SAR TEST REPORT
(MOBILE)

REPORT NO.: SA981217L06A-1

MODEL NO.: PB31200

RECEIVED: May 27, 2010

TESTED: Jun. 06, 2010

ISSUED: Jun. 09, 2010

APPLICANT: HTC Corporation

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1. CERTIFICATION

PRODUCT:	Smartphone
MODEL NO.:	PB31200
BRAND:	HTC
APPLICANT:	HTC Corporation
TESTED:	Jun. 06, 2010
TEST SAMPLE:	ENGINEERING SAMPLE
STANDARDS:	**FCC Part 2 (Section 2.1093)** **FCC OET Bulletin 65, Supplement C (01-01)** **RSS-102**

The above equipment (model: PB31200) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY	: Andrea Hsia / Specialist	, **DATE:** Jun. 09, 2010
TECHNICAL ACCEPTANCE Responsible for RF	: Mason Chang / Engineer	, **DATE:** Jun. 09, 2010
APPROVED BY	: Gary Chang / Assistant Manager	, **DATE:** Jun. 09, 2010

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

EUT	Smart Phone	
MODEL NO.	PC36100	
FCC ID	NM8PB31200	
POWER SUPPLY	3.7Vdc (Battery) 5.0Vdc (Adapter) 5.0Vdc (host equipment)	
MODULATION TYPE	OQPSK, HPSK	
FREQUENCY RANGE	824MHz ~ 849MHz ; 1850MHz ~ 1910MHz	
CHANNEL FREQUENCIES UNDER TEST AND ITS CONDUCTED OUTPUT POWER	**CDMA850 BAND:**	
	SO55 RC3	24.17dBm / 824.7MHz for channel 1013 24.18dBm / 836.5MHz for channel 384 24.21dBm / 848.3MHz for channel 777
	TDSO SO32 RC3	24.30dBm / 836.5MHz for channel 384
	CDMA1900 BAND:	
	SO55 RC3	23.53dBm / 1851.25MHz for channel 25 23.87dBm / 1880.00MHz for channel 600 23.57dBm / 1908.75MHz for channel 1175
	TDSO SO32 RC3	23.89dBm / 1880.00MHz for channel 600
MAX. AVERAGE SAR (1g)	**HEAD:**	1.300W/kg
	BODY:	0.599W/kg
ANTENNA TYPE	PIFA antenna	
ANTENNA GAIN	CDMA850 BAND: 0.5dBi CDMA1900 BAND: 1.0dBi	
DATA CABLE	Refer to NOTE 2	
I/O PORTS	Refer to user's manual	
ACCESSORY DEVICES	Refer to NOTE 2	

NOTE:

1. This report is prepared for FCC class II permissive change. The differences compared with original report are adding a battery and 802.11n (20MHz) modulation by software. Therefore, test item for radiated emission test and SAR test were performed for this addendum.
2. The EUT is a Smartphone. The functions of EUT listed as below:

	REFERENCE REPORT
WLAN 802.11b/g/n	SA981217L06A
CDMA 850 + CDMA 1900	SA981217L06A-1

3. The EUT has following accessories. (New battery is marked in boldface.)

NO.	PRODUCT	BRAND	MODEL	DESCRIPTION	REMARK
1	Power Adapter	Delta	TC P300	I/P: 100-240Vac, 50-60Hz, 0.2A O/P: 5Vdc, 1A	-
2			TC U250		-
3		Emerson	TC U250		-
4	USB cable	MEC	DC M410	1.4m shielded cable without core (For data transmission & charging use)	For TC P300 only
5		Foxlink			For TC U250 only
6	Battery	HT ENERGY	BB96100	Rating: 3.7Vdc, 1300mAh	-
7			BTR6300B		
8		Formosa	BB96100		
9			BTR6300B		
10		**TWS**	**BTR6300B**		**New**

4. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

2.2 SAR MEASUREMENT CONDITIONS FOR CDMA

The following procedures were followed according to FCC "SAR Measurement Procedures 3G Devices", Oct. 2007.

