TEST REPORT

1. Applicant

Name	: POINTMOBILE CO.,LTD
Address	: Gasan-dong, B-9F Kabul Great Valley 32, Digital-ro9-gil, Geumcheon-gu, Seoul, Korea 153-709

2. Products

Name	: Mobile Computer
Model	: PM40
Manufacturer	: POINTMOBILE CO.,LTD

3. Test Standard	: FCC 47 CFR § 2.1093
4. Test Method	: IEEE 1528, OET Bulletin 65, Supplement C(July 2001)
5. Test Results	: Positive
6. Date of Application	: August 12, 2013
7. Date of Issue	: December 22, 2013

Tested by	Approved by
Jong-gon Ban	Jeong-min Kim
Telecommunication Center Senior Engineer	Telecommunication Center Manager

The test results contained apply only to the test sample(s) supplied by the applicant, and this test report shall not be reproduced in full or in part without approval of the KTL in advance.

Korea Testing Laboratory

Test Report revision History

Revision	Date	Comments
00	2013-11-15	Initial Version
01	2013-12-22	1D(scanner) device SAR value & Scaling SAR sample calculation added.

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1. Administrative Information

1.1. Applicant Data

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1.2. Manufacturer Data (only if different from Appicant)

Company Name	
Address	
Contact Person	
Name	
E-mail	
Phone	

1.3. Testing Laboratory Data

The following list shows all places and laboratories involved for test result generation.

Company Name	Korea Testing Laboratory
Address	723 Haean-ro, Sangnok-Gu, Ansan-Si, Gyeounggi-Do, 426-901 KOREA
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2. EUT Information

2.1. General Description of the EUT

The following section lists all specifications of EUT (Equipment Under Test) involved in test. Additionally, KTL has received sufficient documentation from the client and/or manufacturer to perform the tests

General Information	
FCC ID	V2X-PM40
Model Number	PM40
GSM Specification	GSM/GPRS/EDGE850/1900, Multi-Slot Class 12
WCDMA Specification	UMTS850/1900
Antenna Type	Internal Antenna
WLAN Specification	802.11 a/b/g/n (HT20)
WLAN VoIP	Not supported
Bluetooth Specification	V2.1+EDR
Mobile Hotspot	Not supported
Battery options	Li-ion, 3.7 V (standard:1800mAh, extended: 3600mAh)
Device Dimension	Overall (Length x width) : 135.5 mm x 67 mm Overall Diagonal :138mm Display Diagonal : 73 mm

2.2. SAR Results Summaries

Band & Mode	Tx Frequency	SAR	
		1 g Head (W/kg)	1g Body (W/kg)
GSM/GPRS/EDGE 850	824.2 ~ 848.8 MHz	0.282	0.539
UMTS 850	826.4 ~ 846.6 MHz	0.504	0.779
GSM/GPRS/EDGE 1900	1850.2 ~ 1909.8 MHz	0.306	0.243
UMTS 1900	1852.4 ~ 1907.6 MHz	0.427	0.371
2.4 GHz WLAN	2412 ~ 2462 MHz		0.151
5.2 GHz WLAN	5180 ~ 5240 MHz		0.152
5.3 GHz WLAN	5260 ~ 5320 MHz		0.258
5.5 GHz WLAN	5500 ~ 5700 MHz		0.248
5.8 GHz WLAN	5745 ~ 5825 MHz		0.358

3. SAR DEFINITION

Specific Absorption Rate (SAR) is defined as the time derivative (rate) of the incremental energy (dU) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density(p). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body. (see Figure.1)

$$SAR = \frac{d}{dt}\left(\frac{dU}{dm}\right) = \frac{d}{dt}\left(\frac{dU}{pdv}\right)$$

Figure 1 SAR Mathematical Equation

SAR is expressed in units of Watts per Kilogram (W/kg).

$$\text{SAR} = \sigma E^2 / p$$

Where :

σ = conductivity of the tissue-simulant material (S/m)

p = mass density of the tissue-simulant material (kg/m^3)

E = Total RMS electric field strength (V/m)

Note: The primary factors that control rate or energy absorption were found to be the wavelength of the incident field in relations to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.[4]

4. DESCRIPTION OF SAR MEASUREMENT SYSTEM

The DASY4 system used for performing compliance tests consists of the following items:

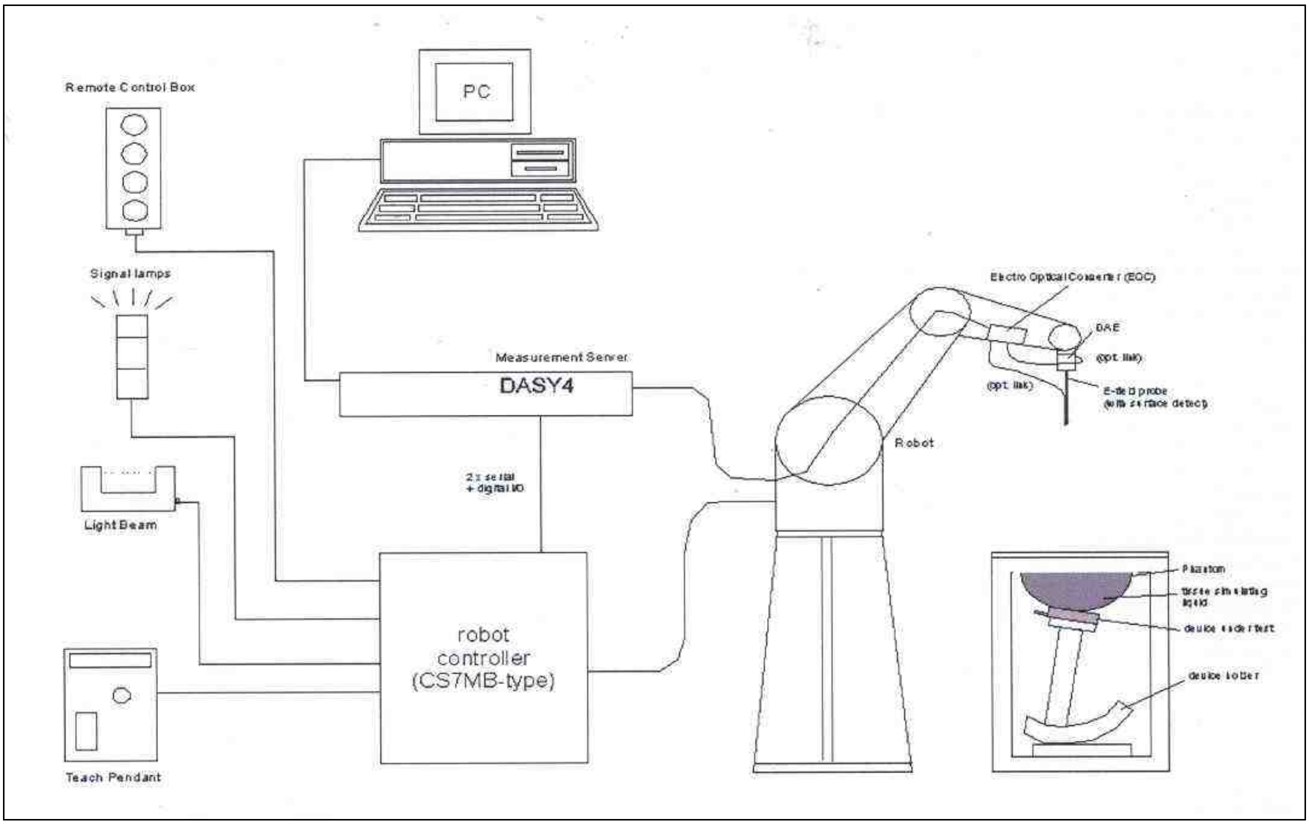


Figure 2 SAR Measurement System

- A standard high precision 6-axis robot with controller, teach pendant and software.
- Data acquisition electronics, DAE4 consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain- switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit.
- Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines.
- The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts.
- The robot uses its own controller with a built in VME-bus computer. Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

5. SYSTEM VERIFICATION

5.1. Tissue Simulating Mixture Characterization

The mixture is characterized to obtain proper dielectric constant (permittivity) and conductivity of the tissue of interest. The tissue dielectric parameters recommended in IEEE 1528 and IEC 62209 have been used as targets for the compositions, and are to match within 5%, per the FC recommendations.

Ingredients (% by weight)	Frequency (MHz)							
	835		1900		2450		5200-5800	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body
Water	41.45	52.4	54.9	40.4	62.7	73.2	62.52	78.66
Salt (NaCl)	1.45	1.4	0.18	0.5	0.5	0.04	0.0	0.0
Sugar	56.0	45.0	0.0	58.0	0.0	0.0	0.0	0.0
HEC	1.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0
Bactericide	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	36.8	0.0	17.24	10.67
DGBE	0.0	0.0	44.92	0.0	0.0	26.7	0.0	0.0
Diethylene glycol hexyl ether	-	-	-	-	-	-	17.24	10.67

Table 2 Composition of the Tissue Equivalent Materials

-Salt: 99+% Pure Sodium Chloride Sugar: 98+% Pure Sucrose
-Water: De-ionized, 16 MΩ+ resistivity HEC: Hydroxyethyl Cellulose
-DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]
-Triton X-100 (ultra pure): Polyethylene glycol mono [4-(1,1, 3, 3-tetramethylbutyl)phenyl]ether

5.2. Tissue Verification

The dielectric parameters of the brain and muscle simulating liquid were measured prior to SAR assessment using the HP85070D dielectric probe kit and Agilent 8753D Network Analyzer. The actual dielectric parameters are shown in the following table. The below measured tissue parameters were used in DASY software.

Freq. [MHz]	Liquid	Date	Liquid Temp [℃]	Parameters	Target Value	Measured Value	Dev. (%)	Limit (%)
835	Head	10/15/2013	22.5	εr	41.5	42.3	+1.9	± 5
				σ	0.90	0.90	0	± 5
835	Head	12/16/2013	22.5	εr	41.5	42.4	+1.9	± 5
				σ	0.90	0.91	+1.1	± 5
835	Body	10/15/2013	22.7	εr	55.2	53.9	-2.4	± 5
				σ	0.97	0.94	-3.1	± 5
835	Body	12/16/2013	22.3	εr	55.2	53.7	-2.8	± 5
				σ	0.97	0.95	-2.1	± 5
1900	Head	10/16/2013	22.3	εr	40.0	40.4	+1.0	± 5
				σ	1.40	1.43	+2.1	± 5
1900	Head	12/17/2013	22.5	εr	40.0	40.2	+0.5	± 5
				σ	1.40	1.42	+1.4	± 5
1900	Body	10/16/2013	22.2	εr	53.3	51.8	-2.9	± 5
				σ	1.52	1.56	+2.6	± 5
1900	Body	12/17/2013	22.5	εr	53.3	52.5	-2.6	± 5
				σ	1.52	1.57	+3.3	± 5
2450	Body	10/22/2013	22.6	εr	52.7	52.6	-0.2	± 5
				σ	1.95	1.94	-0.6	± 5
2450	Body	12/18/2013	22.8	εr	52.7	52.3	-0.8	± 5
				σ	1.95	2.01	+3.1	± 5
5200	Body	10/21/2013	23.1	εr	49.014	49.0	-0.1	± 5
				σ	5.299	5.51	+3.9	± 5
5500	Body	10/21/2013	23.1	εr	48.58	48.4	-0.4	± 5
				σ	5.65	5.82	+3.0	± 5
5800	Body	10/21/2013	23.2	εr	48.20	47.9	-0.7	± 5
				σ	6.00	6.19	+3.2	± 5
5800	Body	12/19/2013	22.9	εr	48.20	48.00	-0.4	± 5
				σ	6.00	6.10	+1.6	± 5

Table 3 Measured Simulating Liquid Dielectric Values

The humidity and dielectric/ambient temperatures are recorded during the assessment of the tissue material dielectric parameters. The difference between the ambient temperature of the liquid during the dielectric measurement and the temperature during tests was less than |2|°C.

5.3. System Validation

Prior to the SAR assessment, the system validation kit was used to verify that the DASY4 was operating within its specifications. The validation dipoles are highly symmetric and matched at the centre frequency for the specified liquid and distance to the phantom. The accurate distance between the liquid surface and the dipole centre is achieved with a distance holder that snaps onto the dipole. System validation is performed by feeding a known power level into a reference dipole, set at a known distance from the phantom. The measured SAR is compared to the theoretically derived level.

The same SAR probe(s) and tissue-equivalent media combinations used with each specific SAR system for system verification must be used for device testing. When multiple probe calibration points are required to cover substantially large transmission bands, independent system verifications are required for each probe calibration point. A system verification must be performed before each series of SAR measurements using the same probe calibration point and tissue-equivalent medium. Additional system verification should be considered according to the conditions of the tissue-equivalent medium and measured tissue dielectric parameters typically every three to four days when the liquid parameters are re-measured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

The measured 1g(10g) SAR should be within 10 % of the expected target reference values at the time of calibration by the calibration facility.

Tissue Frequency (MHz)	Tissue Type	Date	Probe SN	Dipole SN	Measured SAR 1g (W/kg)	Target SAR 1g (W/kg)	Deviation (%)	Limit (%)
835	Head	10/15/2013	3020	481	9.28	9.84	-5.7	±10
835	Head	12/16/2013	3020	481	9.16	9.84	-7.0	±10
835	Body	10/15/2013	3020	481	9.52	10.0	-4.8	±10
835	Body	12/16/2013	3020	481	9.32	10.0	-6.8	±10
1900	Head	10/16/2013	3020	5d038	42.4	40.4	+4.9	±10
1900	Head	12/17/2013	3020	5d038	40.0	40.4	-1.0	±10
1900	Body	10/16/2013	3020	5d038	43.2	40.8	+5.9	±10
1900	Body	12/17/2013	3020	5d038	40.4	40.8	+1.0	±10
2450	Body	10/22/2013	3020	746	51.2	53.2	-3.8	±10
2450	Body	12/18/2013	3020	746	54.0	53.2	+1.5	±10
5200	Body	10/21/2013	3905	1107	73.1	75.0	-2.6	±10
5500	Body	10/21/2013	3905	1107	80.2	79.2	-1.3	±10
5800	Body	10/21/2013	3905	1107	76.6	75.0	+2.1	±10
5800	Body	12/18/2013	3905	1107	77.6	75.0	+3.4	±10

Deviation from Reference Validation Values

5.4. Justification for Extended SAR Dipole Calibrations

Instead of the typical annual calibration recommended by measurement standards, longer calibration intervals of up to three years may be considered when it is demonstrated that the SAR target, impedance and return loss of a dipole have remain stable according to the following requirements

KDB 865664 requirements

a) return loss : < -20 dB, within 20% of previous measurement
b) impedance : within 5Ω from previous measurement.

D2450V2 S/N:746					
Head/Body	Date of Measurement	Return Loss (dB)	Δ%	Impedance (Ω)	ΔΩ
Body	01/24/2012	-25.2	-	50.8	-
	01/11/2013	-24.5	-2.8	48.9	-1.9

6. SAR MEASUREMENT PROCEDURE USING DASY4

The SAR evaluation is performed with the SPEAG DASY4 system as following;

Step 1: Power Reference Measurement

A measurement of the SAR value at a fixed location is used as a reference value for assessing the power drop of the EUT. The SAR at this point is measured at the start of the test and then again at the end of the test.

Step 2: Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine scanning measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2dB range is required in IEEE Standards 1528 and IEC 62209 standards. If only one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of Zoom Scans has to be increased accordingly.

Area Scan Parameters are as below table from KDB 865664 D01 SAR Measurement 100MHz to 6GHz v01r01.

	$\le$ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	$½ \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	$30° \pm 1°$	$20° \pm 1°$
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	$\le$ 2 GHz: $\le$ 15 mm 2 – 3 GHz: $\le$ 12 mm	3 – 4 GHz: $\le$ 12 mm 4 – 6 GHz: $\le$ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\le$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

Step 3: Zoom Scan

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1g and 10g of simulated tissue. The Zoom Scan measures points (refer to table below) within a cube shoes base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1g and 10g and displays these values next to the job's label.

Zoom Scan Parameters are as below table from KDB 865664 D01 SAR Measurement 100MHz to 6GHz v01r01.

Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details. * When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

Step 4: Power drift measurement

The Power drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings.

Step 5: Z-Scan (FCC only)

The Z Scan measures points along a vertical straight line. The line runs along the Z-axis of a one-dimensional grid. In order to get a reasonable extrapolation the extrapolated distance should not lager than the step size in Z-direction.

7. DESCRIPTION OF TEST POSITION

SAR measurements were performed in the “cheek” and “tilted” positions on left and right sides of the phantom according to IEEE 1528. Both were measured in the head section of the SAM Twin Phantom.

