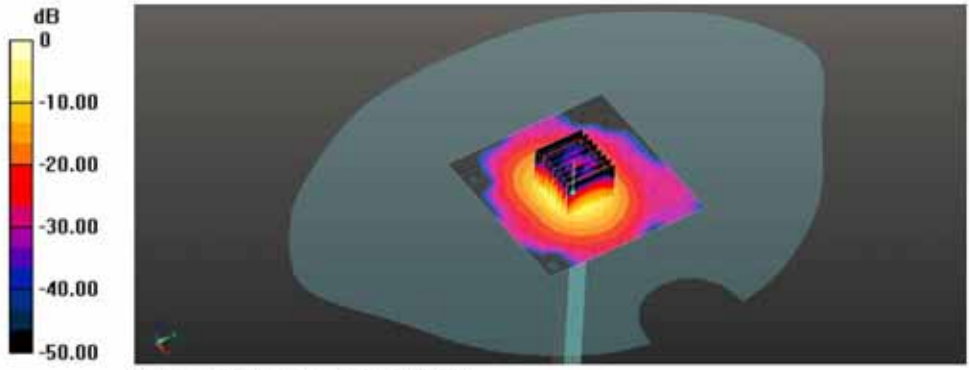
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1130

Communication System: UID 0, CW (0); Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 5.353 S/m; ε_r = 48.843; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.49, 4.49, 4.49); Calibrated: 2014-09-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

System Verification/5200MHz Body System Verification/Area Scan (91x91x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 17.8 W/kg

System Verification/5200MHz Body System Verification/Zoom Scan (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 59.57 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 30.5 W/kg
SAR(1 g) = 7.85 W/kg; SAR(10 g) = 2.23 W/kg
Maximum value of SAR (measured) = 19.3 W/kg



0 dB = 17.8 W/kg = 12.50 dBW/kg

Appendix A.7 Verification Test Plots for 5300 MHz

Head

Date: 2015-03-19

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

Input Power : 100 mW

Ambient Temp : 22.8 ℃ Tissue Temp : 22.4 ℃

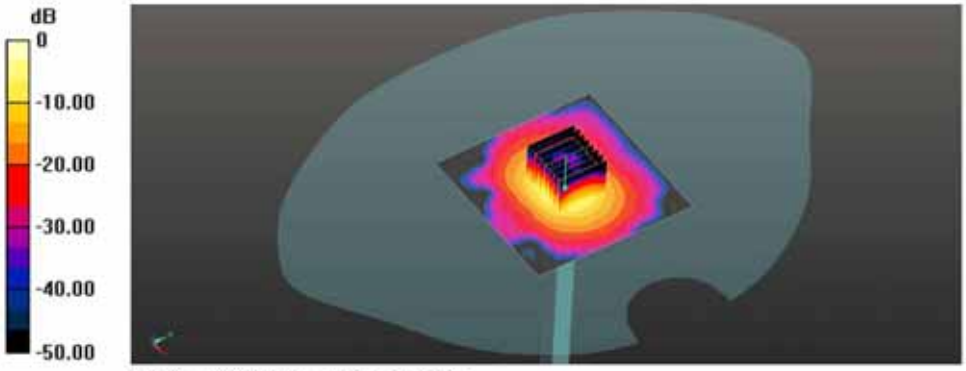
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1130

Communication System: UID 0, CW (0); Frequency: 5300 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5300 MHz; σ = 4.566 S/m; ε_r = 36.825; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(5.24, 5.24, 5.24); Calibrated: 2014-09-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

System Verification/5300MHz Head System Verification/Area Scan (91x91x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 19.2 W/kg

System Verification/5300MHz Head System Verification/Zoom Scan (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 71.55 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 33.7 W/kg
SAR(1 g) = 8.28 W/kg; SAR(10 g) = 2.36 W/kg
Maximum value of SAR (measured) = 20.8 W/kg



0 dB = 19.2 W/kg = 12.83 dBW/kg

Body

Date: 2015-03-19

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

Input Power : 100 mW

Ambient Temp : 22.8 ℃ Tissue Temp : 21.8 ℃

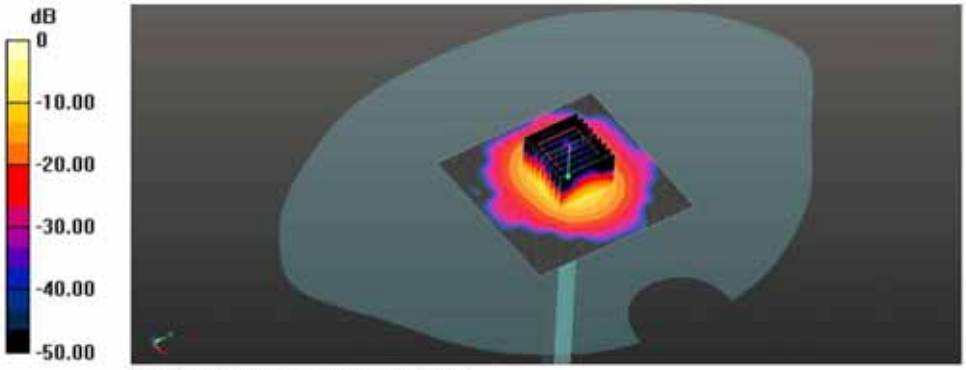
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1130

Communication System: UID 0, CW (0); Frequency: 5300 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5300 MHz; σ = 5.244 S/m; ε_r = 51.081; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.31, 4.31, 4.31); Calibrated: 2014-09-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

System Verification/5300MHz Body System Verification/Area Scan (91x91x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 19.3 W/kg

System Verification/5300MHz Body System Verification/Zoom Scan (9x9x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 59.46 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 30.4 W/kg
SAR(1 g) = 7.91 W/kg; SAR(10 g) = 2.24 W/kg
Maximum value of SAR (measured) = 19.2 W/kg



0 dB = 19.3 W/kg = 12.86 dBW/kg

Body

Date: 2015-04-13

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

Input Power : 100 mW

Ambient Temp : 22.8 ℃ Tissue Temp : 22.4 ℃

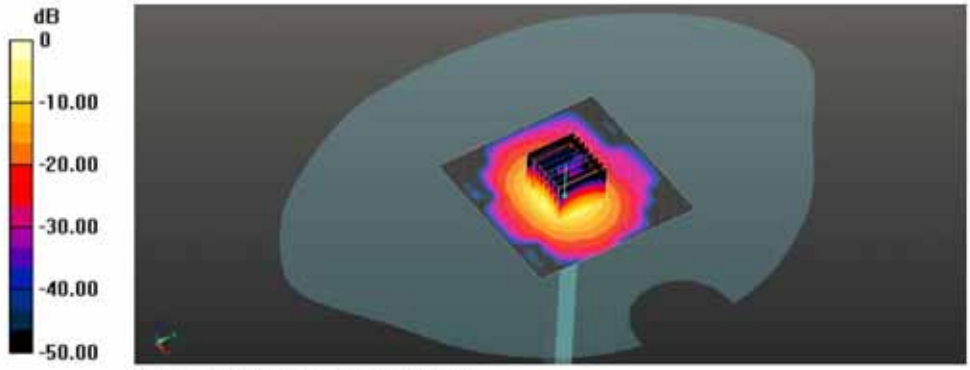
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1130

Communication System: UID 0, CW (0); Frequency: 5300 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5300 MHz; σ = 5.478 S/m; ε_r = 48.668; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.31, 4.31, 4.31); Calibrated: 2014-09-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

System Verification/5300MHz Body System Verification/Area Scan (91x91x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 18.7 W/kg

System Verification/5300MHz Body System Verification/Zoom Scan (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 57.38 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 31.3 W/kg
SAR(1 g) = 7.91 W/kg; SAR(10 g) = 2.22 W/kg
Maximum value of SAR (measured) = 19.5 W/kg