➢ Output Power Verification

Maximum output power is verified on the High, Middle and Low channels according to procedures in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E. Results for at least steps 3, 4 and 10 of the power measurement procedures should be tabulated in the SAR report. Steps 3 and 4 should be measured using SO55 with power control bits in "All Up" condition. TDSO / SO32 may be used instead of SO55 for step 4. Step 10 should be measured using TDSO / SO32 with power control bits in the "Bits Hold" condition (i.e. alternative Up/Down Bits). All power measurements defined in C.S0011/TIA-98-E that are inapplicable to the DUT or cannot be measured due to technical or equipment limitations should be clearly identified in the test report.6

➢ Head SAR Measurement

SAR for head exposure configurations is measured in RC3 with the DUT configured to transmit at full rate using Loopback Service Option SO55. SAR for RC1 is not required when the maximum average output of each channel is less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel in RC1 using the exposure configuration that results in the highest SAR for that channel in RC3.

➢ Body SAR Measurements

SAR for body exposure configurations is measured in RC3 with the DUT configured to transmit at full rate on FCH with all other code channels disabled using TDSO / SO32. SAR for multiple code channels (FCH + SCHn) is not required when the maximum average output of each RF channel is less than ¼ dB higher than that measured with FCH only. Otherwise, SAR is measured on the maximum output channel (FCH + SCHn) with FCH at full rate and SCH0 enabled at 9600 bps using the exposure configuration that results in the highest SAR for that channel with FCH only.

When multiple code channels are enabled, the DUT output may shift by more than 0.5 dB and lead to higher SAR drifts and SCH dropouts. Body SAR in RC1 is not required when the maximum average output of each channel is less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum

output channel in RC1; with Loopback Service Option SO55, at full rate, using the body exposure configuration that results in the highest SAR for that channel in RC3.

➢ Handsets with Ev-Do

For handsets with Ev-Do capabilities, when the maximum average output of each channel in Rev. 0 is less than ¼ dB higher than that measured in RC3 (1x RTT), body SAR for Ev-Do is not required. Otherwise, SAR for Rev. 0 is measured on the maximum output channel at **153.6 kbps** using the body exposure configuration that results in the highest SAR for that channel in RC3. SAR for Rev. A is not required when the maximum average output of each channel is less than that measured in Rev. 0 or less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel for Rev. A using a Reverse Data Channel payload size of 4096 bits and a Termination Target of 16 slots defined for Subtype 2 Physical Layer configurations. A Forward Traffic Channel data rate corresponding to the 2-slot version of 307.2 kbps with the ACK Channel transmitting in all slots should be configured in the downlink for both Rev. 0 and Rev. A.

CDMA850 BAND:

WORST CASE CONDUCTED POWER OF 1x EV-DO								
CHANNEL	FREQ. (MHz)	Revision A	Release 0	CORR. FACTOR (dB)	Revision A		Release 0	
		RAW VALUE (dBm)			OUTPUT POWER			
					dBm	mW	dBm	mW
1013	824.7	19.01	19.25	4.20	23.21	209.4	23.45	221.3
384	836.5	19.11	19.35	4.20	23.31	214.3	23.55	226.5
777	848.3	19.38	19.41	4.20	23.58	228.0	23.61	229.6

CONDUCTED POWER (1x EV-DO)							
CHANNEL	FREQ. (MHz)	Revision A			Release 0		
		RETAP: 128kbps (dBm)	RETAP: 2048kbps (dBm)	RETAP: 12288kbps (dBm)	EVDO-UL: 9.6kbps (dBm)	EVDO-UL: 38.4kbps (dBm)	EVDO-UL: 153.6kbps (dBm)
1013	824.7	23.39	23.18	23.21	23.42	23.45	23.52
384	836.5	23.32	23.25	23.31	23.51	23.55	23.48
777	848.3	23.41	23.43	23.58	23.56	23.61	23.61

