FCC SAR Test Report

Product	:	Mobile Phone
Trade mark	:	MI
Model/Type reference	:	MCG3B
Report Number	:	170817024SZN-001
Date of Issue	:	Sep. 03, 2017
FCC ID	:	2AFZZ-RMS3B
Test Standards	:	FCC 47 CFR Part 2 §2.1093 ANSI/IEEE C95.1-1992 IEEE Std 1528-2013
Test result	:	PASS

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Version

Version No.	Date	Description
V1.0	Sep. 03, 2017	Original

Contents

1 General Information

1.1 Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for the EUT are as follows:

Equipment Class	Mode	Highest Reported Head SAR_{1g} (W/kg)	Highest Reported Body-worn SAR_{1g} (1.0 cm Gap) (W/kg)	Highest Reported Hotspot SAR_{1g} (1.0 cm Gap) (W/kg)
PCE	GSM850	0.58	0.73	0.73
	GSM1900	0.70	0.67	0.67
	WCDMA II	0.99	0.88	0.88
	WCDMA V	0.37	0.55	0.55
	LTE 4	0.44	0.79	1.31
	LTE 5	0.58	0.76	0.76
	LTE 7	0.46	1.21	1.21
	LTE 38	0.18	0.46	0.46
DTS	2.4G WLAN	0.82	0.29	0.29
DSS	Bluetooth	N/A	N/A	N/A
Highest Simultaneous Transmission SAR		Head (W/kg)	Body-worn (W/kg)	Hotspot (W/kg)
PCE + DTS		1.40	1.49	1.49
PCE + DSS		1.36	1.40	N/A

1.2 EUT Description

1.2.1 General Description

Product Name	Mobile Phone
Trade mark	MI
Model No.(EUT)	MCG3B
FCC ID	2AFZZ-RMS3B
Device Dimension	Overall (Length × Width): 140.44mm ×70.14mm Overall Diagonal: 150mm Display Diagonal: 126mm
HW Version	P2.0
SW Version	MIUI8
Tx Frequency Bands (Unit: MHz)	GSM850: 824.2 ~ 848.8 GSM1900: 1850.2 ~ 1909.8 WCDMA Band II: 1852.4 ~ 1907.6 WCDMA Band V: 826.4 ~ 846.6 LTE Band 4: 1710.7 ~ 1754.3 (1.4M), 1711.5 ~ 1753.5 (3M), 1712.5 ~ 1752.5 (5M), 1715 ~ 1750 (10M), 1717.5 ~ 1747.5 (15M), 1720 ~ 1745 (20M) LTE Band 5: 824.7 ~ 848.3 (1.4M), 825.5 ~ 847.5 (3M), 826.5 ~ 846.5 (5M), 829 ~ 844 (10M) LTE Band 7: 2502.5 ~ 2567.5 (5M), 2505 ~ 2565 (10M), 2507.5 ~ 2562.5 (15M), 2510 ~ 2560 (20M) LTE Band 38: 2572.5 ~ 2617.5 (5M), 2575 ~ 2615 (10M), 2577.5 ~ 2612.5 (15M), 2580 ~ 2610 (20M) WLAN: 2412 ~ 2462 Bluetooth: 2402 ~ 2480
Device Class	B
Antenna Type	Fixed Internal Antenna
EUT Stage	Identical Prototype

1.2.2 Wireless Technologies

GSM	Voice GPRS (Multi-Slot Class: 33-4UP) EDGE (Multi-Slot Class: 33-4UP)
WCDMA	RMC HSDPA HSUPA DC-HSDPA
LTE	QPSK 16QAM VoLTE
2.4G WLAN	802.11b 802.11g 802.11n (HT20)
Bluetooth	GFSK π/4-DQPSK 8-DPSK LE
Wireless Router (Hotspot)	2.4G WLAN: Support
VOIP	Support Note: Since this device supports VOIP capability through 3rd party apps software, we have evaluated data mode for head SAR.
Dual SIM	SIM 1: GSM + WCDMA + LTE SIM 2: GSM + WCDMA + LTE Note : This device support dual SIM but they share the same antenna. Since these two SIM are used for subscriber identification only and it is not related to RF identity, only SIM1 was used for SAR testing.

1.2.3 List of Accessory

Battery 1	**Brand Name**	MI
	Model Name	BN34
	Power Rating	3.85Vdc, 2910mAh
	Type	Li-ion
	Manufacture	Sunwoda Electronic Co., Ltd.
Battery 2	**Brand Name**	MI
	Model Name	BN34
	Power Rating	3.85**Vdc,** 2910**mAh**
	Type	**Li-ion**
	Manufacture	SCUD(Fujian)Electronics Co., Ltd.

1.3 Maximum Conducted Power

The maximum conducted average power (Unit: dBm) including tune-up tolerance is shown as below.

Mode	GSM850	GSM1900
GSM (GMSK, 1Tx-slot)	34.0	30.5
GPRS (GMSK, 1Tx-slot)	34.0	30.5
GPRS (GMSK, 2Tx-slot)	33.5	29.5
GPRS (GMSK, 3Tx-slot)	31.5	27.5
GPRS (GMSK, 4Tx-slot)	30.5	26.5
EDGE (8PSK, 1Tx-slot)	27.5	27.0
EDGE (8PSK, 2Tx-slot)	27.0	26.0
EDGE (8PSK, 3Tx-slot)	26.0	25.0
EDGE (8PSK, 4Tx-slot)	25.0	23.5

Mode	WCDMA Band II	WCDMA Band V
RMC 12.2K	24.0	24.0
HSDPA	23.5	23.0
DC-HSDPA	23.5	23.0
HSUPA	23.0	23.0

Band	Mode	Maximum Conducted Power (Unit: dBm)
LTE 4	QPSK / 16QAM	23.5
LTE 5	QPSK / 16QAM	24.5
LTE 7	QPSK / 16QAM	24.0
LTE 38	QPSK / 16QAM	24.0

Mode	2.4G WLAN
802.11b	17.5
802.11g	14.5
802.11n HT20	14.5

Mode	2.4G Bluetooth
GFSK	9.5
π/4-DQPSK	8.0
8-DPSK	8.0
LE	0.5

1.4 Other Information

Sample Received Date:	Aug. 14, 2017
Sample tested Date:	Aug. 20, 2017 ~ Sep. 01, 2017

1.5 Testing Location

Intertek Testing Services Shenzhen Ltd. Longhua Branch
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Telephone: 86-755-8601 6288 Fax : 86-755-8601 6751

1.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:
CNAS-Lab Code: L0327
A2LA (Certificate Number: 4242.01)
FCC Accredited Lab.
Designation Number: CN1188
Test Firm Registration Number: 435976

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC/EN 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

1.7 Guidance Standard

The tests documented in this report were performed in accordance with FCC 47 CFR Part 2 §2.1093, IEEE Std 1528-2013, ANSI/IEEE C95.1-1992, the following FCC Published RF exposure KDB procedures:

KDB 865664 D01 v01r04
KDB 865664 D02 v01r02
KDB 248227 D01 v02r02
KDB 447498 D01 v06
KDB 648474 D04 v01r03
KDB 941225 D01 v03r01
KDB 941225 D05 v02r05
KDB 941225 D06 v02r01

The equipment have been tested by **Intertek Testing Services Shenzhen Ltd. Longhua Branch** , and found compliance with the requirement of the above standards.

2 Specific Absorption Rate (SAR)

2.1 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, by appropriate techniques, to produce specific absorption rates (SARs) as averaged over the whole-body, any 1 g or any 10 g of tissue (defined as a tissue volume in the shape of a cube). All SAR values are to be averaged over any six-minute period. When portable device was used within 20 cm of the user's body, SAR evaluation of the device will be required. The SAR limit in chapter 2.3.

2.2 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:

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

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

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

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength.

2.3 SAR Limits

(A) Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

(B) Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

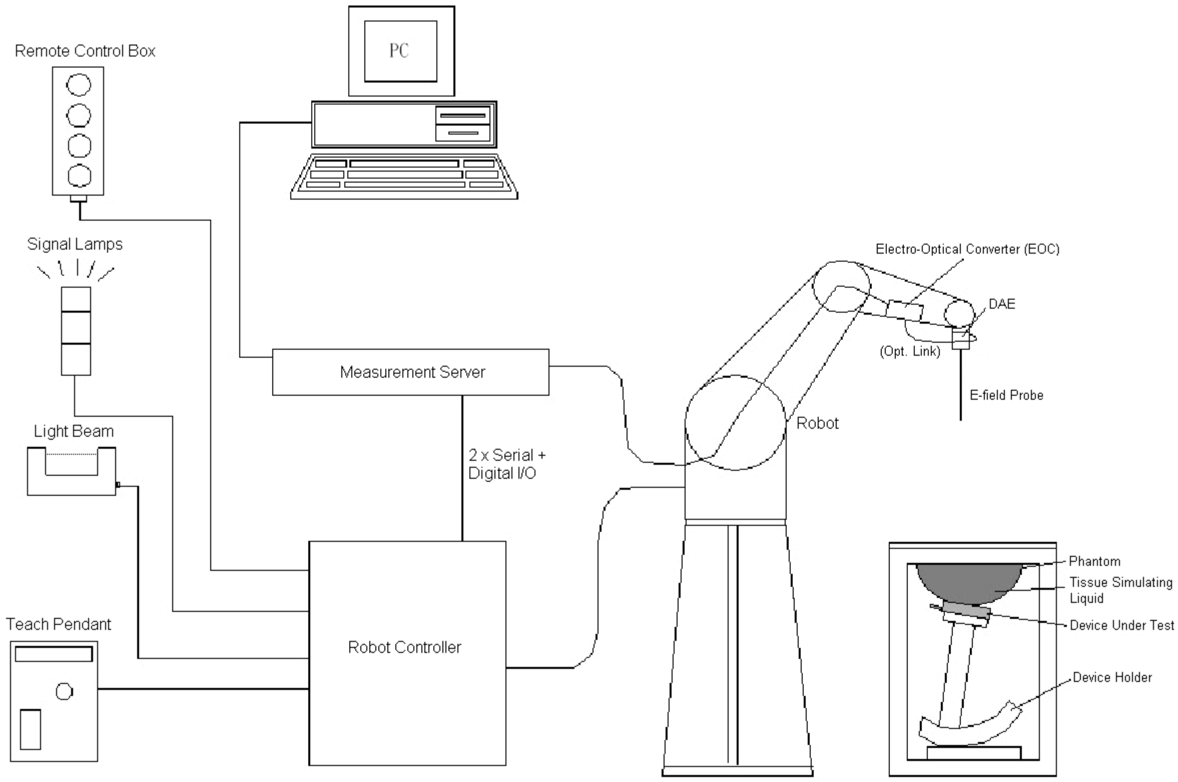
Note:

1. Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1 gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.
2. At frequencies above 6.0 GHz, SAR limits are not applicable and MPE limits for power density should be applied at 5 cm or more from the transmitting device.
3. The SAR limit is specified in FCC 47 CFR Part 2 §2.1093, ANSI/IEEE C95.1-1992.

3 SAR Measurement System

3.1 SPEAG DASY System

DASY system consists of high precision robot, probe alignment sensor, phantom, robot controller, controlled measurement server and near-field probe. The robot includes six axes that can move to the precision position of the DASY5 software defined. The DASY software can define the area that is detected by the probe. The robot is connected to controlled box. Controlled measurement server is connected to the controlled robot box. The DAE includes amplifier, signal multiplexing, AD converter, offset measurement and surface detection. It is connected to the Electro-optical coupler (ECO). The ECO performs the conversion form the optical into digital electric signal of the DAE and transfers data to the PC.



DASY Measurement System

3.1.1 Robot

The DASY system uses the high precision robots from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY5: CS8c) from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability ±0.035 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)

3.1.2 Probe

The SAR measurement is conducted with the dosimetric probe. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency.

Model	EX3DV4
Construction	Symmetrical design with triangular core. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE).
Frequency	10 MHz to 6 GHz Linearity: ± 0.2 dB
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 μW/g to 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μW/g)
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm

Model	ES3DV3
Construction	Symmetrical design with triangular core. Interleaved sensors. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE).
Frequency	10 MHz to 4 GHz Linearity: ± 0.2 dB
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in tissue material (rotation normal to probe axis)
Dynamic Range	5 μW/g to 100 mW/g Linearity: ± 0.2 dB
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm

3.1.3 Data Acquisition Electronics (DAE)

Model	DAE3, DAE4
Construction	Signal amplifier, multiplexer, A/D converter and control logic. Serial optical link for communication with DASY embedded system (fully remote controlled). Two step probe touch detector for mechanical surface detection and emergency robot stop.
Measurement Range	-100 to +300 mV (16 bit resolution and two range settings: 4mV, 400mV)
Input Offset Voltage	< 5μV (with auto zero)
Input Bias Current	< 50 fA
Dimensions	60 x 60 x 68 mm

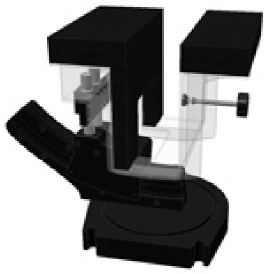
3.1.4 Phantom

Model	Twin SAM	
Construction	The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. 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 evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.	
Material	Vinylester, glass fiber reinforced (VE-GF)	
Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)	
Dimensions	Length: 1000 mm Width: 500 mm Height: adjustable feet	
Filling Volume	approx. 25 liters	

Model	ELI	
Construction	Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.	
Material	Vinylester, glass fiber reinforced (VE-GF)	
Shell Thickness	2.0 ± 0.2 mm (bottom plate)	
Dimensions	Major axis: 600 mm Minor axis: 400 mm	
Filling Volume	approx. 30 liters	

3.1.5 Device Holder

Model	Mounting Device	
Construction	In combination with the Twin SAM Phantom or ELI4, the Mounting Device enables the rotation of the mounted transmitter device in spherical coordinates. Rotation point is the ear opening point. Transmitter devices can be easily and accurately positioned according to IEC, IEEE, FCC or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat).	
Material	POM	

Model	Laptop Extensions Kit	
Construction	Simple but effective and easy-to-use extension for Mounting Device that facilitates the testing of larger devices according to IEC 62209-2 (e.g., laptops, cameras, etc.). It is lightweight and fits easily on the upper part of the Mounting Device in place of the phone positioner.	
Material	POM, Acrylic glass, Foam	

3.1.6 System Validation Dipoles

Model	D-Serial	
Construction	Symmetrical dipole with l/4 balun. Enables measurement of feed point impedance with NWA. Matched for use near flat phantoms filled with tissue simulating solutions.	
Frequency	750 MHz to 5800 MHz	
Return Loss	> 20 dB	
Power Capability	> 100 W (f < 1GHz), > 40 W (f > 1GHz)	

3.2 SAR Scan Procedure

3.2.1 SAR Reference Measurement (drift)

Prior to the SAR test, local SAR shall be measured at a stationary reference point where the SAR exceeds the lower detection limit of the measurement system.

3.2.2 Area Scan

Measurement procedures for evaluating the SAR of wireless device start with a coarse measurement grid to determine the approximate location of the local peak SAR values. This is known as the area-scan procedure. All antennas and radiating structures that may contribute to the measured SAR or influence the SAR distribution must be included in the area scan. The area scan measurement resolution must enable the extrapolation algorithms of the SAR system to correctly identify the peak SAR location(s) for subsequent zoom scan measurements to correctly determine the 1-g SAR. Area scans are performed at a constant distance from the phantom surface, determined by the measurement frequencies. When a measured peak is closer than ½ the zoom scan volume dimension (x, y) from the edge of the area scan region, unless the entire peak and gram-averaging volume are both captured within the zoom scan volume, the area scan must be repeated by shifting and expanding the area scan region to ensure all peaks are away from the area scan boundary. The area scan resolutions specified in the table below must be applied to the SAR measurements.

<table>
<tr><th></th><th>≤ 3 GHz</th><th>> 3 GHz</th></tr>
<tr><td>Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 mm ± 1 mm</td><td>½·δ·ln(2) mm ± 0.5 mm</td></tr>
<tr><td>Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
</table>

3.2.3 Zoom Scan

To evaluate the peak spatial-average SAR values with respect to 1 g or 10 g cubes, fine resolution volume scans, called zoom scans, are performed at the peak SAR locations identified during the area scan. If the cube volume within the zoom scan chosen to calculate the peak spatial-average SAR touches any boundary of the zoom-scan volume, the zoom scan shall be repeated with the center of the zoom-scan volume shifted to the new maximum SAR location. For any secondary peaks found in the area scan that are within 2 dB of the maximum peak and are not within this zoom scan, the zoom scan shall be performed for such peaks, unless the peak spatial-average SAR at the location of the maximum peak is more than 2 dB below the applicable SAR limit (i.e., 1 W/kg for a 1.6 W/kg 1 g limit, or 1.26 W/kg for a 2 W/kg 10 g limit). The zoom scan resolutions specified in the table below must be applied to the SAR measurements.

<table>
<tr><td colspan="3"></td><td>≤ 3 GHz</td><td>> 3 GHz</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom Scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta Z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta Z_{Zoom}(1)$: between 1^{ST} two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta Z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">≤ 1.5·$\Delta Z_{Zoom}(n-1)$ mm</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see IEEE Std 1528-2013 for details.
* When zoom scan is required and the reported SAR from the area scan based 1-g SAR estimation procedures of KDB Publication 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

3.2.4 SAR Drift Measurement

The local SAR (or conducted power) shall be measured at exactly the same location as in 3.2.1 section. The absolute value of the measurement drift (the difference between the SAR measured in 3.2.1 and 3.2.4 section) shall be recorded. The SAR drift shall be kept within ± 5%.

3.3 Test Equipment

Equipment	Manufacturer	Model	SN	Cal. Date	Cal. Interval
System Validation Dipole	SPEAG	D750V3	1141	Jun. 08, 2015	3 Year
System Validation Dipole	SPEAG	D835V2	4d196	Jun. 08, 2015	3 Year
System Validation Dipole	SPEAG	D900V2	1d182	Jun. 08, 2015	3 Year
System Validation Dipole	SPEAG	D1750V2	1138	Jun. 09, 2015	3 Year
System Validation Dipole	SPEAG	D1900V2	5d203	Jun. 09, 2015	3 Year
System Validation Dipole	SPEAG	D2300V2	1052	Jun. 10, 2015	3 Year
System Validation Dipole	SPEAG	D2450V2	966	Jun. 10, 2015	3 Year
System Validation Dipole	SPEAG	D2600V2	1108	Jun. 10, 2015	3 Year
System Validation Dipole	SPEAG	D5GHzV2	1040	Jun. 13, 2017	3 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	7322	Jun. 29, 2017	3 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	3661	May. 05, 2017	3 Year
Data Acquisition Electronics	SPEAG	DAE4	1473	Jun. 23, 2017	3 Year
Power Amplifier	Mini Circuits	ZHL-42W+	QA1449003	Jul. 25, 2017	1 Year
MXG Vector Signal Generator	Keysight	N5182B	MY53051328	Oct. 27, 2016	1 Year
Directional Bridge	Agilent	86205A	MY31402141	Dec. 27, 2016	1 Year
RF Power Meter	Anritsu	ML2496A	1302005	May. 23, 2017	1 Year
Average power sensor	R&S	NRP-Z22	101689	Jul. 02, 2017	1 Year
Universal Radio Communication Tester	R&S	CMU200	112012	May. 23, 2017	1 Year
Wideband Radio Communication Tester	R&S	CMW500	154161	Jul. 02, 2017	1 Year

3.4 Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval.

3.5 Tissue Dielectric Parameter Measurement & System Verification

3.5.1 Tissue Simulating Liquids

The temperature of the tissue-equivalent medium used during measurement must also be within 18 °C to 25 °C and within ± 2 °C of the temperature when the tissue parameters are characterized. The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 - 4 days of use; or earlier if the dielectric parameters can become out of tolerance.

The depth of tissue-equivalent liquid in a phantom must be ≥ 15.0 cm with ≤ ± 0.5 cm variation for SAR measurements ≤ 3 GHz and ≥ 10.0 cm with ≤ ± 0.5 cm variation for measurements > 3 GHz. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5% are listed in Table-3.1.

Photo of Liquid Height

Table-3.1 Tissue Dielectric Parameters for Head and Body

Target Frequency	Head		Body	
(MHz)	εr	σ (S/m)	εr	σ (S/m)
750	*41.9*	*0.89*	*55.5*	*0.96*
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
1450	*40.5*	*1.20*	*54.0*	*1.30*
1640	*40.3*	*1.29*	*53.8*	*1.40*
1750	*40.1*	*1.37*	*53.4*	*1.49*
1800	40.0	1.40	53.3	1.52
1900	40.0	1.40	53.3	1.52
2000	40.0	1.40	53.3	1.52
2300	*39.5*	*1.67*	*52.9*	*1.81*
2450	39.2	1.80	52.7	1.95
2600	*39.0*	*1.96*	*52.5*	*2.16*
3500	*37.9*	*2.91*	*51.3*	*3.31*
5200	*36.0*	*4.66*	*49.0*	*5.30*
5300	*35.9*	*4.76*	*48.9*	*5.42*
5500	*35.6*	*4.96*	*48.6*	*5.65*
5600	*35.5*	*5.07*	*48.5*	*5.77*
5800	35.3	5.27	48.2	6.00
(εr = relative permittivity, σ = conductivity and ρ = 1000 kg/m3)				

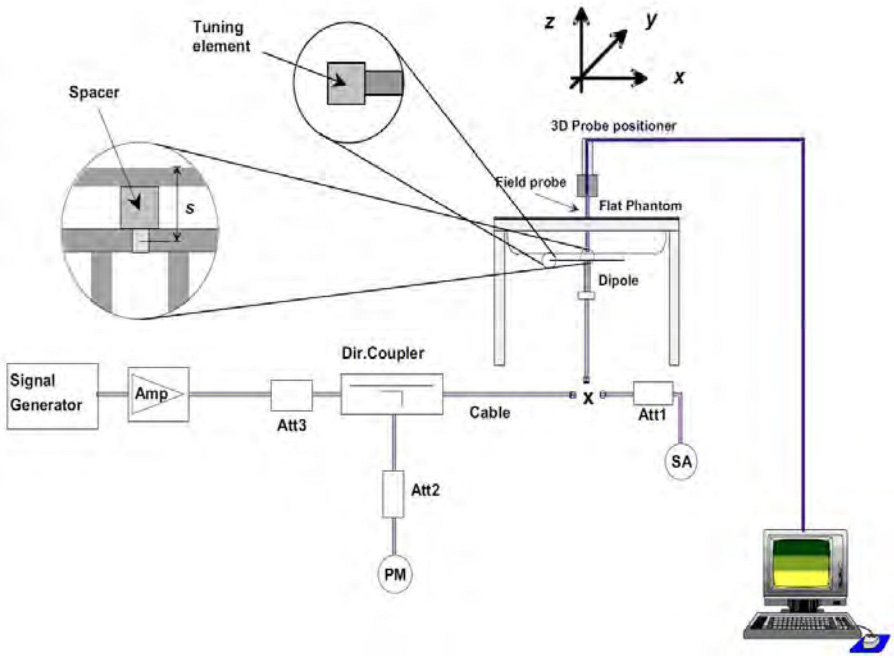
The following table gives the recipes for tissue simulating liquids.

Table-3.2 Recipes of Tissue Simulating Liquid

Tissue Type	Bactericide	DGBE	HEC	NaCl	Sucrose	Triton X-100	Water	Diethylene Glycol Mono-hexylether
H750	0.2	-	0.2	1.4	57.0	-	41.1	-
H835	0.1	-	1.0	1.4	57.0	-	40.5	-
H900	0.1	-	1.0	1.5	56.5	-	40.9	-
H1450	-	45.5	-	0.7	-	-	53.8	-
H1640	-	45.8	-	0.5	-	-	53.7	-
H1750	-	44.5	-	0.3	-	-	55.2	-
H1800	-	44.9	-	0.2	-	-	54.9	-
H1900	-	44.9	-	0.2	-	-	54.9	-
H2000	-	50	-	-	-	-	50	-
H2300	-	44.9	-	0.1	-	-	55.0	-
H2450	-	45.0	-	0.1	-	-	54.9	-
H2600	-	45.1	-	0.1	-	-	54.8	-
H3500	-	8.0	-	0.2	-	20.0	71.8	-
H5G	-	-	-	-	-	17.2	65.52	17.3
B750	0.2	-	0.2	0.8	48.8	-	50.0	-
B835	0.2	-	0.2	0.9	48.5	-	50.2	-
B900	0.2	-	0.2	0.9	48.2	-	50.5	-
B1450	-	34.0	-	0.3	-	-	65.7	-
B1640	-	32.5	-	0.3	-	-	67.2	-
B1750	-	29.4	-	0.4	-	-	70.2	-
B1800	-	29.5	-	0.4	-	-	70.1	-
B1900	-	29.5	-	0.3	-	-	70.2	-
B2000	-	30.0	-	0.2	-	-	69.8	-
B2300	-	31.0	-	0.1	-	-	68.9	-
B2450	-	31.4	-	0.1	-	-	68.5	-
B2600	-	31.8	-	0.1	-	-	68.1	-
B3500	-	28.8	-	0.1	-	-	71.1	-
B5G	-	-	-	-	-	10.7	78.6	10.7

3.5.2 System Check Description

The system check procedure provides a simple, fast, and reliable test method that can be performed daily or before every SAR measurement. The objective here is to ascertain that the measurement system has acceptable accuracy and repeatability. This test requires a flat phantom and a radiating source. The system verification setup is shown as below.



System Verification Setup

3.5.3 Tissue Verification

The measuring results for tissue simulating liquid are shown as below.

Test Date	Tissue Type	Frequency (MHz)	Liquid Temp. (℃)	Measured Conductivity (σ)	Measured Permittivity (ε_r)	Target Conductivity (σ)	Target Permittivity (ε_r)	Conductivity Deviation (%)	Permittivity Deviation (%)
Head	835	21.5	0.890	41.500	0.90	41.50	-1.11	0.00	Aug. 21, 2017
Head	1750	21.5	1.380	39.724	1.37	40.10	0.73	-0.94	Aug. 25, 2017
Head	1900	21.5	1.360	39.800	1.40	40.00	-2.86	-0.50	Aug. 25, 2017
Head	2450	21.5	1.825	37.945	1.80	39.20	1.39	-3.20	Sep. 01, 2017
Head	2600	21.5	2.023	38.491	1.96	39.00	3.21	-1.31	Aug. 30, 2017
Body	835	21.5	0.969	53.932	0.97	55.20	-0.10	-2.30	Aug. 20, 2017
Body	1750	21.5	1.481	52.764	1.49	53.40	-0.60	-1.19	Aug. 30, 2017
Body	1900	21.5	1.470	52.790	1.52	53.30	-3.29	-0.96	Aug. 31, 2017
Body	2450	21.5	2.020	50.710	1.95	52.70	3.59	-3.78	Sep. 01, 2017
Body	2600	21.5	2.186	50.765	2.16	52.50	1.20	-3.30	Aug. 23, 2017

Note:

The dielectric properties of the tissue simulating liquid must be measured within 24 hours before the SAR testing and within ± 5% of the target values. The variation of the liquid temperature must be within ± 2 °C during the test.

3.5.4 System Verification

The measuring result for system verification is tabulated as below.

Test Date	Tissue Type	Frequency (MHz)	1W Target SAR-1g (W/kg)	Measured SAR-1g (W/kg)	Normalized to 1W SAR-1g (W/kg)	Deviation (%)	Dipole S/N	Probe S/N	DAE S/N
Aug. 21, 2017	Head	835	9.08	2.29	9.16	0.88	4d196	7322	1473
Aug. 25, 2017	Head	1750	36.40	8.70	34.80	-4.40	1138	7322	1473
Aug. 25, 2017	Head	1900	40.20	9.20	36.80	-8.46	5d203	7322	1473
Sep. 01, 2017	Head	2450	53.80	13.40	53.60	-0.37	966	7322	1473
Aug. 30, 2017	Head	2600	56.50	15.10	60.40	6.90	1108	7322	1473
Aug. 20, 2017	Body	835	9.14	2.43	9.72	6.35	4d196	7322	1473
Aug. 30, 2017	Body	1750	37.10	9.00	36.00	-2.96	1138	7322	1473
Aug. 31, 2017	Body	1900	39.90	9.72	38.88	-2.56	5d203	7322	1473
Sep. 01, 2017	Body	2450	52.10	12.50	50.00	-4.03	966	7322	1473
Aug. 23, 2017	Body	2600	56.90	14.20	56.80	-0.18	1108	7322	1473

Note:

Comparing to the reference SAR value, the validation data should be within its specification of 10%. The result indicates the system check can meet the variation criterion and the plots can be referred to Appendix A of this report.