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

Appendix A.8 Verification Test Plots for 5600 MHz

Head

Date: 2015-03-20

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

Input Power : 100 mW

Ambient Temp : 22.7 ℃ Tissue Temp : 22.3 ℃

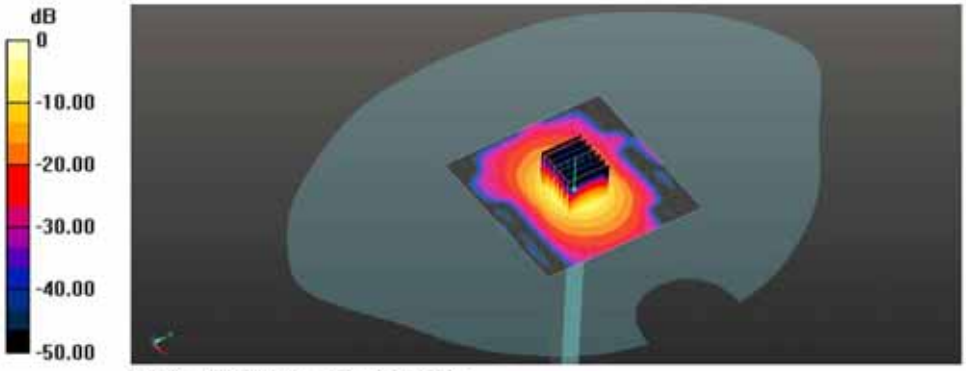
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1130

Communication System: UID 0, CW (0); Frequency: 5600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5600 MHz; σ = 5.201 S/m; ε_r = 36.944; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.7, 4.7, 4.7); Calibrated: 2014-09-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

System Verification/5600MHz Head System Verification/Area Scan (91x91x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 20.5 W/kg

System Verification/5600MHz Head System Verification/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 69.02 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 36.0 W/kg
SAR(1 g) = 8.48 W/kg; SAR(10 g) = 2.4 W/kg
Maximum value of SAR (measured) = 21.7 W/kg



0 dB = 20.5 W/kg = 13.12 dBW/kg

Body

Date: 2015-03-20

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

Input Power : 100 mW

Ambient Temp : 22.7 ℃ Tissue Temp : 22.0 ℃

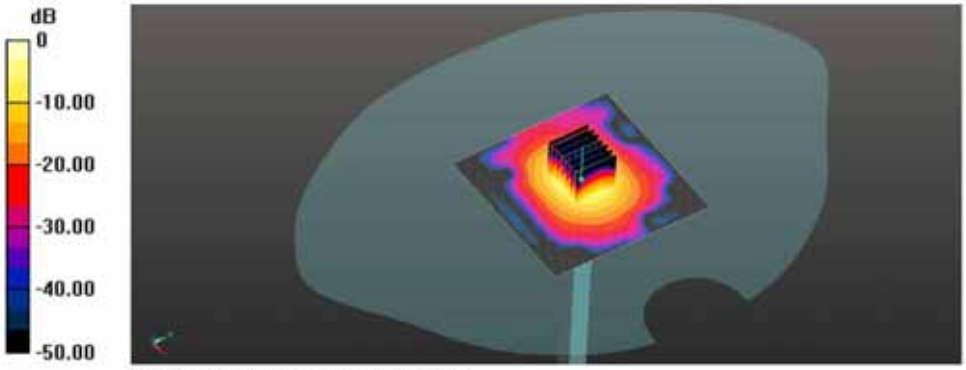
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1130

Communication System: UID 0, CW (0); Frequency: 5600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5600 MHz; σ = 5.664 S/m; ε_r = 50.456; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(3.89, 3.89, 3.89); Calibrated: 2014-09-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

System Verification/5600MHz Body System Verification/Area Scan (91x91x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 18.7 W/kg

System Verification/5600MHz Body System Verification/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 62.39 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 32.1 W/kg
SAR(1 g) = 7.99 W/kg; SAR(10 g) = 2.24 W/kg
Maximum value of SAR (measured) = 20.1 W/kg



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

Body

Date: 2015-04-13

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

Input Power : 100 mW

Ambient Temp : 22.8 ℃ Tissue Temp : 22.4 ℃

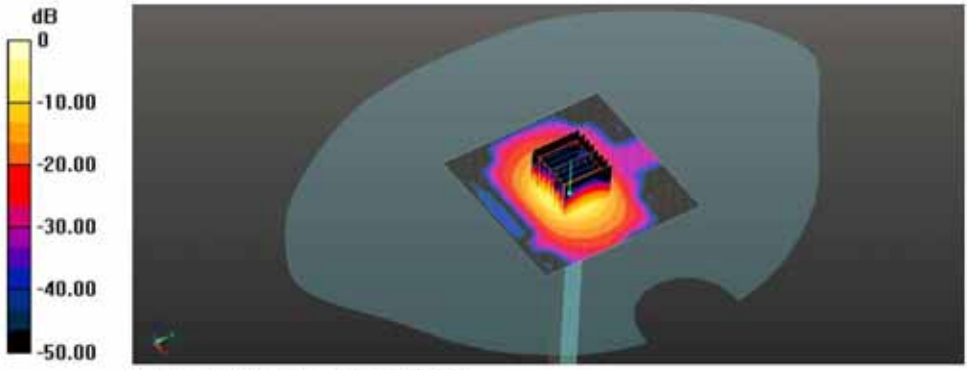
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1130

Communication System: UID 0, CW (0); Frequency: 5600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5600 MHz; σ = 5.81 S/m; ε_r = 49.115; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(3.89, 3.89, 3.89); Calibrated: 2014-09-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

System Verification/5600MHz Body System Verification/Area Scan (91x91x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 19.3 W/kg

System Verification/5600MHz Body System Verification/Zoom Scan (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 58.40 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 34.8 W/kg
SAR(1 g) = 8.33 W/kg; SAR(10 g) = 2.31 W/kg
Maximum value of SAR (measured) = 20.9 W/kg



0 dB = 19.3 W/kg = 12.86 dBW/kg

Appendix A.9 SAR Test Plots for GSM850 Band

Head SAR

Date: 2015-03-25

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: GPRS850_Right Touch_2TX_CH190.da53:0

Ambient Temp : 22.6 ℃ Tissue Temp : 22.2 ℃

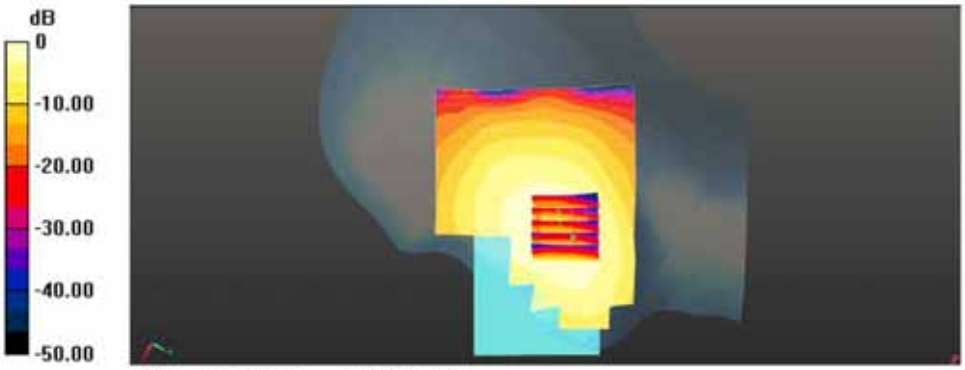
DUT: LGV32; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 359060060006583

Communication System: UID 0, GPRS850 2TX (0); Frequency: 836.6 MHz;Duty Cycle: 1:4.1505
Medium parameters used: f = 837 MHz; σ = 0.9 S/m; ε_r = 42.571; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(9.47, 9.47, 9.47); Calibrated: 2014-09-15;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Head/GPRS850_Right Touch_2TX_CH190/Area Scan (81x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.762 W/kg

Head/GPRS850_Right Touch_2TX_CH190/Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.779 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.826 W/kg
SAR(1 g) = 0.663 W/kg; SAR(10 g) = 0.512 W/kg
Maximum value of SAR (measured) = 0.749 W/kg



0 dB = 0.762 W/kg = -1.18 dBW/kg

Body-Worn SAR

Date: 2015-04-13

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: PCS1900_Front_CH661.da53:0