CDMA 2000 CONDUCTED POWER														
CHAN.	FREQ. (MHz)	CDMA	RAW VALUE (dBm)					CORR. FACTOR (dB)	OUTPUT POWER (dBm)				
		RC	SO2	SO55	TDSO SO32 (FCH)	TDSO SO32 (FCH+ SCH)	SO3		SO2	SO55	TDSO SO32 (FCH)	TDSO SO32 (FCH+ SCH)	SO3
1013	824.7	RC1	19.85	19.92	-	-	19.94	4.20	24.05	24.12	-	-	24.14
		RC3	19.96	19.97	19.99	19.94	19.98	4.20	24.16	24.17	24.19	24.14	24.18
384	836.5	RC1	19.95	19.85	-	-	19.89	4.20	24.15	24.05	-	-	24.09
		RC3	19.98	19.98	20.10	20.00	19.99	4.20	24.18	24.18	24.30	24.20	24.19
777	848.3	RC1	20.02	19.92	-	-	20.00	4.20	24.22	24.12	-	-	24.20
		RC3	20.00	20.01	20.03	19.99	20.00	4.20	24.20	24.21	24.23	24.19	24.20

CDMA1900 BAND:

WORST CASE CONDUCTED POWER OF 1x EV-DO								
CHANNEL	FREQ. (MHz)	Revision A	Release 0	CORR. FACTOR (dB)	Revision A		Release 0	
		RAW VALUE (dBm)			OUTPUT POWER			
					dBm	mW	dBm	mW
25	1851.25	18.50	18.60	4.50	23.00	199.5	23.10	204.2
600	1880.00	18.70	18.80	4.50	23.20	208.9	23.30	213.8
1175	1908.75	18.50	18.50	4.50	23.00	199.5	23.00	199.5

CONDUCTED POWER (1x EV-DO)							
CHANNEL	FREQ. (MHz)	Revision A			Release 0		
		RETAP: 128kbps (dBm)	RETAP: 2048kbps (dBm)	RETAP: 12288kbps (dBm)	EVDO-UL: 9.6kbps (dBm)	EVDO-UL: 38.4kbps (dBm)	EVDO-UL: 153.6kbps (dBm)
25	1851.25	23.00	23.00	22.90	23.00	23.10	23.00
600	1880.00	23.20	23.10	23.10	23.20	23.30	23.30
1175	1908.75	23.00	23.00	22.90	23.00	23.00	23.10

CDMA 2000 CONDUCTED POWER														
CHAN.	FREQ. (MHz)	CDMA 2000	RAW VALUE (dBm)					CORR. FACTOR (dB)	OUTPUT POWER (dBm)				
		RC	SO2	SO55	TDSO SO32 (FCH)	TDSO SO32 (FCH+ SCH)	SO3		SO2	SO55	TDSO SO32 (FCH)	TDSO SO32 (FCH+ SCH)	SO3
25	1851.25	RC1	18.82	18.92	-	-	19.11	4.50	23.32	23.42	-	-	23.61
		RC3	19.03	19.03	19.04	19.02	18.93	4.50	23.53	23.53	23.54	23.52	23.43
600	1880.00	RC1	19.32	19.32	-	-	19.22	4.50	23.82	23.82	-	-	23.72
		RC3	19.36	19.37	19.39	19.23	19.31	4.50	23.86	23.87	23.89	23.73	23.81
1175	1908.75	RC1	18.84	19.02	-	-	18.92	4.50	23.34	23.52	-	-	23.42
		RC3	19.04	19.07	19.08	18.96	18.93	4.50	23.54	23.57	23.58	23.46	23.43

2.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to the specifications of the manufacturer, this product must comply with the requirements of the following standards:

FCC Part 2 (2.1093)

FCC OET Bulletin 65, Supplement C (01- 01)

RSS-102

IEEE 1528-2003

All test items have been performed and recorded as per the above standards.

2.4 GENERAL INOFRMATION OF THE SAR SYSTEM

DASY5 **(Software 5.2 Build 152)** 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 DASY5 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.

EX3DV3 ISOTROPIC E-FIELD PROBE

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 > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
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: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
APPLICATION	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.