4 SAR Measurement Evaluation

4.1 EUT Configuration and Setting

Connections between EUT and System Simulator

For WWAN SAR testing, the EUT was linked and controlled by base station emulator. Communication between the EUT and the emulator was established by air link. The distance between the EUT and the communicating antenna of the emulator is larger than 50 cm and the output power radiated from the emulator antenna is at least 30 dB smaller than the output power of EUT. The EUT was set from the emulator to radiate maximum output power during SAR testing.

4.1.1 GSM Configuration and Testing

GSM (GMSK: CS1) voice mode transmits with 1 time slot. GPRS (GMSK: CS1) and EDGE (GMSK: MCS1, 8PSK: MCS9) may transmit up to 4 time slots in the 8 time-slot frame according to the multislot class implemented in a device.

4.1.2 WCDMA Configuration and Testing

WCDMA Handsets Head SAR

SAR for next to the ear head exposure is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”. The 3G SAR test reduction procedure is applied to AMR configurations with 12.2 kbps RMC as the primary mode.

WCDMA Handsets Body-worn SAR

SAR for body-worn configurations is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”. The 3G SAR test reduction procedure is applied to other spreading codes and multiple $DPDCH_n$ configurations supported by the handset with 12.2 kbps RMC as the primary mode.

Handsets with Release 5 HSDPA

The 3G SAR test reduction procedure is applied to HSDPA body-worn configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for HSDPA using the HSDPA body SAR procedures in the “Release 5 HSDPA Data Devices”, for the highest reported SAR body-worn exposure configuration in 12.2 kbps RMC. Handsets with both HSDPA and HSUPA are tested according to Release 6 HSPA test procedures.

Handsets with Release 6 HSUPA

The 3G SAR test reduction procedure is applied to HSPA (HSUPA/HSDPA with RMC) body-worn configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for HSPA using the HSPA body SAR procedures in the “Release 6 HSPA Data Devices”, for the highest reported body-worn exposure SAR configuration in 12.2 kbps RMC. When VOIP is applicable for next to the ear head exposure in HSPA, the 3G SAR test reduction procedure is applied to HSPA with 12.2 kbps RMC as the primary mode; otherwise, the same HSPA configuration used for body-worn measurements is tested for next to the ear head exposure.

Release 5 HSDPA Data Devices

The 3G SAR test reduction procedure is applied to body SAR with 12.2 kbps RMC as the primary mode. Otherwise, body SAR for HSDPA is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, for the highest reported SAR configuration in 12.2 kbps RMC without HSDPA.

HSDPA is configured according to the applicable UE category of a test device. The number of HS-DSCH / HS-PDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission conditions, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4 ms and a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors (β_c, β_d), and HS-DPCCH power offset parameters (Δ_{ACK}, Δ_{NACK}, Δ_{CQI}) are set according to values indicated in below. The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the H-set.

Sub-test	β_c	β_d	β_d (SF)	β_c / β_d	β_{hs} (1)	CM (dB)(2)	MPR
1	2 / 15	15 / 15	64	2 / 15	4 / 15	0.0	0
2	12 / 15 (3)	15 / 15 (3)	64	12 / 15 (3)	24 / 15	1.0	0
3	15 / 15	8 / 15	64	15 / 8	30 / 15	1.5	0.5
4	15 / 15	4 / 15	64	15 / 4	30 / 15	1.5	0.5

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 8 ⇔ $A_{hs} = \beta_{hs} / \beta_c = 30 / 15$ ⇔ $\beta_{hs} = 30 / 15 * \beta_c$.
Note 2: CM = 1 for $\beta_c / \beta_d = 12 / 15$, $\beta_{hs} / \beta_c = 24 / 15$.
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 $\beta_c = 11 / 15$ and $\beta_d = 15 / 15$.

Release 6 HSUPA Data Devices

The 3G SAR test reduction procedure is applied to body SAR with 12.2 kbps RMC as the primary mode. Otherwise, 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 and power control algorithm 2, according to the highest reported body SAR configuration in 12.2 kbps RMC without HSPA. When VOIP applies to head exposure, the 3G SAR test reduction procedure is applied with 12.2 kbps RMC as the primary mode. Otherwise, the same HSPA configuration used for body SAR measurements are applied to head exposure testing. Due to inner loop power control requirements in HSPA, a communication test set is required for output power and SAR tests. The 12.2 kbps RMC, FRC H-set 1 and E-DCH configurations for HSPA are configured according to the β values indicated in below.

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 Δ_{CQI} = 8 ⇔ $A_{hs} = \beta_{hs} / \beta_c = 30 / 15$ ⇔ $\beta_{hs} = 30 / 15 * \beta_c$.
Note 2: CM = 1 for $\beta_c / \beta_d = 12 / 15$, $\beta_{hs} / \beta_c = 24 / 15$. 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 $\beta_c = 10 / 15$ and $\beta_d = 15 / 15$.
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 $\beta_c = 14 / 15$ and $\beta_d = 15 / 15$.
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.

DC-HSDPA SAR Guidance

The 3G SAR test reduction procedure is applied to DC-HSDPA with 12.2 kbps RMC as the primary mode. Otherwise, when SAR is required for Rel. 5 HSDPA, SAR is required for Rel. 8 DC-HSDPA. Power is measured for DC-HSDPA according to the H-Set 12, FRC configuration in Table C.8.1.12 of 3GPP TS 34.121-1 to determine SAR test reduction. A primary and a secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to be acceptable.

4.1.3 LTE Configuration and Testing

UE power class is category 3. The LTE maximum power reduction (MPR) in accordance with 3GPP TS 36.101 is active all times during LTE operation. The allowed MPR for the maximum output power is specified in below.

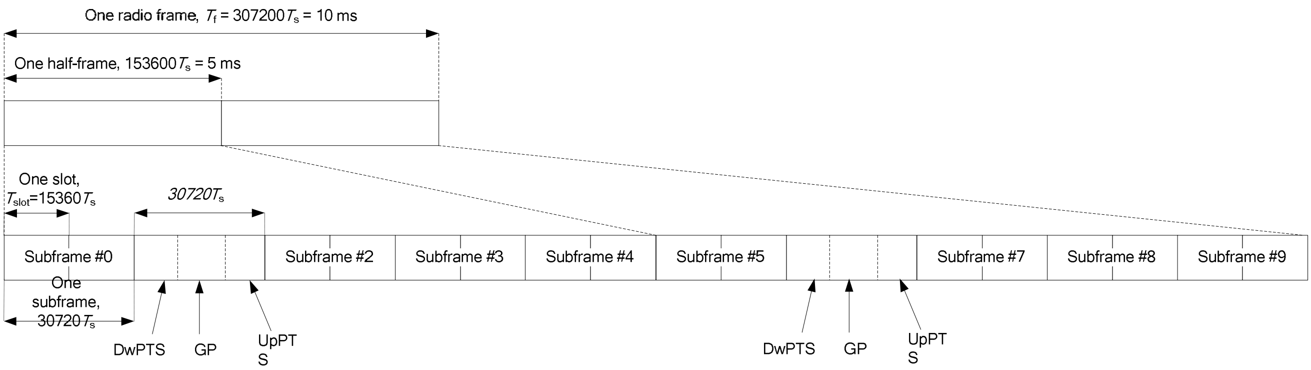
Modulation	Channel Bandwidth / RB Configurations						LTE MPR Setting (dB)
	BW 1.4 MHz	BW 3 MHz	BW 5 MHz	BW 10 MHz	BW 15 MHz	BW 20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	1
16QAM	<= 5	<= 4	<= 8	<= 12	<= 16	<= 18	1
16QAM	> 5	> 4	> 8	> 12	> 16	> 18	2

In addition, the device is compliant with additional maximum power reduction (A-MPR) requirements defined in 3GPP TS 36.101 section 6.2.4 that was disabled for all FCC compliance testing.

A properly configured base station simulator is used for the SAR and power measurements, so spectrum plots for each RB allocation and offset configuration are not included in the SAR report to demonstrate that the tested RB allocations have been correctly established at the maximum output power conditions.

TDD-LTE Setup Configurations

According to KDB 941225 D05, SAR testing for TDD-LTE device must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP TDD-LTE configurations. The TDD-LTE of this device supports frame structure type 2 defined in 3GPP TS 36.211 section 4.2, and the frame structure configuration can be referred to below.



3GPP TS 36.211 Figure 4.2-1: Frame Structure Type 2

<table>
<tr><th rowspan="3">Special Subframe Configuration</th><th colspan="3">Normal Cyclic Prefix in Downlink</th><th colspan="3">Extended Cyclic Prefix in Downlink</th></tr>
<tr><th rowspan="2">DwPTS</th><th colspan="2">UpPTS</th><th rowspan="2">DwPTS</th><th colspan="2">UpPTS</th></tr>
<tr><th>Normal Cyclic Prefix in Uplink</th><th>Extended Cyclic Prefix in Uplink</th><th>Normal Cyclic Prefix in Uplink</th><th>Extended Cyclic Prefix in Uplink</th></tr>
<tr><td>0</td><td>6592·Ts</td><td rowspan="5">2192·Ts</td><td rowspan="5">2560·Ts</td><td>7680·Ts</td><td rowspan="4">2192·Ts</td><td rowspan="4">2560·Ts</td></tr>
<tr><td>1</td><td>19760·Ts</td><td>20480·Ts</td></tr>
<tr><td>2</td><td>21952·Ts</td><td>23040·Ts</td></tr>
<tr><td>3</td><td>24144·Ts</td><td>25600·Ts</td></tr>
<tr><td>4</td><td>26336·Ts</td><td>7680·Ts</td><td rowspan="2">4384·Ts</td><td rowspan="2">5120·Ts</td></tr>
<tr><td>5</td><td>6592·Ts</td><td>4384·Ts</td><td>5120·Ts</td><td>20480·Ts</td></tr>
</table>

6	19760·Ts			23040·Ts		
7	21952·Ts			12800·Ts		
8	24144·Ts			-	-	-
9	13168·Ts			-	-	-

3GPP TS 36.211 Table 4.2-1: Configuration of Special Subframe

Uplink-Downlink Configuration	Downlink-to-Uplink Switch-Point Periodicity	Subframe Number										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%

Uplink-Downlink Configurations and duty cycle

Considering the highest transmission duty cycle, TDD-LTE was tested using Uplink-Downlink Configuration 0 with 6 uplink subframe and 2 special subframe. The special subframe was set to special subframe configuration 7 using extended cyclic prefix uplink. Therefore, SAR testing for TDD-LTE was performed at the maximum output power with highest transmission duty cycle of 63.33%.

4.1.4 WLAN Configuration and Testing

In general, various vendor specific external test software and chipset based internal test modes are typically used for SAR measurement. These chipset based test mode utilities are generally hardware and manufacturer dependent, and often include substantial flexibility to reconfigure or reprogram a device. A Wi-Fi device must be configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools for SAR measurement. The test frequencies established using test mode must correspond to the actual channel frequencies. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. In addition, a periodic transmission duty factor is required for current generation SAR systems to measure SAR correctly. The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

According to KDB 248227 D01, this device has installed WLAN engineering testing software which can provide continuous transmitting RF signal. During WLAN SAR testing, this device was operated to transmit continuously at the maximum transmission duty with specified transmission mode, operating frequency, lowest data rate, and maximum output power.

Initial Test Configuration

An initial test configuration is determined for OFDM transmission modes in 2.4 GHz and 5 GHz bands according to the channel bandwidth, modulation and data rate combination(s) with the highest maximum output power specified for production units in each standalone and aggregated frequency band. When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band.

Subsequent Test Configuration

SAR measurement requirements for the remaining 802.11 transmission mode configurations that have not been tested in the initial test configuration are determined separately for each standalone and aggregated frequency band, in each exposure condition, according to the maximum output power specified for production units. Additional power measurements may be required to determine if SAR measurements are required for subsequent highest output power channels in a subsequent test configuration. When the highest reported SAR for the initial test configuration according to the initial test position or fixed exposure position requirements, is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for that subsequent test configuration.

SAR Test Configuration and Channel Selection

When multiple channel bandwidth configurations in a frequency band have the same specified maximum output power, the initial test configuration is using largest channel bandwidth, lowest order modulation, lowest data rate, and lowest order 802.11 mode (i.e., 802.11a is chosen over 802.11n then 802.11ac or 802.11g is chosen over 802.11n). After an initial test configuration is determined, if multiple test channels have the same measured maximum output power, the channel chosen for SAR measurement is determined according to the following.

1) The channel closest to mid-band frequency is selected for SAR measurement.

2) For channels with equal separation from mid-band frequency; for example, high and low channels or two

mid-band channels, the higher frequency (number) channel is selected for SAR measurement.

4.2 EUT Testing Position

4.2.1 Head Exposure Conditions

RF Exposure Conditions	Test Position	Separation Distance	SAR test exclusion
Head	Right Cheek	0 cm	N/A
	Right Tilted		
	Left Cheek		
	Left Tilted		

Note:

1. Head exposure for voice mode of handset is limited to next to the ear exposure conditions.
2. Devices that are designed to transmit next to the ear must be tested using the SAM phantom.
3. Other head exposure conditions, for example, in-front-of the face, should be tested using a flat phantom according to the required published RF exposure KDB procedures.
4. When data mode operates in next to the ear configurations, either data alone or in conjunction with voice transmissions, SAR evaluation is required for such use conditions.
5. When device supports VoIP, SAR evaluation for head Exposure Conditions using the most appropriate wireless data mode configurations is required.

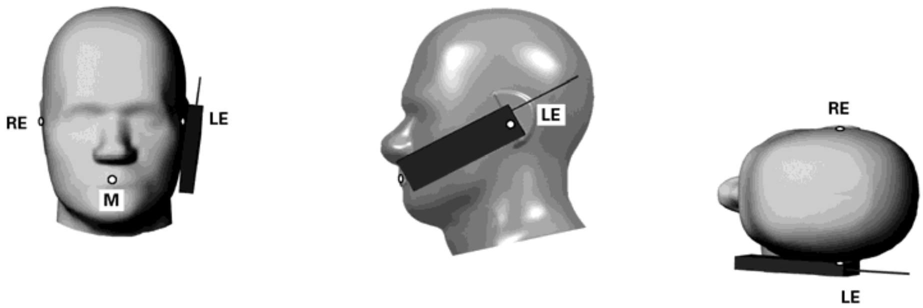


Fig-4.1 Cheek Position

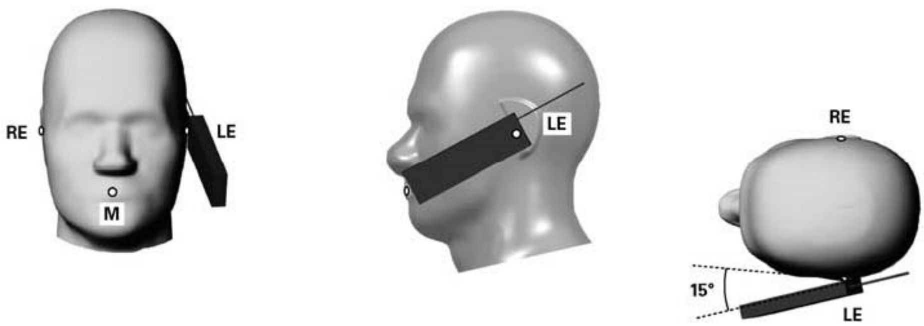


Fig-4.2 Tilted Position

Define two imaginary lines on the handset

a) The vertical centerline passes through two points on the front side of the handset - the midpoint of the width w_t of the handset at the level of the acoustic output, and the midpoint of the width w_b of the bottom of the handset.
b) The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output. The horizontal line is also tangential to the face of the handset at point A.
c) The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that

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Tel: 86-755-8601 6288 Fax: 86-755-8601 6751 www.intertek.com.cn

the vertical centerline is not necessarily parallel to the front face of the handset, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.

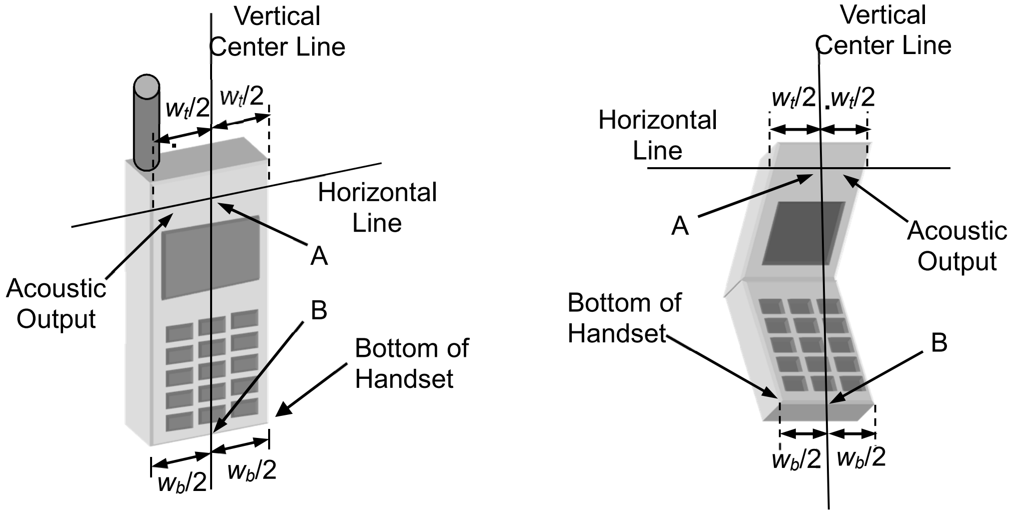


Fig-4.3 Handset Vertical and Horizontal Reference Lines

4.2.2 Body-worn Accessory Exposure Conditions

RF Exposure Conditions	Test Position	Separation Distance	SAR test exclusion
Body-worn	Front Face	0 ~ 2.5 cm	N/A
	Rear Face		

Note:

1. Body-worn accessories that do not contain metallic or conductive components may be tested according to worst-case exposure configurations, typically according to the smallest test separation distance required for the group of body-worn accessories with similar operating and exposure characteristics. All body-worn accessories containing metallic components are tested in conjunction with the host device.
2. Body-worn accessory SAR compliance is based on a single minimum test separation distance for all wireless and operating modes applicable to each body-worn accessory used by the host, and according to the relevant voice and/or data mode transmissions and operations. If a body-worn accessory supports voice only operations in its normal and expected use conditions, testing of data mode for body-worn compliance is not required.
3. A conservative minimum test separation distance for supporting off-the-shelf body-worn accessories that may be acquired by users of consumer handsets should be used to test for body-worn accessory SAR compliance. This distance is determined by the handset manufacturer according to the typical body-worn accessories users may acquire at the time of equipment certification, but not more than 2.5 cm, to enable users to purchase aftermarket body-worn accessories with the required minimum separation.
4. Devices that are designed to operate on the body of users using lanyards and straps or without requiring additional body-worn accessories must be tested for SAR compliance using a conservative minimum test separation distance ≤ 5 mm to support compliance.
5. When device supports VoIP, SAR evaluation for body-worn accessory Exposure Conditions using the most appropriate wireless data mode configurations is required.
6. Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories.
7. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for the body-worn accessory with a headset attached to the handset.

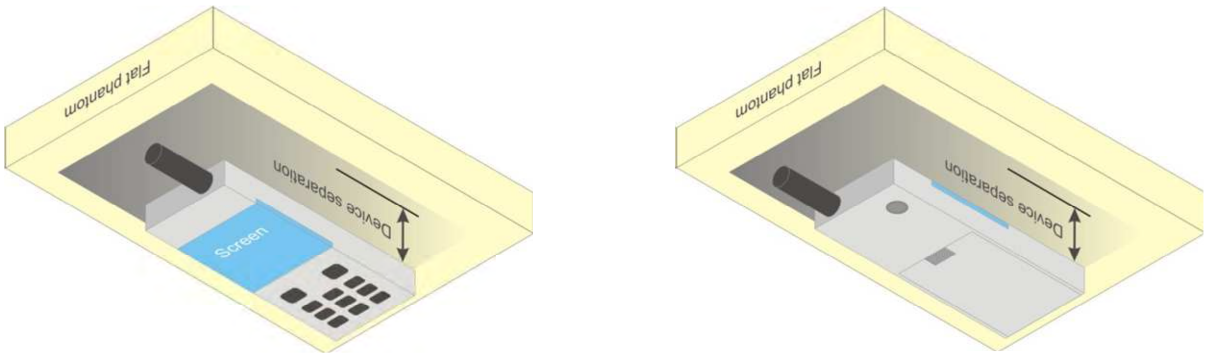


Fig-4.4 Body Worn Position

4.2.3 Hotspot Mode Exposure Conditions

RF Exposure Conditions	Test Position	Separation Distance	SAR test exclusion
Hotspot	Front Face	1 cm	Note 2/3
	Rear Face		
	Left Side		
	Right Side		
	Top Side		
	Bottom Side		

Note:

1. The SAR test separation distance for hotspot mode is determined according to device form factor. When the overall length and width of a device is > 9 cm x 5 cm (~3.5” x 2”), a test separation distance of 10 mm is required for hotspot mode SAR measurements. A test separation distance of 5 mm or less is required for smaller devices. The SAR test separation distance for hotspot mode is determined according to device form factor.
2. Hotspot mode SAR is measured for all edges and surfaces of the device with a transmitting antenna located within 25 mm from that surface or edge.
3. Based on the antenna location shown on appendix D of this report, the SAR testing required for hotspot mode is listed on section 4.5.1.

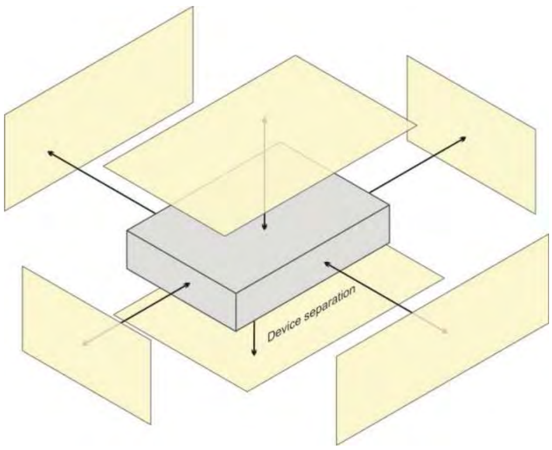


Fig-4.5 Test Positions for Hotspot Mode

4.3 Measured Conducted Power Result

4.3.1 Conducted Power of GSM Band

The measuring conducted average power (Unit: dBm) is shown as below.

Band	GSM850			GSM1900		
Channel	128	190	251	512	661	810
Frequency (MHz)	824.2	836.6	848.8	1850.2	1880.0	1909.8
Maximum Burst-Averaged Output Power						
GSM (GMSK, 1Tx-slot)	32.93	33.15	**33.31**	29.62	29.59	**29.64**
GPRS (GMSK, 1Tx-slot)	32.96	33.19	33.06	29.63	29.58	29.61
GPRS (GMSK, 2Tx-slot)	32.66	32.54	32.73	28.52	28.44	28.58
GPRS (GMSK, 3Tx-slot)	30.56	30.82	30.81	26.53	26.40	26.76
GPRS (GMSK, 4Tx-slot)	29.55	29.66	29.76	25.40	25.72	25.75
EDGE (8PSK, 1Tx-slot)	26.68	26.62	26.67	26.16	26.03	25.96
EDGE (8PSK, 2Tx-slot)	26.13	26.07	26.19	25.10	25.22	25.21
EDGE (8PSK, 3Tx-slot)	25.11	25.05	25.08	23.79	23.81	23.89
EDGE (8PSK, 4Tx-slot)	24.03	24.07	24.12	22.62	22.59	22.66
Maximum Frame-Averaged Output Power						
GSM (GMSK, 1Tx-slot)	23.93	24.15	24.31	20.62	20.59	20.64
GPRS (GMSK, 1Tx-slot)	23.96	24.19	24.06	20.63	20.58	20.61
GPRS (GMSK, 2Tx-slot)	26.66	26.54	26.73	22.52	22.44	22.58
GPRS (GMSK, 3Tx-slot)	26.30	26.56	26.55	22.27	22.14	22.50
GPRS (GMSK, 4Tx-slot)	26.55	26.66	**26.76**	22.40	22.72	**22.75**
EDGE (8PSK, 1Tx-slot)	17.68	17.62	17.67	17.16	17.03	16.96
EDGE (8PSK, 2Tx-slot)	20.13	20.07	20.19	19.10	19.22	19.21
EDGE (8PSK, 3Tx-slot)	20.85	20.79	20.82	19.53	19.55	19.63
EDGE (8PSK, 4Tx-slot)	21.03	21.07	21.12	19.62	19.59	19.66

Note:

1. SAR testing was performed on the maximum frame-averaged power mode.
2. The frame-averaged power is linearly proportion to the slot number configured and it is linearly scaled the maximum burst-averaged power based on time slots. The calculated method is shown as below:
   Frame-averaged power = 10 x log (Burst-averaged power mW x Slot used / 8)

4.3.2 Conducted Power of WCDMA Band

Band	WCDMA Band II			WCDMA Band V			3GPP MPR (dB)
Channel	9262	9400	9538	4132	4182	4233	
Frequency (MHz)	1852.4	1880.0	1907.6	826.4	836.4	846.6	
RMC 12.2K	23.28	23.26	**23.34**	23.23	23.31	**23.35**	-
HSDPA Subtest-1	22.37	22.38	22.45	22.28	22.38	22.34	0
HSDPA Subtest-2	22.30	22.35	22.45	22.26	22.36	22.30	0
HSDPA Subtest-3	21.78	21.73	21.93	21.77	21.73	21.68	0.5
HSDPA Subtest-4	21.84	21.82	21.80	21.67	21.63	21.60	0.5
DC-HSDPA Subtest-1	22.36	22.33	22.41	22.19	22.27	22.31	0
DC-HSDPA Subtest-2	22.35	22.34	22.41	22.19	22.28	22.27	0
DC-HSDPA Subtest-3	21.79	21.70	21.91	21.76	21.72	21.66	0.5
DC-HSDPA Subtest-4	21.83	21.80	21.75	21.66	21.60	21.58	0.5
HSUPA Subtest-1	21.78	21.80	21.91	21.73	21.86	21.79	0
HSUPA Subtest-2	19.76	19.74	19.90	19.70	19.85	19.74	2
HSUPA Subtest-3	20.74	20.78	20.89	20.71	20.85	20.74	1
HSUPA Subtest-4	19.74	19.78	19.89	19.71	19.85	19.74	2
HSUPA Subtest-5	21.74	21.76	21.89	21.70	21.88	21.85	0

4.3.3 Conducted Power of LTE Band

LTE Band / BW	RB Size	RB Offset	QPSK Low CH 19957 1710.7 MHz	QPSK Mid CH 20175 1732.5 MHz	QPSK High CH 20393 1754.3 MHz	3GPP MPR (dB)	16QAM Low CH 19957 1710.7 MHz	16QAM Mid CH 20175 1732.5 MHz	16QAM High CH 20393 1754.3 MHz	3GPP MPR (dB)
4 / 1.4M	1	0	22.27	22.43	22.31	0	21.50	21.43	21.39	1
	1	2	22.49	22.55	22.46	0	21.55	21.26	21.38	1
	1	5	22.24	22.40	22.27	0	21.59	21.07	21.37	1
	3	0	22.25	22.41	22.29	0	21.49	21.42	21.38	1
	3	1	22.47	22.53	22.44	0	21.54	21.25	21.37	1
	3	3	22.22	22.38	22.25	0	21.58	21.06	21.36	1
	6	0	21.42	21.48	21.43	1	20.44	20.60	20.41	2