Ambient Temp : 22.8 ℃ Tissue Temp : 22.2 ℃

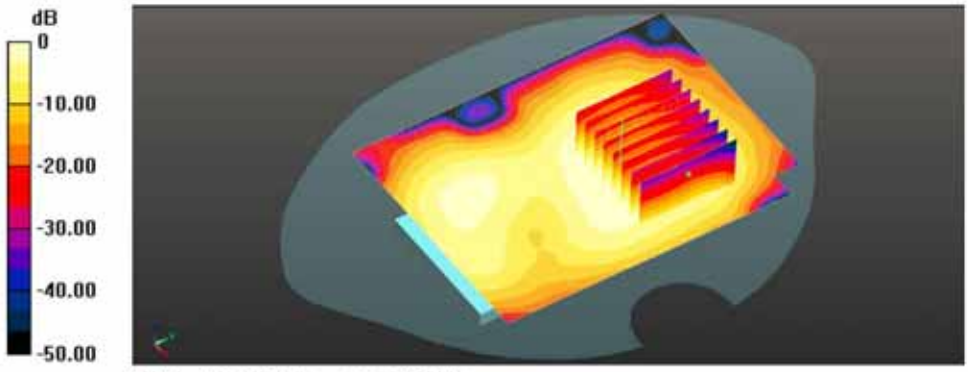
DUT: LGV32; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 359060060006583

Communication System: UID 0, PCS1900 (0); Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; σ = 1.532 S/m; ε_r = 53.543; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3791; ConvF(7.04, 7.04, 7.04); Calibrated: 2014-05-21;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Body/PCS1900_Front_CH661/Area Scan (91x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.243 W/kg

Body/PCS1900_Front_CH661/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.565 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.289 W/kg
SAR(1 g) = 0.196 W/kg; SAR(10 g) = 0.133 W/kg
Maximum value of SAR (measured) = 0.242 W/kg



0 dB = 0.243 W/kg = -6.14 dBW/kg

Hotspot SAR

Date: 2015-03-25

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: GPRS850_Front_2TX_CH190.da53:0

Ambient Temp : 22.6 ℃ Tissue Temp : 22.2 ℃

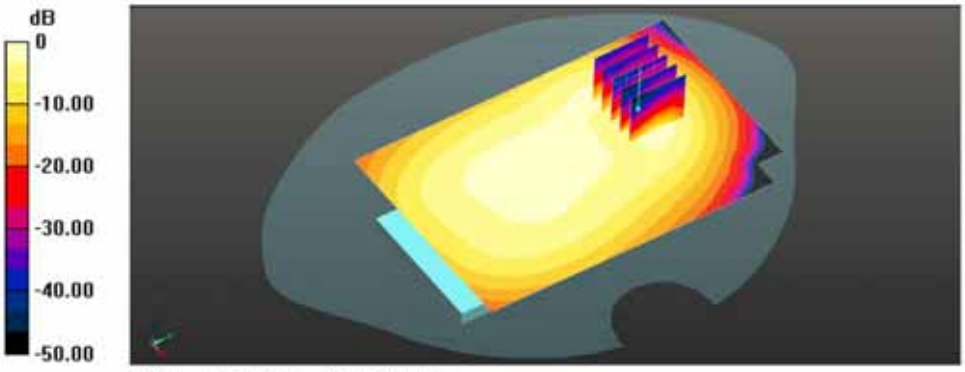
DUT: LGV32; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 359060060006583

Communication System: UID 0, GPRS850 2TX (0); Frequency: 836.6 MHz;Duty Cycle: 1:4.1505
Medium parameters used: f = 837 MHz; σ = 0.993 S/m; ε_r = 55.913; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(9.54, 9.54, 9.54); Calibrated: 2014-09-15;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Body/GPRS850_Front_2TX_CH190/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.17 W/kg

Body/GPRS850_Front_2TX_CH190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.17 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.84 W/kg
SAR(1 g) = 1.06 W/kg; SAR(10 g) = 0.605 W/kg
Maximum value of SAR (measured) = 1.45 W/kg



0 dB = 1.17 W/kg = 0.68 dBW/kg

Appendix A.10 SAR Test Plots for GSM1900 Band

Head SAR

Date: 2015-03-26

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: GPRS1900_Left Touch_2TX_CH661.da53:0

Ambient Temp : 22.4 ℃ Tissue Temp : 21.9 ℃

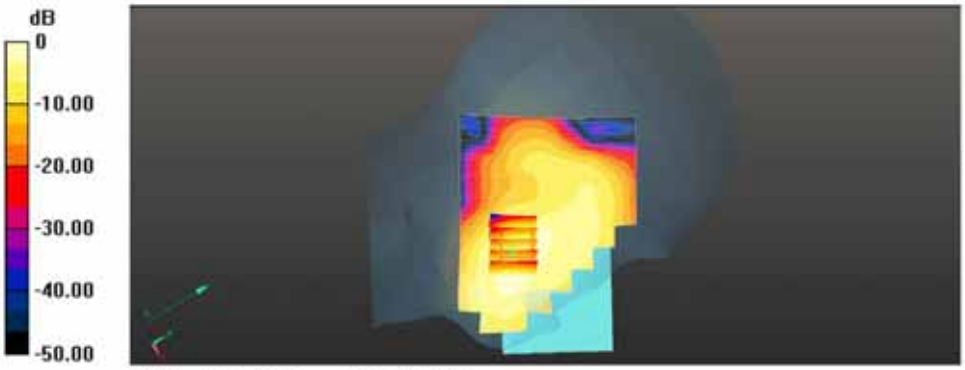
DUT: LGV32; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 359060060006583

Communication System: UID 0, GPRS1900 2TX (0); Frequency: 1880 MHz;Duty Cycle: 1:4.1505
Medium parameters used: f = 1880 MHz; σ = 1.368 S/m; ε_r = 40.31; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(7.99, 7.99, 7.99); Calibrated: 2014-09-15;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Head/GPRS1900_Left Touch_2TX_CH661/Area Scan (81x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.473 W/kg

Head/GPRS1900_Left Touch_2TX_CH661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.915 V/m; Power Drift = 0.20 dB
Peak SAR (extrapolated) = 0.512 W/kg
SAR(1 g) = 0.352 W/kg; SAR(10 g) = 0.227 W/kg
Maximum value of SAR (measured) = 0.437 W/kg



0 dB = 0.473 W/kg = -3.25 dBW/kg

Body-Worn SAR

Date: 2015-04-13

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: PCS1900_Front_CH661.da53:0

Ambient Temp : 22.8 ℃ Tissue Temp : 22.2 ℃

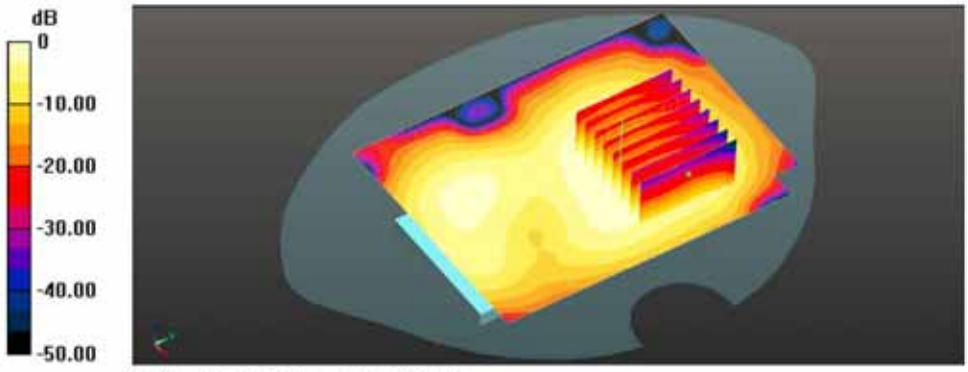
DUT: LGV32; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 359060060006583

Communication System: UID 0, PCS1900 (0); Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; σ = 1.532 S/m; ε_r = 53.543; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3791; ConvF(7.04, 7.04, 7.04); Calibrated: 2014-05-21;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Body/PCS1900_Front_CH661/Area Scan (91x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.243 W/kg

Body/PCS1900_Front_CH661/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.565 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.289 W/kg
SAR(1 g) = 0.196 W/kg; SAR(10 g) = 0.133 W/kg
Maximum value of SAR (measured) = 0.242 W/kg