NOTE

1. The Probe parameters have been calibrated by the SPEAG. Please reference "APPENDIX D" for the Calibration Certification Report.
2. For frequencies above 800MHz, calibration in a rectangular wave-guide is used, because wave-guide size is manageable.
3. For frequencies below 800MHz, temperature transfer calibration is used because the wave-guide size becomes relatively large.

TWIN SAM V4.0

CONSTRUCTION	The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528-2003, EN 62209-1 and IEC 62209. 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 manually teaching three points with the robot.
SHELL THICKNESS	2 ± 0.2mm
FILLING VOLUME	Approx. 25liters
DIMENSIONS	Height: 810mm; Length: 1000mm; Width: 500mm

SYSTEM VALIDATION KITS:

CONSTRUCTION	Symmetrical dipole with l/4 balun enables measurement of feedpoint impedance with NWA matched for use near flat phantoms filled with brain simulating solutions. Includes distance holder and tripod adaptor
CALIBRATION	Calibrated SAR value for specified position and input power at the flat phantom in brain simulating solutions
FREQUENCY	835, 1900MHz
RETURN LOSS	> 20dB at specified validation position
POWER CAPABILITY	> 100W (f < 1GHz); > 40W (f > 1GHz)
OPTIONS	Dipoles for other frequencies or solutions and other calibration conditions upon request

DEVICE HOLDER FOR SAM TWIN PHANTOM

CONSTRUCTION	The device holder for the mobile phone device is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles. The holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity ε =3 and loss tangent δ =0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered. The device holder for the portable device makes up of the polyethylene foam. The dielectric parameters of material close to the dielectric parameters of the air.

DATA ACQUISITION ELECTRONICS

CONSTRUCTION

The data acquisition electronics (DAE3) consists of a highly sensitive electrometer grade preamplifier with auto-zeroing, a channel and gain-switching multiplex, a fast 16 bit AD converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock. The mechanical probe is mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection. The input impedance of the DAE3 box is 200MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

2.5 TEST EQUIPMENT

FOR SAR MEASURENENT

ITEM	NAME	BRAND	TYPE	SERIES NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
1	SAM Phantom	Speag	SAM	TP-1485	NA	NA
2	Signal Generator	Agilent	E4438C	MY47271120	Jul. 28, 2009	Jul. 27, 2010
3	E-Field Probe	S & P	EX3DV4	3504	Jan. 26, 2010	Jan. 25, 2011
4	DAE	S & P	DAE 3	510	Dec. 16, 2009	Dec. 15, 2010
5	Robot Positioner	Staubli Unimation	NA	NA	NA	NA
6	Validation Dipole	S & P	D835V2	4d021	Apr. 29, 2010	Apr. 28, 2011
7	Validation Dipole	S & P	D1900V2	5d036	Feb. 23, 2010	Feb. 22, 2011

NOTE: Before starting the measurement, all test equipment shall be warmed up for 30min.

FOR TISSUE PROPERTY

ITEM	NAME	BRAND	TYPE	SERIES NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
1	Network Analyzer	Agilent	E8358A	US41480538	Dec. 03, 2009	Dec. 02, 2010
2	Dielectric Probe	Agilent	85070D	US01440176	NA	NA

NOTE:

1. Before starting, all test equipment shall be warmed up for 30min.
2. The tolerance (k=1) specified by Agilent for general dielectric measurements, deriving from inaccuracies in the calibration data, analyzer drift, and random errors, are usually ±2.5% and ±5% for measured permittivity and conductivity, respectively. However, the tolerances for the conductivity is smaller for material with large loss tangents, i.e., less than ±2.5% (k=1). It can be substantially smaller if more accurate methods are applied.