LTE Band / BW	RB Size	RB Offset	QPSK Low CH 19965 1711.5 MHz	QPSK Mid CH 20175 1732.5 MHz	QPSK High CH 20385 1753.5 MHz	3GPP MPR (dB)	16QAM Low CH 19965 1711.5 MHz	16QAM Mid CH 20175 1732.5 MHz	16QAM High CH 20385 1753.5 MHz	3GPP MPR (dB)
4 / 3M	1	0	22.28	22.44	22.32	0	21.51	21.44	21.40	1
	1	7	22.50	22.56	22.47	0	21.56	21.27	21.39	1
	1	14	22.25	22.41	22.28	0	21.60	21.08	21.38	1
	8	0	21.49	21.53	21.52	1	20.51	20.62	20.71	2
	8	3	21.49	21.49	21.51	1	20.58	20.58	20.60	2
	8	7	21.35	21.44	21.51	1	20.31	20.54	20.50	2
	15	0	21.43	21.49	21.44	1	20.45	20.61	20.42	2

LTE Band / BW	RB Size	RB Offset	QPSK Low CH 19975 1712.5 MHz	QPSK Mid CH 20175 1732.5 MHz	QPSK High CH 20375 1752.5 MHz	3GPP MPR (dB)	16QAM Low CH 19975 1712.5 MHz	16QAM Mid CH 20175 1732.5 MHz	16QAM High CH 20375 1752.5 MHz	3GPP MPR (dB)
4 / 5M	1	0	22.31	22.47	22.35	0	21.54	21.47	21.43	1
	1	12	22.53	22.59	22.50	0	21.59	21.30	21.42	1
	1	24	22.28	22.44	22.31	0	21.63	21.11	21.41	1
	12	0	21.52	21.56	21.55	1	20.54	20.65	20.74	2
	12	6	21.52	21.52	21.54	1	20.61	20.61	20.63	2
	12	13	21.38	21.47	21.54	1	20.34	20.57	20.53	2
	25	0	21.46	21.52	21.47	1	20.48	20.64	20.45	2

LTE Band / BW	RB Size	RB Offset	QPSK Low CH 20000 1715.0 MHz	QPSK Mid CH 20175 1732.5 MHz	QPSK High CH 20350 1750.0 MHz	3GPP MPR (dB)	16QAM Low CH 20000 1715.0 MHz	16QAM Mid CH 20175 1732.5 MHz	16QAM High CH 20350 1750.0 MHz	3GPP MPR (dB)
4 / 10M	1	0	22.35	22.51	22.39	0	21.58	21.51	21.47	1
	1	24	22.57	22.63	22.54	0	21.63	21.34	21.46	1
	1	49	22.32	22.48	22.35	0	21.67	21.15	21.45	1
	25	0	21.56	21.60	21.59	1	20.58	20.69	20.78	2
	25	12	21.56	21.56	21.58	1	20.65	20.65	20.67	2
	25	25	21.42	21.51	21.58	1	20.38	20.61	20.57	2
	50	0	21.50	21.56	21.51	1	20.52	20.68	20.49	2

LTE Band / BW	RB Size	RB Offset	QPSK Low CH 20025 1717.5 MHz	QPSK Mid CH 20175 1732.5 MHz	QPSK High CH 20325 1747.5 MHz	3GPP MPR (dB)	16QAM Low CH 20025 1717.5 MHz	16QAM Mid CH 20175 1732.5 MHz	16QAM High CH 20325 1747.5 MHz	3GPP MPR (dB)
4 / 15M	1	0	22.41	22.57	22.45	0	21.64	21.57	21.53	1
	1	37	22.63	22.69	22.60	0	21.69	21.40	21.52	1
	1	74	22.38	22.54	22.41	0	21.73	21.21	21.51	1
	36	0	21.62	21.66	21.65	1	20.64	20.75	20.84	2
	36	19	21.62	21.62	21.64	1	20.71	20.71	20.73	2
	36	39	21.48	21.57	21.64	1	20.44	20.67	20.63	2
	75	0	21.56	21.62	21.57	1	20.58	20.74	20.55	2

LTE Band / BW	RB Size	RB Offset	QPSK Low CH 20050 1720.0 MHz	QPSK Mid CH 20175 1732.5 MHz	QPSK High CH 20300 1745.0 MHz	3GPP MPR (dB)	16QAM Low CH 20050 1720.0 MHz	16QAM Mid CH 20175 1732.5 MHz	16QAM High CH 20300 1745.0 MHz	3GPP MPR (dB)
4 / 20M	1	0	22.44	22.60	22.48	0	21.67	21.60	21.56	1
	1	50	22.66	**22.72**	22.63	0	21.72	21.43	21.55	1
	1	99	22.41	22.57	22.44	0	21.76	21.24	21.54	1
	50	0	21.65	21.69	21.68	1	20.67	20.78	20.87	2
	50	25	21.65	21.65	21.67	1	20.74	20.74	20.76	2
	50	50	21.51	21.60	21.67	1	20.47	20.70	20.66	2
	100	0	21.59	21.65	21.60	1	20.61	20.77	20.58	2

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH 20407	Mid CH 20525	High CH 20643		Low CH 20407	Mid CH 20525	High CH 20643	
			824.7 MHz	836.5 MHz	848.3 MHz		824.7 MHz	836.5 MHz	848.3 MHz	
5 / 1.4M	1	0	23.00	23.10	23.21	0	21.70	22.70	22.71	1
	1	2	23.31	23.33	23.34	0	21.77	22.47	22.63	1
	1	5	23.13	23.32	23.14	0	21.91	22.43	22.79	1
	3	0	22.98	23.08	23.19	0	21.69	22.69	22.70	1
	3	1	23.29	23.31	23.32	0	21.76	22.46	22.62	1
	3	3	23.11	23.30	23.12	0	21.90	22.42	22.78	1
	6	0	22.23	22.21	22.26	1	21.11	21.12	21.12	2

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH 20415	Mid CH 20525	High CH 20635		Low CH 20415	Mid CH 20525	High CH 20635	
			825.5 MHz	836.5 MHz	847.5 MHz		825.5 MHz	836.5 MHz	847.5 MHz	
5 / 3M	1	0	23.04	23.14	23.25	0	21.74	22.74	22.75	1
	1	7	23.35	23.37	23.38	0	21.81	22.51	22.67	1
	1	14	23.17	23.36	23.18	0	21.95	22.47	22.83	1
	8	0	22.31	22.27	22.36	1	21.25	21.28	21.23	2
	8	3	22.24	22.21	22.27	1	21.24	21.21	21.29	2
	8	7	22.19	22.25	22.29	1	21.21	21.16	21.34	2
	15	0	22.27	22.25	22.30	1	21.15	21.16	21.16	2

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH 20425	Mid CH 20525	High CH 20625		Low CH 20425	Mid CH 20525	High CH 20625	
			826.5 MHz	836.5 MHz	846.5 MHz		826.5 MHz	836.5 MHz	846.5 MHz	
5 / 5M	1	0	23.10	23.20	23.31	0	21.80	22.80	22.81	1
	1	12	23.41	23.43	23.44	0	21.87	22.57	22.73	1
	1	24	23.23	23.42	23.24	0	22.01	22.53	22.89	1
	12	0	22.37	22.33	22.42	1	21.31	21.34	21.29	2
	12	6	22.30	22.27	22.33	1	21.30	21.27	21.35	2
	12	13	22.25	22.31	22.35	1	21.27	21.22	21.40	2
	25	0	22.33	22.31	22.36	1	21.21	21.22	21.22	2

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH 20450	Mid CH 20525	High CH 20600		Low CH 20450	Mid CH 20525	High CH 20600	
			829.0 MHz	836.5 MHz	844.0 MHz		829.0 MHz	836.5 MHz	844.0 MHz	
5 / 10M	1	0	23.13	23.23	23.34	0	21.83	22.83	22.84	1
	1	24	23.44	23.46	**23.47**	0	21.90	22.60	22.76	1
	1	49	23.26	23.45	23.27	0	22.04	22.56	22.92	1
	25	0	22.40	22.36	22.45	1	21.34	21.37	21.32	2
	25	12	22.33	22.30	22.36	1	21.33	21.30	21.38	2
	25	25	22.28	22.34	22.38	1	21.30	21.25	21.43	2
	50	0	22.36	22.34	22.39	1	21.24	21.25	21.25	2

LTE Band / BW	RB Size	RB Offset	QPSK Low CH 20775 2502.5 MHz	QPSK Mid CH 21100 2535.0 MHz	QPSK High CH 21425 2567.5 MHz	3GPP MPR (dB)	16QAM Low CH 20775 2502.5 MHz	16QAM Mid CH 21100 2535.0 MHz	16QAM High CH 21425 2567.5 MHz	3GPP MPR (dB)
7 / 5M	1	0	22.54	22.16	22.75	0	21.51	21.13	21.40	1
	1	12	22.86	22.62	23.10	0	21.64	21.73	21.61	1
	1	24	22.23	22.15	22.75	0	21.44	21.23	21.36	1
	12	0	21.62	21.65	21.60	1	20.63	20.71	20.67	2
	12	6	21.68	21.74	21.76	1	20.66	20.75	20.66	2
	12	13	21.63	21.62	21.60	1	20.64	20.69	20.45	2
	25	0	21.58	21.67	21.83	1	20.53	20.69	20.52	2

LTE Band / BW	RB Size	RB Offset	QPSK Low CH 20800 2505.0 MHz	QPSK Mid CH 21100 2535.0 MHz	QPSK High CH 21400 2565.0 MHz	3GPP MPR (dB)	16QAM Low CH 20800 2505.0 MHz	16QAM Mid CH 21100 2535.0 MHz	16QAM High CH 21400 2565.0 MHz	3GPP MPR (dB)
7 / 10M	1	0	22.58	22.20	22.79	0	21.55	21.17	21.44	1
	1	24	22.90	22.66	23.14	0	21.68	21.77	21.65	1
	1	49	22.27	22.19	22.79	0	21.48	21.27	21.40	1
	25	0	21.66	21.69	21.64	1	20.67	20.75	20.71	2
	25	12	21.72	21.78	21.80	1	20.70	20.79	20.70	2
	25	25	21.67	21.66	21.64	1	20.68	20.73	20.49	2
	50	0	21.62	21.71	21.87	1	20.57	20.73	20.56	2

LTE Band / BW	RB Size	RB Offset	QPSK Low CH 20825 2507.5 MHz	QPSK Mid CH 21100 2535.0 MHz	QPSK High CH 21375 2562.5 MHz	3GPP MPR (dB)	16QAM Low CH 20825 2507.5 MHz	16QAM Mid CH 21100 2535.0 MHz	16QAM High CH 21375 2562.5 MHz	3GPP MPR (dB)
7 / 15M	1	0	22.64	22.26	22.85	0	21.61	21.23	21.50	1
	1	37	22.96	22.72	23.20	0	21.74	21.83	21.71	1
	1	74	22.33	22.25	22.85	0	21.54	21.33	21.46	1
	36	0	21.72	21.75	21.70	1	20.73	20.81	20.77	2
	36	19	21.78	21.84	21.86	1	20.76	20.85	20.76	2
	36	39	21.73	21.72	21.70	1	20.74	20.79	20.55	2
	75	0	21.68	21.77	21.93	1	20.63	20.79	20.62	2

LTE Band / BW	RB Size	RB Offset	QPSK Low CH 20850 2510.0 MHz	QPSK Mid CH 21100 2535.0 MHz	QPSK High CH 21350 2560.0 MHz	3GPP MPR (dB)	16QAM Low CH 20850 2510.0 MHz	16QAM Mid CH 21100 2535.0 MHz	16QAM High CH 21350 2560.0 MHz	3GPP MPR (dB)
7 / 20M	1	0	22.67	22.29	22.88	0	21.64	21.26	21.53	1
	1	50	22.99	22.75	**23.23**	0	21.77	21.86	21.74	1
	1	99	22.36	22.28	22.88	0	21.57	21.36	21.49	1
	50	0	21.75	21.78	21.73	1	20.76	20.84	20.80	2
	50	25	21.81	21.87	21.89	1	20.79	20.88	20.79	2
	50	50	21.76	21.75	21.73	1	20.77	20.82	20.58	2
	100	0	21.71	21.80	21.96	1	20.66	20.82	20.65	2

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH 37775 2572.5 MHz	Mid CH 38000 2595.0 MHz	High CH 38225 2617.5 MHz		Low CH 37775 2572.5 MHz	Mid CH 38000 2595.0 MHz	High CH 38225 2617.5 MHz	
38 / 5M	1	0	22.60	22.48	22.60	0	22.16	21.70	20.91	1
	1	12	23.12	22.92	22.87	0	22.10	21.69	20.97	1
	1	24	22.56	22.09	22.37	0	21.72	21.46	20.70	1
	12	0	21.74	21.85	21.95	1	20.78	20.81	20.71	2
	12	6	22.04	21.98	21.77	1	20.68	20.99	20.87	2
	12	13	21.75	21.74	21.67	1	20.64	20.74	20.57	2
	25	0	21.93	21.82	21.77	1	20.61	20.82	20.55	2

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH 37800 2575.0 MHz	Mid CH 38000 2595.0 MHz	High CH 38200 2615.0 MHz		Low CH 37800 2575.0 MHz	Mid CH 38000 2595.0 MHz	High CH 38200 2615.0 MHz	
38 / 10M	1	0	22.64	22.52	22.64	0	22.20	21.74	20.95	1
	1	24	23.16	22.96	22.91	0	22.14	21.73	21.01	1
	1	49	22.60	22.13	22.41	0	21.76	21.50	20.74	1
	25	0	21.78	21.89	21.99	1	20.82	20.85	20.75	2
	25	12	22.08	22.02	21.81	1	20.72	21.03	20.91	2
	25	25	21.79	21.78	21.71	1	20.68	20.78	20.61	2
	50	0	21.97	21.86	21.81	1	20.65	20.86	20.59	2

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH 37825 2577.5 MHz	Mid CH 38000 2595.0 MHz	High CH 38175 2612.5 MHz		Low CH 37825 2577.5 MHz	Mid CH 38000 2595.0 MHz	High CH 38175 2612.5 MHz	
38 / 15M	1	0	22.67	22.55	22.67	0	22.23	21.77	20.98	1
	1	37	23.19	22.99	22.94	0	22.17	21.76	21.04	1
	1	74	22.63	22.16	22.44	0	21.79	21.53	20.77	1
	36	0	21.81	21.92	22.02	1	20.85	20.88	20.78	2
	36	19	22.11	22.05	21.84	1	20.75	21.06	20.94	2
	36	39	21.82	21.81	21.74	1	20.71	20.81	20.64	2
	75	0	22.00	21.89	21.84	1	20.68	20.89	20.62	2

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH 37850 2580.0 MHz	Mid CH 38000 2595.0 MHz	High CH 38150 2610.0 MHz		Low CH 37850 2580.0 MHz	Mid CH 38000 2595.0 MHz	High CH 38150 2610.0 MHz	
38 / 20M	1	0	22.74	22.62	22.74	0	22.30	21.84	21.05	1
	1	50	**23.26**	23.06	23.01	0	22.24	21.83	21.11	1
	1	99	22.70	22.23	22.51	0	21.86	21.60	20.84	1
	50	0	21.88	21.99	22.09	1	20.92	20.95	20.85	2
	50	25	22.18	22.12	21.91	1	20.82	21.13	21.01	2
	50	50	21.89	21.88	21.81	1	20.78	20.88	20.71	2
	100	0	22.07	21.96	21.91	1	20.75	20.96	20.69	2

4.3.4 Conducted Power of WLAN

Mode		Channel	Frequency (MHz)	Average Power (dBm)
2.4G	802.11b	1	2412	17.27
		6	2437	17.31
		11	2462	16.47
	802.11g	1	2412	12.74
		6	2437	11.85
		11	2462	13.93
	802.11n (HT20)	1	2412	12.77
		6	2437	11.85
		11	2462	14.00

4.3.5 Conducted Power of BT

Mode		Channel	Frequency (MHz)	Average Power (dBm)
Bluetooth	GFSK	0	2402	7.82
		39	2441	9.08
		78	2480	7.19
	π/4-DQPSK	0	2402	6.55
		39	2441	7.79
		78	2480	5.75
	8-DPSK	0	2402	6.56
		39	2441	7.80
		78	2480	5.91
	LE	0	2402	-1.22
		19	2440	0.13
		39	2480	-2.02

4.4 SAR Test Exclusion Evaluations

4.4.1 Standalone SAR Test Exclusion Considerations

According to KDB 447498 D01, the SAR test exclusion condition is based on source-based time-averaged maximum conducted output power, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions. The 1-g and 10-g *SAR test exclusion thresholds* are determined by the following:

a) For 100 MHz to 6 GHz and *test separation distances* ≤ 50 mm:

$$\frac{Max.Tune\ up\ Power_{(mW)}}{Min.Test\ Separation\ Distance_{(mm)}} \times \sqrt{f_{(GHz)}} \leq 3.0 \text{ for SAR-1g, } \leq 7.5 \text{ for SAR-10g}$$

When the minimum *test separation distance* is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

b) For 100 MHz to 1500 MHz and *test separation distances* > 50 mm:

{[Threshold for 50 mm in step a)] + [(test separation distance – 50 mm) · ($f_{(MHz)}$/150)]} mW

c) For > 1500 MHz and ≤ 6 GHz and *test separation distances* > 50 mm:

{[Threshold for 50 mm in step a)] + [(test separation distance – 50 mm) ·10]} mW

When the calculated result in step a) is <= 3.0 for SAR-1g exposure condition, or <= 7.5 for SAR-10g exposure condition, the SAR testing exclusion is applied.

When the device output power is less than the calculated result (power threshold, mW) shown in in step b) and c), the SAR testing exclusion is applied.

Mode	Max. Tune-up Power (dBm)	Max. Tune-up Power (mW)	Head			Body-Worn		
			Ant. to Surface (mm)	Calculated Result	Require SAR Testing?	Ant. to Surface (mm)	Calculated Result	Require SAR Testing?
BT	2.48	9.5	5	2.8	No	10	1.4	No

4.4.2 Estimated SAR Calculation

According to KDB 447498 D01, when an antenna qualifies for the standalone SAR test exclusion and also transmits simultaneously with other antennas, the standalone SAR value must be estimated according to the following to determine the simultaneous transmission SAR test exclusion criteria:

a) For *test separation distances* ≤ 50 mm:

$$Estimated\ SAR = \frac{Max.Tune\ up\ Power_{(mW)}}{Min.Test\ Separation\ Distance_{(mm)}} \times \frac{\sqrt{f(\mathrm{GHz})}}{x}$$

Where x = 7.5 for 1-g SAR and x = 18.75 for 10-g SAR.

b) For *test separation distances* > 50 mm, 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR.

Mode / Band	Frequency (GHz)	Max. Tune-up Power (dBm)	Test Position	Separation Distance (mm)	Estimated SAR (W/kg)
BT (DSS)	2.48	9.5	Head	5	0.37
BT (DSS)	2.48	9.5	Body-worn	10	0.19

4.5 SAR Testing Results

4.5.1 SAR Test Reduction Considerations

KDB 447498 D01 General RF Exposure Guidance

Testing of other required channels within the operating mode of a frequency band is not required when the *reported* SAR for the mid-band or highest output power channel is:

a) ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
b) ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
c) ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

KDB 941225 D01 3G SAR Procedures

a) GSM SAR Test Reduction
SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power specified for production units, including tune-up tolerance. The data mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. The GMSK EDGE configurations are grouped with GPRS and considered with respect to time-averaged maximum output power to determine compliance. The 3G SAR test reduction procedure is applied to 8-PSK EDGE with GMSK GPRS/EDGE as the primary mode.
b) 3G SAR Test Reduction Procedure
The mode tested for SAR is referred to as the primary mode. The equivalent modes considered for SAR test reduction are denoted as secondary modes. Both primary and secondary modes must be in the same frequency band. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ 1/4 dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

KDB 941225 D05 SAR for LTE Devices

a) QPSK with 1 RB and 50% RB allocation
Start with the largest channel bandwidth and measure SAR, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel. When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.
b) QPSK with 100% RB allocation
SAR is not required when the highest maximum output power for 100% RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
c) Higher order modulations
SAR is required only when the highest maximum output power for the configuration in the higher order

modulation is > 1/2 dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

d) Other channel bandwidth
SAR is required when the highest maximum output power of the smaller channel bandwidth is > 1/2 dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.

KDB 941225 D06 Hot Spot SAR

Hotspot mode SAR is measured for all edges and surfaces of the device with a transmitting antenna located within 25 mm from that surface or edge.

Antenna	Front Face	Rear Face	Left Side	Right Side	Top Side	Bottom Side
WWAN Ant	Yes	Yes	Yes	Yes	N/A	Yes
WLAN / BT	Yes	Yes	Yes	N/A	Yes	N/A

KDB 248227 D01 Wi-Fi SAR

a) For handsets operating next to ear, hotspot mode or mini-tablet configurations, the initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When the reported SAR of initial test position is <= 0.4 W/kg, SAR testing for remaining test positions is not required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is <= 0.8 W/kg or all test positions are measured.

b) For WLAN 2.4 GHz, the highest measured maximum output power channel for DSSS was selected for SAR measurement. When the reported SAR is <= 0.8 W/kg, no further SAR testing is required. Otherwise, SAR is evaluated at the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel. For OFDM modes (802.11g/n), SAR is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and it is <= 1.2 W/kg.

c) Duty Cycle
For SAR test, the correct crest factor parameter in the SAR measurement system software was set.
The duty cycle as below table.

Band	Duty Cycle
2.4G WLAN	100%

Note: Crest Factor = 1 / Duty Cycle

4.5.2 SAR Results for Head Exposure Condition

Plot No.	Band	Mode	Test Position	Ch.	Battery	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaling Factor	Scaled SAR-1g (W/kg)
1	GSM850	GPRS12	Right Cheek	251	1	30.5	29.76	0.03	0.492	1.19	0.58
	GSM850	GPRS12	Right Tilted	251	1	30.5	29.76	0.18	0.222	1.19	0.26
	GSM850	GPRS12	Left Cheek	251	1	30.5	29.76	-0.14	0.341	1.19	0.40
	GSM850	GPRS12	Left Tilted	251	1	30.5	29.76	-0.03	0.168	1.19	0.20
	GSM850	GPRS12	Right Cheek	251	2	30.5	29.76	-0.18	0.353	1.19	0.42
	GSM1900	GPRS12	Right Cheek	810	1	26.5	25.75	0.19	0.355	1.19	0.42
	GSM1900	GPRS12	Right Tilted	810	1	26.5	25.75	0.16	0.316	1.19	0.38
2	GSM1900	GPRS12	Left Cheek	810	1	26.5	25.75	-0.03	0.591	1.19	0.70
	GSM1900	GPRS12	Left Tilted	810	1	26.5	25.75	-0.04	0.366	1.19	0.44
	GSM1900	GPRS12	Left Cheek	810	2	26.5	25.75	-0.02	0.337	1.19	0.40
	WCDMA II	RMC12.2K	Right Cheek	9538	1	24.0	23.34	0.17	0.496	1.16	0.58
	WCDMA II	RMC12.2K	Right Tilted	9538	1	24.0	23.34	0.04	0.351	1.16	0.41
	WCDMA II	RMC12.2K	Left Cheek	9538	1	24.0	23.34	0.14	0.827	1.16	0.96
	WCDMA II	RMC12.2K	Left Tilted	9538	1	24.0	23.34	0.01	0.500	1.16	0.58
	WCDMA II	RMC12.2K	Left Cheek	9262	1	24.0	23.28	0.15	0.764	1.18	0.90
3	WCDMA II	RMC12.2K	Left Cheek	9400	1	24.0	23.26	0.17	0.839	1.19	0.99
	WCDMA II	RMC12.2K	Left Cheek	9400	2	24.0	23.26	0.06	0.585	1.19	0.69
	WCDMA II	RMC12.2K	Left Cheek	9400	1	24.0	23.26	0.16	0.836	1.19	0.99
	WCDMA V	RMC12.2K	Right Cheek	4233	1	24.0	23.35	0.01	0.227	1.16	0.26
	WCDMA V	RMC12.2K	Right Tilted	4233	1	24.0	23.35	0.06	0.068	1.16	0.08
	WCDMA V	RMC12.2K	Left Cheek	4233	1	24.0	23.35	0.08	0.086	1.16	0.10
	WCDMA V	RMC12.2K	Left Tilted	4233	1	24.0	23.35	-0.07	0.023	1.16	0.03
4	WCDMA V	RMC12.2K	Right Cheek	4233	2	24.0	23.35	0.18	0.319	1.16	0.37

Plot No.	Band	Mode	Test Position	Ch.	Battery	RB#	RB Offset	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaling Factor	Scaled SAR-1g (W/kg)
5	LTE 4	QPSK20M	Right Cheek	20175	1	1	50	23.5	22.72	0.14	0.367	1.20	0.44
	LTE 4	QPSK20M	Right Tilted	20175	1	1	50	23.5	22.72	-0.01	0.181	1.20	0.22
	LTE 4	QPSK20M	Left Cheek	20175	1	1	50	23.5	22.72	0.02	0.258	1.20	0.31
	LTE 4	QPSK20M	Left Tilted	20175	1	1	50	23.5	22.72	0.09	0.208	1.20	0.25
	LTE 4	QPSK20M	Right Cheek	20175	1	50	0	22.5	21.69	0.08	0.249	1.21	0.30
	LTE 4	QPSK20M	Right Tilted	20175	1	50	0	22.5	21.69	0.04	0.142	1.21	0.17
	LTE 4	QPSK20M	Left Cheek	20175	1	50	0	22.5	21.69	0.12	0.200	1.21	0.24
	LTE 4	QPSK20M	Left Tilted	20175	1	50	0	22.5	21.69	0.04	0.161	1.21	0.19
	LTE 4	QPSK20M	Right Cheek	20175	2	1	50	23.5	22.72	0.03	0.289	1.20	0.35
	LTE 5	QPSK10M	Right Cheek	20600	1	1	24	24.5	23.47	0.08	0.439	1.27	0.56
	LTE 5	QPSK10M	Right Tilted	20600	1	1	24	24.5	23.47	-0.03	0.275	1.27	0.35
6	LTE 5	QPSK10M	Left Cheek	20600	1	1	24	24.5	23.47	0.02	0.460	1.27	0.58
	LTE 5	QPSK10M	Left Tilted	20600	1	1	24	24.5	23.47	-0.03	0.231	1.27	0.29
	LTE 5	QPSK10M	Right Cheek	20600	1	25	0	23.5	22.45	0.05	0.341	1.27	0.43
	LTE 5	QPSK10M	Right Tilted	20600	1	25	0	23.5	22.45	0.11	0.200	1.27	0.25
	LTE 5	QPSK10M	Left Cheek	20600	1	25	0	23.5	22.45	-0.01	0.321	1.27	0.41
	LTE 5	QPSK10M	Left Tilted	20600	1	25	0	23.5	22.45	-0.02	0.178	1.27	0.23
	LTE 5	QPSK10M	Left Cheek	20600	2	1	24	24.5	23.47	-0.02	0.320	1.27	0.41
	LTE 7	QPSK20M	Right Cheek	21350	1	1	50	24.0	23.23	0.05	0.186	1.19	0.22
	LTE 7	QPSK20M	Right Tilted	21350	1	1	50	24.0	23.23	0.14	0.106	1.19	0.13
7	LTE 7	QPSK20M	Left Cheek	21350	1	1	50	24.0	23.23	0.15	0.387	1.19	0.46
	LTE 7	QPSK20M	Left Tilted	21350	1	1	50	24.0	23.23	0.12	0.092	1.19	0.11
	LTE 7	QPSK20M	Right Cheek	21350	1	50	25	23.0	21.89	0.00	0.149	1.29	0.19
	LTE 7	QPSK20M	Right Tilted	21350	1	50	25	23.0	21.89	0.13	0.088	1.29	0.11
	LTE 7	QPSK20M	Left Cheek	21350	1	50	25	23.0	21.89	0.09	0.306	1.29	0.40
	LTE 7	QPSK20M	Left Tilted	21350	1	50	25	23.0	21.89	0.19	0.072	1.29	0.09
	LTE 7	QPSK20M	Left Cheek	21350	2	1	50	24.0	23.23	-0.03	0.294	1.19	0.35
	LTE 38	QPSK20M	Right Cheek	37850	1	1	50	24.0	23.26	-0.04	0.068	1.19	0.08
	LTE 38	QPSK20M	Right Tilted	37850	1	1	50	24.0	23.26	0.18	0.045	1.19	0.05
8	LTE 38	QPSK20M	Left Cheek	37850	1	1	50	24.0	23.26	0.16	0.151	1.19	0.18
	LTE 38	QPSK20M	Left Tilted	37850	1	1	50	24.0	23.26	0.15	0.043	1.19	0.05
	LTE 38	QPSK20M	Right Cheek	37850	1	50	25	23.0	22.18	0.04	0.051	1.21	0.06
	LTE 38	QPSK20M	Right Tilted	37850	1	50	25	23.0	22.18	0.17	0.038	1.21	0.05
	LTE 38	QPSK20M	Left Cheek	37850	1	50	25	23.0	22.18	0.04	0.124	1.21	0.15
	LTE 38	QPSK20M	Left Tilted	37850	1	50	25	23.0	22.18	0.12	0.037	1.21	0.04
	LTE 38	QPSK20M	Left Cheek	37850	2	1	50	24.0	23.26	0.13	0.130	0.07	0.01