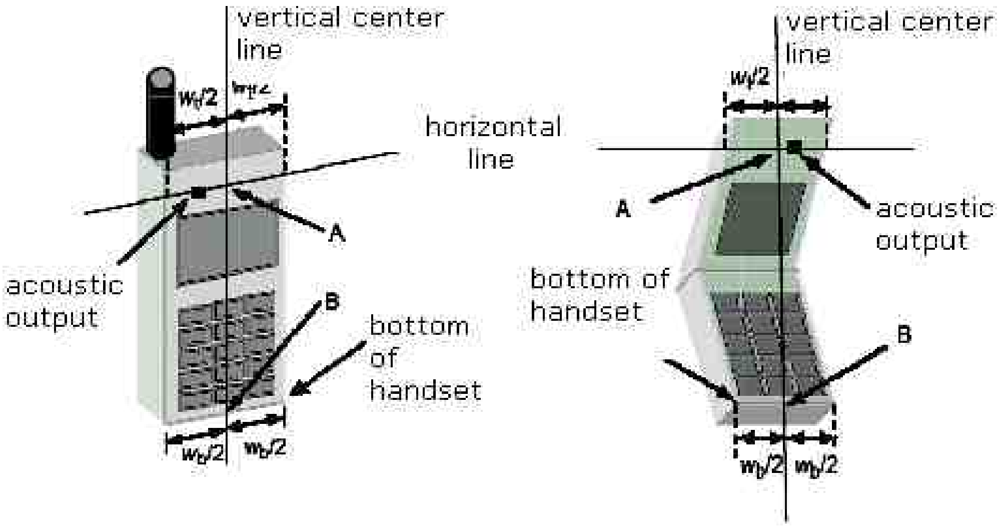


Figure 3 Handset vertical and horizontal reference line

7.1. Cheek Position

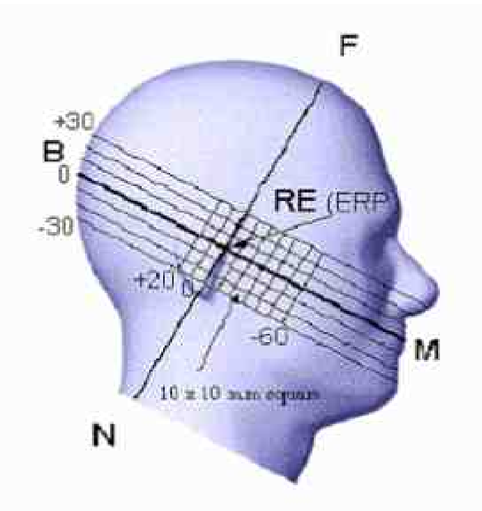


Figure 4 Side view of SAM phantom

The device was positioned with the vertical center line of the body of the device and the horizontal line crossing the center (see Figure 3) of the ear piece in a plane parallel to the sagittal plane of the phantom(see Figure 4). While maintaining the device in this plane, it was aligned the vertical center line with the reference plane containing the three ear and mouth reference points(M, RE and LE) and aligned the center of the ear piece with the line RE-LE. Then device was translated towards the phantom with the ear piece aligned with the line LE-RE until it touched the ear. While maintaining the device in the reference plane and maintaining the device contact with the ear, the bottom of the device was moved until any point on the front side is in contact with the cheek of the phantom.(see Figure 5)

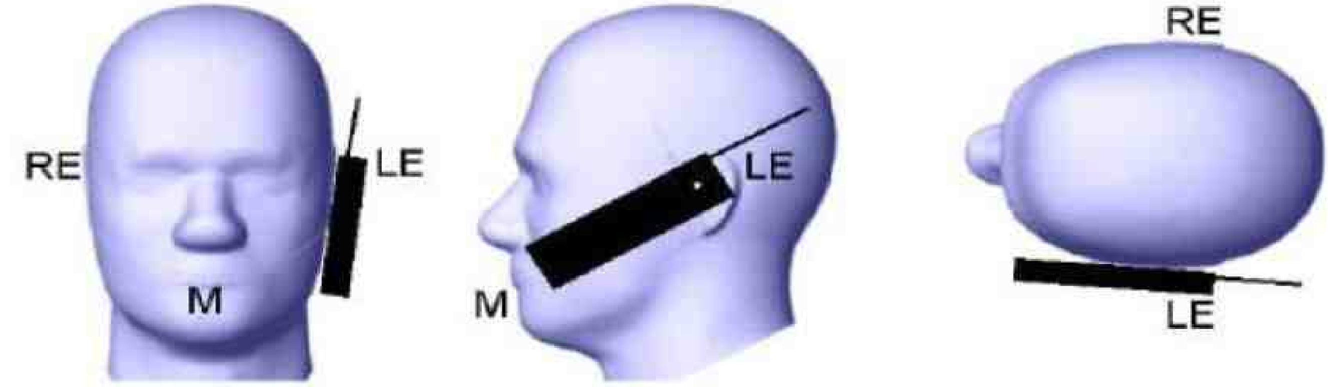


Figure 5 Cheek/Touch Position

7.2. Tilt Position

The device was positioned in the "Cheek" position. While maintaining the device in the reference plane described above cheek position and pivoting against the ear, device was moved outward away from the mouth by an angle of 15 degrees. (see Figure 6)

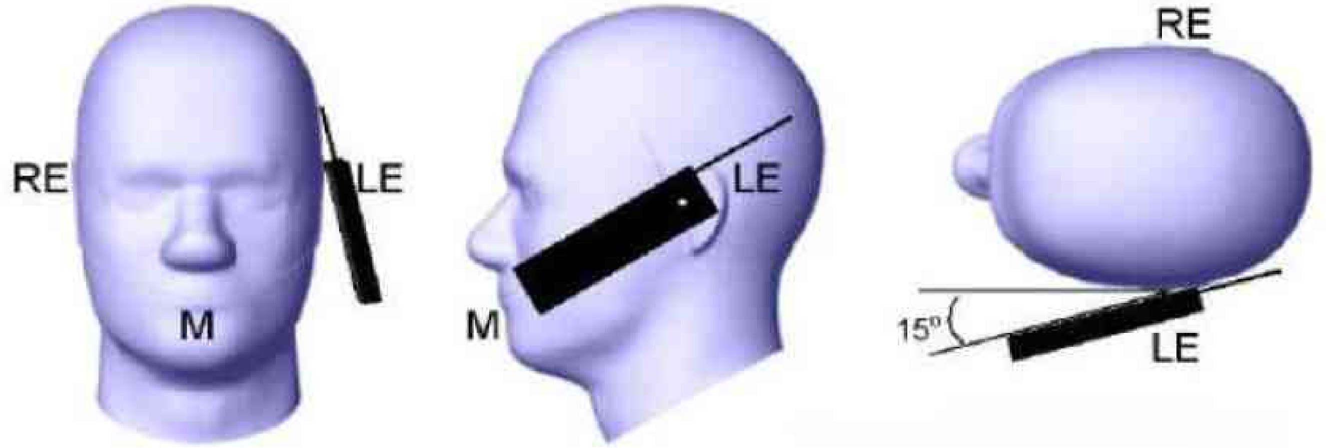


Figure 6 Ear/Tilt Position

Body-worn operating configurations are tested without the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration.

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

7.3. Body Holster/ Belt Clip Configurations

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

Transmitters that are designed to operate in front of a person's face, as the push-to-talk configurations, are test for SAR compliance with the front of the device positioned to face the flat phantom in brain fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

In all cases SAR measurements are performed to investigate the worst-case positioning. Worst-case positioning is then documented and used to perform Body SAR testing.

8. MEASUREMENT UNCERTAINTY

The uncertainty analysis is based on the template listed in the IEEE 1528 for both EUT SAR tests. The measurement uncertainty of a specific device is evaluated independently and the total uncertainty for both evaluations (95 % confidence level) must be less than 25 %.

Uncertainty Component	Uncertainty value (%)	Probability Distribution	Divisor	Ci	Ci ^ 2	Standard Uncertainty(%)	Standard Uncertainty^2	(Standard Uncertainty^2) x ci^2	vi
Measurement System									
Probe Calibration (k=1)	5.90	Normal	1	1	1	5.90	34.81	34.81	∞
Axial Isotropy	4.70	Rectengular	√3	0.7	0.49	2.71	7.34	3.60	∞
Hemispherical Isotropy	9.60	Rectengular	√3	0.7	0.49	5.54	30.69	15.04	∞
Linearity	4.70	Rectengular	√3	1	1	2.71	7.34	7.34	∞
System Detection Limits	1.00	Rectengular	√3	1	1	0.58	0.34	0.34	∞
Boundary Effect	1.00	Rectengular	√3	1	1	0.58	0.34	0.34	∞
Response Time	0.80	Rectengular	√3	1	1	0.46	0.21	0.21	∞
RF Ambient conditions	3.00	Rectengular	√3	1	1	1.73	3.00	3.00	∞
Readout Electronics	0.30	Normal	1	1	1	0.30	0.09	0.09	∞
Integration time	2.60	Rectengular	√3	1	1	1.50	2.25	2.25	∞
Probe positioner	0.40	Rectengular	√3	1	1	0.23	0.05	0.05	∞
Probe positioning	2.90	Rectengular	√3	1	1	1.67	2.79	2.79	∞
Max. SAR evaluation	1.00	Rectengular	√3	1	1	0.58	0.34	0.34	∞
Test Sample Related							**Sub total**	**70.20**	
Device Positioning	1.59	Normal	1	1	1	1.59	2.53	2.53	9
Device Holder Uncertainty	3.60	Normal	1	1	1	3.60	12.96	12.96	∞
Power Drift	5.00	Rectengular	√3	1	1	2.89	8.35	8.35	∞
Phantom and setup							**Sub total**	**23.84**	
Phantom Uncertainty	4.00	Rectengular	√3	1	1	2.31	5.33	5.33	∞
Liquid Conductivity - target value	5.00	Rectengular	√3	0.5	0.25	2.89	8.33	2.08	∞
Liquid Conductivity - Measurement value	2.50	Normal	1	0.5	0.25	2.50	6.25	1.56	∞
Liquid Permittivity - target value	5.00	Rectengular	√3	0.5	0.25	2.89	8.33	2.08	∞
Liquid Pemiittivity - Measurement value	2.50	Normal	1	0.5	0.25	2.50	6.25	1.56	∞
							Sub total	**12.63**	
Combined standard Uncertainty (%)							± 10.33	106.67	-
Expanded Uncertainty	**(95% CONFIDENCE LEVEL,K=2)**							**± 20.66**	

Table 5 Uncertainty Budget of DASY4

9. FCC RF Exposure Limits

HUMAN EXPOSURE	UNCONTROLLED ENVIRONMENT General Population (W/Kg) or (mW/g)	CONTROLLED ENVIRONMENT Occupational (W/Kg) or (mW/g)
SPATIAL PEAK SAR (Brain)	1.60	8.00
SPATIAL AVERAGE SAR (Whole Body)	0.08	0.40
SPATIAL PEAK SAR (Hand / Feet / Ankle / Wrist)	4.00	20.00

Table 6 Safety Limits for Partial Body Exposure

NOTE :

* The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e.as a result of employment or occupation).

10. RF CONDUCTED POWERS

10.1.Nominal and Maximum Output Power Specifications

This device operates using the following maximum and nominal output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D01v05.

Mode		Modulated Average Power (dBm)
GSM850	Maximum	34
	Nominal	33
GSM1900	Maximum	31
	Nominal	30
UMTS Band V(850)	Maximum	25
	Nominal	24
UMTS Band II(1900)	Maximum	25
	Nominal	24
IEEE 802.11b (2.4G)	Maximum	18
	Nominal	16
IEEE 802.11g (2.4G)	Maximum	18
	Nominal	16
IEEE 802.11n (2.4G)	Maximum	18
	Nominal	16
IEEE 802.11a (5G)	Maximum	14
	Nominal	13
IEEE 802.11n (5G)	Maximum	14
	Nominal	13

10.2.SAR scaling factors sample calculation

Scaled SAR results are derived after scaling factors are applied to the measured values as below. Scaling for maximum tune-up tolerance must be considered separately.

SAR Section	Test Position	Mode	Batt.	Dist. (mm)	Freq. (MHz)	CH #	Power (dBm)		SAR 1g (W/kg)	Scaling Factor	Scaled SAR 1g (W/kg)	Plot. No.
							Max. allowed	Mea-sured				
Head	Left Touch	Voice	Ext.	N/A	836.6	190	34.00	33.22	0.223	1.197	0.267	-

*Scaled SAR = Measured SAR x Scaling Factor

0.267 = 0.223 x 1.197

10.3. GSM/GPRS/EDGE Conducted output Power Measurements

Conducted output power measurements were performed with a base station simulator under digital average power. SAR measurements for GSM/GPRS/EDGE modes were performed with a base station simulator R&S CMU200. Communication between the device and the emulator was established by air link. Set base station emulator to allow DUT to radiate maximum output power during all tests. Followings are the worst configuration setup for SAR tests.

* GSM voice: Head SAR

* GPRS Multi-slots: Body SAR with GPRS Multi-slot Class12 with CS 1 (GMSK)

Note;

CS1/MCS7 coding scheme was used in GPRS/EDGE output power measurements and SAR Testing, as a condition where GMSK/8PSK modulation was ensured. Investigation has shown that CS1 - CS4/ MCS5 –MCS9 settings do not have any impact on the output levels in the GPRS/EDGE modes.

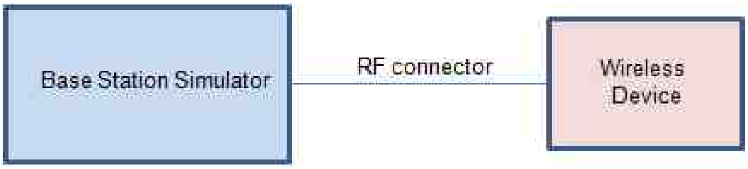


Figure 7 Power Measurement Setup

10.4. GSM/GPRS/EDGE Conducted output Powers

Band	Mode	Multi Slot	Maximum Burst-Averaged Output Power (dBm)			Calculated Maximum Frame-Averaged Output Power(dBm)		
			128CH	190CH	251CH	128CH	190CH	251CH
GSM850	GSM	1 Tx slot	33.15	33.22	33.21	24.12	24.19	24.18
	GPRS	1 Tx slot	33.12	33.20	33.19	24.09	24.17	24.16
		2 Tx slots	30.61	30.72	30.62	**24.59**	**24.70**	**24.60**
		3 Tx slots	28.72	28.73	28.86	24.45	24.46	24.59
		4 Tx slots	27.21	27.43	27.32	24.20	24.42	24.31
	EDGE	1 Tx slot	32.63	32.73	32.78	23.60	23.70	23.75
		2 Tx slots	30.35	30.43	29.97	24.33	24.41	23.95
		3 Tx slots	28.48	28.38	28.48	24.21	24.11	24.21
		4 Tx slots	27.05	27.13	27.06	24.04	24.12	24.05

Band	Mode	Multi Slot	Maximum Burst-Averaged Output Power (dBm)			Calculated Maximum Frame-Averaged Output Power(dBm)		
			512CH	661CH	810CH	512CH	661CH	810CH
GSM1900	GSM	1 Tx slot	29.78	29.55	30.11	20.75	20.52	21.08
	GPRS	1 Tx slot	29.83	29.65	30.15	**20.80**	**20.62**	**21.12**
		2 Tx slots	26.76	26.59	26.77	20.74	20.57	20.75
		3 Tx slots	24.81	24.80	24.86	20.54	20.53	20.59
		4 Tx slots	23.39	23.58	23.45	20.38	20.57	20.44
	EDGE	1 Tx slot	29.61	29.55	29.68	16.59	16.42	16.49
		2 Tx slots	26.55	26.49	26.61	16.46	16.33	16.39
		3 Tx slots	24.77	24.72	24.79	16.58	16.42	16.58
		4 Tx slots	23.33	23.50	23.42	16.45	16.43	16.53

Note:

1. Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged power was calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.
2. The bolded GPRS modes were selected for SAR testing according to the highest frame-averaged output power table according to KDB 941225 D03v01.

10.5. UMTS Conducted output Power Measurements

Procedures Used to Establish RF Signal for SAR

The following procedures are according to FCC KDB Publication 941225 D01 “SAR Measurement Procedures for 3G Devices” V2, October 2007.

The device was placed into a simulated call using a base station simulator R&S CMU200. Establishing connections in this manner ensure a consistent means for SAR and are recommended for evaluating SAR. EUTs were evaluated prior to testing, with a fully charged battery and were configured to operate at maximum output power.

Output Power Verification

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

Head SAR Measurements

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

Body SAR Measurements

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

Handsets with Release 5 HSDPA

Body SAR is not required for handsets with HSDPA capabilities when the maximum average output of each RF channel with HSDPA active is less than ¼ dB higher than that measured without HSDPA using12.2 kbps RMC and the maximum SAR for 12.2 kbps RMC is ≤ 75 % of the SAR limit. Otherwise, SAR is Measured for HSDPA, using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration in 12.2 kbps RMC without HSDPA, on the maximum output channel with the body exposure configuration that results in the highest SAR in 12.2kbps RMC for that RF channel.

Sub-Test 1 Setup for Release 5 HSDPA

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

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

Handsets with Release 6 HSPA (HSDPA/HSUPA)

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

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

Note 1: Δ_{ACK}, Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.
Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. 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} can not be set directly; it is set by Absolute Grant Value.

10.6. UMTS Conducted output Powers

Band	Mode	3GPP 34.121 Subtest	Conducted Powers (dBm)		
			4132CH	4175CH	4233CH
WCDMA850	WCDMA	12.2 kbps RMC	**23.91**	**23.85**	**24.10**
		12.2 kbps AMR	23.85	23.84	24.05
	HSDPA	Subtest 1	23.51	23.49	23.40
		Subtest 2	23.70	23.68	23.43
		Subtest 3	23.19	23.18	23.15
		Subtest 4	23.19	23.20	23.00
	HSUPA	Subtest 1	22.49	22.95	22.61
		Subtest 2	21.69	21.43	21.49
		Subtest 3	21.89	21.89	22.01
		Subtest 4	21.69	21.69	21.81
		Subtest 5	22.51	23.01	23.38

Band	Mode	3GPP 34.121 Subtest	Conducted Powers (dBm)		
				9400CH	9538CH
WCDMA1900	WCDMA	12.2 kbps RMC	**23.78**	**23.64**	**23.75**
		12.2 kbps AMR	23.76	23.64	23.73
	HSDPA	Subtest 1	23.41	23.80	23.22
		Subtest 2	23.60	23.56	23.36
		Subtest 3	23.21	23.25	22.86
		Subtest 4	23.29	23.28	23.15
	HSUPA	Subtest 1	22.91	22.81	22.60
		Subtest 2	21.72	21.54	21.43
		Subtest 3	22.05	21.96	21.96
		Subtest 4	22.01	21.54	21.53
		Subtest 5	22.83	22.62	22.43

Note:

1. The UMTS output powers were measured according to the test requirements outlined in section 5.2 of 3GPP TS34.121-1.
2. UMTS SAR was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v02.
3. HSPA SAR was not required since the average output power of the HSPA subsets was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.

10.7. 802.11b/g/n (2.4GHz) Conducted Output Powers

Required Test channels

Mode	Band	Frequency (GHz)	Channel	"Default Test Channels"	
				802.11b	802.11g
802.11b	2.4 GHz	2.412	1#	√	▽
		2.437	6	√	▽
		2.462	11#	√	▽

Notes:
√ = "default test channels"
▽ = possible 802.11g channels with maximum average output 1/4 dB higher than the "default test channels"
= when output power is reduced for channel 1 and/or 11 to meet restricted band requirements the highest output channels closest to each of these channels should be tested.

Conducted Output Powers

WLAN mode	Worst Power Data Rate [Mbps]	Conducted Powers (dBm)		
		2412MHz	2437MHz	2462MHz
802.11b	1	16.03	15.69	15.23
	2	15.20	15.14	14.99
	5.5	15.95	15.90	15.52
	11	15.69	15.40	14.89
802.11g	6	15.78	15.50	15.21
	9	15.87	15.62	15.33
	12	15.84	15.65	15.08
	18	15.96	15.71	15.24
	24	14.89	14.52	14.21
	36	14.89	14.50	14.29
	48	14.12	13.73	13.46
	54	13.68	13.38	13.09
802.11n	MCS0	15.92	15.71	15.03
	MCS1	15.67	15.51	15.02
	MCS2	15.81	15.70	15.17
	MCS3	14.72	14.46	14.24
	MCS4	14.57	14.15	13.99
	MCS5	13.69	13.60	13.45
	MCS6	13.53	13.34	13.22
	MCS7	12.94	12.70	12.00

Note: Per KDB 248227 D01, SAR is not required for 802.11g/n mode when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11b mode.