0 dB = 0.243 W/kg = -6.14 dBW/kg

Hotspot SAR

Date: 2015-03-26

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: GPRS1900_Left Edge_2TX_CH661.da53:0

Ambient Temp : 22.4 ℃ Tissue Temp : 21.9 ℃

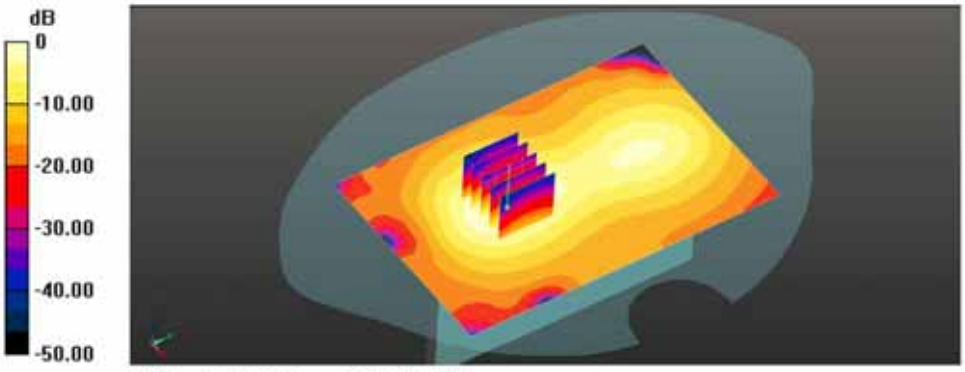
DUT: LGV32; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 359060060006583

Communication System: UID 0, GPRS1900 2TX (0); Frequency: 1880 MHz;Duty Cycle: 1:4.1505
Medium parameters used: f = 1880 MHz; σ = 1.493 S/m; ε_r = 55.342; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(7.61, 7.61, 7.61); Calibrated: 2014-09-15;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Body/GPRS1900_Left Edge_2TX_CH661/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.494 W/kg

Body/GPRS1900_Left Edge_2TX_CH661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.69 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.578 W/kg
SAR(1 g) = 0.368 W/kg; SAR(10 g) = 0.223 W/kg
Maximum value of SAR (measured) = 0.482 W/kg



0 dB = 0.494 W/kg = -3.06 dBW/kg

Appendix A.11 SAR Test Plots for WCDMA850 Band

Head SAR

Date: 2015-03-25

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

Ambient Temp : 22.6 ℃ Tissue Temp : 22.2 ℃

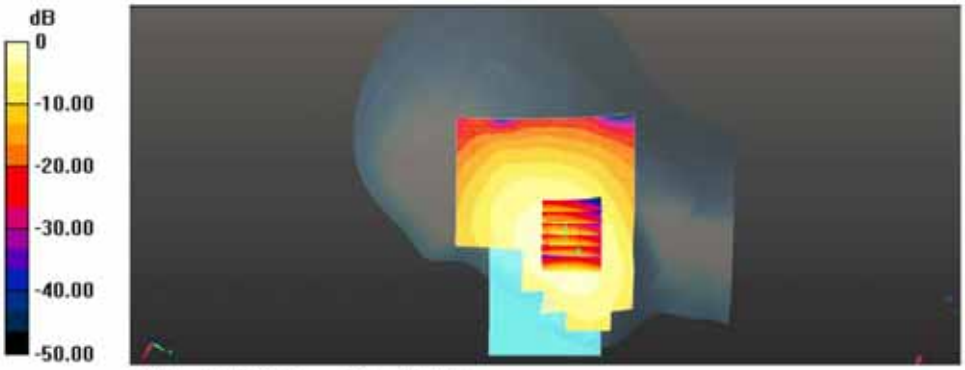
DUT: LGV32; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 359060060006583

Communication System: UID 0, WCDMA5 (0); Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.9 S/m; ε_r = 42.571; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(9.47, 9.47, 9.47); Calibrated: 2014-09-15;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Head/WCDMA 5_Right Touch_CH4183/Area Scan (81x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.489 W/kg

Head/WCDMA 5_Right Touch_CH4183/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.027 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 0.540 W/kg
SAR(1 g) = 0.436 W/kg; SAR(10 g) = 0.335 W/kg
Maximum value of SAR (measured) = 0.490 W/kg



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

Body-Worn and Hotspot SAR

Date: 2015-03-25

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WCDMA 5_Front_CH4183.da53:0

Ambient Temp : 22.6 ℃ Tissue Temp : 22.2 ℃

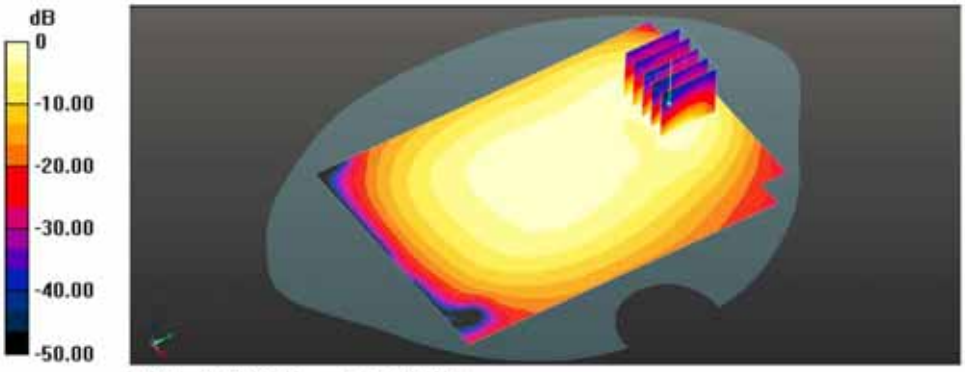
DUT: LGV32; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 359060060006583

Communication System: UID 0, WCDMA5 (0); Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.993 S/m; ε_r = 55.913; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(9.54, 9.54, 9.54); Calibrated: 2014-09-15;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Body/WCDMA 5_Front_CH4183/Area Scan (91x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.678 W/kg

Body/WCDMA 5_Front_CH4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.93 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.936 W/kg
SAR(1 g) = 0.548 W/kg; SAR(10 g) = 0.315 W/kg
Maximum value of SAR (measured) = 0.748 W/kg



0 dB = 0.678 W/kg = -1.69 dBW/kg

Appendix A.12 SAR Test Plots for LTE Band 5

Head SAR

Date: 2015-03-24

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: LTE Band 5_10MHz_1RB_0 Offset_QPSK_Right Touch_CH20525.da53:0

Ambient Temp : 22.5 ℃ Tissue Temp : 22.1 ℃

DUT: LGV32; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 359060060006583

Communication System: UID 0, LTE Band 5 (0); Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.5 MHz; σ = 0.887 S/m; ε_r = 42.089; ρ = 1000 kg/m^3
Phantom section: Right Section

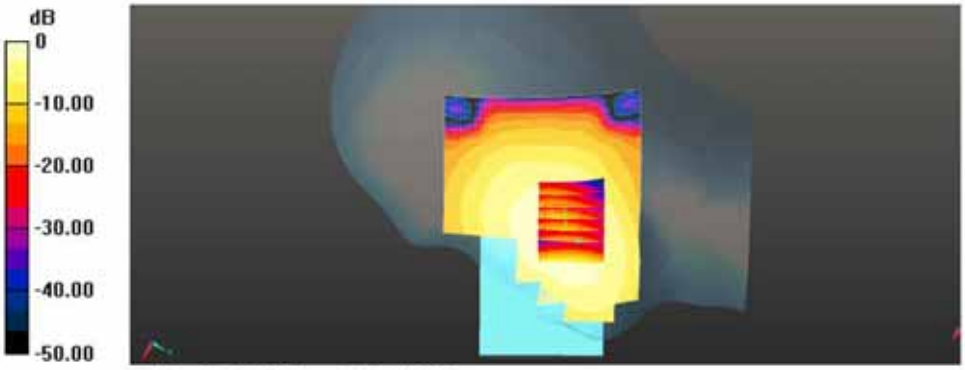
DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(9.47, 9.47, 9.47); Calibrated: 2014-09-15;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Head/LTE Band 5_10MHz_1RB_0 Offset_QPSK_Right Touch_CH20525/Area Scan (81x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.426 W/kg