Plot No.	Band	Mode	Test Position	Ch.	Batery	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaling Factor	Scaled SAR-1g (W/kg)
9	802.11b	-	Right Cheek	6	1	17.5	17.31	-0.10	0.784	1.04	0.82
	802.11b	-	Right Tilted	6	1	17.5	17.31	-0.08	0.495	1.04	0.52
	802.11b	-	Left Cheek	6	1	17.5	17.31	-0.02	0.301	1.04	0.31
	802.11b	-	Left Tilted	6	1	17.5	17.31	0.14	0.364	1.04	0.38
	802.11b	-	Right Cheek	1	1	17.5	17.31	-0.16	0.759	1.04	0.79
	802.11b	-	Right Cheek	6	2	17.5	17.31	0.02	0.709	1.04	0.74

4.5.3 SAR Results for Body-worn Exposure Condition (Separation Distance is 1.0 cm)

Plot No.	Band	Mode	Test Position	Ch.	Battery	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaling Factor	Scaled SAR-1g (W/kg)
	GSM850	GPRS12	Front Face	251	1	30.5	29.76	-0.06	0.302	1.19	0.36
	GSM850	GPRS12	Rear Face	251	1	30.5	29.76	0.08	0.494	1.19	0.59
10	GSM850	GPRS12	Rear Face	251	2	30.5	29.76	0.03	0.617	1.19	0.73
	GSM1900	GPRS12	Front Face	810	1	26.5	25.75	-0.07	0.502	1.19	0.60
11	GSM1900	GPRS12	Rear Face	810	1	26.5	25.75	-0.07	0.560	1.19	0.67
	GSM1900	GPRS12	Rear Face	810	2	26.5	25.75	-0.08	0.488	1.19	0.58
	WCDMA II	RMC12.2K	Front Face	9538	1	24.0	23.34	-0.01	0.719	1.16	0.84
12	WCDMA II	RMC12.2K	Rear Face	9538	1	24.0	23.34	-0.03	0.759	1.16	0.88
	WCDMA II	RMC12.2K	Front Face	9262	1	24.0	23.28	-0.09	0.680	1.18	0.80
	WCDMA II	RMC12.2K	Front Face	9400	1	24.0	23.26	-0.07	0.719	1.19	0.85
	WCDMA II	RMC12.2K	Rear Face	9262	1	24.0	23.28	-0.04	0.538	1.18	0.64
	WCDMA II	RMC12.2K	Rear Face	9400	1	24.0	23.26	-0.07	0.667	1.19	0.79
	WCDMA II	RMC12.2K	Rear Face	9538	2	24.0	23.34	-0.10	0.759	1.16	0.88
	WCDMA V	RMC12.2K	Front Face	4233	1	24.0	23.35	-0.15	0.420	1.16	0.49
13	WCDMA V	RMC12.2K	Rear Face	4233	1	24.0	23.35	0.03	0.470	1.16	0.55
	WCDMA V	RMC12.2K	Rear Face	4233	2	24.0	23.35	0.05	0.250	1.16	0.29

Plot No.	Band	Mode	Test Position	Ch.	Battery	RB#	RB Offset	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaling Factor	Scaled SAR-1g (W/kg)
	LTE 4	QPSK20M	Front Face	20175	1	1	50	23.5	22.72	0.09	0.643	1.20	0.77
14	LTE 4	QPSK20M	Rear Face	20175	1	1	50	23.5	22.72	-0.01	0.657	1.20	0.79
	LTE 4	QPSK20M	Front Face	20175	1	50	0	22.5	21.69	0.08	0.513	1.21	0.62
	LTE 4	QPSK20M	Rear Face	20175	1	50	0	22.5	21.69	0.06	0.509	1.21	0.61
	LTE 4	QPSK20M	Rear Face	20175	2	1	50	23.5	22.72	0.02	0.579	1.20	0.69
	LTE 5	QPSK10M	Front Face	20600	1	1	24	24.5	23.47	0.03	0.505	1.27	0.64
15	LTE 5	QPSK10M	Rear Face	20600	1	1	24	24.5	23.47	0.00	0.597	1.27	0.76
	LTE 5	QPSK10M	Front Face	20600	1	25	0	23.5	22.45	-0.03	0.361	1.27	0.46
	LTE 5	QPSK10M	Rear Face	20600	1	25	0	23.5	22.45	0.00	0.460	1.27	0.59
	LTE 5	QPSK10M	Rear Face	20600	2	1	24	24.5	23.47	0.00	0.560	1.27	0.71
	LTE 7	QPSK20M	Front Face	21350	1	1	50	24.0	23.23	0.11	0.535	1.19	0.64
	LTE 7	QPSK20M	Rear Face	21350	1	1	50	24.0	23.23	0.12	0.948	1.19	1.13
	LTE 7	QPSK20M	Front Face	21350	1	50	25	23.0	21.89	0.07	0.412	1.29	0.53
	LTE 7	QPSK20M	Rear Face	21350	1	50	25	23.0	21.89	0.11	0.783	1.29	1.01
	LTE 7	QPSK20M	Rear Face	21350	1	100	0	23.0	21.96	-0.05	0.637	1.27	0.81
16	LTE 7	QPSK20M	Rear Face	20850	1	1	50	24.0	22.99	0.06	0.955	1.26	1.21
	LTE 7	QPSK20M	Rear Face	21100	1	1	50	24.0	22.75	0.00	0.808	1.33	1.08
	LTE 7	QPSK20M	Rear Face	20850	1	50	25	23.0	21.81	-0.05	0.771	1.32	1.01
	LTE 7	QPSK20M	Rear Face	21100	1	50	25	23.0	21.87	0.03	0.625	1.30	0.81
	LTE 7	QPSK20M	Rear Face	20850	2	1	50	24.0	23.23	0.04	0.882	1.19	1.05
	LTE 7	QPSK20M	Rear Face	20850	1	1	50	24.0	22.99	0.13	0.945	1.26	1.19
	LTE 38	QPSK20M	Front Face	37850	1	1	50	24.0	23.26	0.19	0.196	1.19	0.23
17	LTE 38	QPSK20M	Rear Face	37850	1	1	50	24.0	23.26	-0.14	0.390	1.19	0.46
	LTE 38	QPSK20M	Front Face	37850	1	50	25	23.0	22.18	0.13	0.158	1.21	0.19
	LTE 38	QPSK20M	Rear Face	37850	1	50	25	23.0	22.18	0.10	0.295	1.21	0.36
	LTE 38	QPSK20M	Rear Face	37850	2	1	50	24.0	23.26	-0.06	0.308	1.19	0.37

Plot No.	Band	Mode	Test Position	Ch.	Battery	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaling Factor	Scaled SAR-1g (W/kg)
	802.11b	-	Front Face	6	1	17.5	17.31	0.00	0.188	1.04	0.20
18	802.11b	-	Rear Face	6	1	17.5	17.31	-0.09	0.276	1.04	0.29
	802.11b	-	Rear Face	6	2	17.5	17.31	-0.08	0.245	1.04	0.26

4.5.4 SAR Results for Hotspot Exposure Condition (Separation Distance is 1.0 cm)

Plot No.	Band	Mode	Test Position	Ch.	Battery	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaling Factor	Scaled SAR-1g (W/kg)
	GSM850	GPRS12	Front Face	251	1	30.5	29.76	-0.06	0.302	1.19	0.36
	GSM850	GPRS12	Rear Face	251	1	30.5	29.76	0.08	0.494	1.19	0.59
	GSM850	GPRS12	Left Side	251	1	30.5	29.76	-0.03	0.398	1.19	0.47
	GSM850	GPRS12	Right Side	251	1	30.5	29.76	0.04	0.170	1.19	0.20
	GSM850	GPRS12	Bottom Side	251	1	30.5	29.76	0.08	0.083	1.19	0.10
10	GSM850	GPRS12	Rear Face	251	2	30.5	29.76	0.03	0.617	1.19	0.73
	GSM1900	GPRS12	Front Face	810	1	26.5	25.75	-0.07	0.502	1.19	0.60
11	GSM1900	GPRS12	Rear Face	810	1	26.5	25.75	-0.07	0.560	1.19	0.67
	GSM1900	GPRS12	Left Side	810	1	26.5	25.75	-0.12	0.336	1.19	0.40
	GSM1900	GPRS12	Right Side	810	1	26.5	25.75	-0.10	0.241	1.19	0.29
	GSM1900	GPRS12	Bottom Side	810	1	26.5	25.75	-0.14	0.348	1.19	0.41
	GSM1900	GPRS12	Rear Face	810	2	26.5	25.75	-0.08	0.488	1.19	0.58
	WCDMA II	RMC12.2K	Front Face	9538	1	24.0	23.34	-0.01	0.719	1.16	0.84
12	WCDMA II	RMC12.2K	Rear Face	9538	1	24.0	23.34	-0.03	0.759	1.16	0.88
	WCDMA II	RMC12.2K	Left Side	9538	1	24.0	23.34	-0.05	0.463	1.16	0.54
	WCDMA II	RMC12.2K	Right Side	9538	1	24.0	23.34	-0.09	0.327	1.16	0.38
	WCDMA II	RMC12.2K	Bottom Side	9538	1	24.0	23.34	-0.03	0.540	1.16	0.63
	WCDMA II	RMC12.2K	Front Face	9262	1	24.0	23.28	-0.09	0.680	1.18	0.80
	WCDMA II	RMC12.2K	Front Face	9400	1	24.0	23.26	-0.07	0.719	1.19	0.85
	WCDMA II	RMC12.2K	Rear Face	9262	1	24.0	23.28	-0.04	0.538	1.18	0.64
	WCDMA II	RMC12.2K	Rear Face	9400	1	24.0	23.26	-0.07	0.667	1.19	0.79
	WCDMA II	RMC12.2K	Rear Face	9538	2	24.0	23.34	-0.10	0.759	1.16	0.88
	WCDMA V	RMC12.2K	Front Face	4233	1	24.0	23.35	-0.15	0.420	1.16	0.49
13	WCDMA V	RMC12.2K	Rear Face	4233	1	24.0	23.35	0.03	0.470	1.16	0.55
	WCDMA V	RMC12.2K	Left Side	4233	1	24.0	23.35	-0.17	0.330	1.16	0.38
	WCDMA V	RMC12.2K	Right Side	4233	1	24.0	23.35	0.09	0.297	1.16	0.38
	WCDMA V	RMC12.2K	Bottom Side	4233	1	24.0	23.35	0.05	0.064	1.16	0.07
	WCDMA V	RMC12.2K	Rear Face	4233	2	24.0	23.35	0.05	0.250	1.16	0.29

Plot No.	Band	Mode	Test Position	Ch.	Battery	RB#	RB Offset	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaling Factor	Scaled SAR-1g (W/kg)
	LTE 4	QPSK20M	Front Face	20175	1	1	50	23.5	22.72	0.09	0.643	1.20	0.77
	LTE 4	QPSK20M	Rear Face	20175	1	1	50	23.5	22.72	-0.01	0.657	1.20	0.79
	LTE 4	QPSK20M	Left Side	20175	1	1	50	23.5	22.72	0.08	0.152	1.20	0.18
	LTE 4	QPSK20M	Right Side	20175	1	1	50	23.5	22.72	0.04	0.203	1.20	0.24
	LTE 4	QPSK20M	Bottom Side	20175	1	1	50	23.5	22.72	-0.03	0.999	1.20	1.20
	LTE 4	QPSK20M	Front Face	20175	1	50	0	22.5	21.69	0.08	0.513	1.21	0.62
	LTE 4	QPSK20M	Rear Face	20175	1	50	0	22.5	21.69	0.06	0.509	1.21	0.61
	LTE 4	QPSK20M	Left Side	20175	1	50	0	22.5	21.69	0.13	0.112	1.21	0.13
	LTE 4	QPSK20M	Right Side	20175	1	50	0	22.5	21.69	0.16	0.150	1.21	0.18
	LTE 4	QPSK20M	Bottom Side	20175	1	50	0	22.5	21.69	-0.03	0.803	1.21	0.97
	LTE 4	QPSK20M	Bottom Side	20175	1	100	0	22.5	21.65	-0.01	0.801	1.22	0.97
19	LTE 4	QPSK20M	Bottom Side	20050	1	1	50	23.5	22.66	-0.02	1.080	1.21	1.31
	LTE 4	QPSK20M	Bottom Side	20300	1	1	50	23.5	22.63	-0.02	0.831	1.22	1.02
	LTE 4	QPSK20M	Bottom Side	20050	1	50	0	22.5	21.65	-0.03	0.885	1.22	1.08
	LTE 4	QPSK20M	Bottom Side	20300	1	50	0	22.5	21.68	-0.02	0.704	1.21	0.85
	LTE 4	QPSK20M	Bottom Side	20050	2	1	50	23.5	22.66	0.14	0.811	1.21	0.98
	LTE 4	QPSK20M	Bottom Side	20050	1	1	50	23.5	22.66	0.01	1.020	1.21	1.24
	LTE 4	QPSK20M	Bottom Side	20050	1	1	50	23.5	22.66	0.02	1.040	1.21	1.26
	LTE 5	QPSK10M	Front Face	20600	1	1	24	24.5	23.47	0.03	0.505	1.27	0.64
15	LTE 5	QPSK10M	Rear Face	20600	1	1	24	24.5	23.47	0.00	0.597	1.27	0.76
	LTE 5	QPSK10M	Left Side	20600	1	1	24	24.5	23.47	0.02	0.463	1.27	0.59
	LTE 5	QPSK10M	Right Side	20600	1	1	24	24.5	23.47	0.00	0.448	1.27	0.57
	LTE 5	QPSK10M	Bottom Side	20600	1	1	24	24.5	23.47	0.06	0.059	1.27	0.08
	LTE 5	QPSK10M	Front Face	20600	1	25	0	23.5	22.45	-0.03	0.361	1.27	0.46
	LTE 5	QPSK10M	Rear Face	20600	1	25	0	23.5	22.45	0.00	0.460	1.27	0.59
	LTE 5	QPSK10M	Left Side	20600	1	25	0	23.5	22.45	-0.05	0.358	1.27	0.46
	LTE 5	QPSK10M	Right Side	20600	1	25	0	23.5	22.45	0.00	0.330	1.27	0.42
	LTE 5	QPSK10M	Bottom Side	20600	1	25	0	23.5	22.45	-0.01	0.045	1.27	0.06
	LTE 5	QPSK10M	Rear Face	20600	2	1	24	24.5	23.47	0.00	0.560	1.27	0.71
	LTE 7	QPSK20M	Front Face	21350	1	1	50	24.0	23.23	0.11	0.535	1.19	0.64
	LTE 7	QPSK20M	Rear Face	21350	1	1	50	24.0	23.23	0.12	0.948	1.19	1.13
	LTE 7	QPSK20M	Left Side	21350	1	1	50	24.0	23.23	-0.03	0.197	1.19	0.24
	LTE 7	QPSK20M	Right Side	21350	1	1	50	24.0	23.23	-0.06	0.083	1.19	0.10
	LTE 7	QPSK20M	Bottom Side	21350	1	1	50	24.0	23.23	0.04	0.507	1.19	0.61
	LTE 7	QPSK20M	Front Face	21350	1	50	25	23.0	21.89	0.07	0.412	1.29	0.53
	LTE 7	QPSK20M	Rear Face	21350	1	50	25	23.0	21.89	0.11	0.783	1.29	1.01
	LTE 7	QPSK20M	Left Side	21350	1	50	25	23.0	21.89	-0.04	0.153	1.29	0.20
	LTE 7	QPSK20M	Right Side	21350	1	50	25	23.0	21.89	0.01	0.068	1.29	0.09
	LTE 7	QPSK20M	Bottom Side	21350	1	50	25	23.0	21.89	-0.01	0.402	1.29	0.52
	LTE 7	QPSK20M	Rear Face	21350	1	100	0	23.0	21.96	-0.05	0.637	1.27	0.81
16	LTE 7	QPSK20M	Rear Face	20850	1	1	50	24.0	22.99	0.06	0.955	1.26	1.21
	LTE 7	QPSK20M	Rear Face	21100	1	1	50	24.0	22.75	0.00	0.808	1.33	1.08
	LTE 7	QPSK20M	Rear Face	20850	1	50	25	23.0	21.81	-0.05	0.771	1.32	1.01
	LTE 7	QPSK20M	Rear Face	21100	1	50	25	23.0	21.87	0.03	0.625	1.30	0.81
	LTE 7	QPSK20M	Rear Face	20850	2	1	50	24.0	23.23	0.04	0.882	1.19	1.05
	LTE 7	QPSK20M	Rear Face	20850	1	1	50	24.0	22.99	0.13	0.945	1.26	1.19
	LTE 38	QPSK20M	Front Face	37850	1	1	50	24.0	23.26	0.19	0.196	1.19	0.23
17	LTE 38	QPSK20M	Rear Face	37850	1	1	50	24.0	23.26	-0.14	0.390	1.19	0.46
	LTE 38	QPSK20M	Left Side	37850	1	1	50	24.0	23.26	-0.02	0.085	1.19	0.10
	LTE 38	QPSK20M	Right Side	37850	1	1	50	24.0	23.26	-0.08	0.044	1.19	0.05
	LTE 38	QPSK20M	Bottom Side	37850	1	1	50	24.0	23.26	0.01	0.241	1.19	0.29
	LTE 38	QPSK20M	Front Face	37850	1	50	25	23.0	22.18	0.13	0.158	1.21	0.19
	LTE 38	QPSK20M	Rear Face	37850	1	50	25	23.0	22.18	0.10	0.295	1.21	0.36
	LTE 38	QPSK20M	Left Side	37850	1	50	25	23.0	22.18	0.00	0.066	1.21	0.08
	LTE 38	QPSK20M	Right Side	37850	1	50	25	23.0	22.18	-0.15	0.035	1.21	0.04
	LTE 38	QPSK20M	Bottom Side	37850	1	50	25	23.0	22.18	-0.01	0.192	1.21	0.23
	LTE 38	QPSK20M	Rear Face	37850	2	1	50	24.0	23.26	-0.06	0.308	1.19	0.37

Plot No.	Band	Mode	Test Position	Ch.	Battery	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaling Factor	Scaled SAR-1g (W/kg)
	802.11b	-	Front Face	6	1	17.5	17.31	0.00	0.188	1.04	0.20
18	802.11b	-	Rear Face	6	1	17.5	17.31	-0.09	0.276	1.04	0.29
	802.11b	-	Left Side	6	1	17.5	17.31	-0.04	0.153	1.04	0.16
	802.11b	-	Top Side	6	1	17.5	17.31	-0.14	0.178	1.04	0.19
	802.11b	-	Rear Face	6	2	17.5	17.31	-0.08	0.245	1.04	0.26

4.6 SAR Measurement Variability

4.6.1 Repeated Measurement

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

SAR repeated measurement procedure:

1. When the highest measured SAR is < 0.80 W/kg, repeated measurement is not required.
2. When the highest measured SAR is >= 0.80 W/kg, repeat that measurement once.
3. If the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20, or when the original or repeated measurement is >= 1.45 W/kg, perform a second repeated measurement.
4. If the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20, and the original, first or second repeated measurement is >= 1.5 W/kg, perform a third repeated measurement.

Band	Mode	Test Position	Ch.	Original Measured SAR-1g (W/kg)	1st Repeated SAR-1g (W/kg)	L/S Ratio	2nd Repeated SAR-1g (W/kg)	L/S Ratio	3rd Repeated SAR-1g (W/kg)	L/S Ratio
WCDMA II	RMC12.2K	Left Cheek	9400	0.839	0.836	1.00	N/A	N/A	N/A	N/A
LTE 7	QPSK20M	Rear Face	20850	0.955	0.945	1.01	N/A	N/A	N/A	N/A
LTE 4	QPSK20M	Bottom Side	20050	1.080	1.020	1.06	N/A	N/A	N/A	N/A

4.6.2 DUT Holder Perturbations

Depending on antenna locations, buttons locations on phones or device, form factor (e.g. dongles etc.), the measured SAR could be influenced by the relative positions of the test device and its holder.

When the highest reported SAR of an antenna is > 1.2 W/kg, holder perturbation verification is required, using the highest SAR configuration among all applicable frequency bands with and without the device holder.

Band	Mode	Test Position	Ch.	Original Scaled SAR-1g (W/kg) with holder	Scaled SAR-1g (W/kg) without holder
LTE 4	QPSK20M	Bottom Side	20050	1.080	1.040

Note: The SAR result with and without the device holder are almost the same, so the influence of SAR test with device holder is very low.

4.7 Simultaneous Multi-band Transmission Evaluation

4.7.1 Simultaneous Transmission SAR Test Exclusion Considerations

a) Sum of SAR

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna. When the sum of SAR_{1g} of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit (SAR_{1g} 1.6 W/kg), the simultaneous transmission SAR is not required. When the sum of SAR_{1g} is greater than the SAR limit (SAR_{1g} 1.6 W/kg), SAR test exclusion is determined by the SPLSR.

b) SAR to Peak Location Separation Ratio

The simultaneous transmitting antennas in each operating mode and exposure condition combination are considered one pair at a time to determine the SPLSR.

$$SPLSR = (SAR_1 + SAR_2)^{1.5}/R_i$$

The ratio is rounded to two decimal digits, and must be ≤ 0.04 for all antenna pairs in the configuration to qualify for 1-g SAR test exclusion. When 10-g SAR applies, the ratio must be ≤ 0.10.

SAR_1 and SAR_2 are the highest reported or estimated SAR values for each antenna in the pair, and R_i is the separation distance in mm between the peak SAR locations for the antenna pair

$$peak\ location\ separation\ distance = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2 + (z_1 - z_2)^2}$$

Where (x_1, y_1, z_1) and (x_2, y_2, z_2) are the coordinates of the extrapolated peak SAR locations in the area or zoom scans.

When standalone test exclusion applies, SAR is estimated; the peak location is assumed to be at the feed-point or geometric center of the antenna. Due to curvatures on the SAM phantom, when SAR is estimated for one of the antennas in an antenna pair, the measured peak SAR location will be translated onto the test device to determine the peak location separation for the antenna pair.

When SAR is estimated for both antennas, the peak location separation should be determined by the closest physical separation of the antennas, according to the feed-point or geometric center of the antennas.

c) Volume Scan

When the SPLSR is <= 0.04 for 1-g SAR and <= 0.10 for 10-g SAR, the simultaneous transmission SAR is not required. Otherwise, the enlarged zoom scan and volume scan post-processing procedures will be performed.

4.7.2 Simultaneous Transmission Possibilities

The simultaneous transmission possibilities for this device are listed as below.

Simultaneous Transmission Configurations	Head (Voice / VoIP)	Body-worn (Voice / VoIP)	Hotspot (Data)
GSM (Voice / Data) + WLAN (Data)	Yes	Yes	Yes
WCDMA (Voice / Data) + WLAN (Data)	Yes	Yes	Yes
LTE (Data) + WLAN (Data)	Yes	Yes	Yes
GSM (Voice / Data) + BT (Data)	Yes	Yes	No
WCDMA (Voice / Data) + BT (Data)	Yes	Yes	No
LTE (Data) + BT (Data)	Yes	Yes	No

Note:

1. The WLAN and Bluetooth cannot transmit simultaneously, so there is no co-location test requirement for WLAN and Bluetooth.

4.7.3 Max. Standalone SAR

WWAN

Position		GSM		WCDMA		LTE			
		850	1900	II	V	4	5	7	38
Head	Right Cheek	0.58	0.42	0.58	0.37	0.44	0.56	0.22	0.08
	Right Tilted	0.26	0.38	0.41	0.08	0.22	0.35	0.13	0.05
	Left Cheek	0.40	0.70	0.99	0.10	0.31	0.58	0.46	0.18
	Left Tilted	0.20	0.44	0.58	0.03	0.25	0.29	0.11	0.05
Body-worn	Front Face	0.36	0.60	0.84	0.49	0.77	0.64	0.64	0.23
	Rear Face	0.73	0.67	0.88	0.55	0.79	0.76	1.21	0.46
Hotspot	Front Face	0.36	0.60	0.84	0.49	0.77	0.64	0.64	0.23
	Rear Face	0.73	0.67	0.88	0.55	0.79	0.76	1.21	0.46
	Left Side	0.47	0.40	0.54	0.38	0.18	0.59	0.24	0.10
	Right Side	0.20	0.29	0.38	0.38	0.24	0.57	0.10	0.05
	Top Side	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bottom Side	0.10	0.41	0.63	0.07	1.31	0.08	0.61	0.29

WLAN & BT

Position		WLAN	BT
		2.4G	2.4G
Head	Right Cheek	0.82	0.37
	Right Tilted	0.52	0.37
	Left Cheek	0.31	0.37
	Left Tilted	0.38	0.37
Body-worn	Front Face	0.20	0.19
	Rear Face	0.29	0.19
Hotspot	Front Face	0.20	N/A
	Rear Face	0.29	N/A
	Left Side	0.16	N/A
	Right Side	0.00	N/A
	Top Side	0.19	N/A
	Bottom Side	0.00	N/A

4.7.4 Sum of SAR

WWAN + WLAN (DTS)

Position		Highest Simultaneous Transmission SAR	GSM		WCDMA		LTE			
			850	1900	II	V	4	5	7	38
Head	Right Cheek	1.40	1.40	1.24	1.40	1.19	1.26	1.38	1.04	0.90
	Right Tilted		0.78	0.89	0.93	0.60	0.73	0.87	0.64	0.57
	Left Cheek		0.72	1.02	1.31	0.41	0.62	0.90	0.78	0.49
	Left Tilted		0.58	0.82	0.96	0.41	0.63	0.67	0.49	0.43
Body-worn	Front Face	1.49	0.55	0.79	1.03	0.68	0.97	0.84	0.84	0.43
	Rear Face		1.02	0.95	1.17	0.83	1.07	1.05	1.49	0.75
Hotspot	Front Face	1.49	0.55	0.79	1.03	0.68	0.97	0.84	0.84	0.43
	Rear Face		1.02	0.95	1.17	0.83	1.07	1.05	1.49	0.75
	Left Side		0.63	0.56	0.70	0.54	0.34	0.75	0.40	0.26
	Right Side		0.20	0.29	0.38	0.38	0.24	0.57	0.10	0.05
	Top Side		0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
	Bottom Side		0.10	0.41	0.63	0.07	1.31	0.08	0.61	0.29

WWAN + BT(DSS)

Position		Highest Simultaneous Transmission SAR	GSM		WCDMA		LTE			
			850	1900	II	V	4	5	7	38
Head	Right Cheek	1.36	0.95	0.79	0.95	0.74	0.81	0.93	0.59	0.45
	Right Tilted		0.63	0.75	0.78	0.45	0.59	0.72	0.50	0.42
	Left Cheek		0.77	1.07	1.36	0.47	0.68	0.95	0.83	0.55
	Left Tilted		0.57	0.81	0.95	0.40	0.62	0.66	0.48	0.42
Body-worn	Front Face	1.40	0.55	0.79	1.03	0.68	0.96	0.83	0.83	0.42
	Rear Face		0.92	0.86	1.07	0.74	0.98	0.95	1.40	0.65

Appendix A. SAR Plots of System Verification

The plots for system verification with largest deviation for each SAR system combination are shown as follows.