10.8. 802.11a/n(5GHz) Conducted Output Powers

Required Test channels

WLAN mode		Band	Frequency (GHz)	Channel	"Default Test Channels"	
					802.11a	
802.11a	UNII (15.407)	5.2 GHz	5.180	36	√	
			5.200	40		*
			5.220	44		*
			5.240	48	√	
		5.3 GHz	5.260	52	√	
			5.280	56		*
			5.300	60		*
			5.320	64	√	
		5.5 GHz	5.500	100		*
			5.520	104	√	
			5.540	108		*
			5.560	112		*
			5.580	116	√	
			5.600	120		*
			5.620	124	√	
			5.640	128		*
			5.660	132		*
			5.680	136	√	
			5.700	140		*
	DTS (15.247)	5.8 GHz	5.745	149	√	
			5.765	153		*
			5.785	157	√	
			5.805	161		*
			5.825	165	√	

Note :
√ = "default test channels"
* = possible 802.11a channels with maximum average output > the "default test channels"

802.11a Conducted Output Powers

Mode	Freq. (MHz)	Channel	802.11a (5GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
802.11a	5180	**36** √	12.87	12.72	12.77	12.83	12.83	12.89	12.98	13.00
802.11a	5200	40	12.85	12.84	12.87	12.83	12.75	12.93	12.86	12.98
802.11a	5220	44	12.83	12.81	12.83	12.80	12.71	12.88	12.81	12.93
802.11a	5240	48	12.75	12.80	12.85	12.92	12.85	12.93	12.95	12.95
802.11a	5260	**52** √	12.91	12.95	13.00	12.98	12.99	13.03	13.12	13.11
802.11a	5280	56	12.86	12.87	12.91	12.93	12.90	13.02	13.11	12.99
802.11a	5300	60	12.85	12.84	12.90	12.90	12.87	13.05	13.11	12.98
802.11a	5320	64	12.81	12.81	12.86	12.92	12.96	13.01	12.96	13.02
802.11a	5500	**100***	12.26	12.29	12.28	12.35	12.31	12.50	12.43	12.46
802.11a	5520	104	12.10	12.12	12.15	12.20	12.18	12.19	12.31	12.36
802.11a	5540	108	11.99	11.94	11.97	12.03	12.10	12.11	12.19	12.23
802.11a	5560	112	11.90	11.92	11.96	12.07	12.08	12.04	12.07	12.10
802.11a	5580	116	11.72	11.84	11.78	11.86	11.92	11.85	11.96	11.96
802.11a	5600	120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5620	124	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5640	128	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5660	132	11.10	11.23	11.18	11.25	11.32	11.25	11.29	11.31
802.11a	5680	136	11.09	11.21	11.19	11.24	11.20	11.24	11.33	11.37
802.11a	5700	140	11.08	11.14	11.12	11.22	11.14	11.22	11.28	11.27
802.11a	5745	**149** √	10.89	10.89	10.95	10.91	10.92	**11.00**	10.98	10.96
802.11a	5765	153	10.74	10.77	10.81	10.81	10.82	10.84	10.85	10.87
802.11a	5785	157	10.66	10.65	10.72	10.71	10.70	10.77	10.81	10.84
802.11a	5805	161	10.53	10.55	10.57	10.59	10.61	10.69	10.70	10.73
802.11a	5825	**165** √	10.48	10.51	10.46	10.54	10.58	**10.63**	10.56	10.57

Note:

Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02.

- For 5GHz, highest average RF output power channels for the lowest data rate for IEEE 802.11a were selected for SAR evaluation.
- When the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is <1.6 W/kg and the reported 1g averaged SAR I <0.8 W/kg, SAR testing on other channels is not required.

√ = SAR Measured default test channels

* = SAR Measured channel which has higher output power than default test channels

802.11n Conducted Output Powers

Mode	Freq. (MHz)	Channel	802.11n (5GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
			6.5	13	19.5	26	39	52	58.5	65
802.11n	5180	36	11.77	11.84	11.90	11.97	12.03	11.84	11.86	11.97
802.11n	5200	40	11.83	11.85	11.95	11.91	11.99	11.79	11.94	11.92
802.11n	5220	44	11.79	11.85	11.96	11.90	11.89	11.78	11.93	11.87
802.11n	5240	48	11.78	11.76	11.85	11.84	11.97	11.81	11.92	12.06
802.11n	5260	52	11.86	11.83	11.93	11.91	12.10	12.04	11.92	12.03
802.11n	5280	56	11.83	11.84	11.86	11.93	12.09	12.00	11.96	11.99
802.11n	5300	60	11.81	11.86	11.86	11.95	12.01	11.95	11.97	11.95
802.11n	5320	64	11.77	11.81	11.86	11.79	11.98	11.94	11.97	12.03
802.11n	5500	100	11.22	11.24	11.33	11.31	11.53	11.48	11.39	11.49
802.11n	5520	104	11.21	11.21	11.30	11.29	11.50	11.44	11.36	11.44
802.11n	5540	108	11.16	11.15	11.25	11.25	11.43	11.37	11.30	11.39
802.11n	5560	112	10.86	10.85	10.94	10.93	11.15	11.28	11.22	11.30
802.11n	5580	116	10.76	10.86	10.87	10.94	11.08	11.00	11.01	11.02
802.11n	5600	120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5620	124	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5640	128	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5660	132	10.29	10.43	10.37	10.41	10.52	10.39	10.51	10.50
802.11n	5680	136	10.27	10.40	10.33	10.41	10.51	10.37	10.48	10.47
802.11n	5700	140	10.19	10.29	10.22	10.33	10.39	10.23	10.39	10.33
802.11n	5745	149	9.77	9.84	9.81	9.88	9.98	9.92	9.93	10.05
802.11n	5765	153	9.69	9.65	9.74	9.68	9.89	9.72	9.73	9.88
802.11n	5785	157	9.60	9.59	9.68	9.61	9.82	9.64	9.65	9.78
802.11n	5805	161	9.49	9.54	9.65	9.59	9.66	9.67	9.62	9.73
802.11n	5825	165	9.39	9.43	9.55	9.50	9.57	9.50	9.53	9.87

Note:

Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02.

- For 5GHz, highest average RF output power channels for the lowest data rate for IEEE 802.11a were selected for SAR evaluation.

10.9. Bluetooth Conducted Output Powers

Modulation	Max Output Power (mW)
GFSK	1.6
8-DPSK	1.7

Per FCC KDB 447498 D01v05, the SAR exclusion threshold for distance <50mm is defined by the following equation:

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

Based on the maximum conducted power of Bluetooth (rounded to the nearest mW) and the antenna to user separation distance, **Bluetooth body-worn accessory SAR was not required**. [(1.7/15)*√ 2.441] = 0.2 < 3.0

11. SAR TEST CONDITIONS & ANTENNA INFORMATION

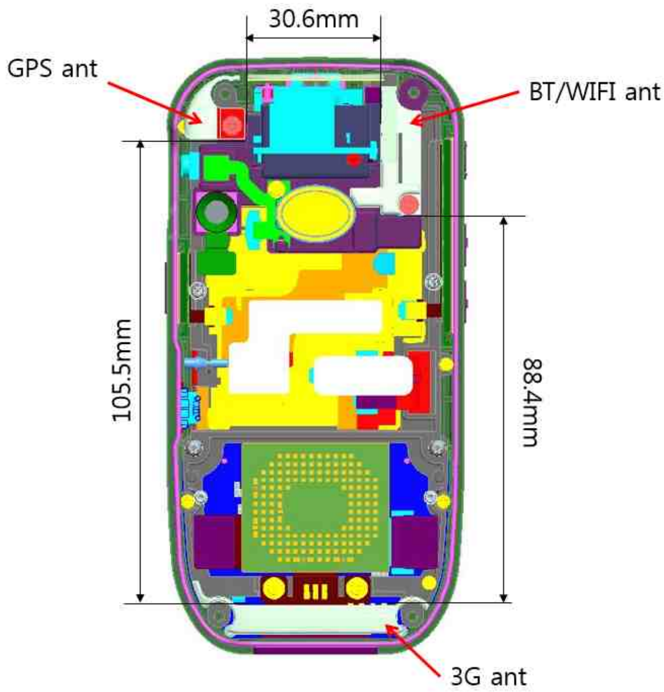
11.1. Standalone SAR Measurements

Test Modes	Head SAR	Body SAR	Note
WWAN	Yes	Yes	
2.4 GHz WLAN	No	Yes	
5 GHz WLAN	No	Yes	
Bluetooth	No	No	SAR is not required according to the KDB 447498 D01 - 1g SAR test Exclusion thresholds conditions.

11.2. Simultaneous SAR Measurements

RF Exposure Condition	Capable Transmit Configurations
Head	WWAN+BT only
Body	WWAN+BT only
Hotspot & WiFi Direct	Not supported

11.3. Antenna Information



12. SAR MEASUREMENT RESULTS

12.1. GSM850 SAR Measurement Results

SAR Section	Test Position	Mode	Batt.	Dist. (mm)	Freq. (MHz)	CH #	Power (dBm)		SAR 1g (W/kg)	Scaling Factor	Scaled SAR 1g (W/kg)	Plot. No.
							Max. allowed	Mea-sured				
Head	Left Touch	Voice	Ext.	N/A	836.6	190	34.00	33.22	0.223	1.197	0.267	-
	Left Tilt	Voice	Ext.	N/A	836.6	190	34.00	33.22	0.153	1.197	0.183	-
	Right Touch	Voice	Ext.	N/A	836.6	190	34.00	33.22	0.236	1.197	**0.282**	**1**
	Right Tilt	Voice	Ext.	N/A	836.6	190	34.00	33.22	0.138	1.197	0.165	-
	Right Touch	Voice	Std.	N/A	836.6	190	34.00	33.22	0.230	1.197	0.275	-
	Right Touch	Voice(*1D)	Ext.	N/A	836.6	190	34.00	33.22	0.218	1.197	0.261	-
Body	Front	Voice	Ext.	15	836.6	190	34.00	33.22	0.298	1.197	0.357	-
	Rear	Voice	Ext.	15	836.6	190	34.00	33.22	0.450	1.197	**0.539**	**2**
	Rear	GPRS 2TX	Ext	15	836.6	190	31.00	30.72	0.484	1.067	0.516	**3**
	Rear	GPRS 2TX	Std	15	836.6	190	31.00	30.72	0.408	1.067	0.435	-
	Rear	Voice(*1D)	Ext.	15	836.6	190	34.00	33.22	0.434	1.197	0.519	**-**

*1D: 1D scanner base model test result
*2D scanner base model was the worst case model and fully tested.

12.2. GSM1900 SAR Measurement Results

SAR Section	Test Position	Mode	Batt.	Dist. (mm)	Freq. (MHz)	CH #	Power (dBm)		SAR 1g (W/kg)	Scaling Factor	Scaled SAR 1g (W/kg)	Plot. No.
							Max. allowed	Mea-sured				
Head	Left Touch	Voice	Ext.	N/A	1880.0	661	31.00	29.55	0.152	1.396	0.212	-
	Left Tilt	Voice	Ext.	N/A	1880.0	661	31.00	29.55	0.074	1.396	0.103	-
	Right Touch	Voice	Ext.	N/A	1880.0	661	31.00	29.55	0.219	1.396	**0.306**	**4**
	Right Tilt	Voice	Ext.	N/A	1880.0	661	31.00	29.55	0.101	1.396	0.141	-
	Right Touch	Voice	Std.	N/A	1880.0	661	31.00	29.55	0.18	1.396	0.251	-
	Right Touch	Voice(*1D)	Ext.	N/A	1880.0	661	31.00	29.55	0.205	1.396	0.286	-
Body	Front	Voice	Ext.	15	1880.0	661	31.00	29.55	0.156	1.396	0.218	-
	Rear	Voice	Ext.	15	1880.0	661	31.00	29.55	0.174	1.396	**0.243**	**5**
	Rear	GPRS 2TX	Ext	15	1880.0	661	31.00	29.65	0.131	1.364	0.179	-
	Rear	GPRS 2TX	Std	15	1880.0	661	31.00	29.55	0.141	1.396	0.197	-
	Rear	Voice(*1D)	Ext.	15	1880.0	661	31.00	29.55	0.168	1.396	0.235	-

*1D: 1D scanner base model test result
*2D scanner base model was the worst case model fully tested.

12.3. UMTS850 SAR Measurement Results

SAR Section	Test Position	Mode	Batt.	Dist. (mm)	Freq. (MHz)	CH #	Power (dBm)		SAR 1g (W/kg)	Scaling Factor	Scaled SAR 1g (W/kg)	Plot. No.
							Max. allowed	Mea-sured				
Head	Left Touch	RMC	Ext.	N/A	835	4175	25.00	23.85	0.328	1.303	0.427	-
	Left Tilt	RMC	Ext.	N/A	835	4175	25.00	23.85	0.229	1.303	0.298	-
	Right Touch	RMC	Ext.	N/A	835	4175	25.00	23.85	0.387	1.303	**0.504**	**6**
	Right Tilt	RMC	Ext.	N/A	835	4175	25.00	23.85	0.222	1.303	0.289	-
	Right Touch	RMC	Std.	N/A	835	4175	25.00	23.85	0.358	1.303	0.466	-
	Right Touch	RMC(*1D)	Ext.	N/A	835	4175	25.00	23.85	0.371	1.303	0.483	-
Body	Front	RMC	Ext.	15	835	4175	25.00	23.85	0.443	1.303	0.577	-
	Rear	RMC	Ext.	15	835	4175	25.00	23.85	0.598	1.303	**0.779**	**7**
	Rear	RMC	Std.	15	835	4175	25.00	23.85	0.542	1.303	0.706	-
	Rear	RMC(*1D)	Ext.	15	835	4175	25.00	23.85	0.515	1.303	0.671	-

*1D: 1D scanner base model test result
*2D scanner base model was the worst case model fully tested.

12.4. UMTS1900 SAR Measurement Results

SAR Section	Test Position	Mode	Batt.	Dist. (mm)	Freq. (MHz)	CH #	Power (dBm)		SAR 1g (W/kg)	Scaling Factor	Scaled SAR 1g (W/kg)	Plot. No.
							Max. allowed	Mea-sured				
Head	Left Touch	RMC	Ext.	N/A	1880	9400	25.00	23.64	0.210	1.368	0.287	-
	Left Tilt	RMC	Ext.	N/A	1880	9400	25.00	23.64	0.109	1.368	0.149	-
	Right Touch	RMC	Ext.	N/A	1880	9400	25.00	23.64	**0.312**	1.368	**0.427**	**8**
	Right Tilt	RMC	Ext.	N/A	1880	9400	25.00	23.64	0.113	1.368	0.155	-
	Right Touch	RMC	Std.	N/A	1880	9400	25.00	23.64	0.288	1.368	0.394	-
	Right Touch	RMC(*1D)	Ext.	N/A	1880	9400	25.00	23.64	0.289	1.368	0.395	-
Body	Front	RMC	Ext.	15	1880	9400	25.00	23.64	0.213	1.368	0.291	-
	Rear	RMC	Ext.	15	1880	9400	25.00	23.64	0.271	1.368	**0.371**	**9**
	Rear	RMC	Std.	15	1880	9400	25.00	23.64	0.219	1.368	0.300	-
	Rear	RMC(*1D)	Std.	15	1880	9400	25.00	23.64	0.246	1.368	0.337	-

*1D: 1D scanner base model test result
*2D scanner base model was the worst case model fully tested.

12.5. WLAN (2.4GHz) SAR Measurements Results

SAR Section	Test Position	Mode	Batt.	Dist. (mm)	Freq. (MHz)	CH #	Power (dBm)		SAR 1g (W/kg)	Scaling Factor	Scaled SAR 1g (W/kg)	Plot. No.
							Max. allowed	Mea-sured				
Body	Front	802.11b	Ext.	15	2412	1	18.00	16.03	0.041	1.574	0.065	-
	Rear	802.11b	Ext.	15	2412	1	18.00	16.03	0.096	1.574	**0.151**	10
	Rear	802.11b	Std.	15	2412	1	18.00	16.03	0.090	1.574	0.142	-
	Rear	802.11b	Ext.	15	2412	1	18.00	16.03	0.089	1.574	0.140	-

*1D: 1D scanner base model test result
*2D scanner base model was the worst case model fully tested.

12.6. WLAN (5GHz) SAR Measurements Results

SAR Section	Test Position	Mode	Batt.	Dist. (mm)	Freq. (MHz)	CH #	Power (dBm)		SAR 1g (W/kg)	Scaling Factor	Scaled SAR 1g (W/kg)	Plot. No.
							Max. allowed	Mea-sured				
Body	Front	802.11a	Ext.	15	5180	36	14.00	12.87	0.063	1.297	0.082	-
	Rear	802.11a	Ext.	15	5180	36	14.00	12.87	0.117	1.297	0.152	-
	Rear	802.11a	Ext..	15	5260	52	14.00	12.91	0.201	1.285	0.258	**11**
	Rear	802.11a	Ext..	15	5500	100	14.00	12.26	0.166	1.493	0.248	-
	Rear	802.11a	Ext..	15	5475	149	14.00	10.89	0.168	2.046	0.344	-
	Rear	802.11a	Ext..	15	5825	165	14.00	10.48	0.159	2.249	**0.358**	**12**
	Rear	802.11a	Std.	15	5260	52	14.00	12.91	0.193	1.285	0.248	-
	Rear	802.11a	Ext..	15	5825	165	14.00	10.48	0.144	2.249	0.324	-

*1D: 1D scanner base model test result
*2D scanner base model was the worst case model fully tested.

12.7. SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2003, FCC KDB Procedure.
2. Batteries are fully charged at the beginning of the SAR measurements. An Extended battery was used for all SAR measurements. SAR measurements were performed with a standard battery at the worst-SAR configuration.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB 447498 D01v05.
6. Per FCC KDB 648474 D04v01, SAR was evaluated without a headset connected to the device. Since the standalone reported SAR was less than 1.2 W/kg, no additional SAR evaluation using a headset cable were required.
7. Per FCC KDB 865664 D01v01, variability SAR tests were not performed since the measured SAR results for all frequency bands were less than 0.8 W/kg. Please see Section 13 for variability analysis information.

GSM/GPRS Test Notes:

1. Body-Worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.
2. Justification for reduced test configurations per KDB 941225 D03v01: The source-based time-averaged output power was evaluated for all multi-slot operations. The multi-slot configuration with the highest frame averaged output power was evaluated for SAR.
3. Per FCC KDB 447498 D01v05, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is ≤ 1/2 dB, instead of the middle channel, the highest output power channel must be used.

UMTS Test Notes:

1. UMTS mode in Body SAR was tested under RMC 12.2 kbps with HSPA inactive per KDB 941225 D01v02. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.
2. Per FCC KDB 447498 D01v05, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). Since the maximum output power variation across the required test

channels is ≤ 1/2 dB, middle channel was the default channel used.