Head/LTE Band 5_10MHz_1RB_0 Offset_QPSK_Right Touch_CH20525/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.897 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.458 W/kg
SAR(1 g) = 0.370 W/kg; SAR(10 g) = 0.285 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.418 W/kg



0 dB = 0.426 W/kg = -3.71 dBW/kg

Body-Worn and Hotspot SAR

Date: 2015-03-24

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: LTE Band 5_10MHz_1RB_0 Offset_QPSK_Front_CH20525.da53:0

Ambient Temp : 22.5 ℃ Tissue Temp : 22.1 ℃

DUT: LGV32; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 359060060006583

Communication System: UID 0, LTE Band 5 (0); Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.5 MHz; σ = 0.953 S/m; ε_r = 54.754; ρ = 1000 kg/m^3
Phantom section: Flat Section

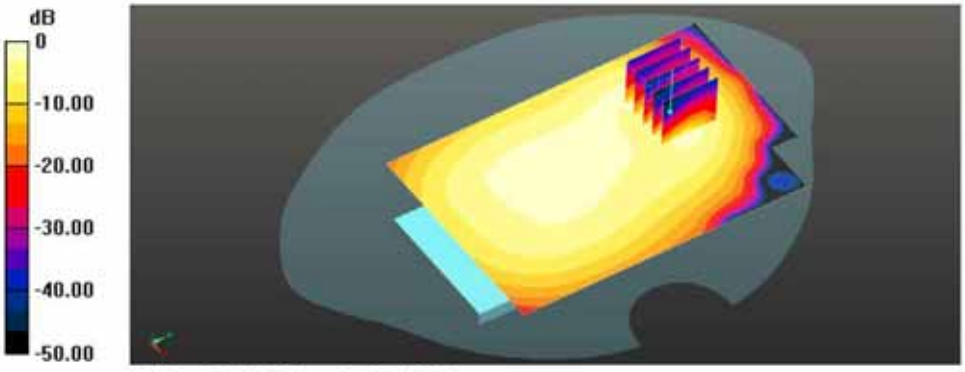
DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(9.54, 9.54, 9.54); Calibrated: 2014-09-15;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Body/LTE Band 5_10MHz_1RB_0 Offset_QPSK_Front_CH20525/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.710 W/kg

Body/LTE Band 5_10MHz_1RB_0 Offset_QPSK_Front_CH20525/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.50 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.902 W/kg
SAR(1 g) = 0.516 W/kg; SAR(10 g) = 0.290 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.726 W/kg



0 dB = 0.710 W/kg = -1.49 dBW/kg

Appendix A.13 SAR Test Plots for LTE Band 17

Head SAR

Date: 2015-03-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: LTE Band 17_10MHz_1RB_0 Offset_QPSK_Right Touch_CH23790.da53:0

Ambient Temp : 22.7 ℃ Tissue Temp : 22.3 ℃

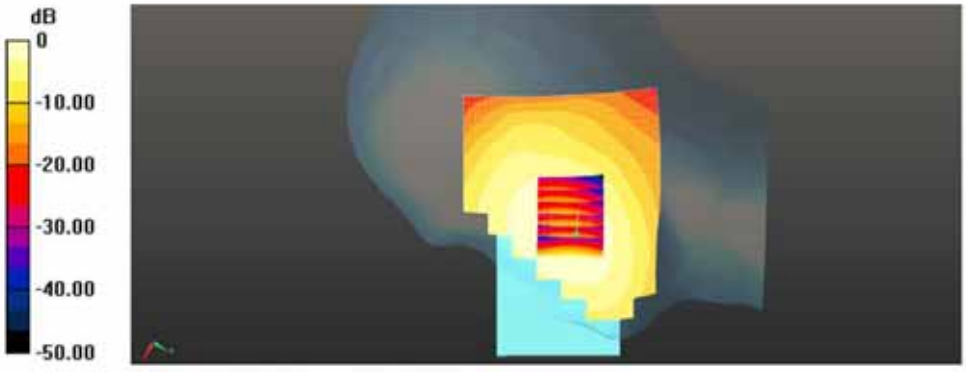
DUT: LGV32; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 359060060006583

Communication System: UID 0, LTE Band 17 (0); Frequency: 710 MHz;Duty Cycle: 1:1
Medium parameters used: f = 710 MHz; σ = 0.878 S/m; ε_r = 43.521; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY52 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.52, 6.52, 6.52); Calibrated: 2015-02-24;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Head/LTE Band 17_10MHz_1RB_0 Offset_QPSK_Right Touch_CH23790/Area Scan (81x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.251 W/kg

Head/LTE Band 17_10MHz_1RB_0 Offset_QPSK_Right Touch_CH23790/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.172 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.291 W/kg
SAR(1 g) = 0.241 W/kg; SAR(10 g) = 0.188 W/kg
Maximum value of SAR (measured) = 0.249 W/kg



0 dB = 0.251 W/kg = -6.00 dBW/kg

Body-Worn and Hotspot SAR

Date: 2015-03-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: LTE Band 17_10MHz_1RB_0 Offset_QPSK_Front_CH23790.da53:0

Ambient Temp : 22.7 ℃ Tissue Temp : 22.3 ℃

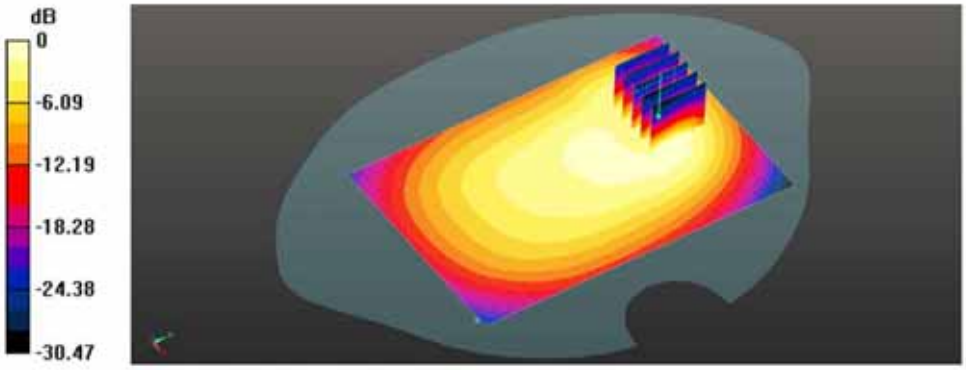
DUT: LGV32; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 359060060006583

Communication System: UID 0, LTE Band 17 (0); Frequency: 710 MHz;Duty Cycle: 1:1
Medium parameters used: f = 710 MHz; σ = 0.942 S/m; ε_r = 56.384; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.02, 6.02, 6.02); Calibrated: 2015-02-24;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Body/LTE Band 17_10MHz_1RB_0 Offset_QPSK_Front_CH23790/Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.471 W/kg

Body/LTE Band 17_10MHz_1RB_0 Offset_QPSK_Front_CH23790/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.37 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.745 W/kg
SAR(1 g) = 0.421 W/kg; SAR(10 g) = 0.243 W/kg
Maximum value of SAR (measured) = 0.472 W/kg



0 dB = 0.471 W/kg = -3.27 dBW/kg

Appendix A.14 SAR Test Plots for LTE Band 41

Head SAR

Date: 2015-03-29

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: LTE Band 41_20MHz_1RB_0 Offset_QPSK_Left Touch_CH40620.da53:0