Date: 8/21/2017

Test Laboratory: Intertek Service

System Check 835 HEAD

Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL835 Medium parameters used: f = 835 MHz; $\sigma = 0.89$ S/m; $\varepsilon_r = 41.5$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section

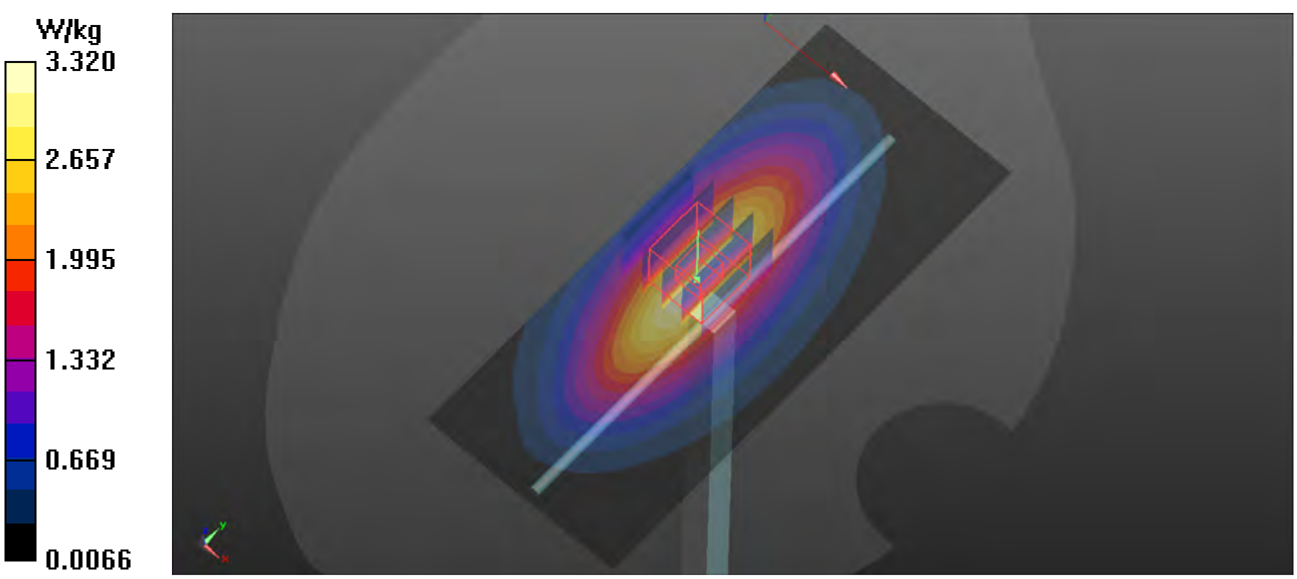
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(9.38, 9.38, 9.38); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: SAM 2 V5.0 (30deg); Type: QD 000 P40 CD; Serial: 1888
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Pin=250 mW/Area Scan (51x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 3.32 W/kg

Pin=250 mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 59.76 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 3.46 W/kg
SAR(1 g) = 2.29 W/kg; SAR(10 g) = 1.52 W/kg
Maximum value of SAR (measured) = 3.04 W/kg



Date: 8/25/2017

Test Laboratory: Intertek Service

System Check 1750 HEAD

Communication System: UID 0, CW (0); Frequency: 1750 MHz;Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used: f = 1750 MHz; σ = 1.38 S/m; ε_r = 39.724; ρ = 1000 kg/m^3
Phantom section: Flat Section

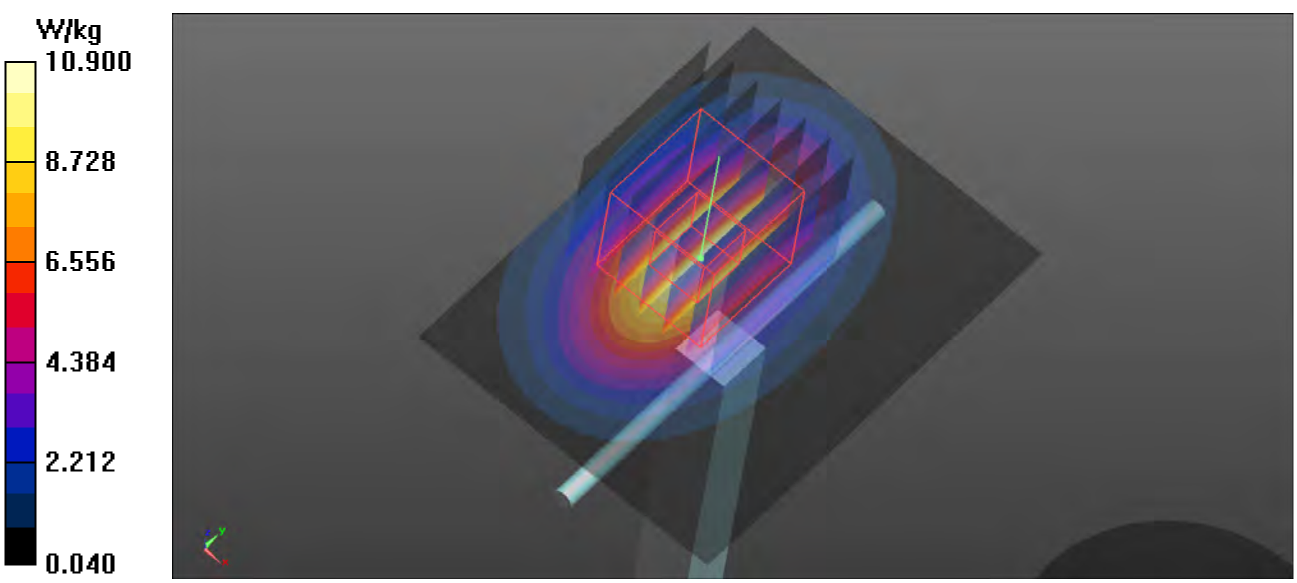
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(8.41, 8.41, 8.41); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: SAM 2 V5.0 (30deg); Type: QD 000 P40 CD; Serial: 1888
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Pin=250 mW/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 10.9 W/kg

Pin=250 mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 72.97 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 15.3 W/kg
SAR(1 g) = 8.7 W/kg; SAR(10 g) = 4.73 W/kg
Maximum value of SAR (measured) = 10.9 W/kg



Date: 8/25/2017

Test Laboratory: Intertek Service

System Check 1900 HEAD

Communication System: UID 0, _CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL1950 Medium parameters used: f = 1900 MHz; σ = 1.36 S/m; ε_r = 39.8; ρ = 1000 kg/m^3
Phantom section: Flat Section

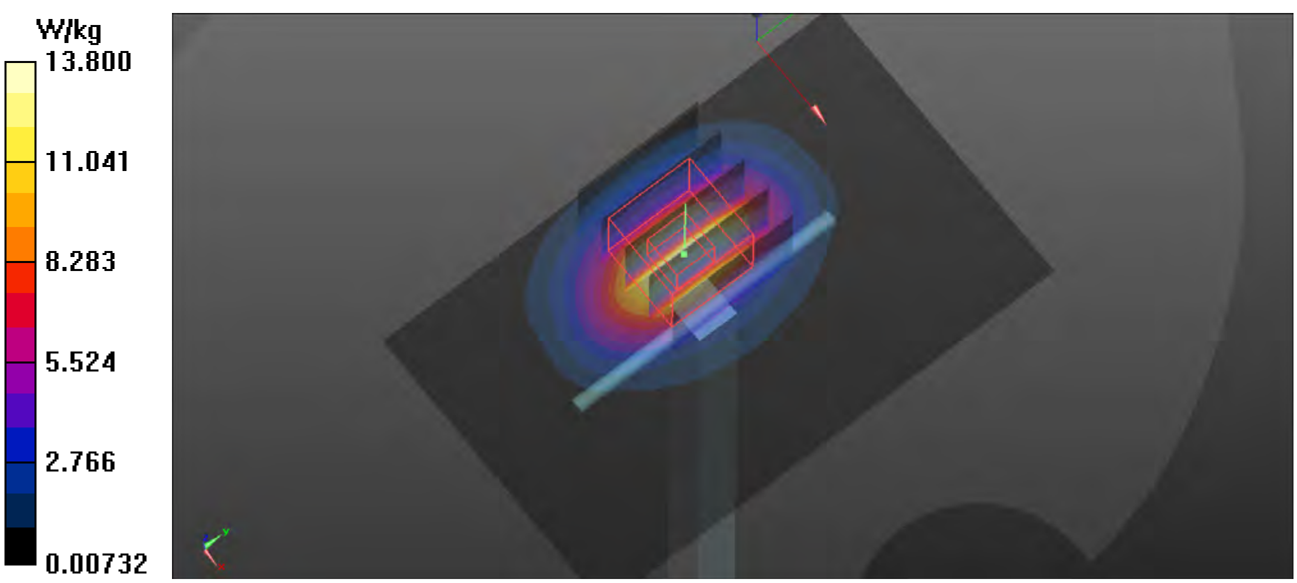
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(7.88, 7.88, 7.88); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: SAM 2 V5.0 (30deg); Type: QD 000 P40 CD; Serial: 1888
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Pin=250 mW/Area Scan (51x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 13.8 W/kg

Pin=250 mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 83.80 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 16.6 W/kg
SAR(1 g) = 9.2 W/kg; SAR(10 g) = 4.92 W/kg
Maximum value of SAR (measured) = 13.9 W/kg



Date: 9/01/2017

Test Laboratory: Intertek Service

System Check 2450 HEAD

Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: 2450 HSL Medium parameters used: f = 2450 MHz; σ = 1.825 S/m; ε_r = 37.945; ρ = 1000 kg/m^3
Phantom section: Flat Section

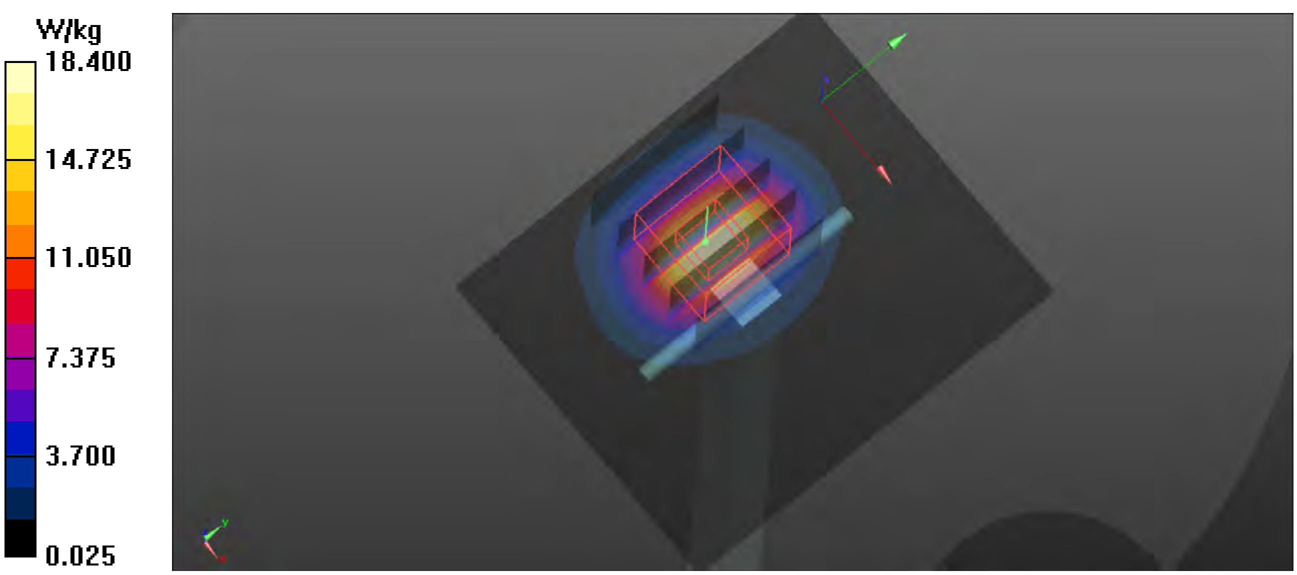
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(7.36, 7.36, 7.36); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: SAM 1 V5.0 (30deg); Type: QD 000 P40 CD; Serial: 1891
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Pin=250 mW/Area Scan (51x61x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 18.4 W/kg

Pin=250 mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 69.14 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 27.8 W/kg
SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.19 W/kg
Maximum value of SAR (measured) = 17.6 W/kg



Date: 8/30/2017

Test Laboratory: Intertek Service

System Check 2600 HEAD

Communication System: UID 0, CW (0); Frequency: 2600 MHz;Duty Cycle: 1:1
Medium: HSL2600 Medium parameters used: f = 2600 MHz; σ = 2.023 S/m; ε_r = 38.491; ρ = 1000 kg/m^3
Phantom section: Flat Section

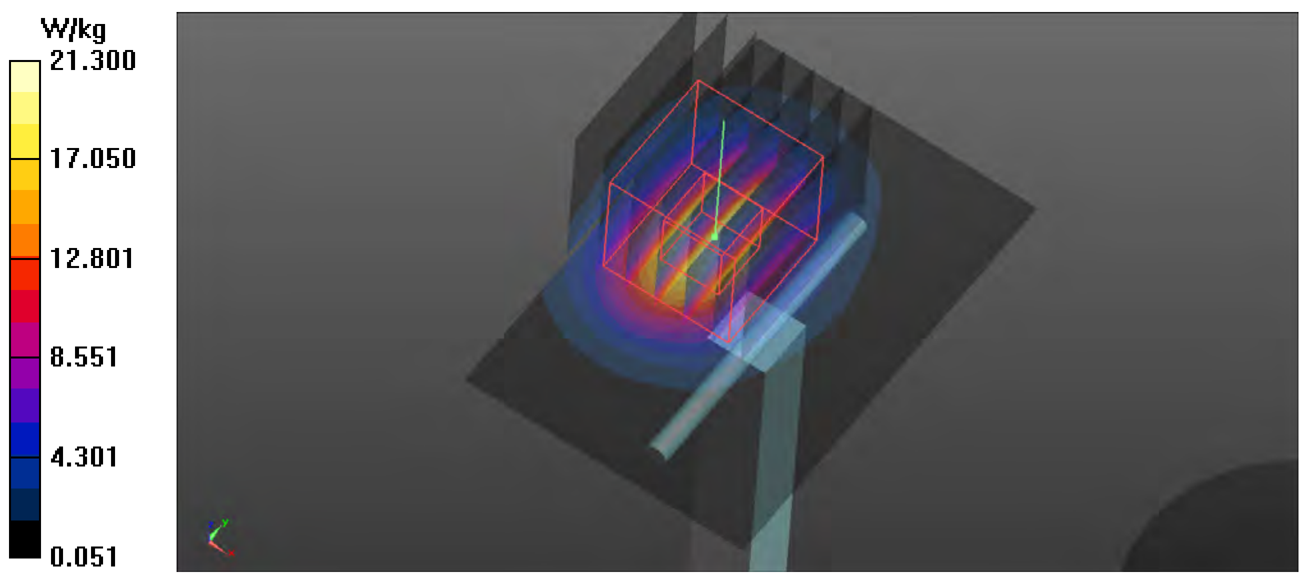
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(7.09, 7.09, 7.09); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: SAM 1 V5.0 (30deg); Type: QD 000 P40 CD; Serial: 1891
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Area Scan (41x61x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 21.3 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 74.66 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 33.0 W/kg
SAR(1 g) = 15.1 W/kg; SAR(10 g) = 6.74 W/kg
Maximum value of SAR (measured) = 20.3 W/kg



Date: 8/20/2017

Test Laboratory: Intertek Service

System Check 835 BODY

Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL835 Medium parameters used: f = 835 MHz; $\sigma = 0.969$ S/m; $\varepsilon_r = 53.932$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section

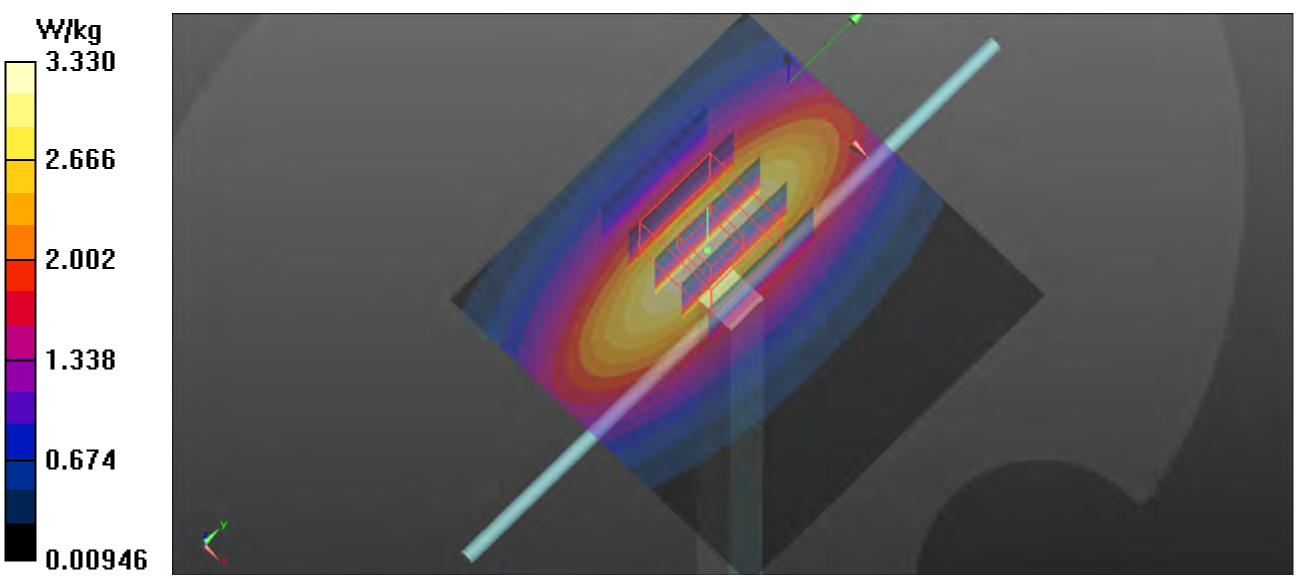
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(9.77, 9.77, 9.77); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: SAM 1 V5.0 (30deg); Type: QD 000 P40 CD; Serial: 1891
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Pin=250 mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 3.33 W/kg

Pin=250 mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 54.10 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 3.77 W/kg
SAR(1 g) = 2.43 W/kg; SAR(10 g) = 1.59 W/kg
Maximum value of SAR (measured) = 3.28 W/kg



Date: 8/30/2017

Test Laboratory: Intertek

System Check 1750 BODY

Communication System: UID 0, CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium: MSL1750 Medium parameters used: f = 1750 MHz; σ = 1.481 S/m; ε_r = 52.764; ρ = 1000 kg/m^3
Phantom section: Flat Section

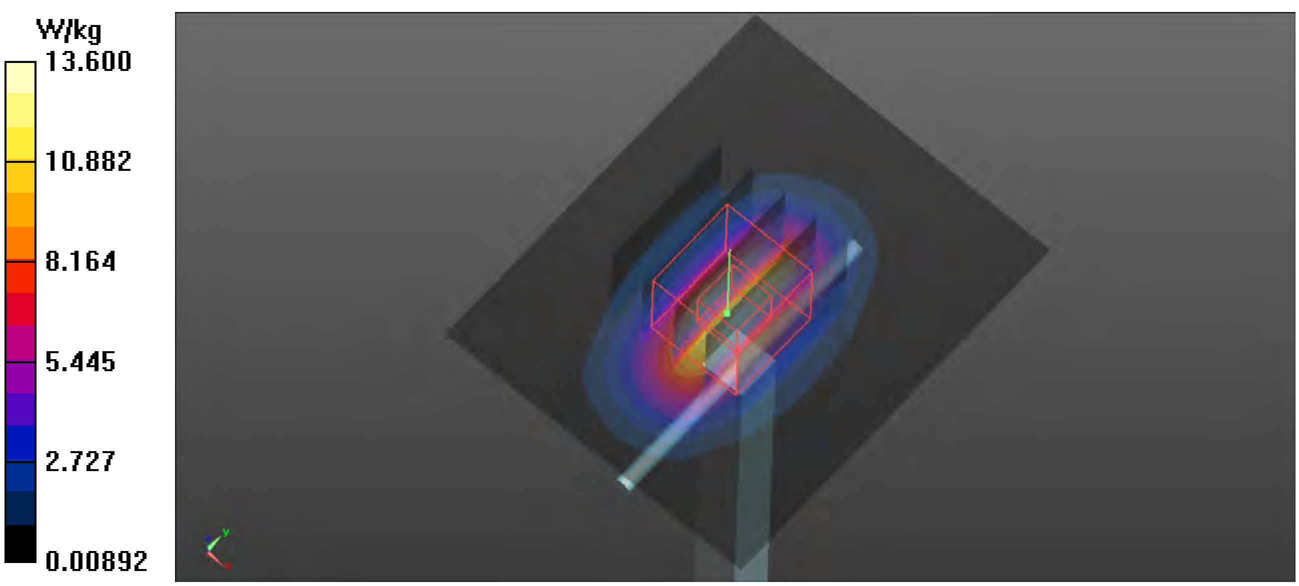
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(7.72, 7.72, 7.72); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: ELI V6.0 (20deg probe tilt); Type: QD OVA 003 AA; Serial: xxxx
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7373)

Pin=250 mW/Area Scan (61x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 13.6 W/kg

Pin=250 mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.38 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 16.1 W/kg
SAR(1 g) = 9 W/kg; SAR(10 g) = 4.79 W/kg
Maximum value of SAR (measured) = 12.8 W/kg



Date: 8/31/2017

Test Laboratory: Intertek Service

System Check 1900 BODY

Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL1950 Medium parameters used: f = 1900 MHz; σ = 1.47 S/m; ε_r = 52.79; ρ = 1000 kg/m^3
Phantom section: Flat Section

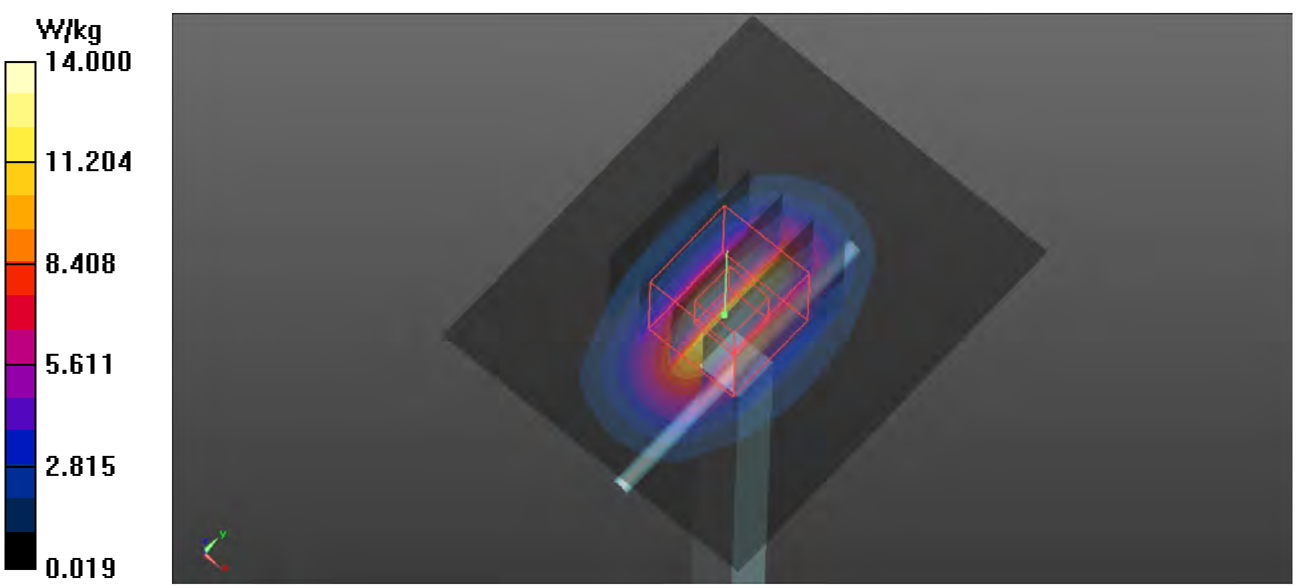
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(7.73, 7.73, 7.73); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: ELI V6.0 (20deg probe tilt); Type: QD OVA 003 AA; Serial: xxxx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Area Scan (51x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 14.0 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 91.09 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 17.0 W/kg
SAR(1 g) = 9.72 W/kg; SAR(10 g) = 5.15 W/kg
Maximum value of SAR (measured) = 12.2 W/kg



Date: 9/1/2017

Test Laboratory: Intertek Service

System Check 2450 Body

Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: MSL2450 Medium parameters used: f = 2450 MHz; σ = 2.02 S/m; ε_r = 50.71; ρ = 1000 kg/m^3
Phantom section: Flat Section

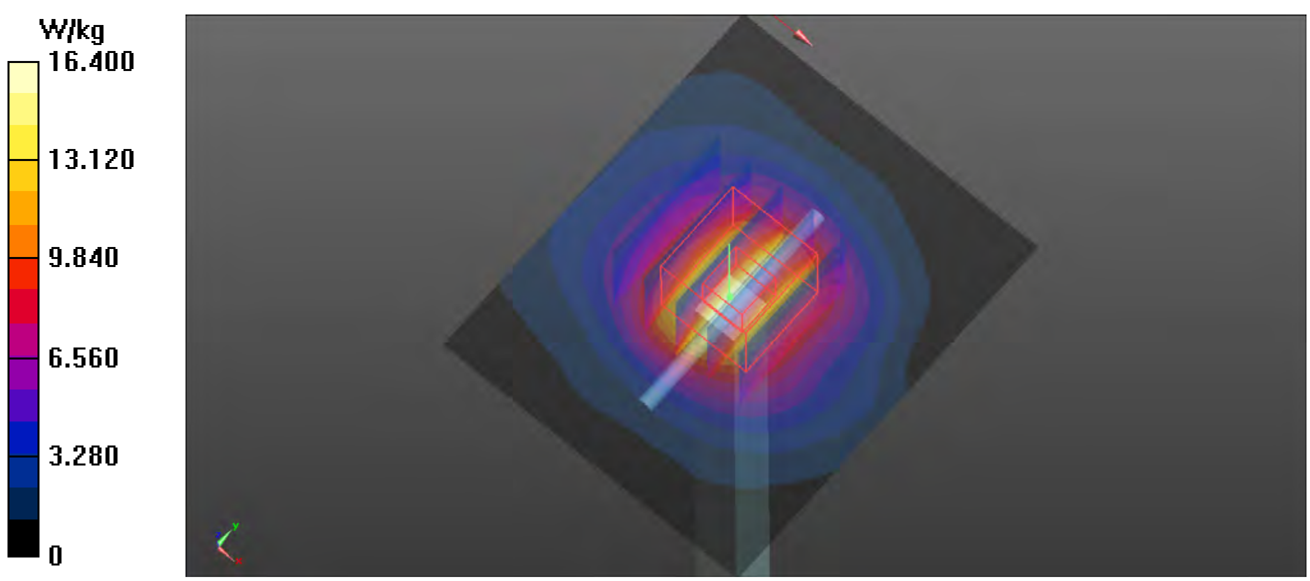
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(7.15, 7.15, 7.15); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: ELI V6.0 (20deg probe tilt); Type: QD OVA 003 AA; Serial: xxxx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Pin=250 mW/Area Scan (51x61x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 16.4 W/kg

Pin=250 mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 66.09 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 25.2 W/kg
SAR(1 g) = 12.5 W/kg; SAR(10 g) = 5.78 W/kg
Maximum value of SAR (measured) = 16.5 W/kg



Date: 8/23/2017

Test Laboratory: Intertek

System Check 2600 body

Communication System: UID 0, CW (0); Frequency: 2600 MHz;Duty Cycle: 1:1
Medium: MSL2600 Medium parameters used: f = 2600 MHz; σ = 2.186 S/m; ε_r = 50.765; ρ = 1000 kg/m^3
Phantom section: Flat Section

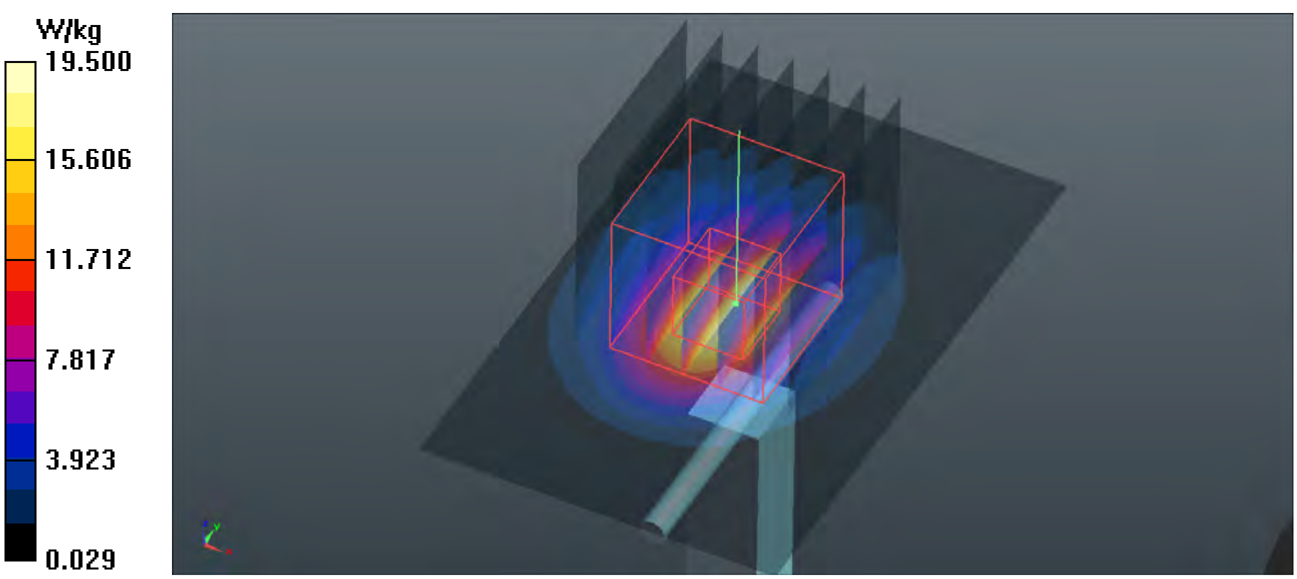
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(7.15, 7.15, 7.15); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: ELI V6.0 (20deg probe tilt); Type: QD OVA 003 AA; Serial: xxxx
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7373)

Area Scan (51x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 19.5 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 90.37 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 30.2 W/kg
SAR(1 g) = 14.2 W/kg; SAR(10 g) = 6.32 W/kg
Maximum value of SAR (measured) = 18.8 W/kg



Appendix B. SAR Plots of SAR Measurement

The SAR plots for highest measured SAR in each exposure configuration, wireless mode and frequency band combination, and measured SAR > 1.5 W/kg are shown as follows.