WLAN Test Notes:

1. Justification for reduced test configurations for WIFI channels per KDB 248227 D01v01r02 and Oct. 2012 FCC/TCB Meeting Notes for 2.4 GHz WIFI: Highest average RF output power channel for the lowest data rate was selected for SAR evaluation in 802.11b. Other IEEE 802.11 modes (including 802.11 g/n) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11b mode.
2. Justification for reduced test configurations for WIFI channels per KDB 248227 D01v01r02 and Oct. 2012 FCC/TCB Meeting Notes for 5 GHz WIFI: Highest average RF output power channel for the lowest data rate was selected for SAR evaluation in 802.11a. Other IEEE 802.11 modes were not investigated since the average output power over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data of IEEE 802.11a mode.
3. Since the maximum extrapolated peak SAR of the zoom scan for the maximum output channel was ≤ 1.6 W/kg and the reported 1g averaged SAR was ≤ 0.8 W/kg, SAR testing on other default channels was not required.

13. FCC MULTI-TX CONSIDERATION

13.1. Introduction

The following procedures adopted from FCC KDB Publication 447498 D01v05 are applicable to handsets with built-in unlicensed transmitters such as 802.11a/b/g/n/ac and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

13.2. Simultaneous Transmission Procedures

This device contains transmitter that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01v05 IV.C.1.iii, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific physical test configuration is ≤ 1.6 W/kg. When standalone SAR is not required to be measured, per FCC KDB 447498 D01v05 4.3.2 2), the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter.

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

Mode	Frequency	Maximum Allowed Power		Separation Distance (body)	Estimated SAR(body)
	[MHz]	[dBm]	[mW]	[mm]	[W/kg]
Bluetooth	2441	4	2.51	15	0.04

Note: Held-to ear configurations are not applicable to Bluetooth operations and therefore were not considered for simultaneous transmission. Per KDB Publication 447498 D01v05r01, the maximum power of the channel was rounded to the nearest mW before calculation.

14. SAR MEASUREMENT VARIABILITY

14.1. Measurement Variability

Per FCC KDB Publication 865864 D01v01, SAR measurement variability was assessed when measured 1g SAR is > 0.80 W/kg or when measured 10g SAR is >2.00 W/kg. Since all measured 1g SAR values were <0.8 W/kg SAR measurement variability was not assessed.

14.2. Measurement Uncertainty

The measured SAR was <1.5 W/kg for all frequency bands. Therefore, per KDB Publication 865664 D01v01, the extended measurement uncertainty analysis per IEEE 1528-2003 was not required.

15. CONCLUSION

The SAR evaluation indicates that PM40 complies with the RF radiation exposure limits of the FCC. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

16. EQUIPMENT LIST AND CALIBRATION DETAILS

Equipment Type	Manufacturer	Model Number	Serial Number	Calibration Due	Used For this Test
Robot - Six Axes	Staubli	RX60	N/A	N/A	☒
Robot Remote Control	SPEAG	CS7MB	F03/5U96A1 /C/01	N/A	☒
SAM Twin Phantom	SPEAG	TP1276	QD000P40CA	N/A	☒
Flat Phantom V4.4	SPEAG	QD000P44BA,BB	1001, higher	N/A	☐
Data Acquisition Electronics	SPEAG	DAE4	559	2014.02.14	☒
Probe E-Field	SPEAG	ES3DV2	3020	2014.02.21	☒
Probe E-Field	SPEAG	EX3DV4	3905	2014.02.27	☒
Antenna Dipole 835 MHz	SPEAG	D835V2	481	2015.04.25	☒
Antenna Dipole 900 MHz	SPEAG	D900V2	194	2013.11.18	☐
Antenna Dipole 1800 MHz	SPEAG	D1800V2	2d066	2014.01.26	☐
Antenna Dipole 1900 MHz	SPEAG	D1900V2	5d038	2015.05.13	☒
Antenna Dipole 1950 MHz	SPEAG	D1950V2	1027	2014.01.24	☐
Antenna Dipole 2450 MHz	SPEAG	D2450V2	746	2014.01.24	☒
Antenna Dipole 5000 MHz	SPEAG	5GHzV2	1107	2015.02.21	☒
High power RF Amplifier	EMPOWER	2057-BBS3Q5KCK	1002D/C0321	2014.02.25	☒
Digital Communication Tester	R&S	CMU200	110019	2014.02.12	☒
Signal Generator	Agilent	8648C	3629U00868	2014.02.04	☒
Signal Generator	R&S	SMBV100A	1407.6004k02-259341-Ez	2014.10.10	☒
RF Power Meter Dual	Hewlett Packard	E4419A	GB37170495	2014.02.21	☒
RF Power Sensor 0.01 - 18 GHz	Hewlett Packard	8481A	US37299851	2014.03.19	☒
RF Power Sensor 0.01 - 18 GHz	Hewlett Packard	8481A	3318A92872	2014.03.19	☒
S-Parameter Network Analyzer	Agilent	8753D	3410A07251	2014.03.07	☒
Dual Directional Coupler	Hewlett Packard	778D	1144AO4576	2014.03.19	☒
Directional Coupler	Agilent	773D	MY28390213	2014.02.13	☒
Bluetooth Test Set	Anritsu	MT8852B	6K00006994	2014.01.28	☐

APPENDIX A. SAR PLOTS

- Test Laboratory: KTL

- Model: PM40

- Position: GSM850 RIGHT CHEEK TOUCH_190CH

- Test Date: October 15, 2013

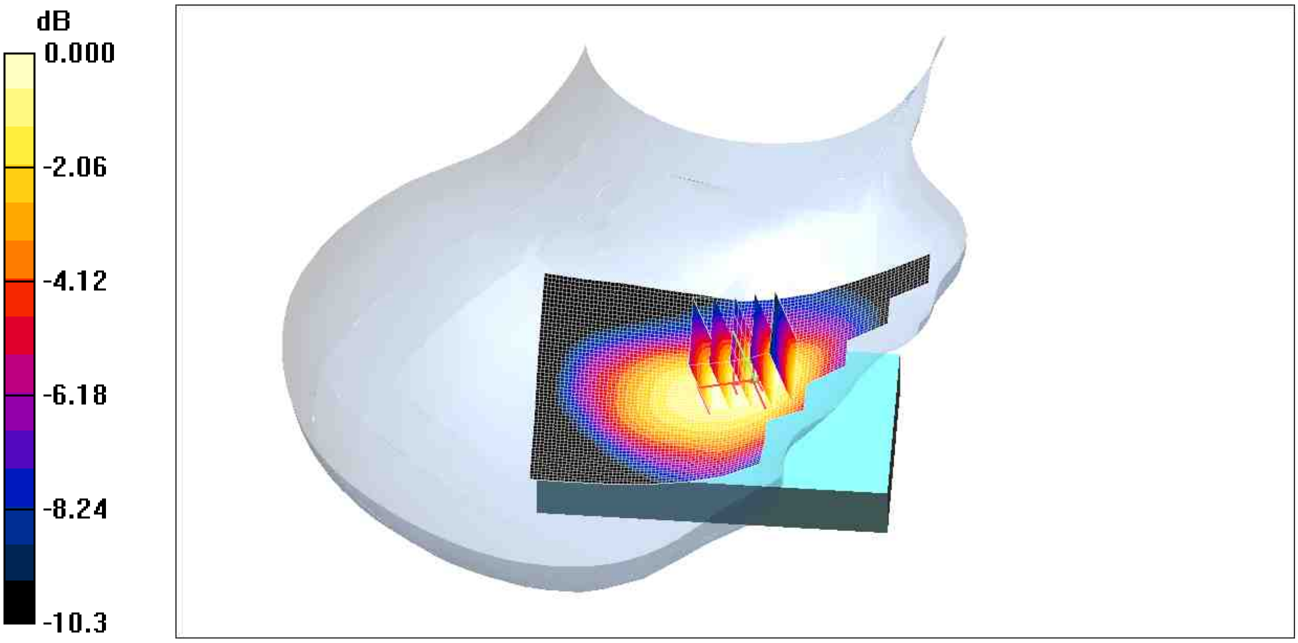
- Measured Liquid Temperature: 22.5 ℃, Ambient Temperature: 22.1 ℃

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: HSL835 Medium parameters used: f = 836.6 MHz; σ = 0.9 mho/m; ε_r = 42.2; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.37, 6.37, 6.37); Calibrated: 2013-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.255 mW/g
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.44 V/m; Power Drift = 0.016 dB
Peak SAR (extrapolated) = 0.306 W/kg
SAR(1 g) = 0.236 mW/g; SAR(10 g) = 0.176 mW/g.
Maximum value of SAR (measured) = 0.252 mW/g



0 dB = 0.252mW/g

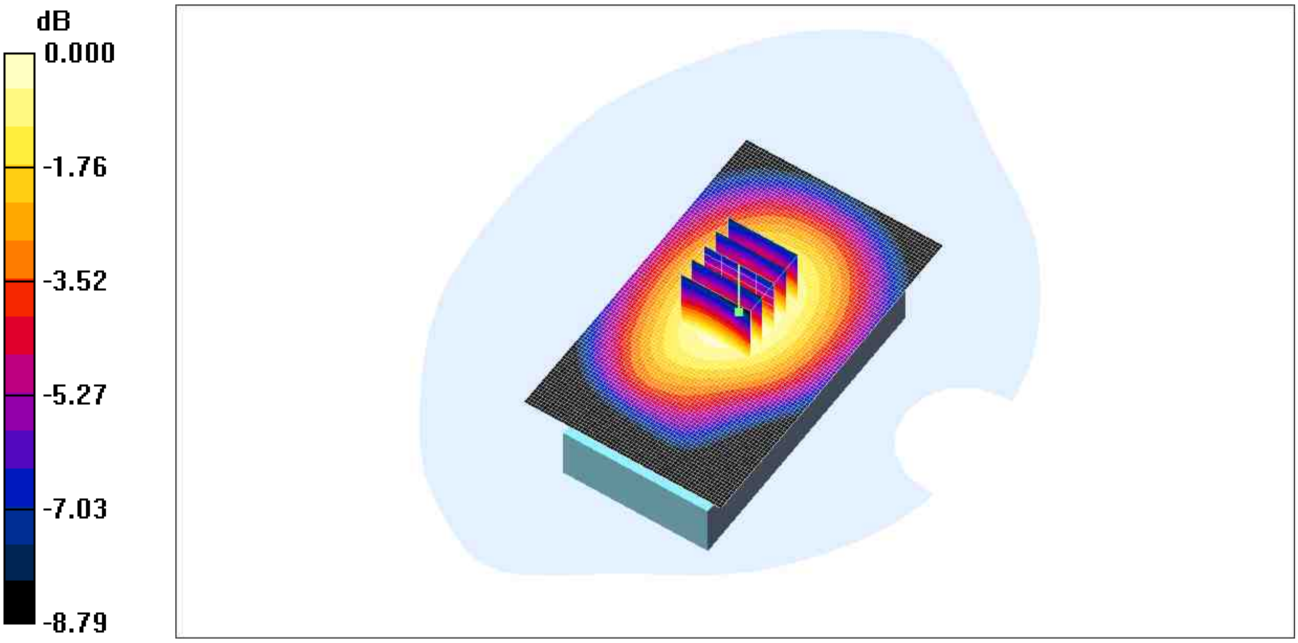
- **Test Laboratory: KTL**
- **Model: PM40**
- **Position: GSM850 BODY REAR 1.5cm_190CH**
- **Test Date: October 15, 2013**
- **Measured Liquid Temperature: 22.7 ℃, Ambient Temperature: 22.1 ℃**

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: MSL835 Medium parameters used: f = 836.6 MHz; σ = 0.94 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.27, 6.27, 6.27); Calibrated: 2013-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.479 mW/g
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.9 V/m; Power Drift = -0.019 dB
Peak SAR (extrapolated) = 0.566 W/kg
SAR(1 g) = 0.450 mW/g; SAR(10 g) = 0.336 mW/g
Maximum value of SAR (measured) = 0.474 mW/g



0 dB = 0.474mW/g

- Test Laboratory: KTL

- Model: PM40

- Position: GPRS850 BODY REAR 1.5cm_190CH_2SLOTS

- Test Date: October 15, 2013

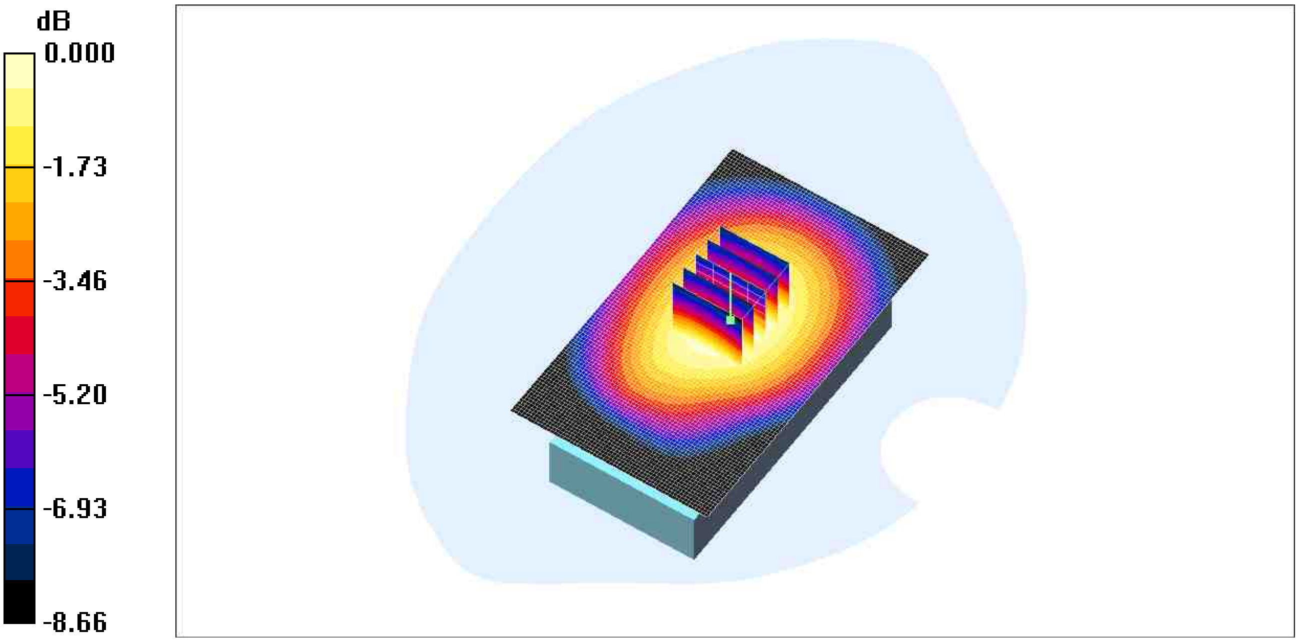
- Measured Liquid Temperature: 22.7 ℃, Ambient Temperature: 22.0 ℃

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:4.15
Medium: MSL835 Medium parameters used: f = 836.6 MHz; σ = 0.94 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.27, 6.27, 6.27); Calibrated: 2013-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.518 mW/g
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.6 V/m; Power Drift = -0.049 dB
Peak SAR (extrapolated) = 0.608 W/kg
SAR(1 g) = 0.484 mW/g; SAR(10 g) = 0.361 mW/g
Maximum value of SAR (measured) = 0.510 mW/g



0 dB = 0.510mW/g

Plot No.4

- Test Laboratory: KTL

- Model: PM40

- Position: GSM1900 RIGHT CHEEK TOUCH_661CH

- Test Date: October 16, 2013

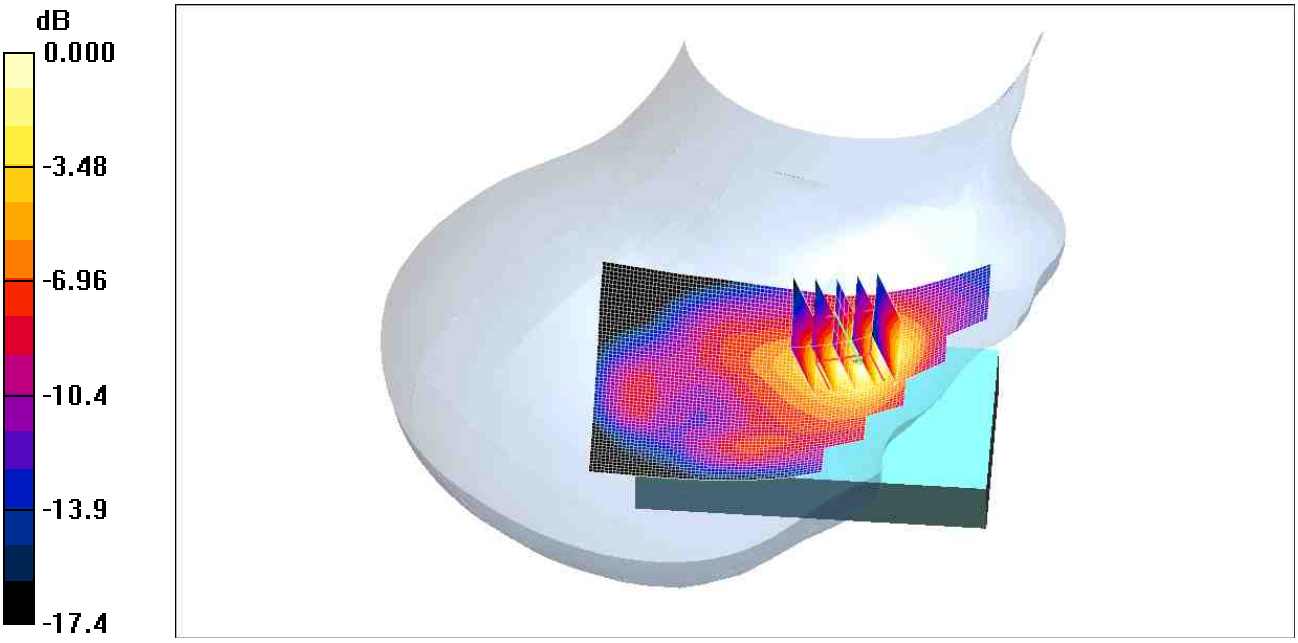
- Measured Liquid Temperature: 22.3 ℃, Ambient Temperature: 22.0 ℃

Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: HSL1900 Medium parameters used: f = 1880 MHz; σ = 1.37 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.83, 4.83, 4.83); Calibrated: 2013-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.255 mW/g
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.82 V/m; Power Drift = -0.172 dB
Peak SAR (extrapolated) = 0.365 W/kg
SAR(1 g) = 0.219 mW/g; SAR(10 g) = 0.124 mW/g
Maximum value of SAR (measured) = 0.246 mW/g