2.6 GENERAL DESCRIPTION OF THE SPATIAL PEAK SAR EVALUATION

The DASY5 post-processing software (SEMCAD) automatically executes the following procedures to calculate the field units from the micro-volt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters:	- Sensitivity	$Norm_i$, a_{i0}, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$
	- Diode compression point	dcp_i
Device parameters:	- Frequency	F
	- Crest factor	Cf
Media parameters:	- Conductivity	σ
	- Density	ρ

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \bullet \frac{cf}{dcp_i}$$

V_i	=compensated signal of channel i	(i = x, y, z)
U_i	=input signal of channel I	(i = x, y, z)
Cf	=crest factor of exciting field	(DASY parameter)
dcp_i	=diode compression point	(DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

$$\text{E-fieldprobes: } E_i = \sqrt{\frac{V_1}{Norm_i \cdot ConvF}}$$

$$\text{H-fieldprobes: } H_i = \sqrt{V_i} \cdot \frac{a_{i0} + a_{i1} f + a_{i2} f^2}{f}$$

V_i	=compensated signal of channel I	(i = x, y, z)
$Norm_i$	=sensor sensitivity of channel i μV/(V/m)2 for E-field Probes	(i = x, y, z)
ConvF	= sensitivity enhancement in solution	
a_{ij}	= sensor sensitivity factors for H-field probes	
F	= carrier frequency [GHz]	
E_i	= electric field strength of channel i in V/m	
H_i	= magnetic field strength of channel i in A/m	

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

The primary field data are used to calculate the derived field units.

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1'000}$$

SAR	= local specific absorption rate in mW/g
E_{tot}	= total field strength in V/m
σ	= conductivity in [mho/m] or [Siemens/m]
ρ	= equivalent tissue density in g/cm3

Note that the density is set to 1, to account for actual head tissue density rather than the density of the tissue simulating liquid. The entire evaluation of the spatial peak values is performed within the Post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

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

The probe is calibrated at the center of the dipole sensors that is located 1 to 2.7mm away from the probe tip. During measurements, the probe stops shortly above the phantom surface, depending on the probe and the surface detecting system. Both distances are included as parameters in the probe configuration file. The software always knows exactly how far away the measured point is from the surface. As the probe cannot directly measure at the surface, the values between the deepest measured point and the surface must be extrapolated. The angle between the probe axis and the surface normal line is less than 30 degree.

The maximum search is automatically performed after each area scan measurement. It is based on splines in two or three dimensions. The procedure can find the maximum for most SAR distributions even with relatively large grid spacing. After the area scanning measurement, the probe is automatically moved to a position at the interpolated maximum. The following scan can directly use this position for reference, e.g., for a finer resolution grid or the cube evaluations. The 1g and 10g peak evaluations are only available for the predefined cube 7 x 7 x 7 scans. The routines are verified and optimized for the grid dimensions used in these cube measurements. The measured volume of 30 x 30 x 30mm contains about 30g of tissue. The first procedure is an extrapolation (incl. boundary correction) to get the points between the lowest measured plane and the surface. The next step uses 3D interpolation to get all points within the measured volume in a 1mm grid (42875 points). In the last step, a 1g cube is placed numerically into the volume and its averaged SAR is calculated. This cube is the moved around until the highest averaged SAR is found. If the highest SAR is found at the edge of the measured volume, the system will issue a warning: higher SAR values might be found outside of the measured volume. In that case the cube measurement can be repeated, using the new interpolated maximum as the center.

3. DESCRIPTION OF SUPPORT UNITS

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.
1	Universal Radio Communication Tester	R&S	CMU200	104484

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA

NOTE: All power cords of the above support units are non shielded (1.8m).

4. Recipes for Tissue simulating liquids

For the measurement of the field distribution inside the SAM phantom, the phantom must be filled with 25 litters of tissue simulation liquid.