Address: 1F/2F, Building B, QiaoAn Scientific Technology Park, Shangkeng Community, Guanhu Subdistrict, Longhua District, Shenzhen, P.R. China
Tel: 86-755-8601 6288 Fax: 86-755-8601 6751 www.intertek.com.cn

Date: 8/21/2017

Test Laboratory: Intertek Service

P01_GSM850_GPRS12_Right cheek_251

Communication System: UID 0, class 12 (0); Frequency: 848.6 MHz;Duty Cycle: 1:2

Medium: HSL835 Medium parameters used (interpolated): f = 848.6 MHz; σ = 0.899 S/m; ε_r = 41.327; ρ = 1000 kg/m^3
Phantom section: Right Section

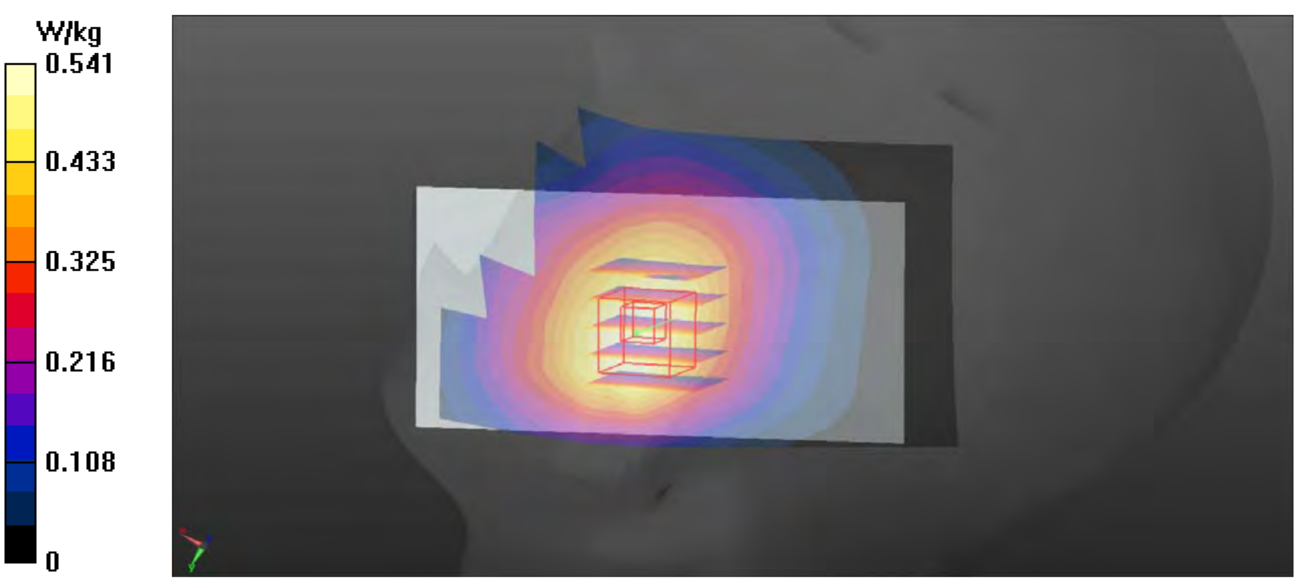
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(9.55, 9.55, 9.55); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: SAM 2 V5.0 (30deg); Type: QD 000 P40 CD; Serial: 1888
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.541 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.608 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.770 W/kg
SAR(1 g) = 0.492 W/kg; SAR(10 g) = 0.353 W/kg
Maximum value of SAR (measured) = 0.537 W/kg



Date: 8/25/2017

Test Laboratory: Intertek Service

P02_GSM1900_GPRS12_Left Cheek_810

Communication System: UID 0, class 12 (0); Frequency: 1909.8 MHz;Duty Cycle: 1:2
Medium: HSL1900 Medium parameters used: f = 1909.8 MHz; σ = 1.48 S/m; ε_r = 39.6; ρ = 1000 kg/m^3
Phantom section: Left Section

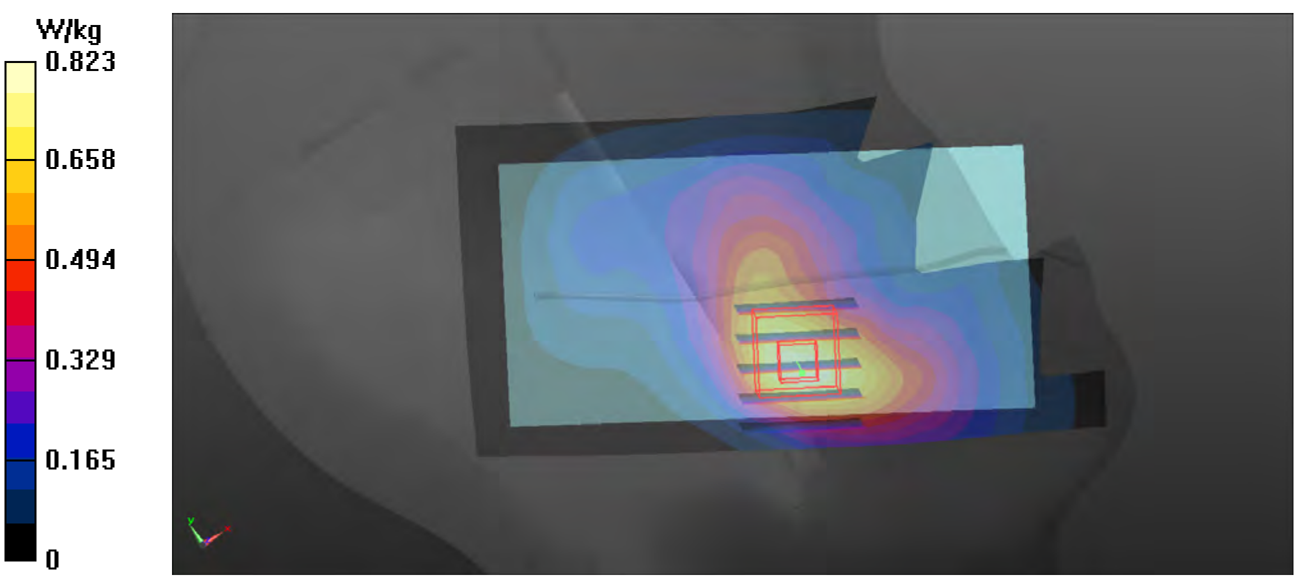
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(7.88, 7.88, 7.88); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: SAM 2 V5.0 (30deg); Type: QD 000 P40 CD; Serial: 1888
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.823 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.937 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.911 W/kg
SAR(1 g) = 0.591 W/kg; SAR(10 g) = 0.371 W/kg
Maximum value of SAR (measured) = 0.799 W/kg



Date: 8/25/2017

Test Laboratory: Intertek Service

P03_WCDMA II_RMC12.2K_Left Cheek_9400

Communication System: UID 0, WCDMA 1900 (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: HSL1900 Medium parameters used: f = 1880 MHz; σ = 1.45 S/m; ε_r = 39.74; ρ = 1000 kg/m^3
Phantom section: Left Section

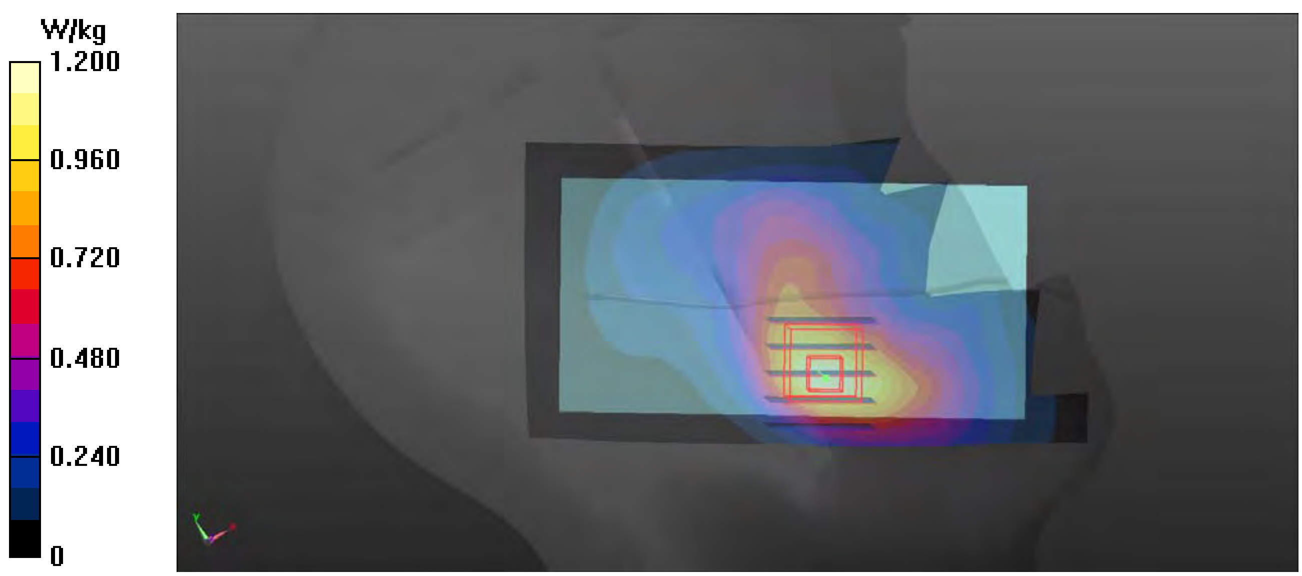
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(7.88, 7.88, 7.88); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: SAM 2 V5.0 (30deg); Type: QD 000 P40 CD; Serial: 1888
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.20 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.453 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 1.31 W/kg
SAR(1 g) = 0.839 W/kg; SAR(10 g) = 0.525 W/kg
Maximum value of SAR (measured) = 1.15 W/kg



Date: 8/21/2017

Test Laboratory: Intertek Service

P04_WCDMA V_RMC12.2K_Right cheek_4233_2#

Communication System: UID 0, WCDMA 850 (0); Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium: HSL835 Medium parameters used (interpolated): f = 846.6 MHz; σ = 0.898 S/m; ε_r = 41.352; ρ = 1000 kg/m^3
Phantom section: Right Section

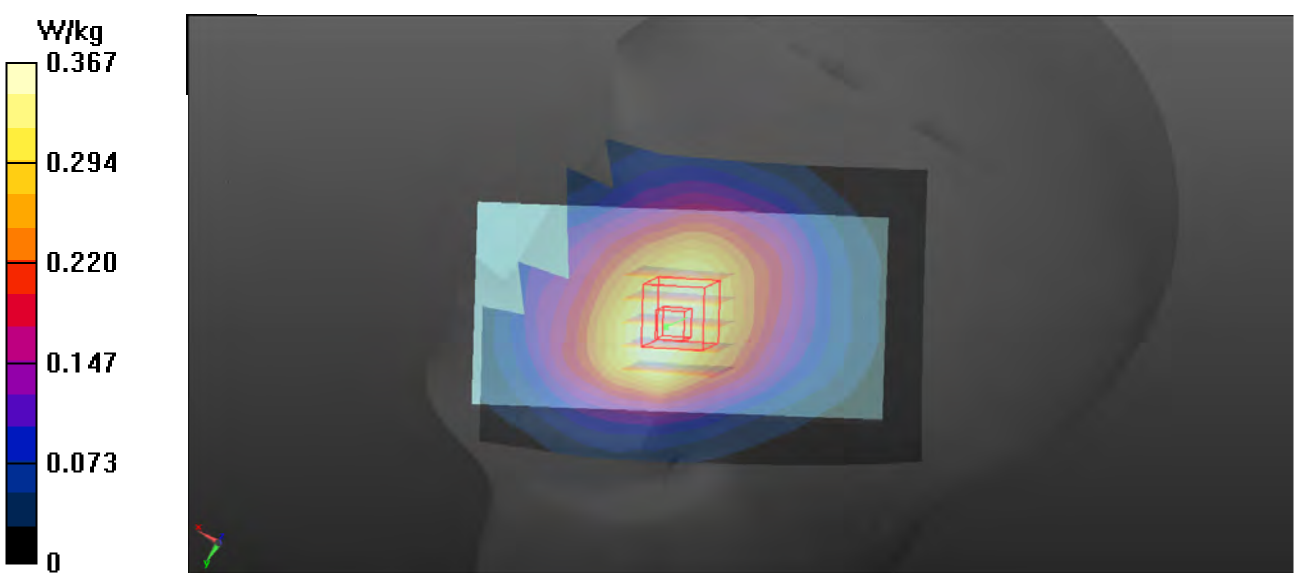
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(9.55, 9.55, 9.55); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: SAM 2 V5.0 (30deg); Type: QD 000 P40 CD; Serial: 1888
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.367 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.248 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.413 W/kg
SAR(1 g) = 0.319 W/kg; SAR(10 g) = 0.246 W/kg
Maximum value of SAR (measured) = 0.382 W/kg



Date: 8/25/2017

Test Laboratory: Intertek Service

P05_LTE4_QPSK20M_Right cheek_1RB_50Offset_20175

Communication System: UID 0, Generic LTE (0); Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: HSL1750 Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.363 S/m; ε_r = 40.136; ρ = 1000 kg/m^3
Phantom section: Right Section

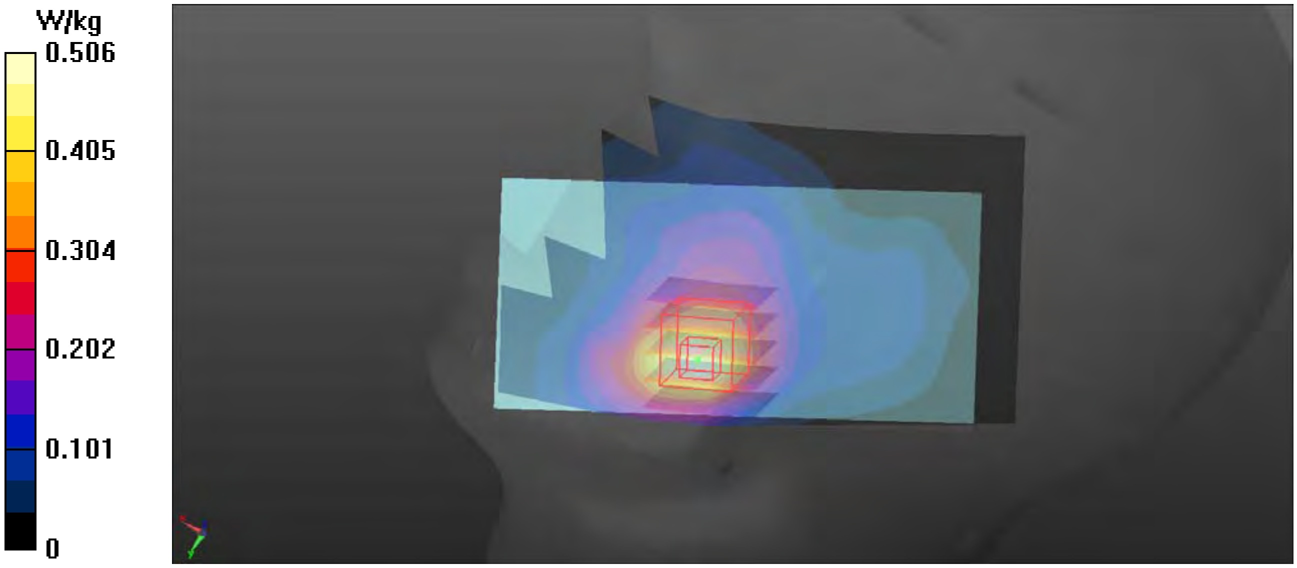
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(8.41, 8.41, 8.41); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: SAM 2 V5.0 (30deg); Type: QD 000 P40 CD; Serial: 1888
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.506 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.538 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.538 W/kg
SAR(1 g) = 0.367 W/kg; SAR(10 g) = 0.233 W/kg
Maximum value of SAR (measured) = 0.478 W/kg



Date: 8/21/2017

Test Laboratory: Intertek Service

P06_LTE5_QPSK10M_Left Cheek _1RB_24Offset_20600

Communication System: UID 0, Generic LTE (0); Frequency: 844 MHz;Duty Cycle: 1:1
Medium: HSL835 Medium parameters used (interpolated): f = 844 MHz; σ = 0.896 S/m; ε_r = 41.385; ρ = 1000 kg/m^3
Phantom section: Left Section

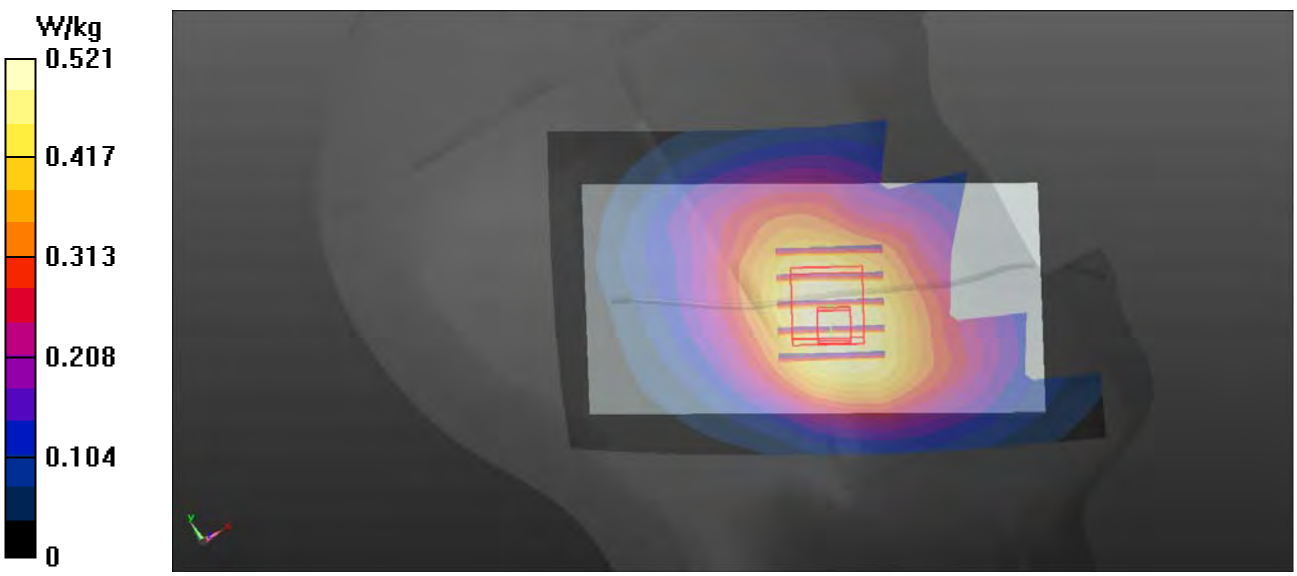
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(9.55, 9.55, 9.55); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: SAM 2 V5.0 (30deg); Type: QD 000 P40 CD; Serial: 1888
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Area Scan (51x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.521 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.903 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.610 W/kg
SAR(1 g) = 0.460 W/kg; SAR(10 g) = 0.356 W/kg
Maximum value of SAR (measured) = 0.560 W/kg



Date: 8/30/2017

Test Laboratory: Intertek Service

P07_LTE7_QPSK20M_Left Cheek_1RB_50offset_21350

Communication System: UID 0, Generic LTE (0); Frequency: 2560 MHz;Duty Cycle: 1:1
Medium: HSL2600 Medium parameters used: f = 2560 MHz; σ = 1.967 S/m; ε_r = 38.749; ρ = 1000 kg/m^3
Phantom section: Left Section

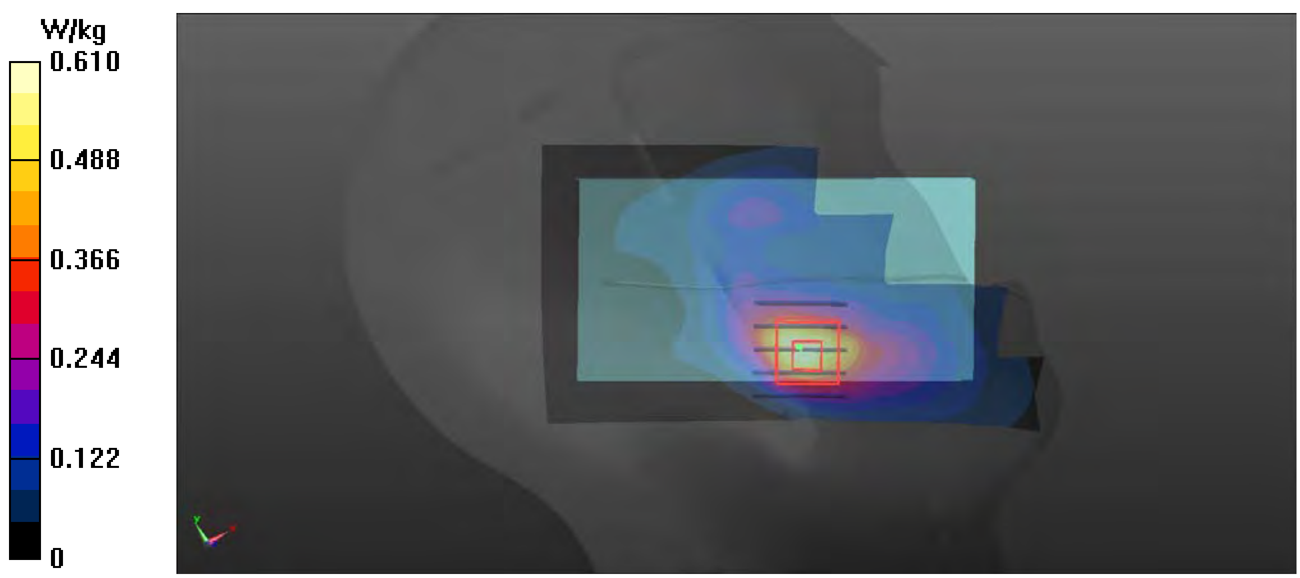
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(7.09, 7.09, 7.09); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: SAM 1 V5.0 (30deg); Type: QD 000 P40 CD; Serial: 1891
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Area Scan (81x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.610 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.016 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.741 W/kg
SAR(1 g) = 0.387 W/kg; SAR(10 g) = 0.199 W/kg
Maximum value of SAR (measured) = 0.567 W/kg



Date: 8/30/2017

Test Laboratory: Intertek Service

P08_LTE38_QPSK20M_Left Cheek_1RB_50offset_37850

Communication System: UID 0, Generic LTE TDD (0); Frequency: 2580 MHz;Duty Cycle: 1:1.58
Medium: HSL2600 Medium parameters used: f = 2580 MHz; σ = 1.976 S/m; ε_r = 38.664; ρ = 1000 kg/m^3
Phantom section: Left Section

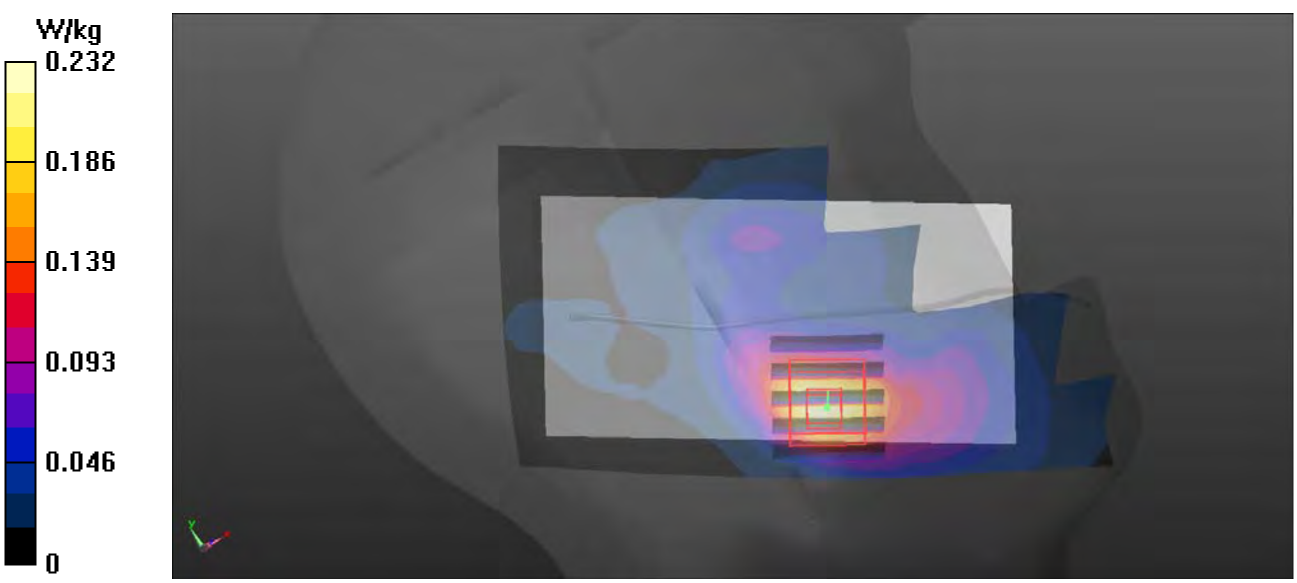
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(7.09, 7.09, 7.09); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: SAM 1 V5.0 (30deg); Type: QD 000 P40 CD; Serial: 1891
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Area Scan (81x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.232 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.362 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 0.283 W/kg
SAR(1 g) = 0.151 W/kg; SAR(10 g) = 0.079 W/kg
Maximum value of SAR (measured) = 0.229 W/kg



Date: 9/1/2017

Test Laboratory: Intertek Service

P09_802.11b_Right Cheek_6

Communication System: UID 0, WiFi 802.11 b (0); Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: HSL2450 Medium parameters used (interpolated): f = 2437 MHz; σ = 1.835 S/m; ε_r = 38.212; ρ = 1000 kg/m^3
Phantom section: Right Section