0 dB = 0.246mW/g

Plot No.5

- Test Laboratory: KTL

- Model: PM40

- Position: GSM1900 BODY REAR 1.5cm_661CH

- Test Date: October 16, 2013

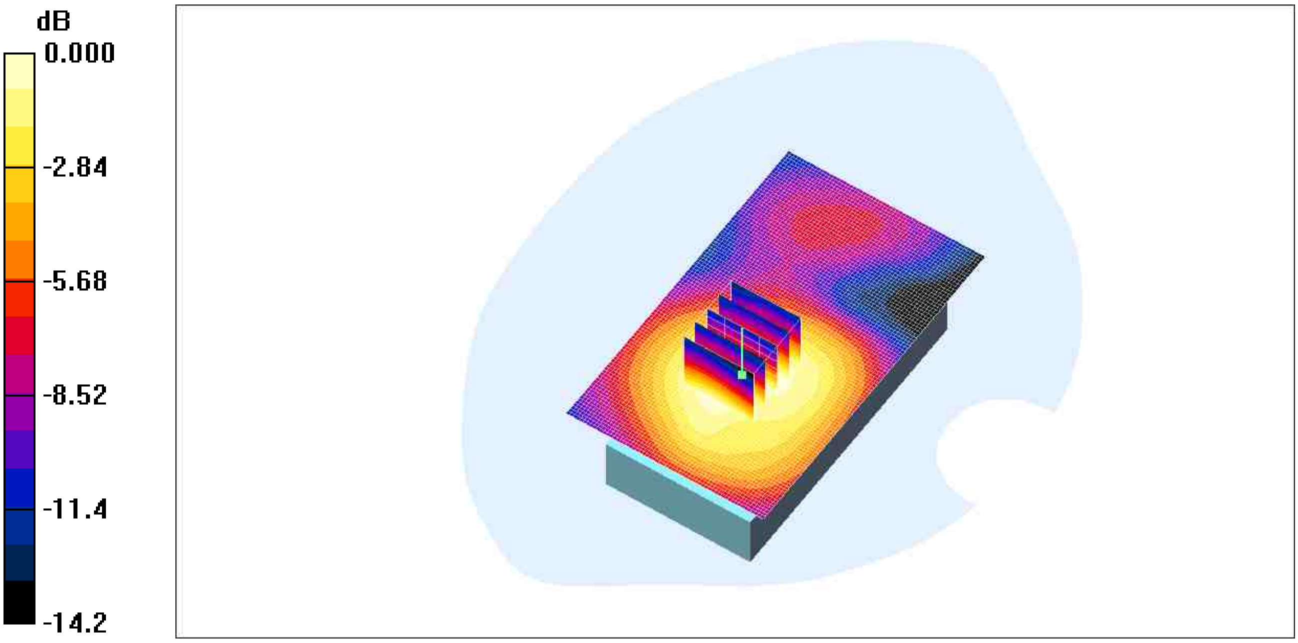
- Measured Liquid Temperature: 22.2 ℃, Ambient Temperature: 22.0 ℃

Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.56 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.5, 4.5, 4.5); Calibrated: 2013-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.182 mW/g
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.64 V/m; Power Drift = 0.071 dB
Peak SAR (extrapolated) = 0.260 W/kg
SAR(1 g) = 0.174 mW/g; SAR(10 g) = 0.113 mW/g
Maximum value of SAR (measured) = 0.186 mW/g



0 dB = 0.186mW/g

Plot No.6

- Test Laboratory: KTL

- Model: PM40

- Position: WCDMA850 RIGHT CHEEK TOUCH_4175CH

- Test Date: October 15, 2013

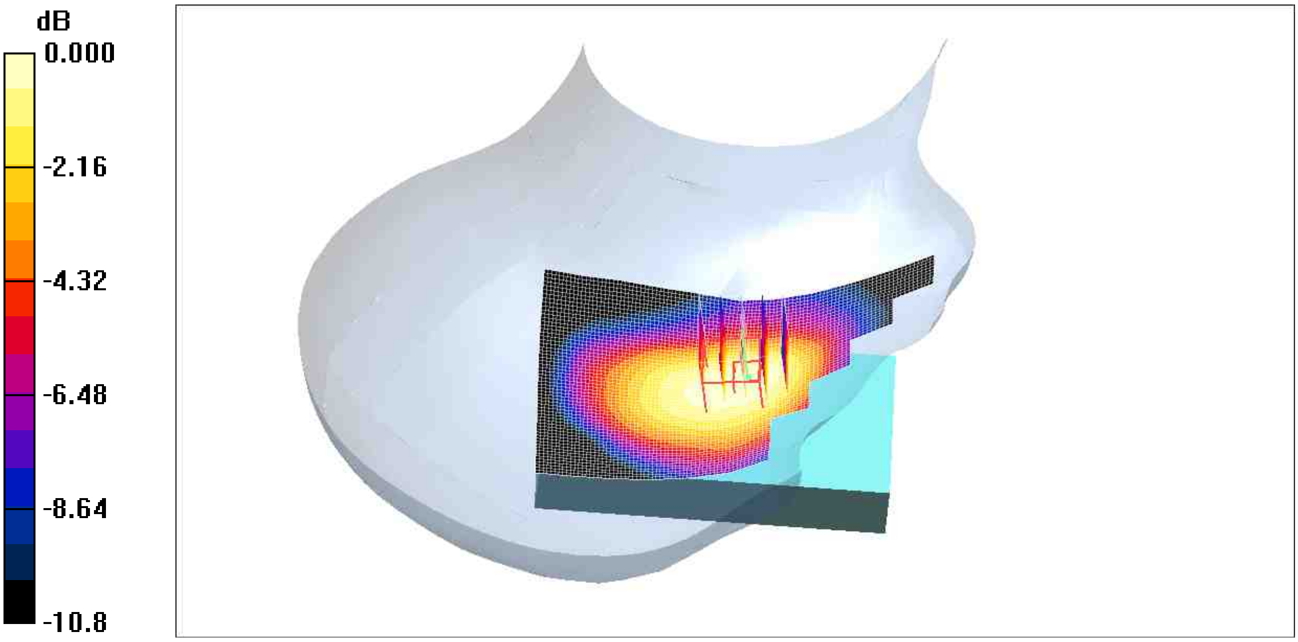
- Measured Liquid Temperature: 22.5 ℃, Ambient Temperature: 22.0 ℃

Communication System: WCDMA BAND5; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL835 Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 42.3; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.37, 6.37, 6.37); Calibrated: 2013-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.415 mW/g
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.96 V/m; Power Drift = 0.013 dB
Peak SAR (extrapolated) = 0.506 W/kg
SAR(1 g) = 0.387 mW/g; SAR(10 g) = 0.289 mW/g
Maximum value of SAR (measured) = 0.411 mW/g



0 dB = 0.411mW/g

- Test Laboratory: KTL

- Model: PM40

- Position: WCDMA850 BODY REAR 1.5cm_4175CH

- Test Date: October 15, 2013

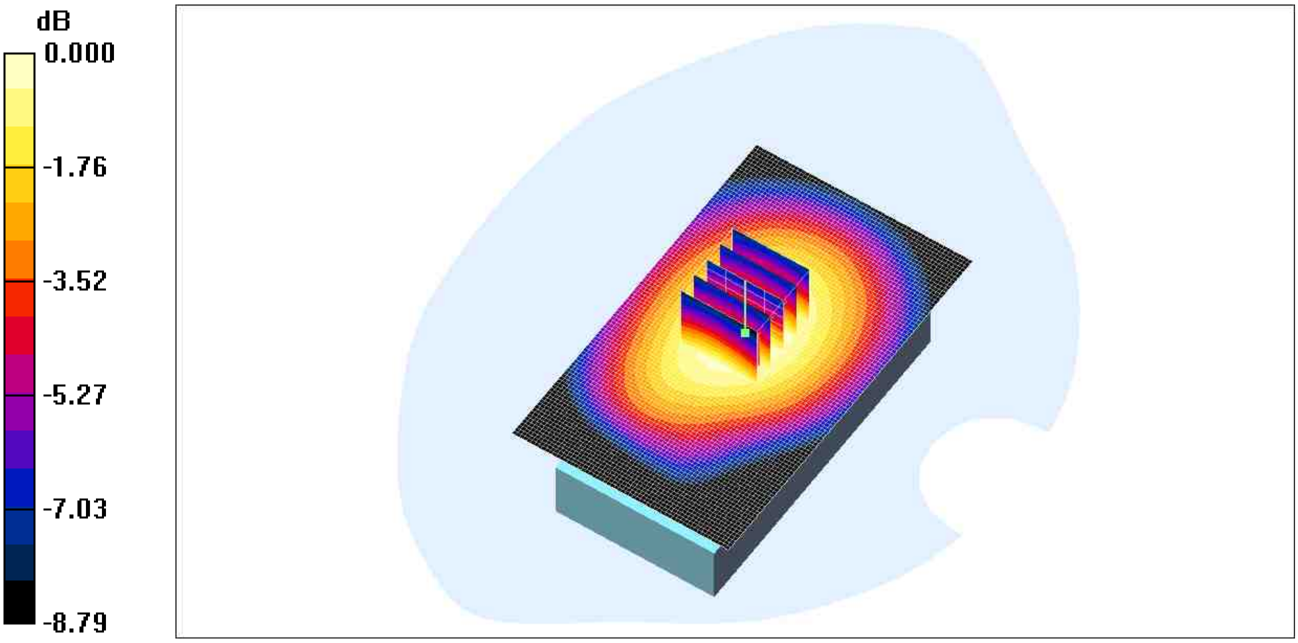
- Measured Liquid Temperature: 22.7 ℃, Ambient Temperature: 22.0 ℃

Communication System: WCDMA BAND5; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL835 Medium parameters used: f = 835 MHz; σ = 0.94 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.27, 6.27, 6.27); Calibrated: 2013-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.625 mW/g
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.0 V/m; Power Drift = -0.046 dB
Peak SAR (extrapolated) = 0.804 W/kg
SAR(1 g) = 0.598 mW/g; SAR(10 g) = 0.445 mW/g
Maximum value of SAR (measured) = 0.621 mW/g



0 dB = 0.621mW/g

- Test Laboratory: KTL

- Model: PM40

- Position: WCDMA1900 RIGHT CHEEK TOUCH_9400CH

- Test Date: October 16, 2013

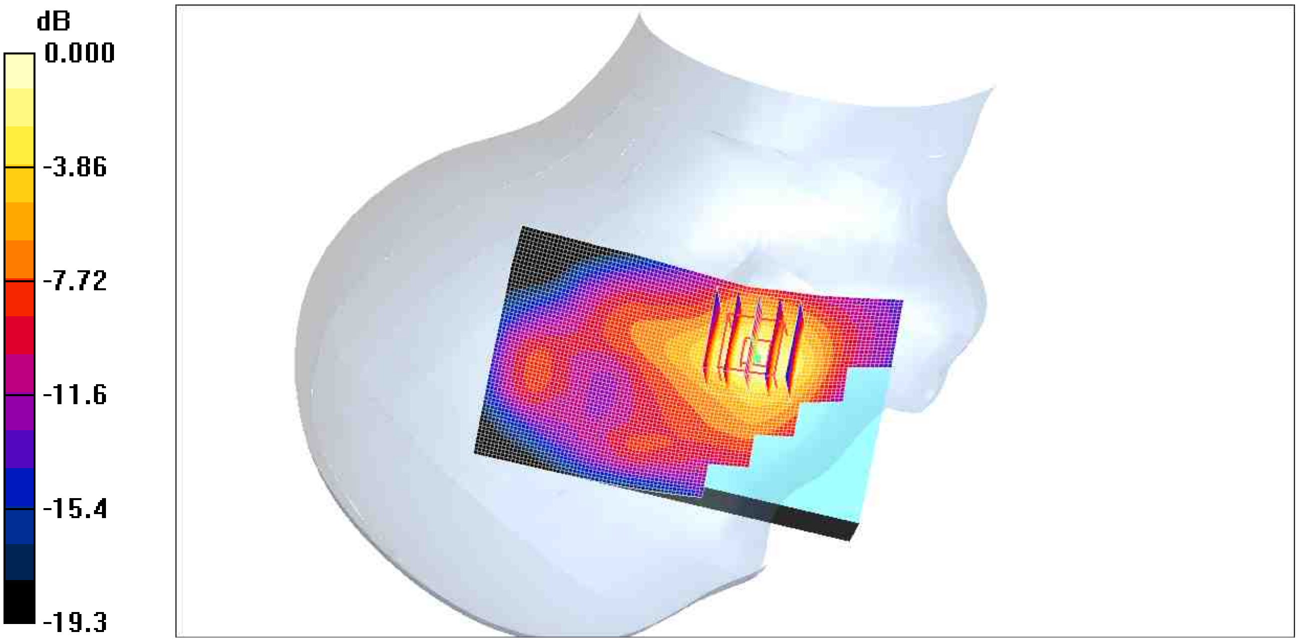
- Measured Liquid Temperature: 22.3 ℃, Ambient Temperature: 22.0 ℃

Communication System: WCDMA ; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: HSL1900 Medium parameters used: f = 1880 MHz; σ = 1.37 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.83, 4.83, 4.83); Calibrated: 2013-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.290 mW/g
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.45 V/m; Power Drift = -0.888 dB
Peak SAR (extrapolated) = 0.533 W/kg
SAR(1 g) = 0.312 mW/g; SAR(10 g) = 0.173 mW/g
Maximum value of SAR (measured) = 0.353 mW/g



0 dB = 0.353mW/g

- Test Laboratory: KTL

- Model: PM40

- Position: WCDMA1900 BODY REAR 1.5cm_9400CH

- Test Date: October 16, 2013

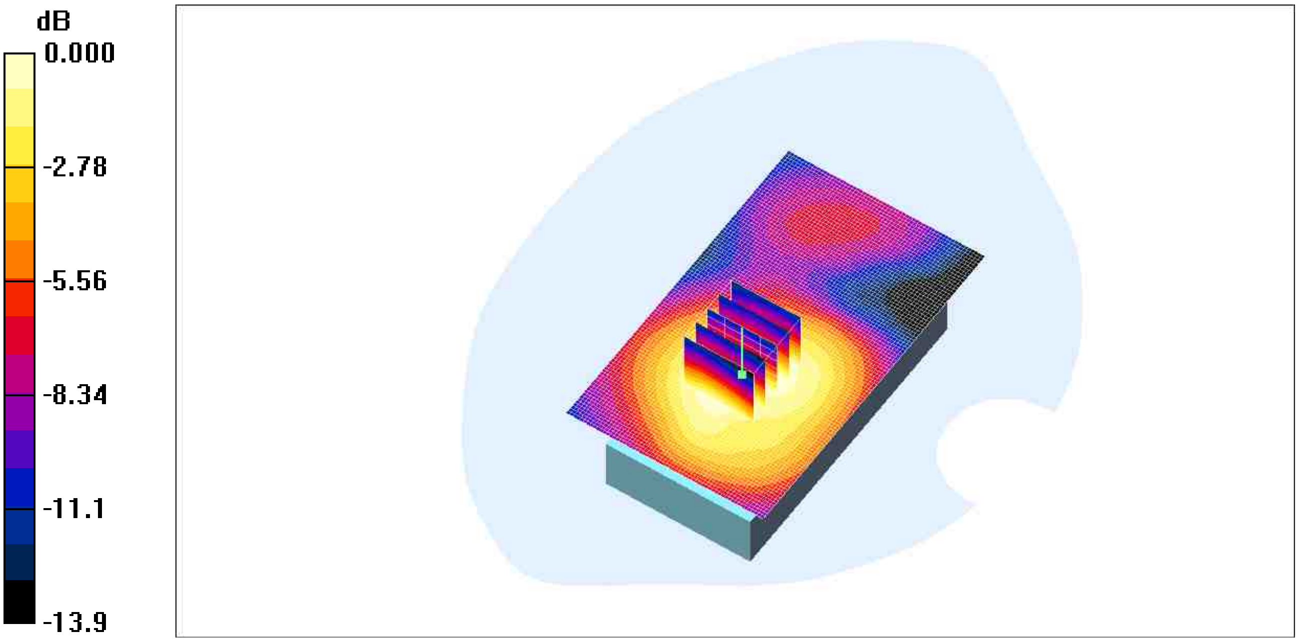
- Measured Liquid Temperature: 22.2 ℃, Ambient Temperature: 22.0 ℃

Communication System: WCDMA ; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.56 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.5, 4.5, 4.5); Calibrated: 2013-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.286 mW/g
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.74 V/m; Power Drift = -0.144 dB
Peak SAR (extrapolated) = 0.404 W/kg
SAR(1 g) = 0.271 mW/g; SAR(10 g) = 0.175 mW/g
Maximum value of SAR (measured) = 0.289 mW/g



0 dB = 0.289mW/g

- Test Laboratory: KTL

- Model: PM40

- Position: 802.11b 2412 BODY REAR 1.5cm_1CH

- Test Date: October 22, 2013

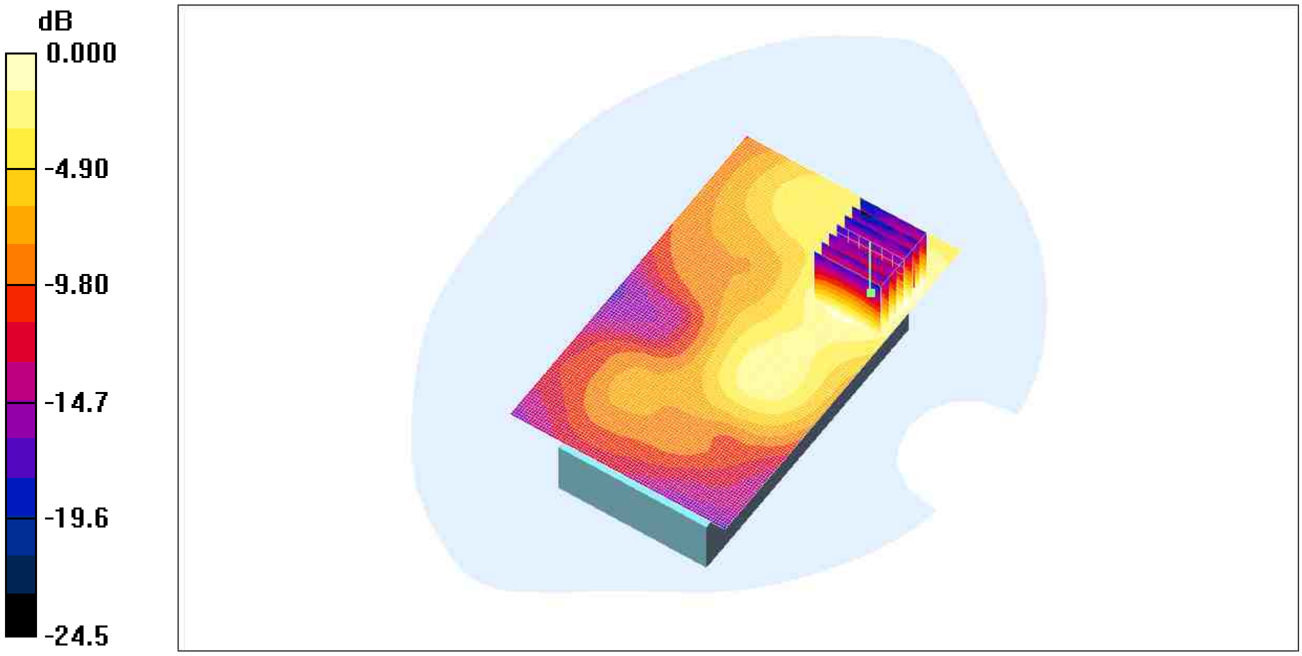
- Measured Liquid Temperature: 22.6 ℃, Ambient Temperature: 21.0 ℃