Ambient Temp : 22.2 ℃ Tissue Temp : 21.7 ℃

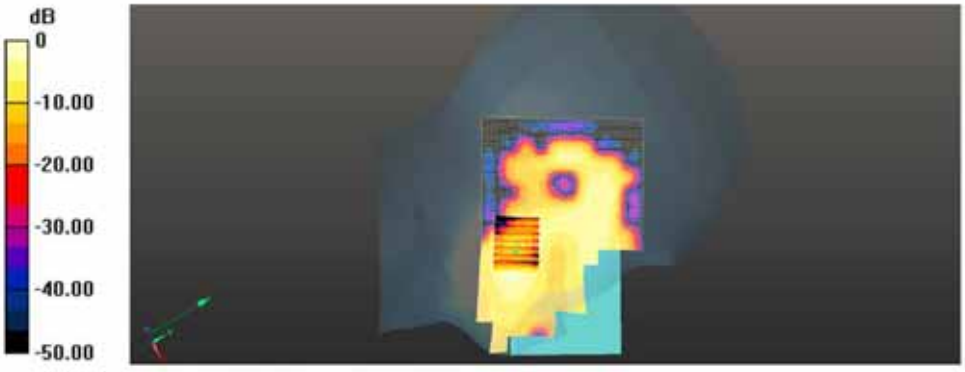
DUT: LGV32; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 359060060006583

Communication System: UID 0, LTE Band 41 (0); Frequency: 2593 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2593 MHz; σ = 1.979 S/m; ε_r = 38.974; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3791; ConvF(6.41, 6.41, 6.41); Calibrated: 2014-05-21;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Head/LTE Band 41_20MHz_1RB_0 Offset_QPSK_Left Touch_CH40620/Area Scan (111x161x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.207 W/kg

Head/LTE Band 41_20MHz_1RB_0 Offset_QPSK_Left Touch_CH40620/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.344 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 0.261 W/kg
SAR(1 g) = 0.139 W/kg; SAR(10 g) = 0.067 W/kg
Maximum value of SAR (measured) = 0.199 W/kg



0 dB = 0.207 W/kg = -6.84 dBW/kg

Body-Worn and Hotspot SAR

Date: 2015-03-29

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: LTE Band 41_20MHz_1RB_0 Offset_QPSK_Rear_CH40620.da53:0

Ambient Temp : 22.2 ℃ Tissue Temp : 21.7 ℃

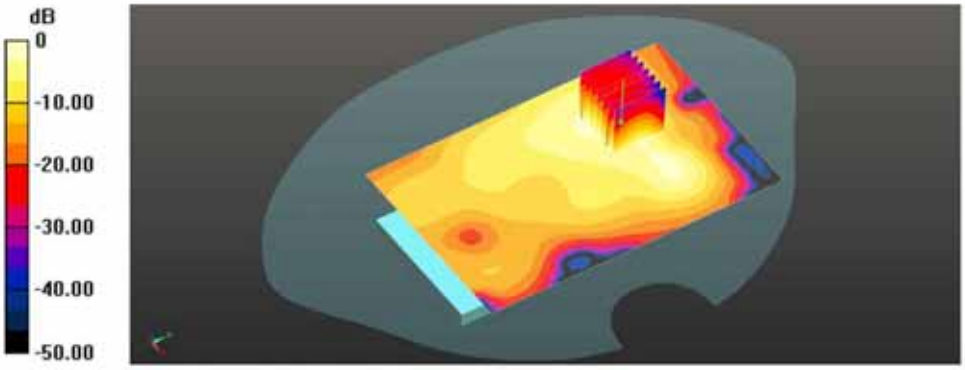
DUT: LGV32; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 359060060006583

Communication System: UID 0, LTE Band 41 (0); Frequency: 2593 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2593 MHz; σ = 2.172 S/m; ε_r = 51.773; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3791; ConvF(6.36, 6.36, 6.36); Calibrated: 2014-05-21;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Body/LTE Band 41_20MHz_1RB_0 Offset_QPSK_Rear_CH40620/Area Scan (111x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.948 W/kg

Body/LTE Band 41_20MHz_1RB_0 Offset_QPSK_Rear_CH40620/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.617 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 1.28 W/kg
SAR(1 g) = 0.636 W/kg; SAR(10 g) = 0.309 W/kg
Maximum value of SAR (measured) = 0.951 W/kg



0 dB = 0.948 W/kg = -0.23 dBW/kg

Appendix A.15 SAR Test Plots for WLAN 2.4 GHz Band

Head SAR

Date: 2015-03-18

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WLAN_802.11b_1Mbps_Right Touch_CH6.da53:0

Ambient Temp : 22.6 ℃ Tissue Temp : 22.3 ℃

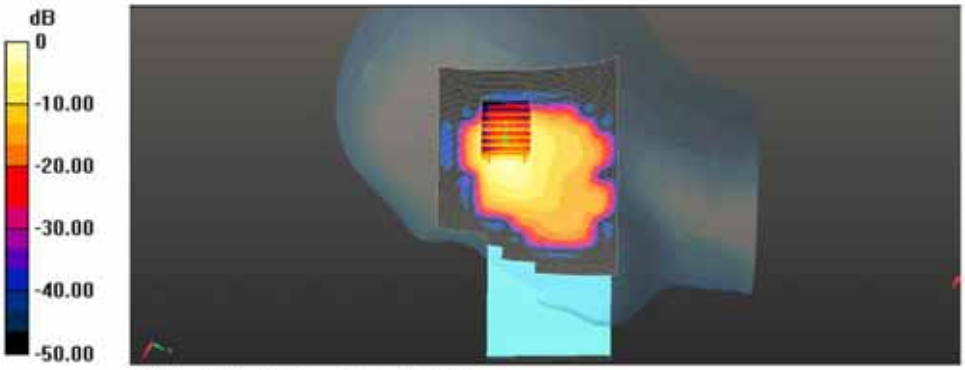
DUT: LGV32; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 359060060006583

Communication System: UID 0, WLAN 2.45GHz (0); Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.839 S/m; ε_r = 37.575; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(7.24, 7.24, 7.24); Calibrated: 2014-09-15;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Head/WLAN_802.11b_1Mbps_Right Touch_CH6/Area Scan (111x141x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.774 W/kg

Head/WLAN_802.11b_1Mbps_Right Touch_CH6/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.336 V/m; Power Drift = 0.20 dB
Peak SAR (extrapolated) = 0.997 W/kg
SAR(1 g) = 0.470 W/kg; SAR(10 g) = 0.206 W/kg
Maximum value of SAR (measured) = 0.704 W/kg



0 dB = 0.774 W/kg = -1.11 dBW/kg

Body-Worn and Hotspot SAR

Date: 2015-03-18

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WLAN_802.11b_1Mbps_Front_CH6.da53:0

Ambient Temp : 22.6 ℃ Tissue Temp : 22.4 ℃

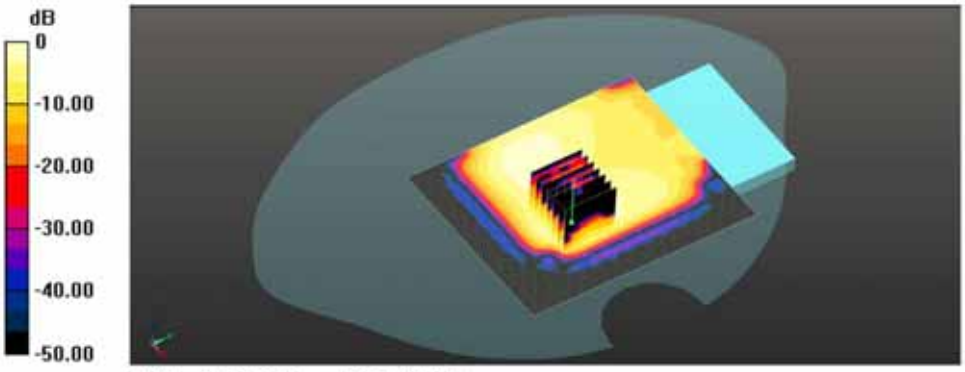
DUT: LGV32; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 359060060006583

Communication System: UID 0, WLAN 2.45GHz (0); Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.948 S/m; ε_r = 52.659; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(7.21, 7.21, 7.21); Calibrated: 2014-09-15;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Body/WLAN_802.11b_1Mbps_Front_CH6/Area Scan (111x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.121 W/kg

Body/WLAN_802.11b_1Mbps_Front_CH6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.726 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.161 W/kg
SAR(1 g) = 0.080 W/kg; SAR(10 g) = 0.038 W/kg
Maximum value of SAR (measured) = 0.118 W/kg



0 dB = 0.121 W/kg = -9.17 dBW/kg

Appendix A.16 SAR Test Plots for WLAN 5.2 GHz Band

Head SAR

Date: 2015-03-19

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WLAN_802.11a_6Mbps_Right Touch_CH36.da53:0