The following are some common ingredients：

- **WATER-** Deionized water (pure H20), resistivity _16 M - as basis for the liquid
- **SUGAR-** Refined sugar in crystals, as available in food shops - to reduce relative permittivity
- **SALT-** Pure NaCl - to increase conductivity
- **CELLULOSE-** Hydroxyethyl-cellulose, medium viscosity (75-125mPa.s, 2% in water, 20_C),
  CAS # 54290 - to increase viscosity and to keep sugar in solution
- **PRESERVATIVE-** Preventol D-7 Bayer AG, D-51368 Leverkusen, CAS # 55965-84-9 - to prevent the spread of bacteria and molds
- **DGMBE-** Diethylenglycol-monobuthyl ether (DGMBE), Fluka Chemie GmbH, CAS # 112-34-5 - to reduce relative permittivity

THE RECIPES FOR 835MHz SIMULATING LIQUID TABLE

INGREDIENT	HEAD SIMULATING LIQUID 835MHz (HSL-835)	MUSCLE SIMULATING LIQUID 835MHz (MSL-835)
Water	40.28%	50.07%
Cellulose	02.41%	NA
Salt	01.38%	0.94%
Preventtol D-7	00.18%	0.09%
Sugar	57.97%	48.2%
Dielectric Parameters at 22℃	f = 835MHz ε= 41.5 ± 5% σ= 0.97 ± 5% S/m	f= 835MHz ε= 55.0 ± 5% σ= 1.05 ± 5% S/m

THE RECIPES FOR 1900MHz SIMULATING LIQUID TABLE

INGREDIENT	HEAD SIMULATING LIQUID 1900MHz (HSL-1900)	MUSCLE SIMULATING LIQUID 1900MHz (MSL-1900)
Water	55.24%	70.16%
DGMBE	44.45%	29.44%
Salt	0.306%	00.39%
Dielectric Parameters at 22℃	f= 1900MHz ε= 40.0 ± 5% σ= 1.40 ± 5% S/m	f= 1900MHz ε= 53.3 ± 5% σ= 1.52 ± 5% S/m

Testing the liquids using the Agilent Network Analyzer E8358A and Agilent Dielectric Probe Kit 85070D.The testing procedure is following as

1. Turn Network Analyzer on and allow at least 30min. warm up.
2. Mount dielectric probe kit so that interconnecting cable to Network Analyzer will not be moved during measurements or calibration.
3. Pour de-ionized water and measure water temperature (±1°).
4. Set water temperature in Agilent-Software (Calibration Setup).
5. Perform calibration.
6. Validate calibration with dielectric material of known properties (e.g. polished ceramic slab with >8mm thickness ε'=10.0, ε''=0.0). If measured parameters do not fit within tolerance, repeat calibration (±0.2 for ε': ±0.1 for ε'').
7. Conductivity can be calculated from ε'' by $\sigma = \omega \varepsilon_0 \varepsilon'' = \varepsilon'' f [GHz] / 18$.
8. Measure liquid shortly after calibration. Repeat calibration every hour.
9. Stir the liquid to be measured. Take a sample (~ 50ml) with a syringe from the center of the liquid container.
10. Pour the liquid into a small glass flask. Hold the syringe at the bottom of the flask to avoid air bubbles.
11. Put the dielectric probe in the glass flask. Check that there are no air bubbles in front of the opening in the dielectric probe kit.
12. Perform measurements.
13. Adjust medium parameters in DASY5 for the frequencies necessary for the measurements (‘Setup Config’, select medium (e.g. Brain 900MHz) and press ‘Option’-button.
14. Select the current medium for the frequency of the validation (e.g. Setup Medium Brain 900MHz).

FOR SIMULATING LIQUID

LIQUID TYPE		HSL-835			
SIMULATING LIQUID TEMP.		21.2			
TEST DATE		Jun. 06, 2010			
TESTED BY		Kevin Liang			
FREQ. (MHz)	LIQUID PARAMETER	STANDARD VALUE	MEASUREMENT VALUE	ERROR PERCENTAGE (%)	LIMIT(%)
835.00	Permitivity (ε)	41.50	42.30	1.93	±5
836.52		41.50	42.30	1.93	
835.00	Conductivity (σ) S/m	0.90	0.89	-1.11	
836.52		0.90	0.90	0.00	