Communication System: WLAN; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: 2450D Medium parameters used: f = 2412 MHz; σ = 1.92 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(3.94, 3.94, 3.94); Calibrated: 2013-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (81x131x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.097 mW/g
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.89 V/m; Power Drift = 0.102 dB
Peak SAR (extrapolated) = 0.181 W/kg
SAR(1 g) = 0.096 mW/g; SAR(10 g) = 0.053 mW/g
Maximum value of SAR (measured) = 0.101 mW/g



0 dB = 0.101mW/g

Plot No.11

- Test Laboratory: KTL

- Model: PM40

- Position: 802.11a 5260 BODY REAR 1.5cm_52CH

- Test Date: October 21, 2013

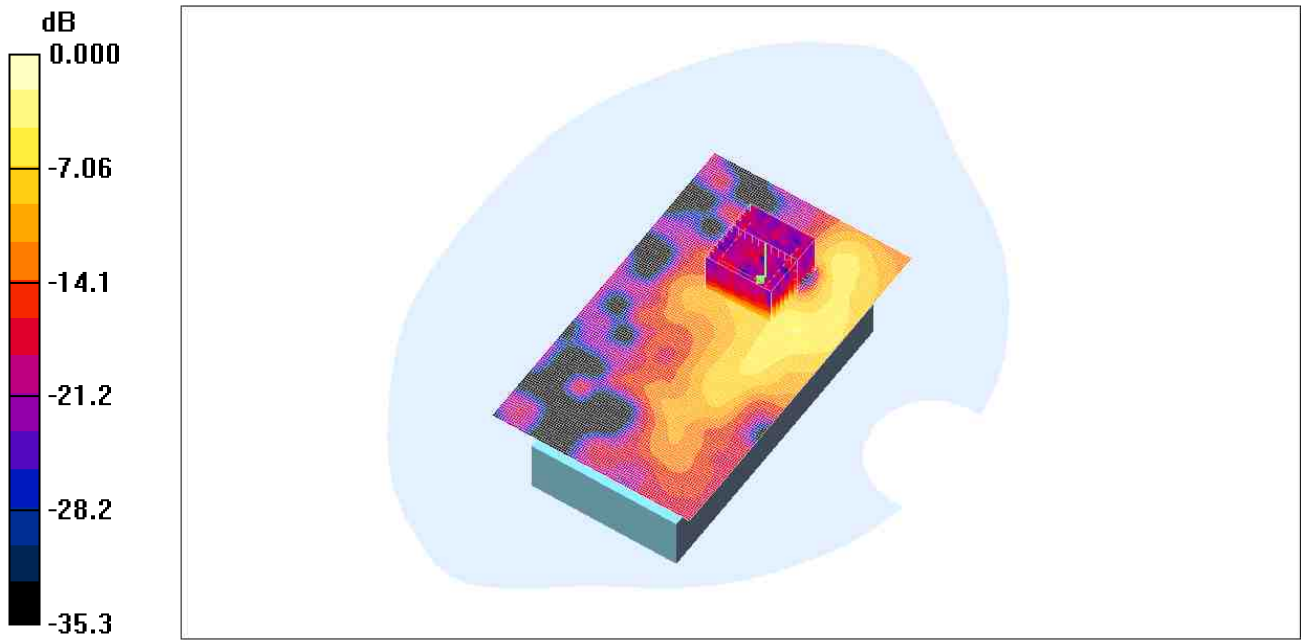
- Measured Liquid Temperature: 23.1 ℃, Ambient Temperature: 23.0 ℃

Communication System: WLAN 11a; Frequency: 5260 MHz;Duty Cycle: 1:1
Medium: 5GHz body Medium parameters used: f = 5260 MHz; σ = 5.58 mho/m; ε_r = 48.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3905; ConvF(4.12, 4.12, 4.12); Calibrated: 2013-02-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (91x151x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.370 mW/g
Zoom Scan (11x11x6)/Cube 0: Measurement grid: dx=3mm, dy=3mm, dz=2mm
Reference Value = 2.47 V/m; Power Drift = 0.135 dB
Peak SAR (extrapolated) = 0.683 W/kg
SAR(1 g) = 0.201 mW/g; SAR(10 g) = 0.065 mW/g
Maximum value of SAR (measured) = 0.419 mW/g



0 dB = 0.419mW/g

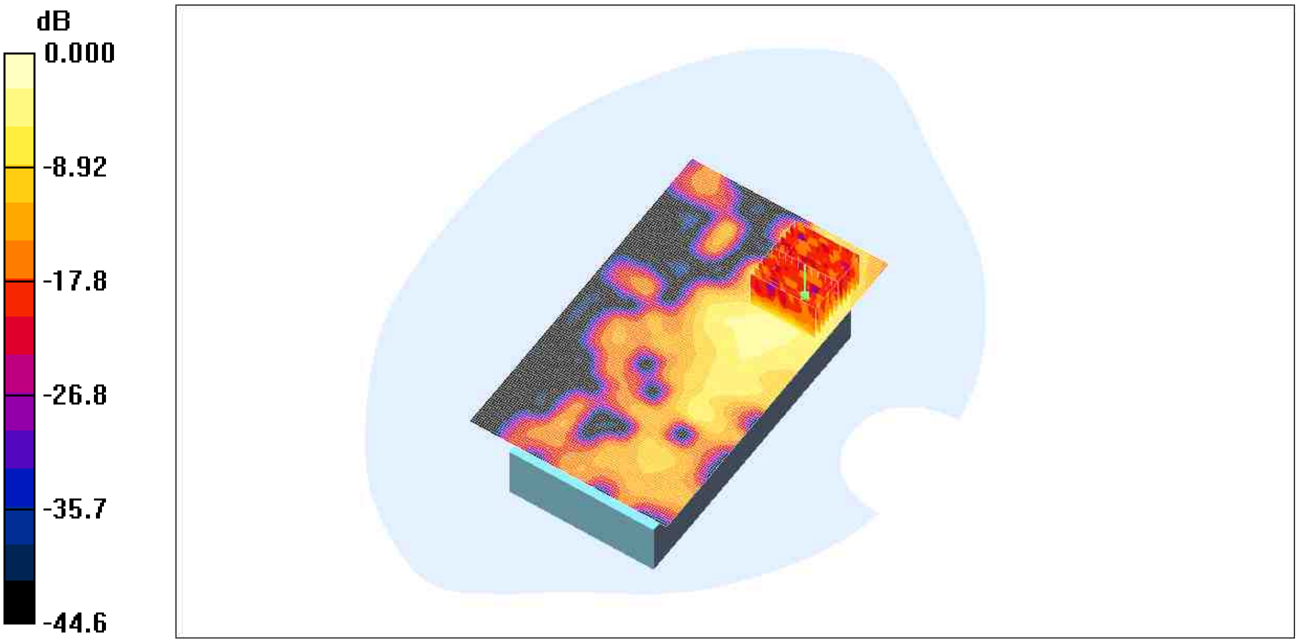
- **Test Laboratory: KTL**
- **Model: PM40**
- **Position: 802.11a 5825 BODY REAR 1.5cm_165CH**
- **Test Date: October 21, 2013**
- **Measured Liquid Temperature: 23.2 ℃, Ambient Temperature: 23.0 ℃**

Communication System: WLAN 11a; Frequency: 5825 MHz;Duty Cycle: 1:1
Medium: 5GHz Medium parameters used: f = 5825 MHz; σ = 5.44 mho/m; ε_r = 33.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3905; ConvF(4.93, 4.93, 4.93); Calibrated: 2013-02-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (91x151x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.166 mW/g
Zoom Scan (11x11x6)/Cube 0: Measurement grid: dx=3mm, dy=3mm, dz=2mm
Reference Value = 1.40 V/m; Power Drift = 0.086 dB
Peak SAR (extrapolated) = 0.531 W/kg
SAR(1 g) = 0.159 mW/g; SAR(10 g) = 0.055 mW/g
Maximum value of SAR (measured) = 0.322 mW/g



0 dB = 0.322mW/g

723 Haean-ro, Sa-dong, Sangnok-gu, Ansan-si, 426-910 Korea
http:://www.ktl.re.kr
Tel: +82-31-500-0133
Fax: +82-31-500-0149

835 MHz Head – Verification DATA (D835V2 – 481)

- Test Date: October 15, 2013

- Measured Liquid Temperature: 22.5 ℃, Ambient Temperature: 22.1 ℃

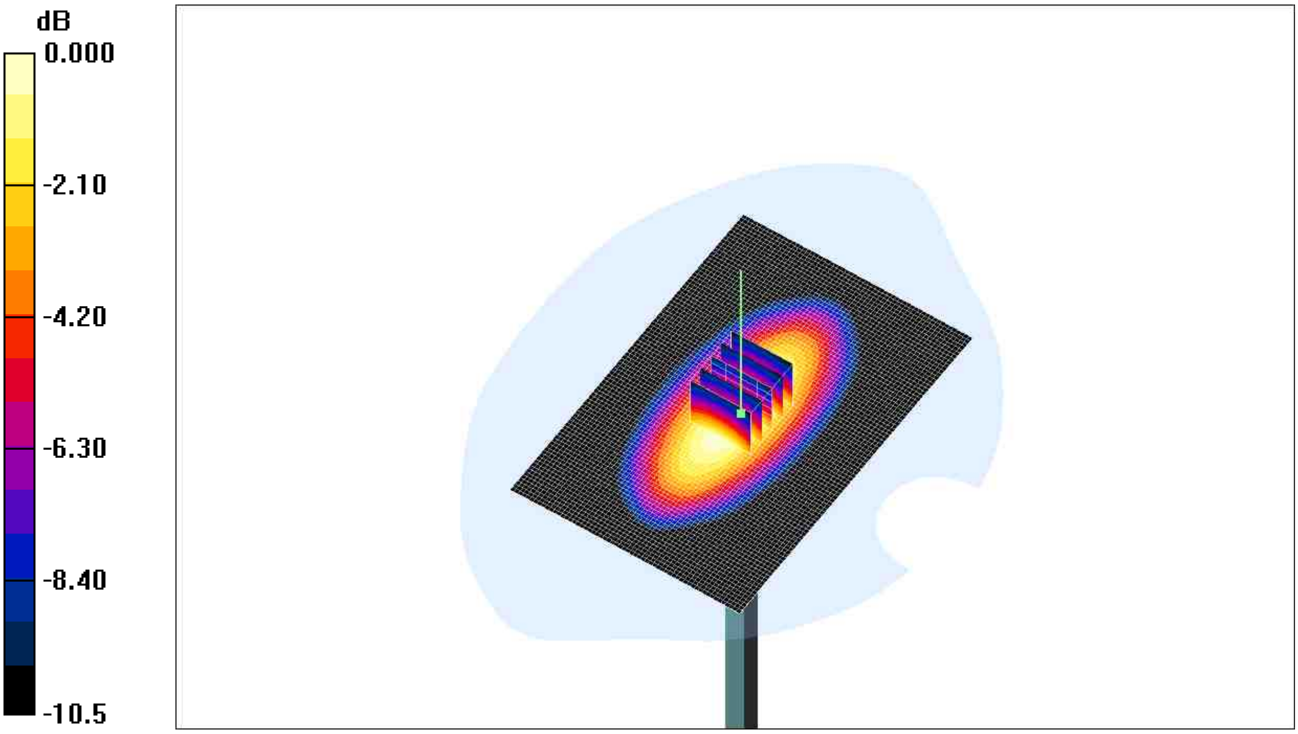
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL835 Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 42.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.37, 6.37, 6.37); Calibrated: 2013-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (61x91x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 2.55 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 53.6 V/m; Power Drift = -0.025 dB
Peak SAR (extrapolated) = 3.37 W/kg
SAR(1 g) = 2.32 mW/g; SAR(10 g) = 1.53 mW/g
Maximum value of SAR (measured) = 2.50 mW/g



0 dB = 2.50mW/g

835 MHz Body- Verification DATA (D83.5V2 – 481)

- Test Date: October 15, 2013

- Measured Liquid Temperature: 22.7 ℃, Ambient Temperature: 22.0 ℃

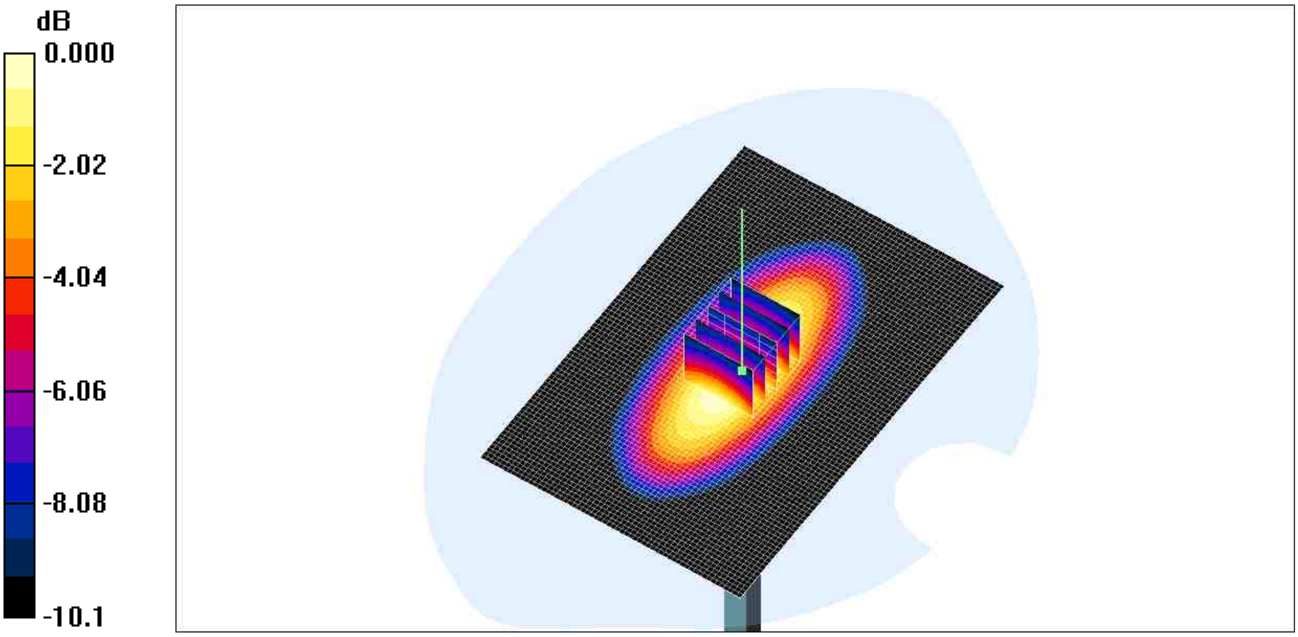
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL835 Medium parameters used: f = 835 MHz; σ = 0.94 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.27, 6.27, 6.27); Calibrated: 2013-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (61x91x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 2.63 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 52.8 V/m; Power Drift = -0.007 dB
Peak SAR (extrapolated) = 3.43 W/kg
SAR(1 g) = 2.38 mW/g; SAR(10 g) = 1.58 mW/g
Maximum value of SAR (measured) = 2.56 mW/g



0 dB = 2.56mW/g

1900 MHz Head- Verification DATA (D1900V2 – 5d038)

- Test Date: October 16, 2013

- Measured Liquid Temperature: 22.3 ℃, Ambient Temperature: 22.0 ℃

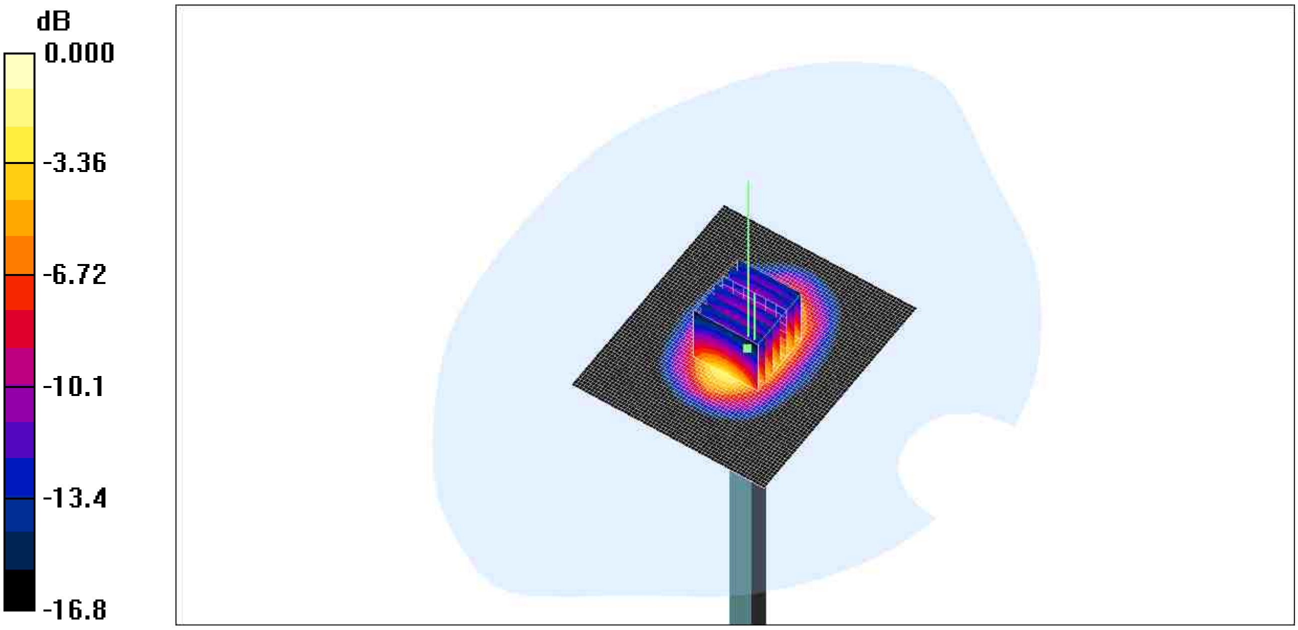
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL1900 Medium parameters used: f = 1900 MHz; σ = 1.43 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.83, 4.83, 4.83); Calibrated: 2013-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (61x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.7 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.1 V/m; Power Drift = 0.028 dB
Peak SAR (extrapolated) = 18.8 W/kg
SAR(1 g) = 10.6 mW/g; SAR(10 g) = 5.67 mW/g
Maximum value of SAR (measured) = 11.8 mW/g