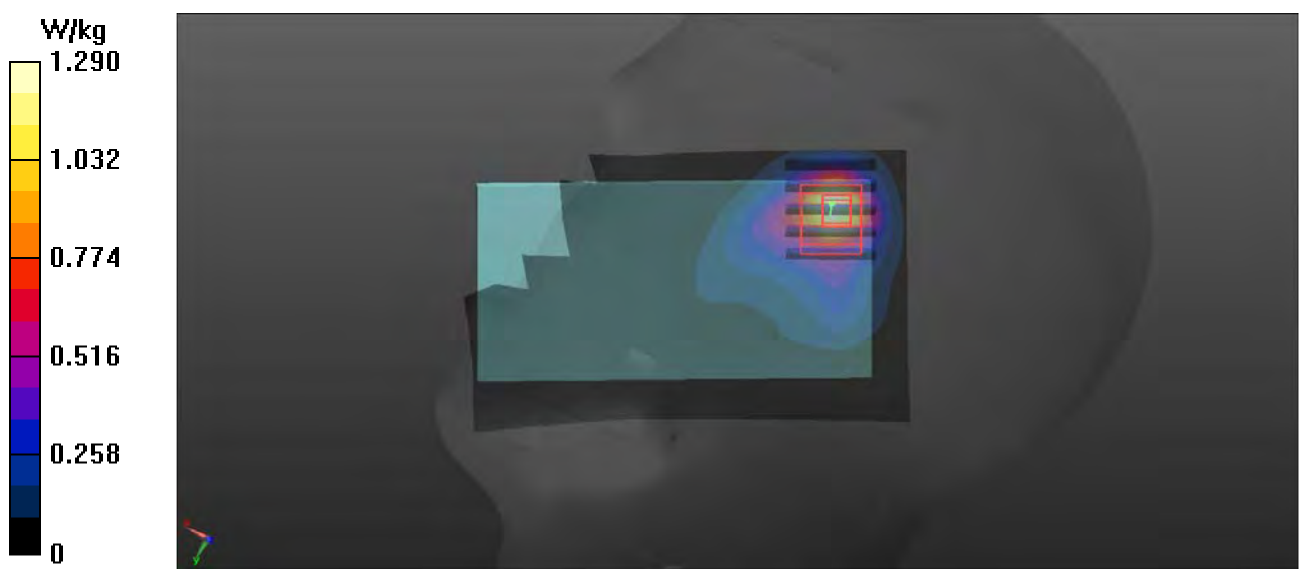
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(7.36, 7.36, 7.36); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: SAM 1 V5.0 (30deg); Type: QD 000 P40 CD; Serial: 1891
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Area Scan (81x131x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.29 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.93 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 1.69 W/kg
SAR(1 g) = 0.784 W/kg; SAR(10 g) = 0.371 W/kg
Maximum value of SAR (measured) = 1.26 W/kg



Date: 8/30/2017

Test Laboratory: Intertek Service

P19_LTE4_QPSK20M_Rear Face_1.0cm_1RB_50 offset_20175

Communication System: UID 0, Generic LTE (0); Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: MSL1750 Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.459 S/m; ε_r = 53.239; ρ = 1000 kg/m^3
Phantom section: Flat Section

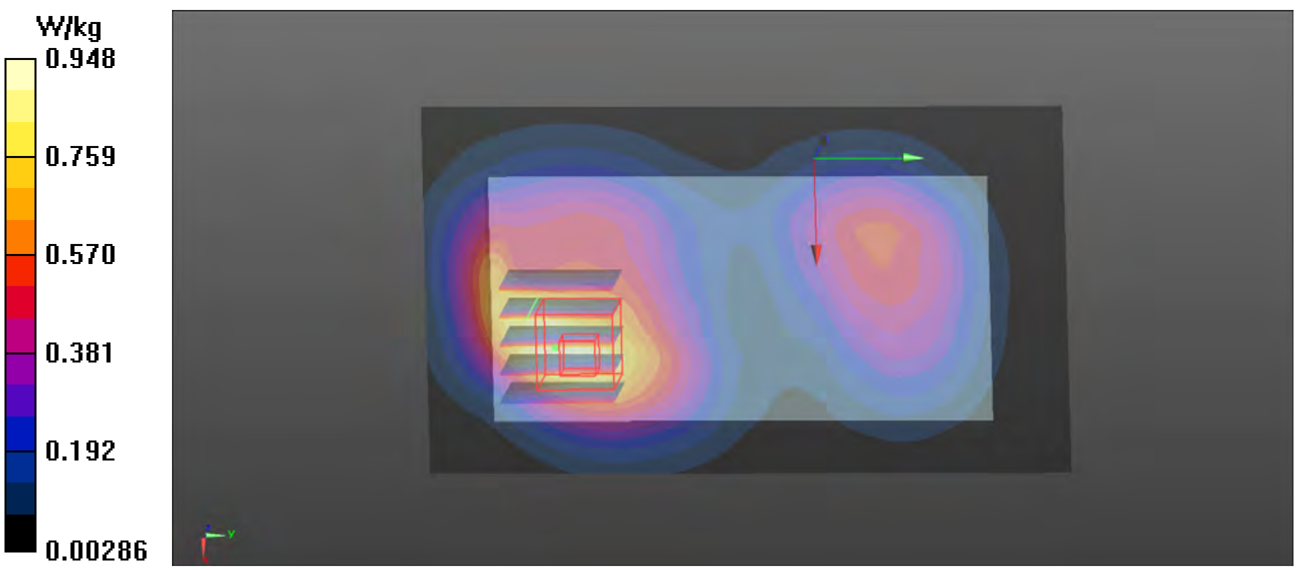
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(8, 8, 8); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: ELI V6.0 (20deg probe tilt); Type: QD OVA 003 AA; Serial: xxxx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.948 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.990 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.08 W/kg
SAR(1 g) = 0.657 W/kg; SAR(10 g) = 0.420 W/kg
Maximum value of SAR (measured) = 0.904 W/kg



Date: 8/20/2017

Test Laboratory: Intertek Service

P10_GSM850_GPRS12_Rear Face_1cm_251_2#

Communication System: UID 0, class 12 (0); Frequency: 848.6 MHz;Duty Cycle: 1:2

Medium: MSL835 Medium parameters used (interpolated): f = 848.6 MHz; σ = 0.969 S/m; ε_r = 55.752; ρ = 1000 kg/m^3

Phantom section: Flat Section

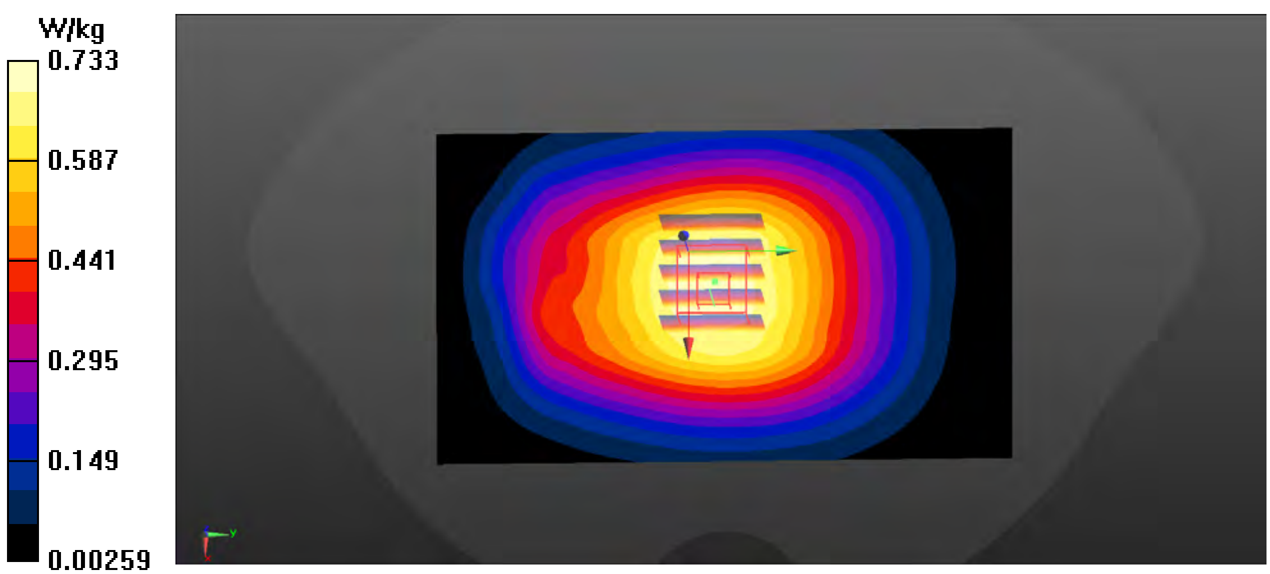
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(9.68, 9.68, 9.68); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: SAM 1 V5.0 (30deg); Type: QD 000 P40 CD; Serial: 1891
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.733 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.69 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.787 W/kg
SAR(1 g) = 0.617 W/kg; SAR(10 g) = 0.479 W/kg
Maximum value of SAR (measured) = 0.730 W/kg



Date: 8/31/2017

Test Laboratory: Intertek Service

P11_GPRS1900_GPRS12_Rear Face_1.0cm_810

Communication System: UID 0, class 12 (0); Frequency: 1909.8 MHz;Duty Cycle: 1:2
Medium: MSL1900 Medium parameters used: f = 1910 MHz; σ = 1.516 S/m; ε_r = 51.606; ρ = 1000 kg/m^3
Phantom section: Flat Section

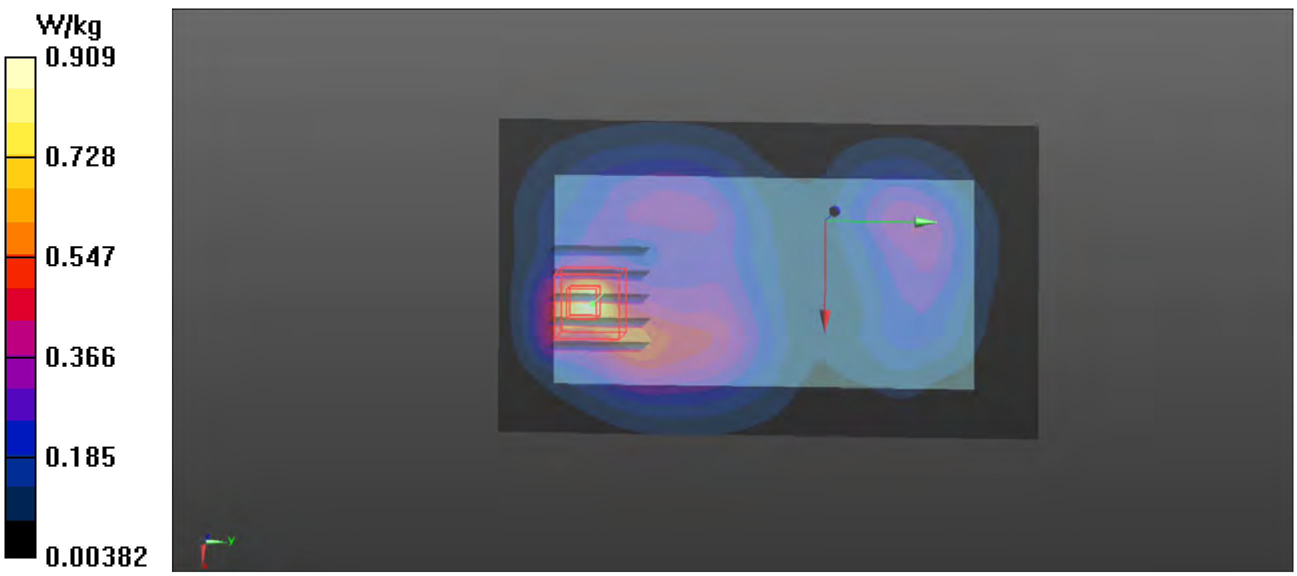
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(7.73, 7.73, 7.73); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: ELI V6.0 (20deg probe tilt); Type: QD OVA 003 AA; Serial: xxxx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.909 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.16 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 1.16 W/kg
SAR(1 g) = 0.560 W/kg; SAR(10 g) = 0.281 W/kg
Maximum value of SAR (measured) = 0.855 W/kg



Date: 8/31/2017

Test Laboratory: Intertek Service

P12_WCDMA II_RMC12.2K_Rear Face_1.0cm_9538

Communication System: UID 0, WCDMA 1900 (0); Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium: MSL 1900 Medium parameters used (extrapolated): f = 1907.6 MHz; σ = 1.635 S/m; ε_r = 52.451; ρ = 1000 kg/m^3
Phantom section: Flat Section

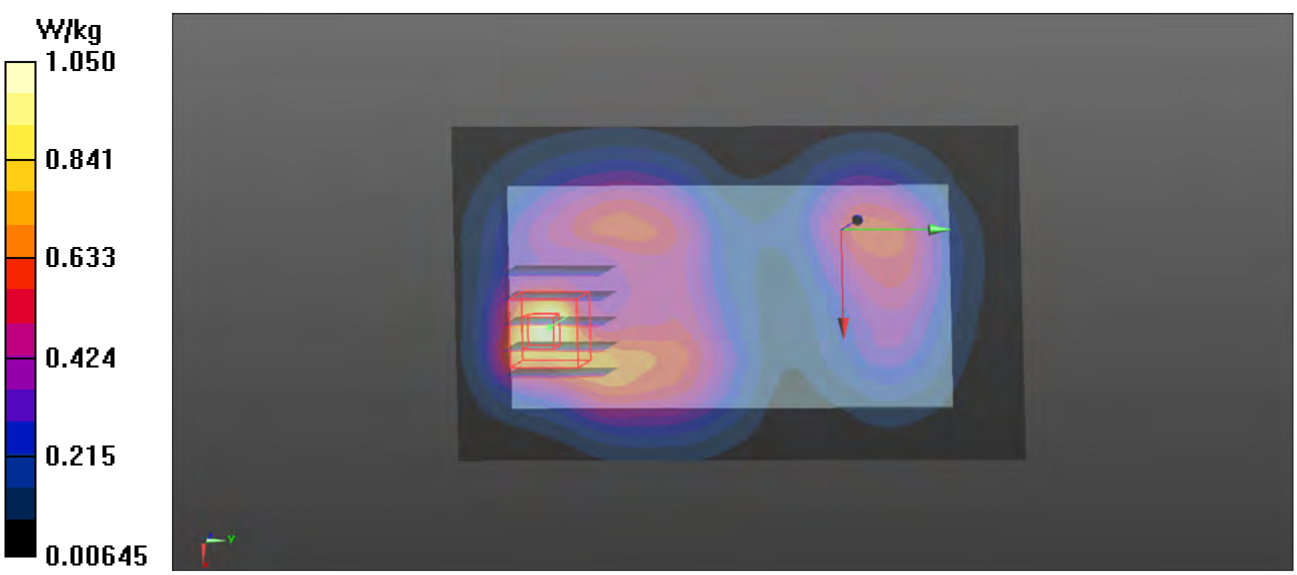
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(7.73, 7.73, 7.73); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: ELI V6.0 (20deg probe tilt); Type: QD OVA 003 AA; Serial: xxxx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.05 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.04 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.54 W/kg
SAR(1 g) = 0.759 W/kg; SAR(10 g) = 0.380 W/kg
Maximum value of SAR (measured) = 1.15 W/kg



Date: 8/20/2017

Test Laboratory: Intertek Service

P13_WCDMA V_RMC12.2K_Rear Face_1cm_4233

Communication System: UID 0, WCDMA 850 (0); Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium: MSL835 Medium parameters used (interpolated): f = 846.6 MHz; σ = 0.968 S/m; ε_r = 55.77; ρ = 1000 kg/m^3
Phantom section: Flat Section

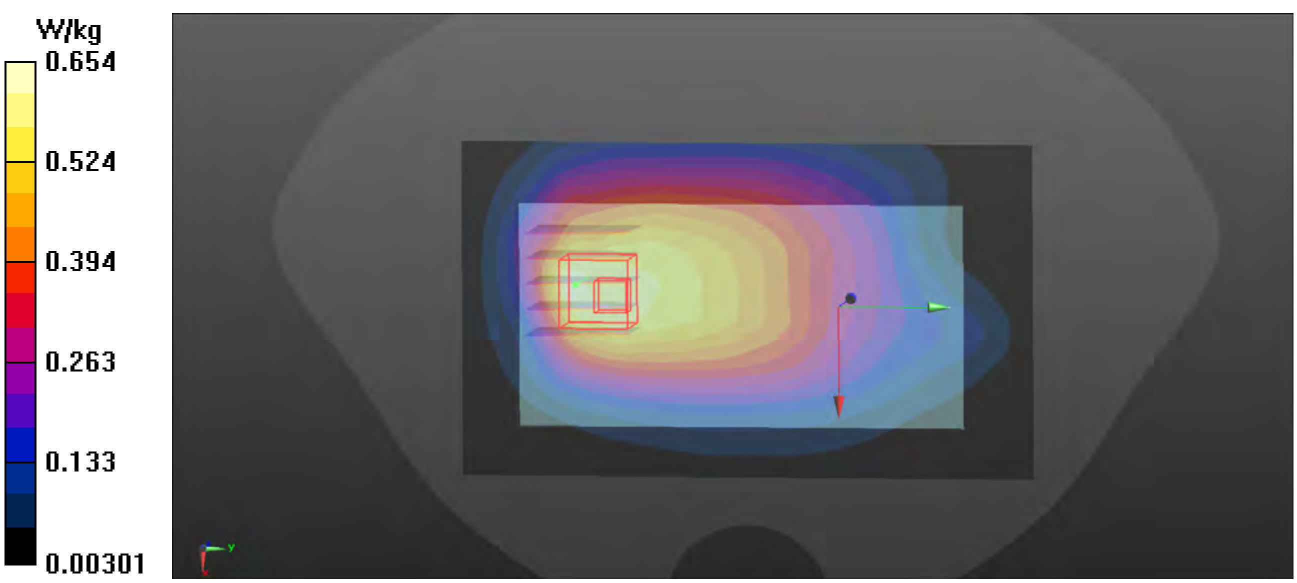
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(9.68, 9.68, 9.68); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: SAM 1 V5.0 (30deg); Type: QD 000 P40 CD; Serial: 1891
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.654 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.47 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.720 W/kg
SAR(1 g) = 0.470 W/kg; SAR(10 g) = 0.307 W/kg
Maximum value of SAR (measured) = 0.605 W/kg



Date: 8/30/2017

Test Laboratory: Intertek Service

P14_LTE4_QPSK20M_Bottom Side_1.0cm_1RB_50 offset_20050

Communication System: UID 0, Generic LTE (0); Frequency: 1720 MHz;Duty Cycle: 1:1
Medium: MSL1750 Medium parameters used (interpolated): f = 1720 MHz; σ = 1.444 S/m; ε_r = 53.316; ρ = 1000 kg/m^3
Phantom section: Flat Section

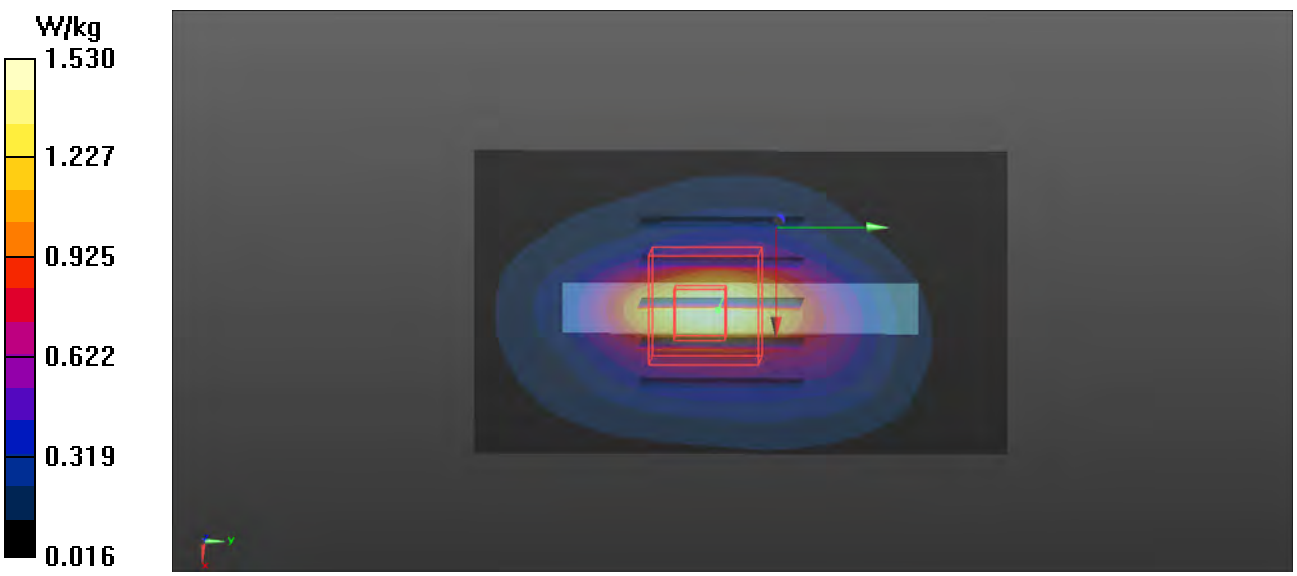
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(8, 8, 8); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: ELI V6.0 (20deg probe tilt); Type: QD OVA 003 AA; Serial: xxxx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Area Scan (41x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.53 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.96 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.85 W/kg
SAR(1 g) = 1.08 W/kg; SAR(10 g) = 0.598 W/kg
Maximum value of SAR (measured) = 1.53 W/kg



Date: 8/20/2017

Test Laboratory: Intertek Service

P15_LTE5_QPSK10M_Rear Face_1cm_1RB_24Offset_20600

Communication System: UID 0, Generic LTE (0); Frequency: 844 MHz;Duty Cycle: 1:1
Medium: MSL835 Medium parameters used (interpolated): f = 844 MHz; σ = 0.966 S/m; ε_r = 55.793; ρ = 1000 kg/m^3
Phantom section: Flat Section

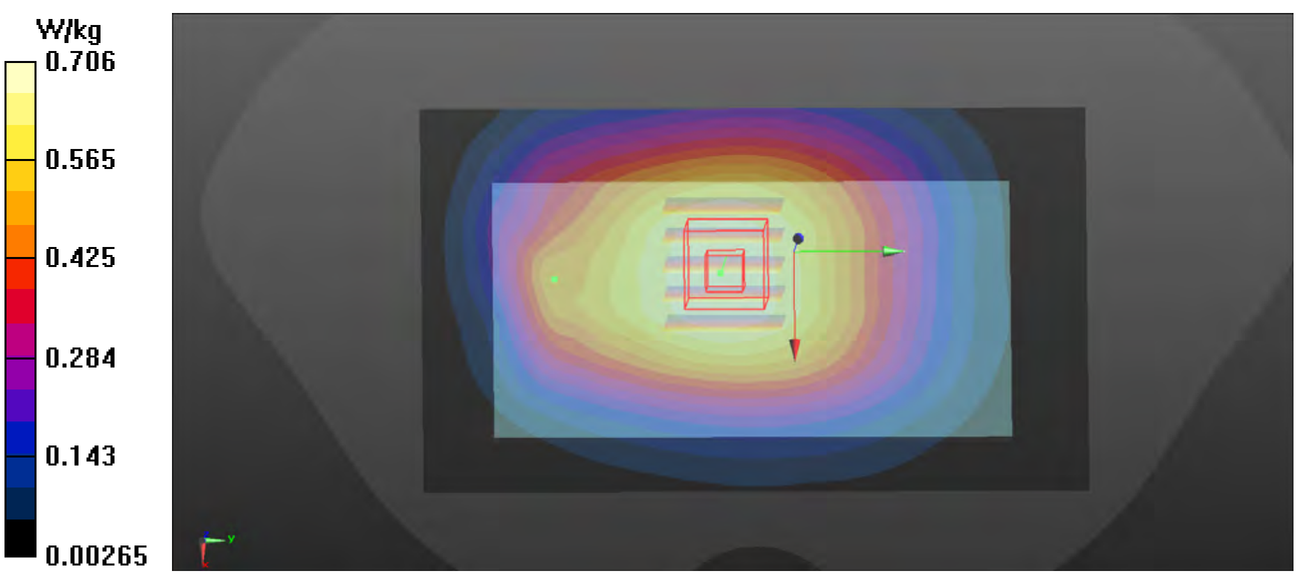
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(9.68, 9.68, 9.68); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: SAM 1 V5.0 (30deg); Type: QD 000 P40 CD; Serial: 1891
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.706 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.49 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.764 W/kg
SAR(1 g) = 0.597 W/kg; SAR(10 g) = 0.461 W/kg
Maximum value of SAR (measured) = 0.709 W/kg



Date: 8/23/2017

Test Laboratory: Intertek Service

P16_LTE 7_QPSK20M_Rear Side_1.0cm_1RB_50 Offset_20850

Communication System: UID 0, Generic LTE (0); Frequency: 2510 MHz;Duty Cycle: 1:1
Medium: MSL2600 Medium parameters used: f = 2510 MHz; σ = 2.043 S/m; ε_r = 51.413; ρ = 1000 kg/m^3
Phantom section: Flat Section

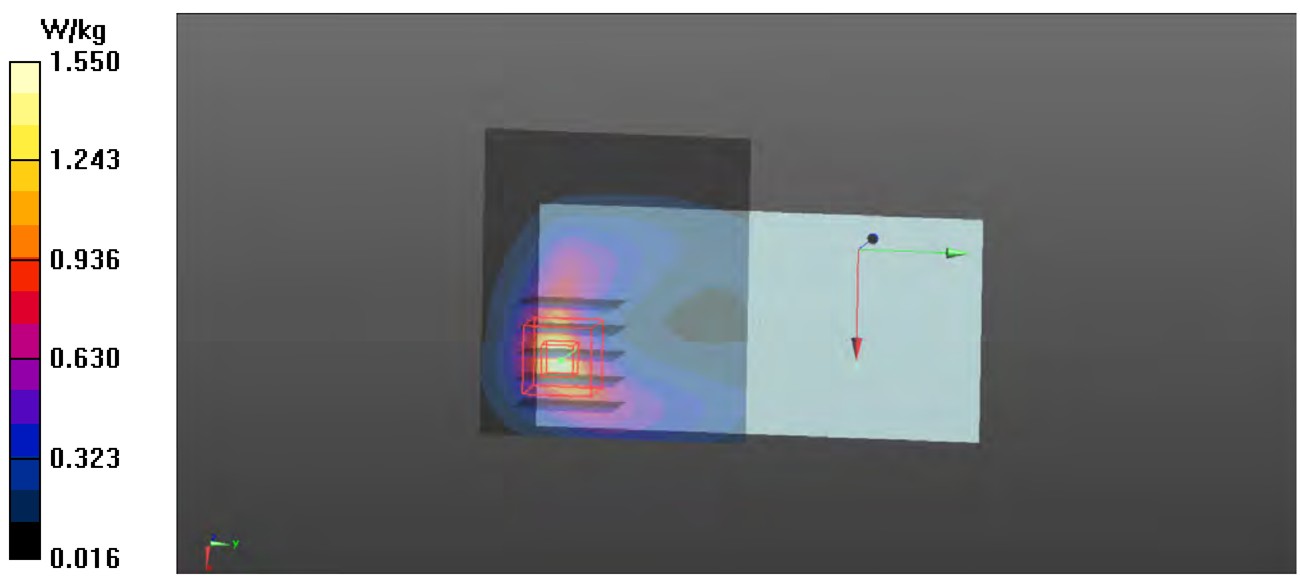
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(7.15, 7.15, 7.15); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: ELI V6.0 (20deg probe tilt); Type: QD OVA 003 AA; Serial: xxxx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Area Scan (81x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.55 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.261 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.87 W/kg
SAR(1 g) = 0.955 W/kg; SAR(10 g) = 0.457 W/kg
Maximum value of SAR (measured) = 1.56 W/kg



Date: 8/23/2017

Test Laboratory: Intertek Service

P17_LTE38_QPSK20M_Rear Face_1.0cm_1RB_50 Offset_37850

Communication System: UID 0, Generic LTE TDD (0); Frequency: 2580 MHz;Duty Cycle: 1:1.58
Medium: MSL2600 Medium parameters used: f = 2580 MHz; $\sigma = 2.126$ S/m; $\varepsilon_r = 51.23$; $\rho = 1000$ kg/m^3