Ambient Temp : 22.8 ℃ Tissue Temp : 22.4 ℃

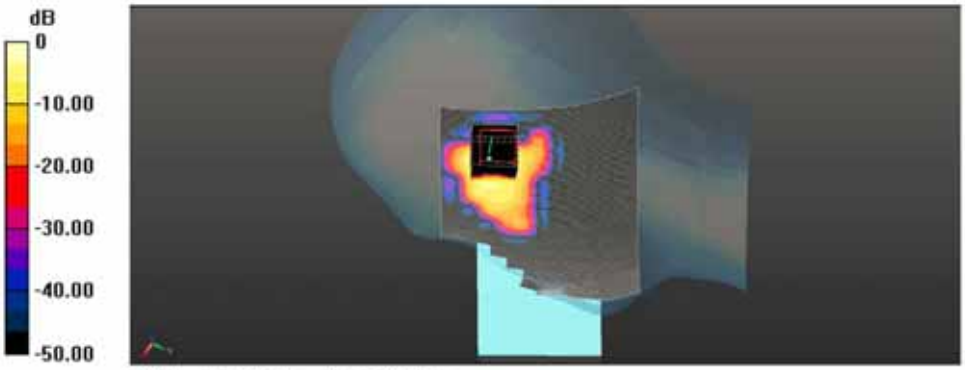
DUT: LGV32; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 359060060006583

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5180 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5180 MHz; σ = 4.469 S/m; ε_r = 37.24; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(5.43, 5.43, 5.43); Calibrated: 2014-09-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Head/WLAN_802.11a_6Mbps_Right Touch_CH36/Area Scan (121x151x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.12 W/kg

Head/WLAN_802.11a_6Mbps_Right Touch_CH36/Zoom Scan (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 2.875 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.64 W/kg
SAR(1 g) = 0.381 W/kg; SAR(10 g) = 0.121 W/kg
Maximum value of SAR (measured) = 0.946 W/kg



0 dB = 1.12 W/kg = 0.49 dBW/kg

Body-Worn SAR

Date: 2015-04-13

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WLAN_802.11a_6Mbps_Front_CH36.da53:0

Ambient Temp : 22.8 ℃ Tissue Temp : 22.4 ℃

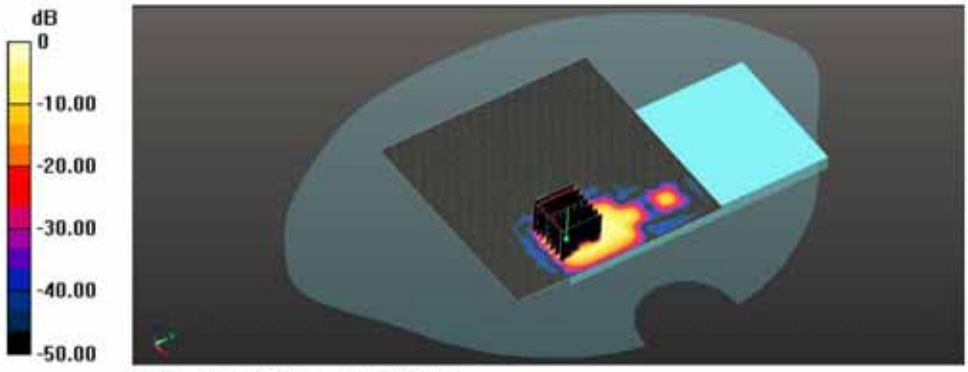
DUT: LGV32; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 359060060006583

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5180 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5180 MHz; σ = 5.33 S/m; ε_r = 48.877; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.49, 4.49, 4.49); Calibrated: 2014-09-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Body/WLAN_802.11a_6Mbps_Front_CH36/Area Scan (121x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.218 W/kg

Body/WLAN_802.11a_6Mbps_Front_CH36/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 2.128 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.349 W/kg
SAR(1 g) = 0.040 W/kg; SAR(10 g) = 0.013 W/kg
Maximum value of SAR (measured) = 0.131 W/kg



0 dB = 0.218 W/kg = -6.62 dBW/kg

Appendix A.17 SAR Test Plots for WLAN 5.3 GHz Band

Head SAR

Date: 2015-03-19

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WLAN_802.11a_6Mbps_Right Touch_CH56.da53:0

Ambient Temp : 22.8 ℃ Tissue Temp : 22.4 ℃

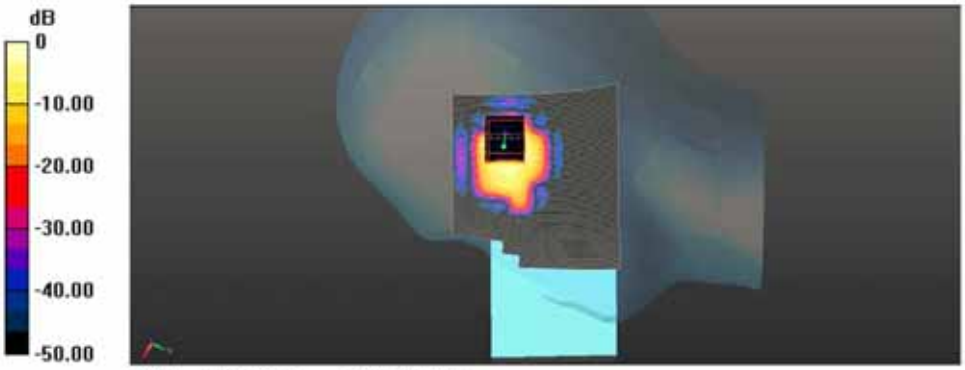
DUT: LGV32; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 359060060006583

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5280 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5280 MHz; σ = 4.54 S/m; ε_r = 36.839; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(5.24, 5.24, 5.24); Calibrated: 2014-09-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Head/WLAN_802.11a_6Mbps_Right Touch_CH56/Area Scan (101x121x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.999 W/kg

Head/WLAN_802.11a_6Mbps_Right Touch_CH56/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 1.307 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.53 W/kg
SAR(1 g) = 0.298 W/kg; SAR(10 g) = 0.088 W/kg
Maximum value of SAR (measured) = 0.751 W/kg



0 dB = 0.999 W/kg = -0.00 dBW/kg

Body-Worn SAR

Date: 2015-04-13

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WLAN_802.11a_6Mbps_Front_CH56.da53:0

Ambient Temp : 22.8 ℃ Tissue Temp : 22.4 ℃

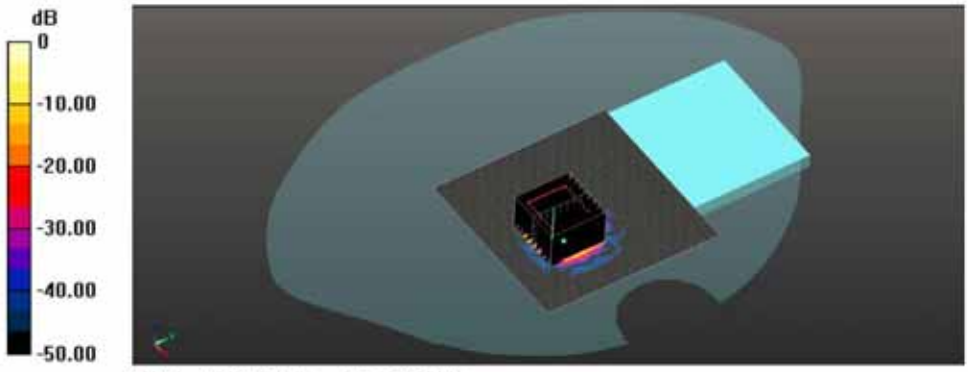
DUT: LGV32; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 359060060006583

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5280 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5280 MHz; σ = 5.453 S/m; ε_r = 48.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.31, 4.31, 4.31); Calibrated: 2014-09-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Body/WLAN_802.11a_6Mbps_Front_CH56/Area Scan (101x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.168 W/kg