0 dB = 11.8mW/g

1900 MHz Body- Verification DATA (D1900V2 – 5d038)

- Test Date: October 16, 2013

- Measured Liquid Temperature: 22.2 ℃, Ambient Temperature: 22.0 ℃

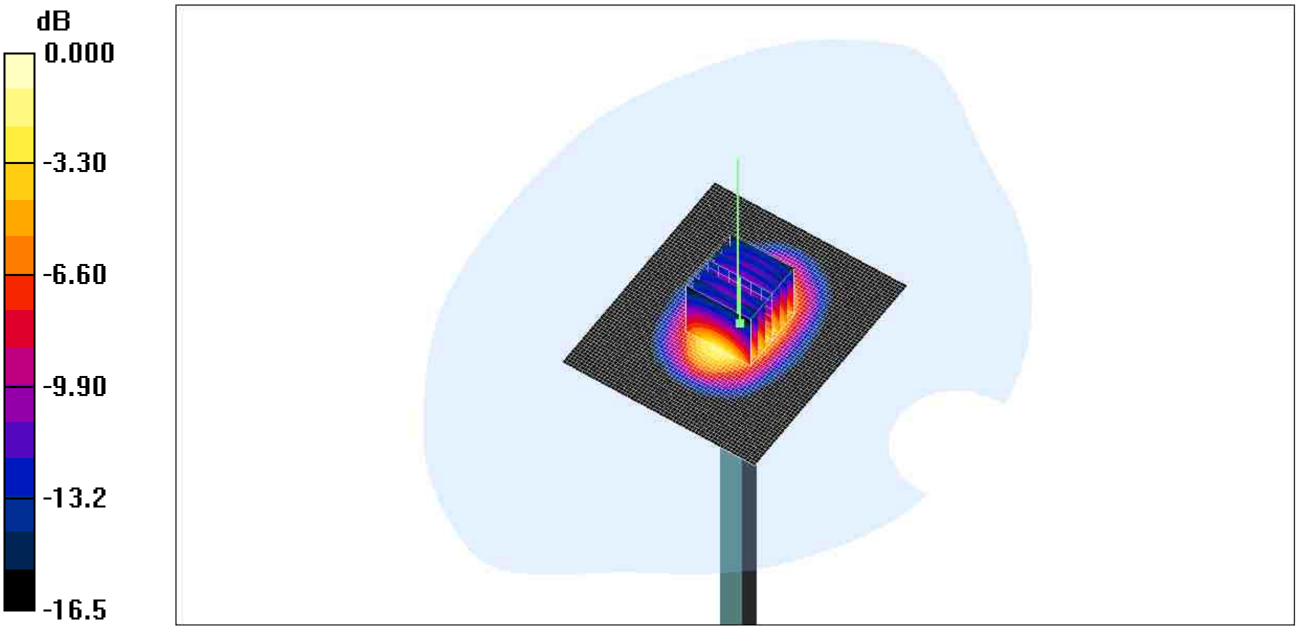
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL1900 Medium parameters used: f = 1900 MHz; σ = 1.56 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.5, 4.5, 4.5); Calibrated: 2013-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (61x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.6 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.9 V/m; Power Drift = 0.004 dB
Peak SAR (extrapolated) = 18.2 W/kg
SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.56 mW/g
Maximum value of SAR (measured) = 11.7 mW/g



0 dB = 11.7mW/g

2450 MHz Body- Verification DATA (D245V2 – 746)

- Test Date: October 22, 2013

- Measured Liquid Temperature: 22.6 ℃, Ambient Temperature: 22.0 ℃

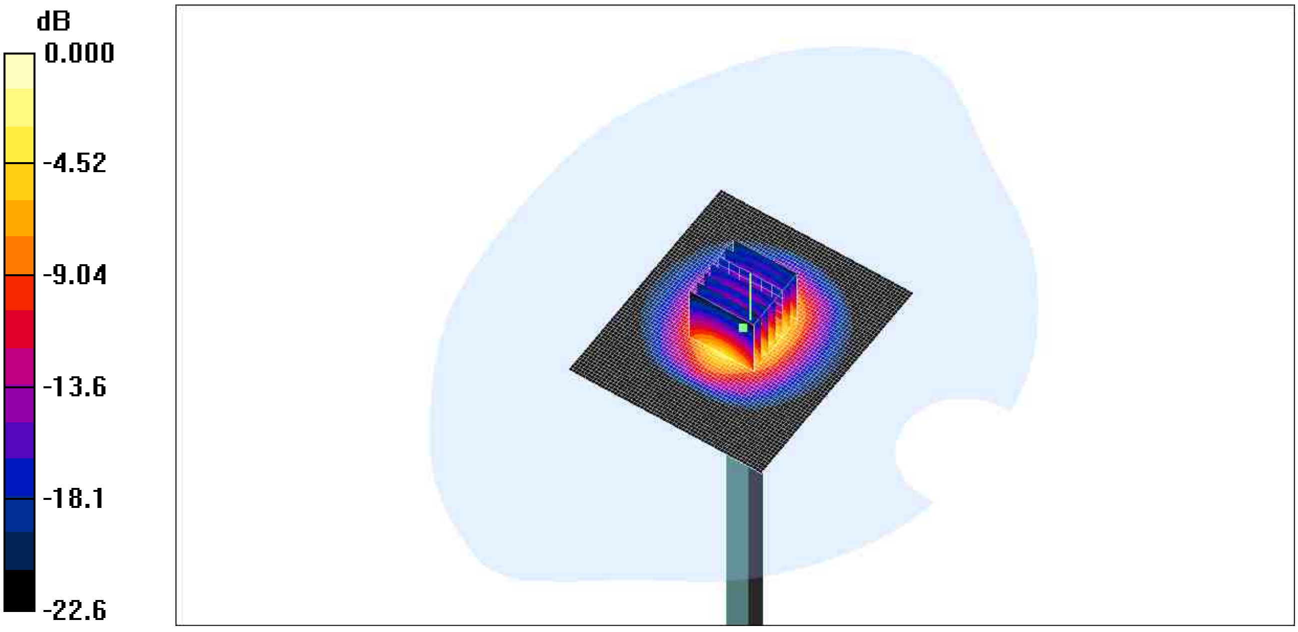
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: 2450D Medium parameters used: f = 2450 MHz; σ = 1.99 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.17, 4.17, 4.17); Calibrated: 2013-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (81x91x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 17.4 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.8 V/m; Power Drift = 0.034 dB
Peak SAR (extrapolated) = 28.9 W/kg
SAR(1 g) = 13.3 mW/g; SAR(10 g) = 6.32 mW/g
Maximum value of SAR (measured) = 15.9 mW/g



0 dB = 15.9mW/g

5200 MHz Body- Verification DATA (D5GHzV2 – 1107)

- Test Date: October 22, 2013

- Measured Liquid Temperature: 23.1 ℃, Ambient Temperature: 23.0 ℃

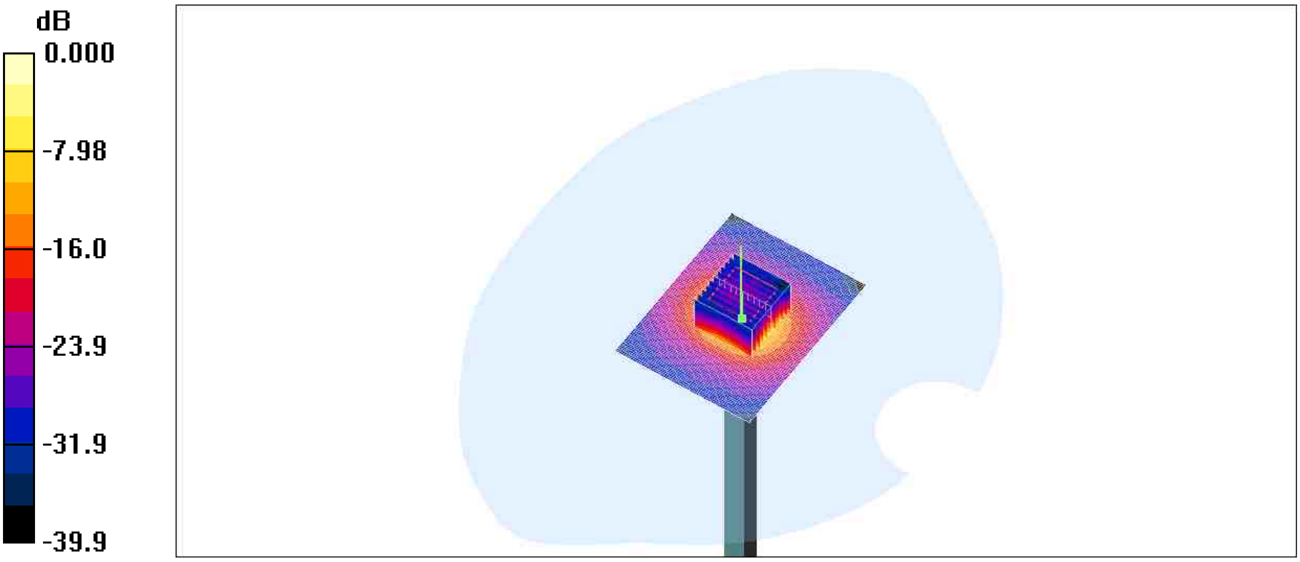
Communication System: CW; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: 5GHz body Medium parameters used: f = 5200 MHz; σ = 5.51 mho/m; ε_r = 49; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3905; ConvF(4.2, 4.2, 4.2); Calibrated: 2013-02-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (71x91x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 8.71 mW/g

Zoom Scan (11x11x6)/Cube 0: Measurement grid: dx=3mm, dy=3mm, dz=2mm
Reference Value = 38.9 V/m; Power Drift = 0.058 dB
Peak SAR (extrapolated) = 30.2 W/kg
SAR(1 g) = 7.31 mW/g; SAR(10 g) = 2.07 mW/g
Maximum value of SAR (measured) = 15.2 mW/g



0 dB = 15.2mW/g

5500 MHz Body- Verification DATA (D5GHzV2 – 1107)

- Test Date: October 22, 2013

- Measured Liquid Temperature: 23.1 ℃, Ambient Temperature: 23.0 ℃

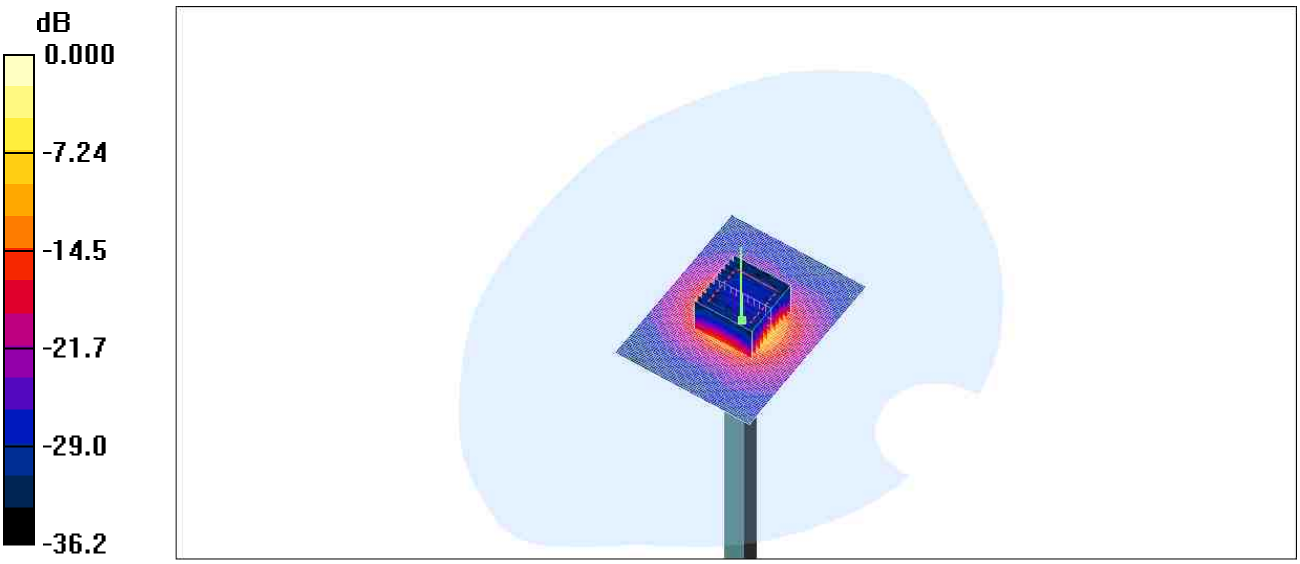
Communication System: CW; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium: 5GHz body Medium parameters used: f = 5500 MHz; σ = 5.82 mho/m; ε_r = 48.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3905; ConvF(3.7, 3.7, 3.7); Calibrated: 2013-02-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (71x91x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 9.13 mW/g

Zoom Scan (11x11x6)/Cube 0: Measurement grid: dx=3mm, dy=3mm, dz=2mm
Reference Value = 39.1 V/m; Power Drift = 0.020 dB
Peak SAR (extrapolated) = 36.0 W/kg
SAR(1 g) = 8.02 mW/g; SAR(10 g) = 2.23 mW/g
Maximum value of SAR (measured) = 16.8 mW/g



0 dB = 16.8mW/g

5800 MHz Body- Verification DATA (D5GHzV2 – 1107)

- Test Date: October 22, 2013

- Measured Liquid Temperature: 23.2 ℃, Ambient Temperature: 23.0 ℃

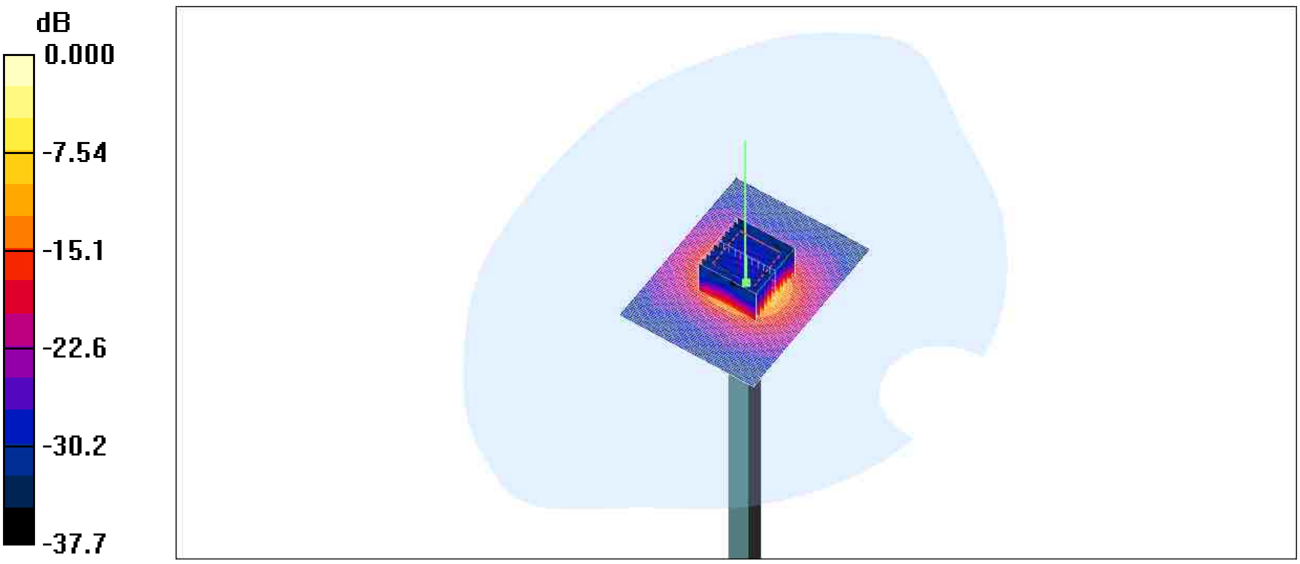
Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5GHz body Medium parameters used: f = 5800 MHz; σ = 6.19 mho/m; ε_r = 47.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3905; ConvF(3.94, 3.94, 3.94); Calibrated: 2013-02-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (71x91x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 8.61 mW/g

Zoom Scan (11x11x6)/Cube 0: Measurement grid: dx=3mm, dy=3mm, dz=2mm
Reference Value = 36.8 V/m; Power Drift = 0.032 dB
Peak SAR (extrapolated) = 33.6 W/kg
SAR(1 g) = 7.66 mW/g; SAR(10 g) = 2.15 mW/g
Maximum value of SAR (measured) = 16.3 mW/g



0 dB = 16.3mW/g

835 MHz Head – Verification DATA (D835V2 – 481)

- Test Date: December 16, 2013

- Measured Liquid Temperature: 22.5 ℃, Ambient Temperature: 22.0 ℃

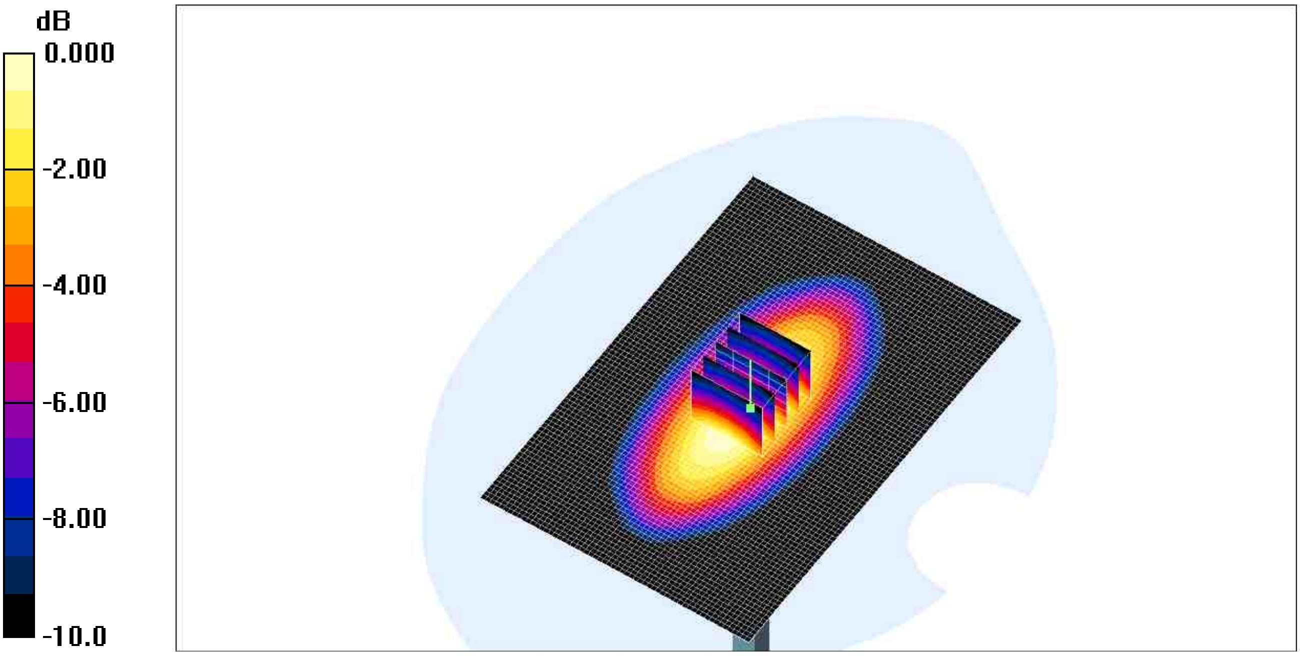
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL835 Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 42.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.37, 6.37, 6.37); Calibrated: 2013-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (61x91x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 2.55 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 53.2 V/m; Power Drift = -0.021 dB
Peak SAR (extrapolated) = 3.33 W/kg
SAR(1 g) = 2.29 mW/g; SAR(10 g) = 1.50 mW/g
Maximum value of SAR (measured) = 2.44 mW/g