Phantom section: Flat Section

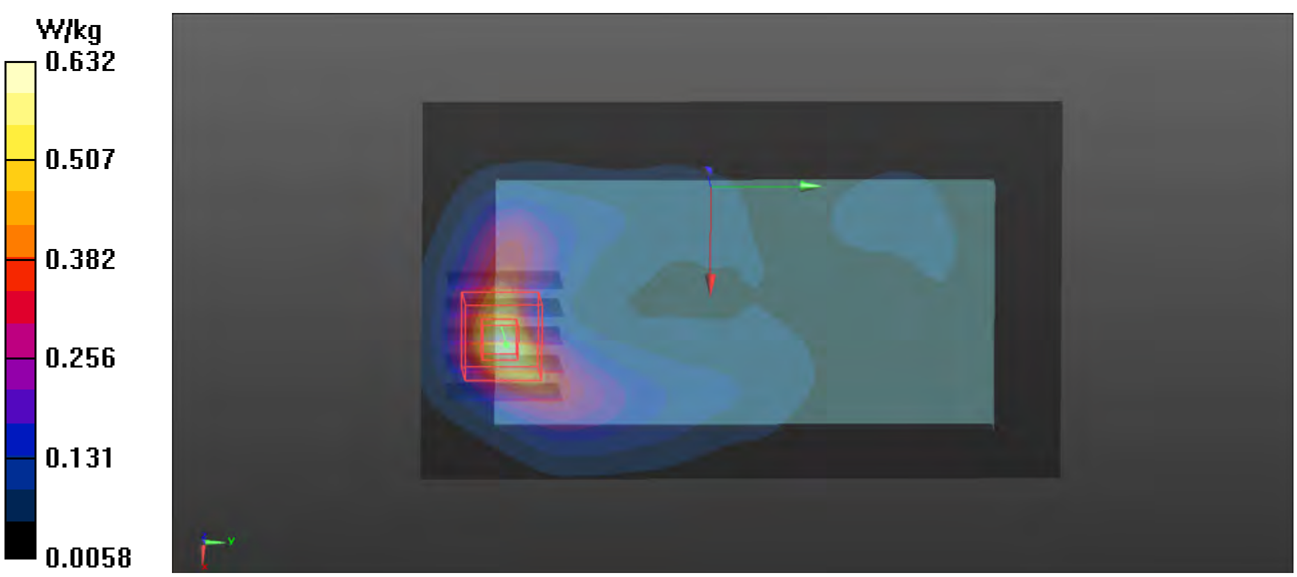
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(7.04, 7.04, 7.04); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: ELI V6.0 (20deg probe tilt); Type: QD OVA 003 AA; Serial: xxxx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Area Scan (91x151x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.632 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.815 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.771 W/kg
SAR(1 g) = 0.390 W/kg; SAR(10 g) = 0.186 W/kg
Maximum value of SAR (measured) = 0.641 W/kg



Date: 9/1/2017

Test Laboratory: Intertek Service

P18_802.11b_Rear Face_1.0cm_6

Communication System: UID 0, WiFi 802.11 b (0); Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: MSL2450 Medium parameters used (interpolated): f = 2437 MHz; σ = 1.965 S/m; ε_r = 51.378; ρ = 1000 kg/m^3
Phantom section: Flat Section

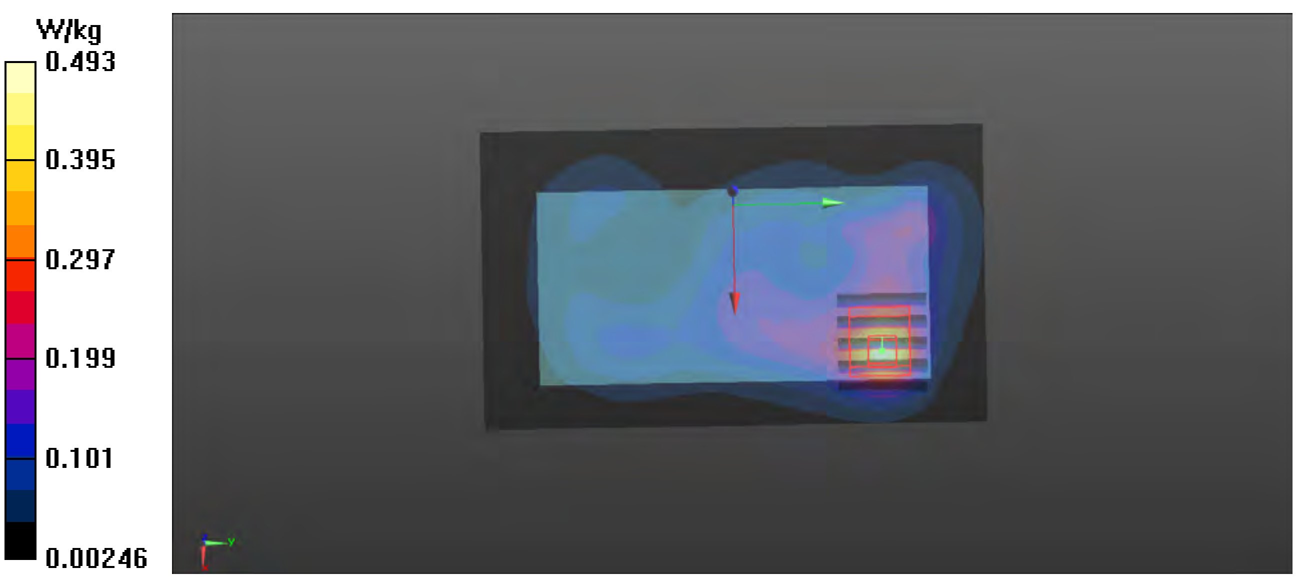
Ambient Temperature: 22.0 °C; Liquid Temperature: 21.5 °C

DASY Configuration:

- Probe: EX3DV4 - SN7322; ConvF(7.15, 7.15, 7.15); Calibrated: 6/29/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1473; Calibrated: 6/23/2017
- Phantom: ELI V6.0 (20deg probe tilt); Type: QD OVA 003 AA; Serial: xxxx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Area Scan (91x151x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.493 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.592 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.536 W/kg
SAR(1 g) = 0.276 W/kg; SAR(10 g) = 0.144 W/kg
Maximum value of SAR (measured) = 0.441 W/kg



Appendix C. Calibration Certificate for Probe and Dipole

The calibration certificates are shown as follows.

In Collaboration with
speag
CALIBRATION LABORATORY

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

中国认可
国际互认
校准
CALIBRATION
CNAS L0570

Client **Intertek** **Certificate No: Z17-97087**

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:7322
Calibration Procedure(s)	FF-Z11-004-01 Calibration Procedures for Dosimetric E-field Probes
Calibration date:	June 29, 2017

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	27-Jun-17 (CTTL, No.J17X05857)	Jun-18
Power sensor NRP-Z91	101547	27-Jun-17 (CTTL, No.J17X05857)	Jun-18
Power sensor NRP-Z91	101548	27-Jun-17 (CTTL, No.J17X05857)	Jun-18
Reference10dBAttenuator	18N50W-10dB	13-Mar-16(CTTL,No.J16X01547)	Mar-18
Reference20dBAttenuator	18N50W-20dB	13-Mar-16(CTTL, No.J16X01548)	Mar-18
Reference Probe EX3DV4	SN 7433	26-Sep-16(SPEAG,No.EX3-7433_Sep16)	Sep-17
DAE4	SN 549	13-Dec-16(SPEAG, No.DAE4-549_Dec16)	Dec -17
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
SignalGeneratorMG3700A	6201052605	27-Jun-17 (CTTL, No.J17X05858)	Jun-18
Network Analyzer E5071C	MY46110673	13-Jan-17 (CTTL, No.J17X00285)	Jan -18

	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: June 30, 2017

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

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

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

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Probe EX3DV4

SN: 7322

Calibrated: June 29, 2017

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 7322

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm(μV/(V/m)^2)[A]	0.45	0.55	0.52	±10.0%
DCP(mV)[B]	97.4	98.3	98.6	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	176.7	±2.0%
		Y	0.0	0.0	1.0		198.0	
		Z	0.0	0.0	1.0		195.2	

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

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

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 7322

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz][C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (k=2)
835	41.5	0.90	9.55	9.55	9.55	0.11	1.66	±12.1%
1750	40.1	1.37	8.41	8.41	8.41	0.25	1.00	±12.1%
1900	40.0	1.40	7.88	7.88	7.88	0.28	0.97	±12.1%
2300	39.5	1.67	7.64	7.64	7.64	0.46	0.76	±12.1%
2450	39.2	1.80	7.36	7.36	7.36	0.31	1.09	±12.1%
2600	39.0	1.96	7.09	7.09	7.09	0.40	0.88	±12.1%
5250	35.9	4.71	5.25	5.25	5.25	0.36	1.40	±13.3%
5600	35.5	5.07	4.73	4.73	4.73	0.40	1.35	±13.3%
5750	35.4	5.22	4.77	4.77	4.77	0.40	1.40	±13.3%

[C] Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequency below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 7322

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz][C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (k=2)
835	55.2	0.97	9.68	9.68	9.68	0.17	1.46	±12.1%
1750	53.4	1.49	8.00	8.00	8.00	0.23	1.06	±12.1%
1900	53.3	1.52	7.73	7.73	7.73	0.18	1.23	±12.1%
2300	52.9	1.81	7.40	7.40	7.40	0.37	1.01	±12.1%
2450	52.7	1.95	7.15	7.15	7.15	0.31	1.25	±12.1%
2600	52.5	2.16	7.04	7.04	7.04	0.50	0.90	±12.1%
5250	48.9	5.36	4.72	4.72	4.72	0.45	1.70	±13.3%
5600	48.5	5.77	4.06	4.06	4.06	0.45	1.75	±13.3%
5750	48.3	5.94	4.27	4.27	4.27	0.50	1.97	±13.3%

[C] Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequency below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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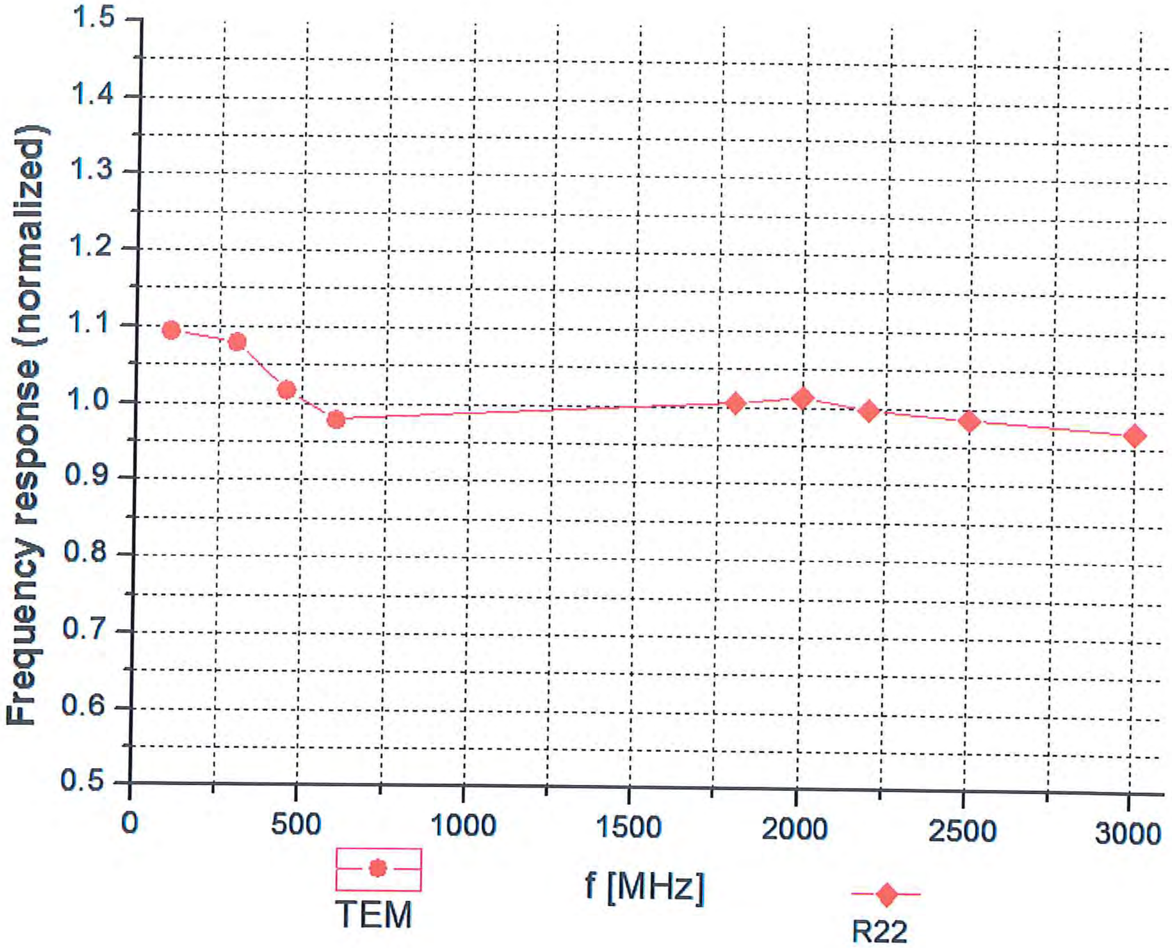
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ±7.4% (k=2)

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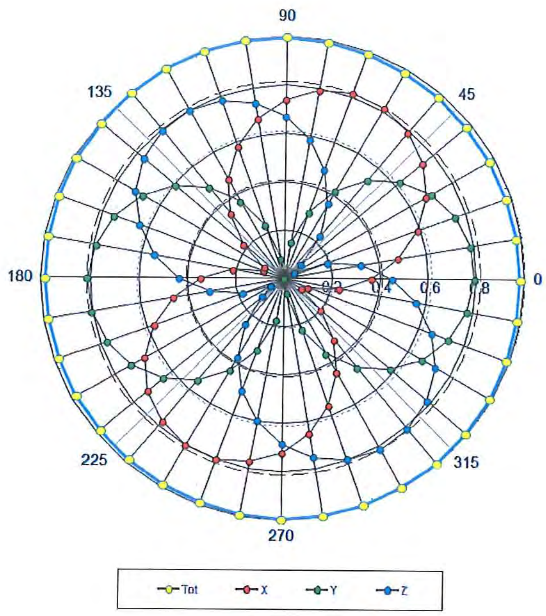
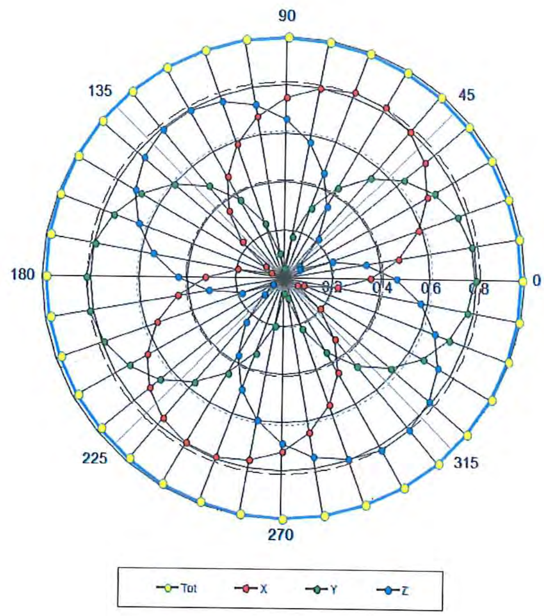
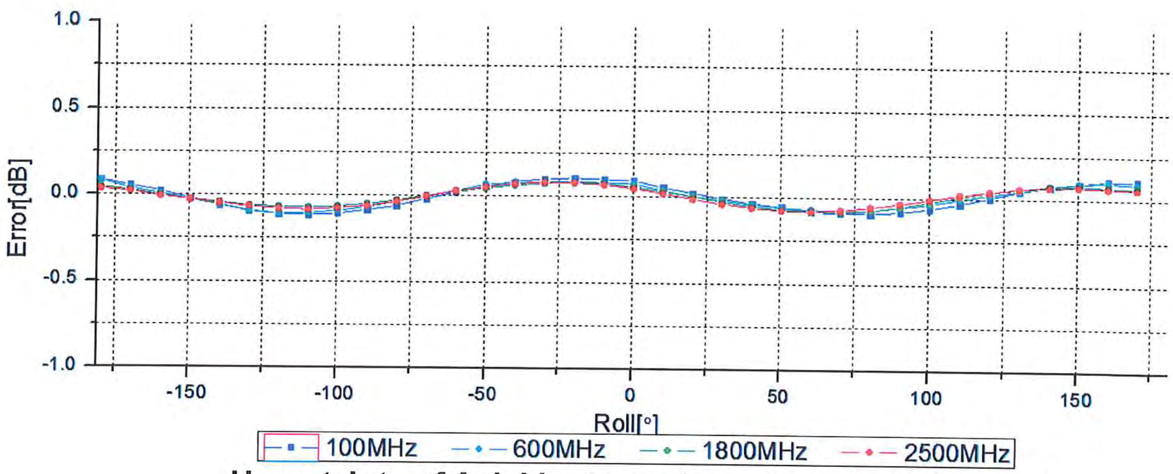
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM



f=1800 MHz, R22





Uncertainty of Axial Isotropy Assessment: ±1.2% (k=2)

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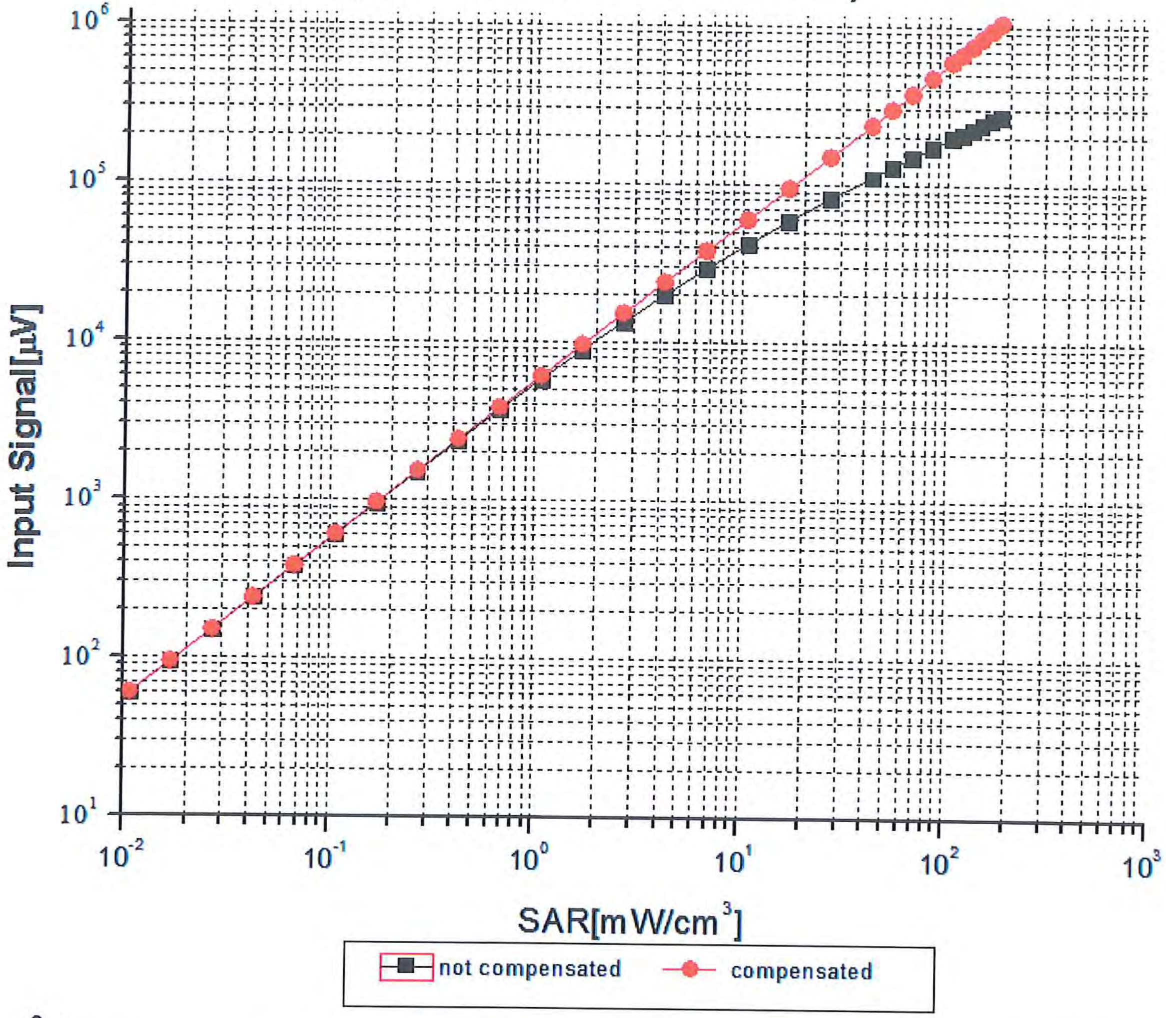
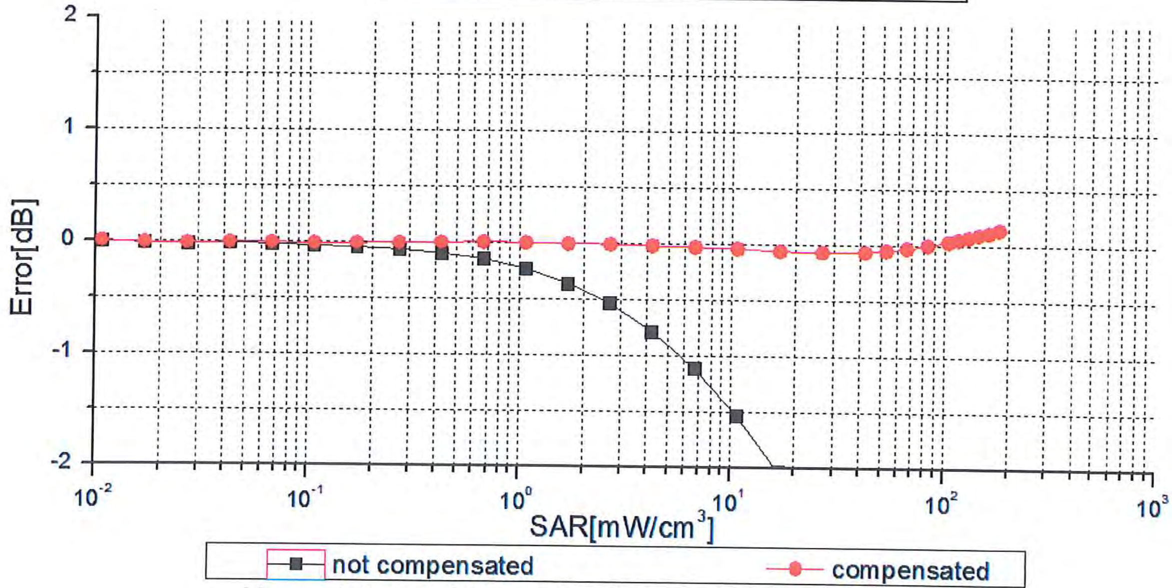
Dynamic Range f(SAR_{head})
(TEM cell, f = 900 MHz)





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

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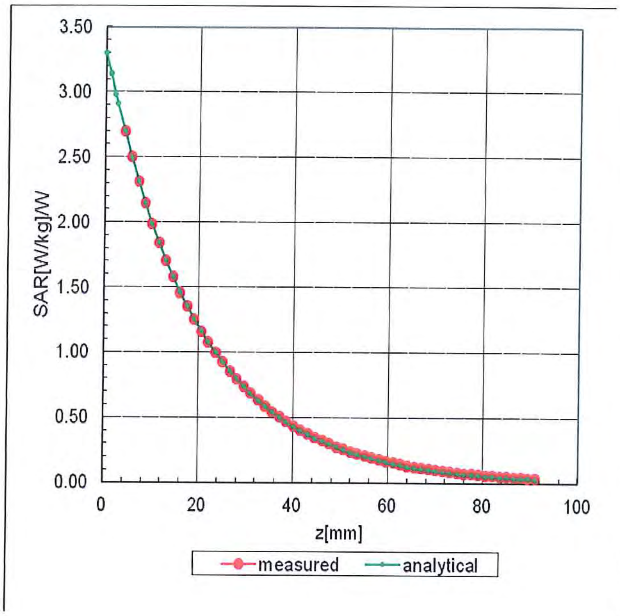
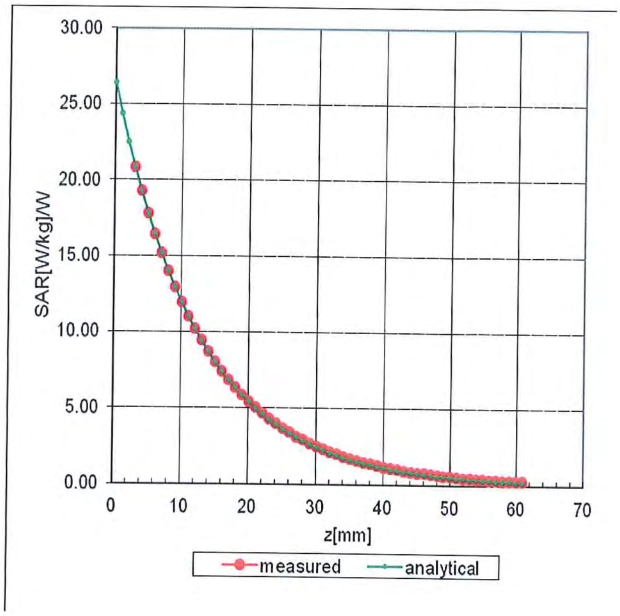
Conversion Factor Assessment

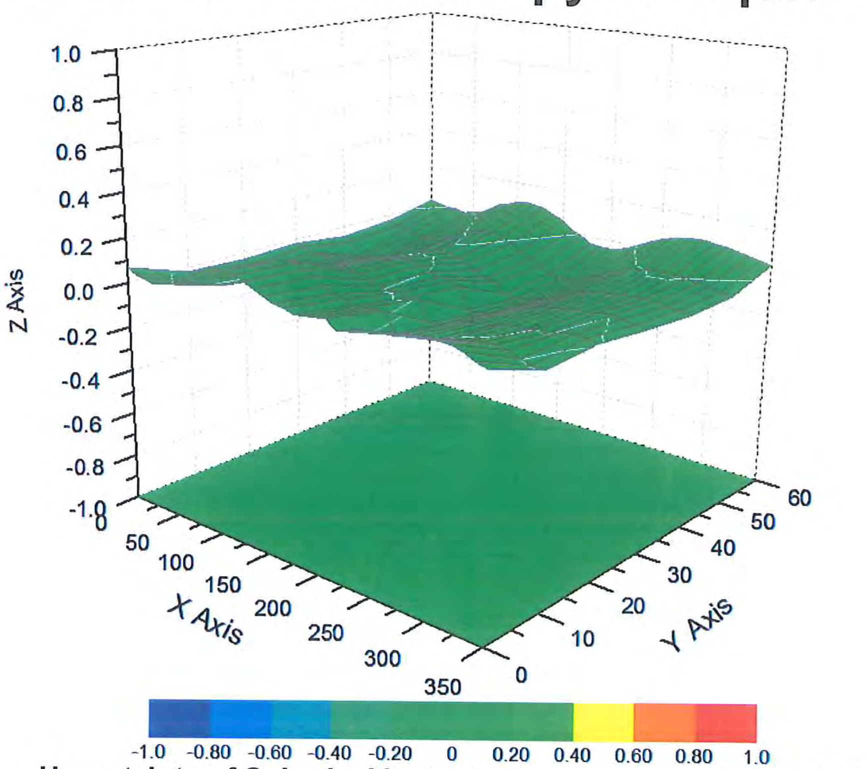
f=835 MHz, WGLS R9(H_convF)



f=1750 MHz, WGLS R22(H_convF)



Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment: ±3.2% (K=2)

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 7322

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	41.9
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	9mm
Tip Diameter	2.5mm
Probe Tip to Sensor X Calibration Point	1mm
Probe Tip to Sensor Y Calibration Point	1mm
Probe Tip to Sensor Z Calibration Point	1mm
Recommended Measurement Distance from Surface	1.4mm

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S **Schweizerischer Kalibrierdienst**
C **Service suisse d'étalonnage**
S **Servizio svizzero di taratura**
Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **Intertek HK (Auden)**

Certificate No: D835V2-4d196_Jun15

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d196
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	June 08, 2015

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	01-Apr-15 (No. 217-02131)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02134)	Mar-16
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-15

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 10, 2015