Body/WLAN_802.11a_6Mbps_Front_CH56/Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 2.001 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.491 W/kg
SAR(1 g) = 0.033 W/kg; SAR(10 g) = 0.010 W/kg
Maximum value of SAR (measured) = 0.0990 W/kg



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

Appendix A.18 SAR Test Plots for WLAN 5.6 GHz Band

Head SAR

Date: 2015-03-20

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WLAN_802.11a_6Mbps_Right Touch_CH116.da53:0

Ambient Temp : 22.7 ℃ Tissue Temp : 22.3 ℃

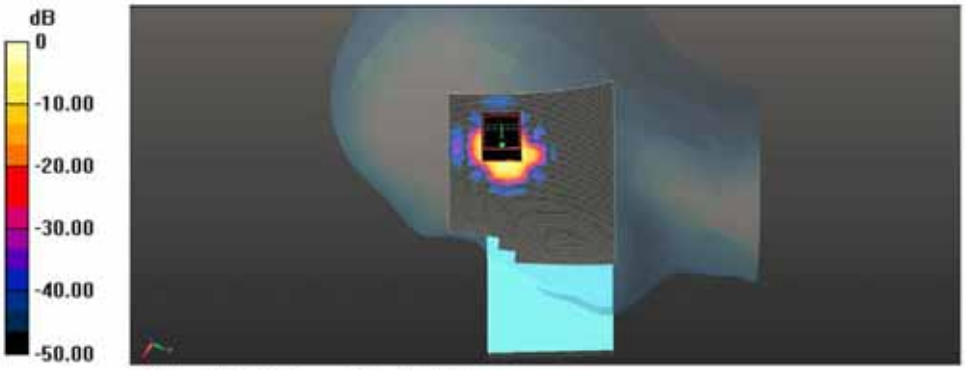
DUT: LGV32; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 359060060006583

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5580 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5580 MHz; σ = 5.171 S/m; ε_r = 36.984; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(4.7, 4.7, 4.7); Calibrated: 2014-09-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1721
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Head/WLAN_802.11a_6Mbps_Right Touch_CH116/Area Scan (101x121x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.524 W/kg

Head/WLAN_802.11a_6Mbps_Right Touch_CH116/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 0.6820 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.580 W/kg
SAR(1 g) = 0.119 W/kg; SAR(10 g) = 0.033 W/kg
Maximum value of SAR (measured) = 0.356 W/kg



0 dB = 0.524 W/kg = -2.81 dBW/kg

Body-Worn SAR

Date: 2015-03-20

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WLAN_802.11a_6Mbps_Rear_CH116.da53:0

Ambient Temp : 22.7 ℃ Tissue Temp : 22.0 ℃

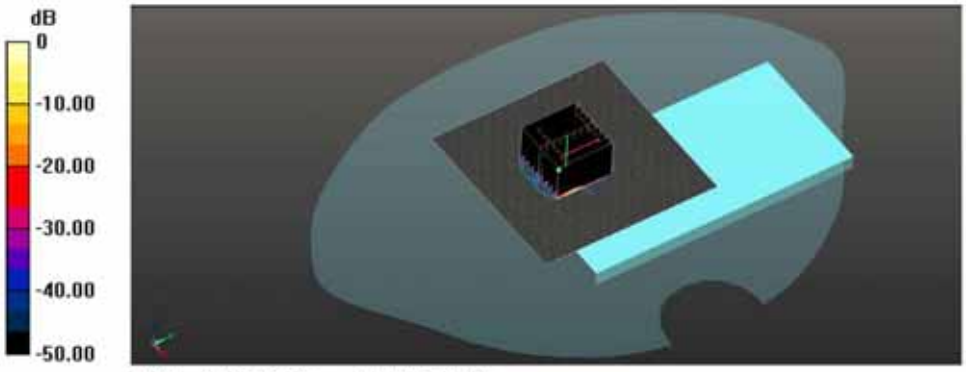
DUT: LGV32; Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA and LTE Phone with Bluetooth, WLAN and RFID; Serial: 359060060006583

Communication System: UID 0, 5GHz WLAN (0); Frequency: 5580 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5580 MHz; σ = 5.633 S/m; ε_r = 50.506; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN3862; ConvF(3.89, 3.89, 3.89); Calibrated: 2014-09-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1340; Calibrated: 2014-05-19
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.8.8(1222)SEMCAD X 14.6.10(7331)

Body/WLAN_802.11a_6Mbps_Rear_CH116/Area Scan (101x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.0362 W/kg

Body/WLAN_802.11a_6Mbps_Rear_CH116/Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 1.676 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.235 W/kg
SAR(1 g) = 0.010 W/kg; SAR(10 g) = 0.00135 W/kg
Maximum value of SAR (measured) = 0.0380 W/kg



0 dB = 0.0362 W/kg = -14.41 dBW/kg

Appendix B.1 Uncertainty Analysis DASY5 #2

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 IEEE 1528	Tol (%)	Prob . Dist.	Div.	Ci (1g)	1g ui (%)	Vi (Veff)
Probe calibration	E.2.1	6.0	N	1	1	6.00	∞
Axial isotropy	E.2.2	4.7	R	1.73	0.71	1.92	∞
Hemispherical isotropy	E.2.2	9.6	R	1.73	0.71	3.92	∞
Boundary effect	E.2.3	1.0	R	1.73	1	0.58	∞
Linearity	E.2.4	4.7	R	1.73	1	2.71	∞
System detection limit	E.2.5	0.3	R	1.73	1	0.14	∞
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	3.0	R	1.73	1	1.73	∞
RF ambient Condition - reflections	E.6.1	3.0	R	1.73	1	1.73	∞
Probe Positiones	E.6.2	1.5	R	1.73	1	0.87	∞
Probe Positioning	E.6.3	2.9	R	1.73	1	1.67	∞
Max. SAR evaluation	E.5.2	1.0	R	1.73	1	0.58	∞
Test sample positioning	E.4.2	2.8	N	1	1	2.78	9
Device holder uncertainty	E.4.1	3.6	N	1	1	3.60	4
Output power variation -SAR drift measurement	6.6.3	5.0	R	1.73	1	2.89	∞
Phantom uncertainty	E.3.1	4.0	R	1.73	1	2.31	∞
Liquid conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	1.85	∞
Liquid conductivity - measurement uncertainty	E.3.2	1.6	N	1	0.64	1.00	5
Liquid permittivity - deviation from target values	E.3.3	5.0	R	1.73	0.6	1.73	∞
Liquid permittivity - measurement uncertainty	E.3.3	1.2	N	1	0.6	0.75	4
Combined standard uncertainty				RSS		10.83	283
Expanded uncertainty				K=2		**21.66**	

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 IEEE 1528	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	1.92	∞
Hemispherical isotropy	E.2.2	9.6	R	1.73	0.71	3.92	∞
Boundary effect	E.2.3	1.0	R	1.73	1	0.58	∞
Linearity	E.2.4	4.7	R	1.73	1	2.71	∞
System detection limit	E.2.5	0.3	R	1.73	1	0.14	∞
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	3.0	R	1.73	1	1.73	∞
RF ambient Condition - reflections	E.6.1	3.0	R	1.73	1	1.73	∞
Probe Positiones	E.6.2	1.5	R	1.73	1	0.87	∞
Probe Positioning	E.6.3	2.9	R	1.73	1	1.67	∞
Max. SAR evaluation	E.5.2	1.0	R	1.73	1	0.58	∞
Test sample positioning	E.4.2	2.8	N	1	1	2.78	9
Device holder uncertainty	E.4.1	3.6	N	1	1	3.60	4
Output power variation -SAR drift measurement	6.6.3	5.0	R	1.73	1	2.89	∞
Phantom uncertainty	E.3.1	6.1	R	1.73	1	3.52	∞
Liquid conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	1.85	∞
Liquid conductivity - measurement uncertainty	E.3.2	1.6	N	1	0.64	1.00	5
Liquid permittivity - deviation from target values	E.3.3	5.0	R	1.73	0.6	1.73	∞
Liquid permittivity - measurement uncertainty	E.3.3	1.2	N	1	0.6	0.75	4
Combined standard uncertainty				RSS		11.46	355
Expanded uncertainty (95% CONFIDENCE INTERVAL)				K=2		**22.92**	