0 dB = 2.44mW/g

835 MHz Body- Verification DATA (D83.5V2 – 481)

- Test Date: December 16, 2013

- Measured Liquid Temperature: 22.3 ℃, Ambient Temperature: 22.0 ℃

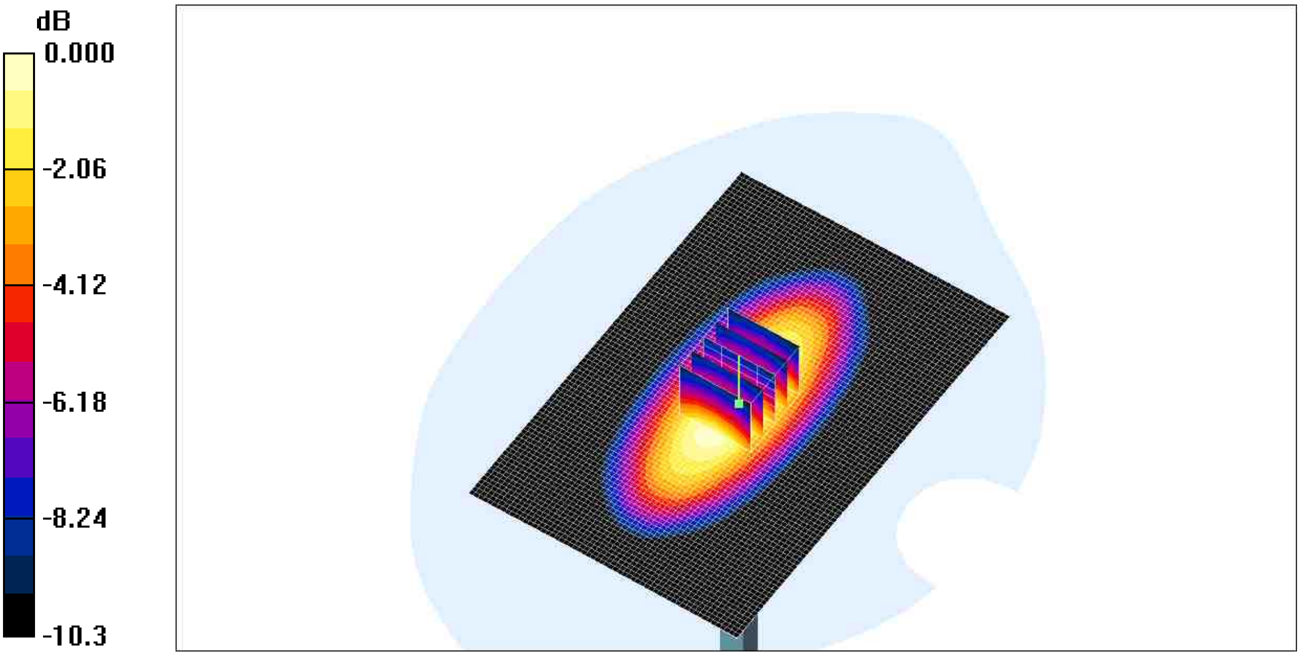
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL835 Medium parameters used: f = 835 MHz; σ = 0.95 mho/m; ε_r = 53.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(6.27, 6.27, 6.27); Calibrated: 2013-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (61x91x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 2.60 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 52.5 V/m; Power Drift = -0.009 dB
Peak SAR (extrapolated) = 3.41 W/kg
SAR(1 g) = 2.33 mW/g; SAR(10 g) = 1.56 mW/g
Maximum value of SAR (measured) = 2.51 mW/g



0 dB = 2.51mW/g

1900 MHz Head- Verification DATA (D1900V2 – 5d038)

- Test Date: December 17, 2013

- Measured Liquid Temperature: 22.5 ℃, Ambient Temperature: 22.0 ℃

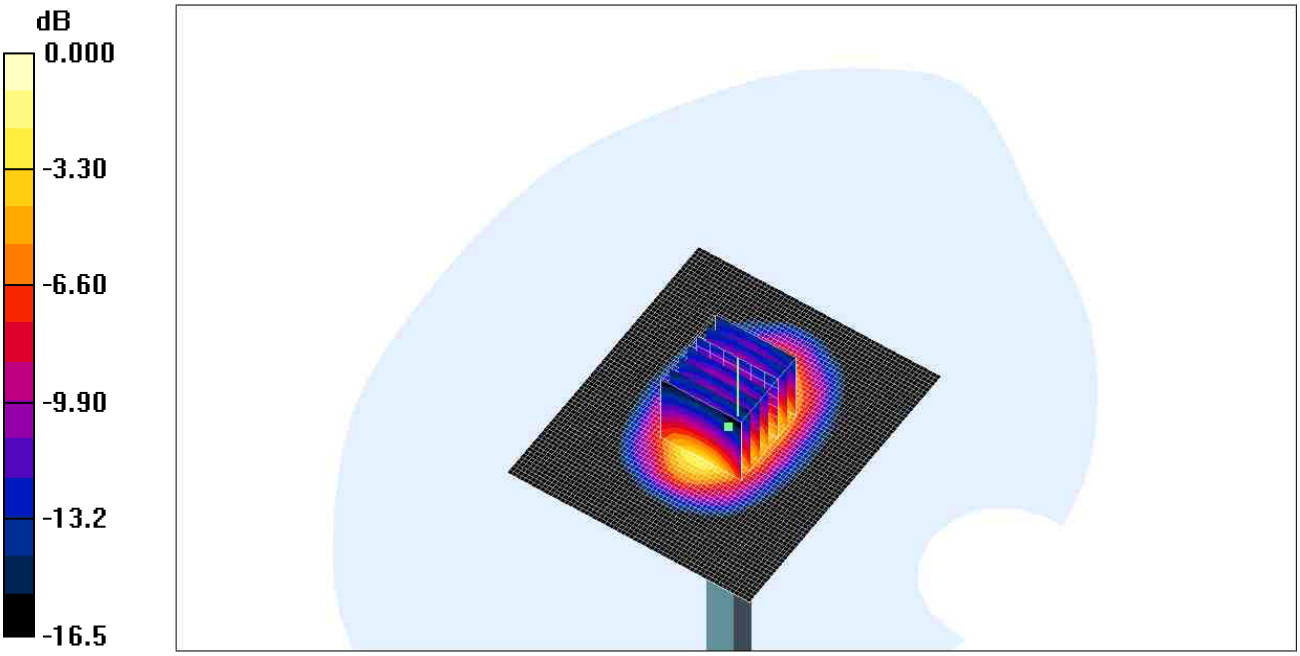
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL1900 Medium parameters used: f = 1900 MHz; σ = 1.42 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.83, 4.83, 4.83); Calibrated: 2013-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (61x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 13.0 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.3 V/m; Power Drift = 0.025 dB
Peak SAR (extrapolated) = 19.0 W/kg
SAR(1 g) = 10.8 mW/g; SAR(10 g) = 5.62 mW/g
Maximum value of SAR (measured) = 12.0 mW/g



0 dB = 12.0mW/g

1900 MHz Body- Verification DATA (D1900V2 – 5d038)

- Test Date: December 17, 2013

- Measured Liquid Temperature: 22.5 ℃, Ambient Temperature: 22.0 ℃

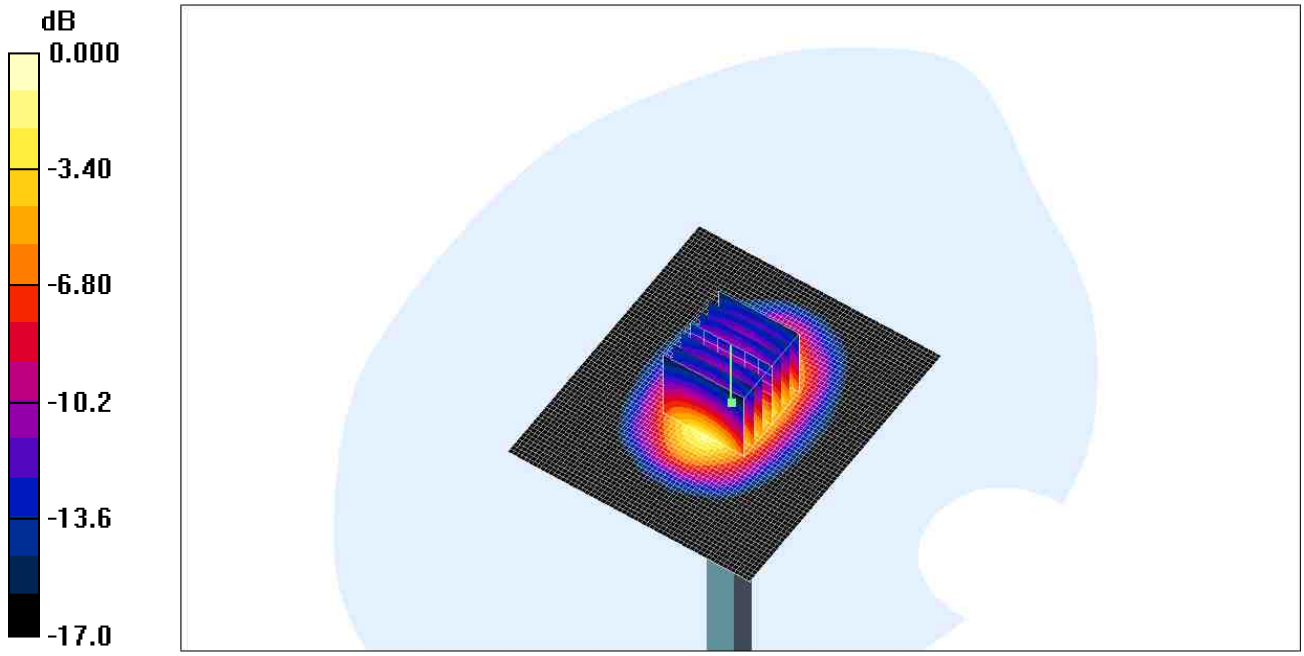
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL1900 Medium parameters used: f = 1900 MHz; σ = 1.57 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.5, 4.5, 4.5); Calibrated: 2013-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (61x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.3 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.5 V/m; Power Drift = 0.014 dB
Peak SAR (extrapolated) = 18.0 W/kg
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.52 mW/g
Maximum value of SAR (measured) = 11.5 mW/g



0 dB = 11.5mW/g

2450 MHz Body- Verification DATA (D245V2 – 746)

- Test Date: December 18, 2013

- Measured Liquid Temperature: 22.8 ℃, Ambient Temperature: 23.0 ℃

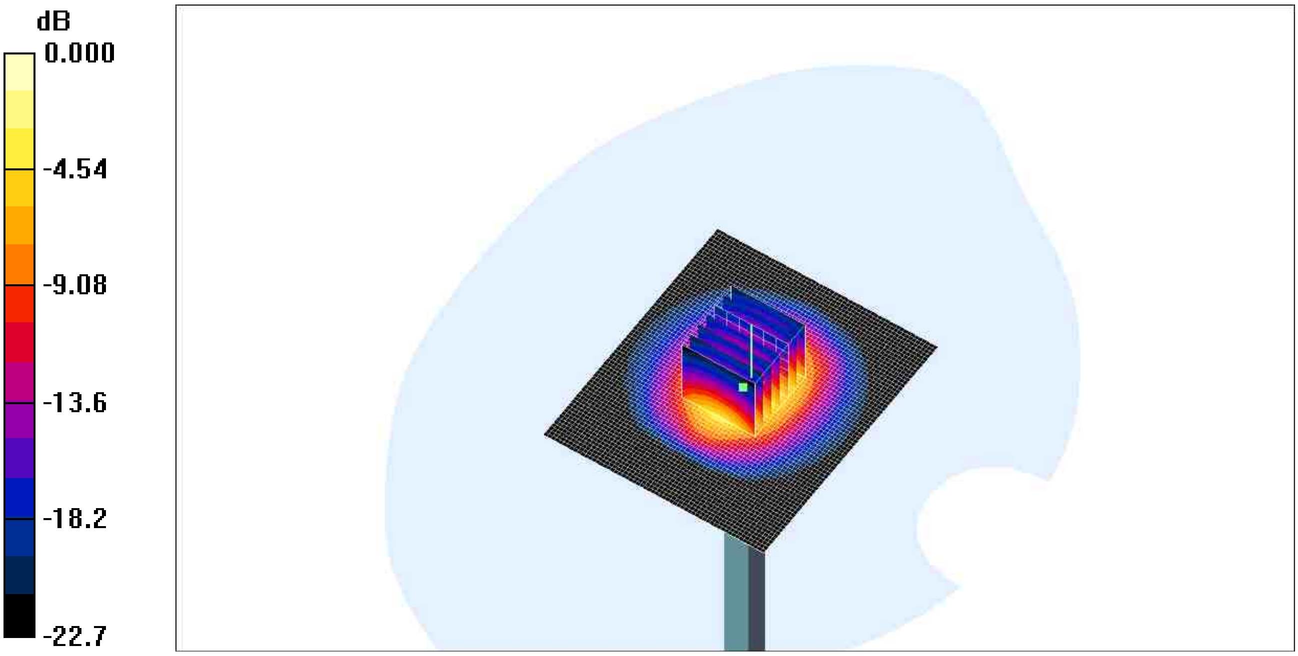
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: 2450D Medium parameters used: f = 2450 MHz; σ = 2.01 mho/m; ε_r = 52.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.17, 4.17, 4.17); Calibrated: 2013-02-21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (81x91x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 17.6 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.8 V/m; Power Drift = 0.034 dB
Peak SAR (extrapolated) = 29.0 W/kg
SAR(1 g) = 13.5 mW/g; SAR(10 g) = 6.34 mW/g
Maximum value of SAR (measured) = 16.2 mW/g



0 dB = 16.2mW/g

5800 MHz Body- Verification DATA (D5GHzV2 – 1107)

- Test Date: December 19, 2013

- Measured Liquid Temperature: 22.9 ℃, Ambient Temperature: 22.0 ℃

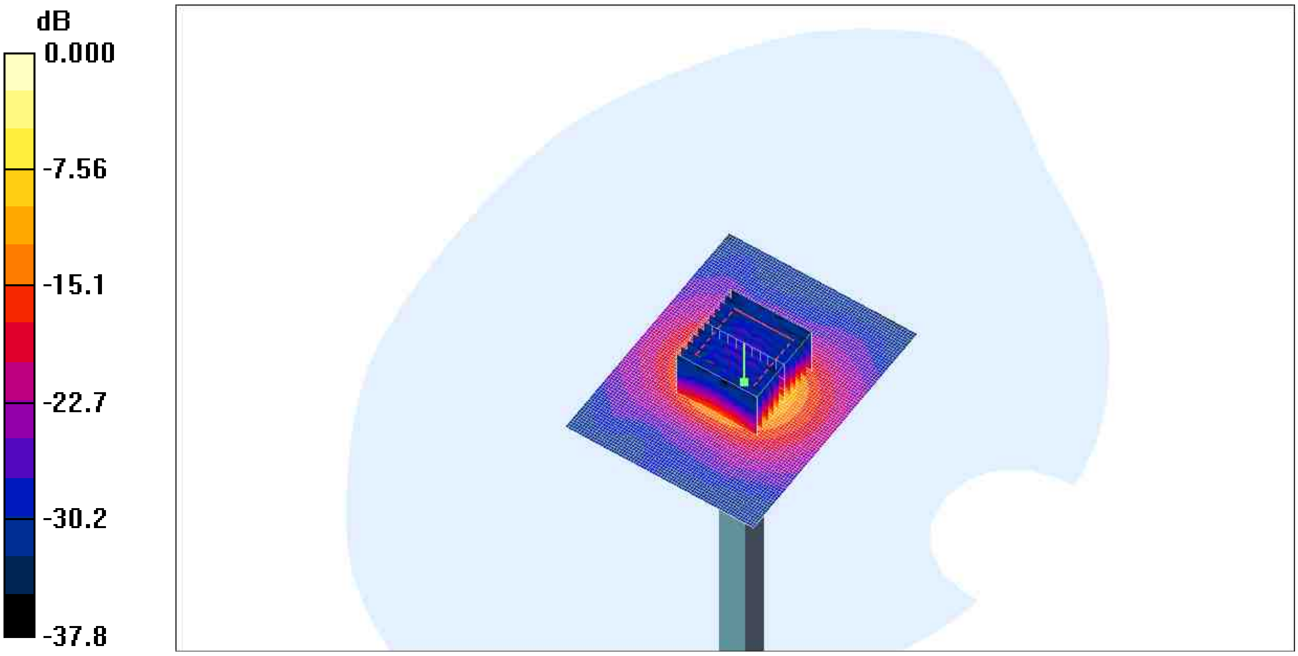
Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5GHz body Medium parameters used: f = 5800 MHz; σ = 6.10 mho/m; ε_r = 48.0; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3905; ConvF(3.94, 3.94, 3.94); Calibrated: 2013-02-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 0mm (Fix Surface)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2013-02-14
- Phantom: SAM Twin Phantom_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Area Scan (71x91x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 8.71 mW/g

Zoom Scan (11x11x6)/Cube 0: Measurement grid: dx=3mm, dy=3mm, dz=2mm
Reference Value = 37.0 V/m; Power Drift = 0.022 dB
Peak SAR (extrapolated) = 33.8 W/kg
SAR(1 g) = 7.76 mW/g; SAR(10 g) = 2.18 mW/g
Maximum value of SAR (measured) = 16.5 mW/g



0 dB = 16.5 mW/g