LIQUID TYPE		MSL-835			
SIMULATING LIQUID TEMP.		22.8			
TEST DATE		Jun. 06, 2010			
TESTED BY		Kevin Liang			
FREQ. (MHz)	LIQUID PARAMETER	STANDARD VALUE	MEASUREMENT VALUE	ERROR PERCENTAGE (%)	LIMIT(%)
835.00	Permitivity (ε)	55.20	54.70	-0.91	±5
836.52		55.20	54.70	-0.91	
835.00	Conductivity (σ) S/m	0.97	0.98	1.03	
836.52		0.97	0.98	1.03	

LIQUID TYPE	HSL-1900				
SIMULATING LIQUID TEMP.	22.8				
TEST DATE	Jun. 06, 2010				
TESTED BY	Kevin Liang				
FREQ. (MHz)	**LIQUID PARAMETER**	**STANDARD VALUE**	**MEASUREMENT VALUE**	**ERROR PERCENTAGE (%)**	**LIMIT(%)**
1900.00	Permitivity (ε)	40.00	40.30	0.75	±5
1908.75		40.00	41.00	2.50	
1900.00	Conductivity (σ) S/m	1.40	1.42	1.43	
1908.75		1.40	1.44	2.86	

LIQUID TYPE	MSL-1900				
SIMULATING LIQUID TEMP.	22.8				
TEST DATE	Jun. 06, 2010				
TESTED BY	Kevin Liang				
FREQ. (MHz)	**LIQUID PARAMETER**	**STANDARD VALUE**	**MEASUREMENT VALUE**	**ERROR PERCENTAGE (%)**	**LIMIT(%)**
1880.00	Permitivity (ε)	53.30	53.50	0.38	±5
1900.00		53.30	53.50	0.38	
1880.00	Conductivity (σ) S/m	1.52	1.54	1.32	
1900.00		1.52	1.54	1.32	

5. SYSTEM VALIDATION

The system validation was performed in the flat phantom with equipment listed in the following table. Since the SAR value is calculated from the measured electric field, dielectric constant and conductivity of the body tissue and the SAR is proportional to the square of the electric field. So, the SAR value will be also proportional to the RF power input to the system validation dipole under the same test environment. In our system validation test, 250mW RF input power was used.

5.1 TEST PROCEDURE

Before the system performance check, we need only to tell the system which components (probe, medium, and device) are used for the system performance check; the system will take care of all parameters. The dipole must be placed beneath the flat section of the SAM Twin Phantom with the correct distance holder in place. The distance holder should touch the phantom surface with a light pressure at the reference marking (little cross) and be oriented parallel to the long side of the phantom. Accurate positioning is not necessary, since the system will search for the peak SAR location, except that the dipole arms should be parallel to the surface. The device holder for mobile phones can be left in place but should be rotated away from the dipole.

1. The ”Power Reference Measurement” and ”Power Drift Measurement” jobs are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the amplifier output power. If it is too high (above ±0.1 dB), the system performance check should be repeated; some amplifiers have very high drift during warm-up. A stable amplifier gives drift results in the DASY system below ±0.02dB.

2. The ”Surface Check” job tests the optical surface detection system of the DASY system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ±0.1mm). In that case it is better to abort the system performance check and stir the liquid.

3. The ”Area Scan” job measures the SAR above the dipole on a plane parallel to the surface. It is used to locate the approximate location of the peak SAR. The proposed scan uses large grid spacing for faster measurement; due to the symmetric field, the peak detection is reliable. If a finer graphic is desired, the grid spacing can be reduced. Grid spacing and orientation have no influence on the SAR result.

4. The ”Zoom Scan” job measures the field in a volume around the peak SAR value assessed in the previous ”Area Scan” job (for more information see the application note on SAR evaluation).

About the validation dipole positioning uncertainty, the constant and low loss dielectric spacer is used to establish the correct distance between the top surface of the dipole and the bottom surface of the phantom, the error component introduced by the uncertainty of the distance between the liquid (i.e., phantom shell) and the validation dipole in the DASY5 system is less than ±0.1mm.

$$SAR_{tolerance}[\%] = 100 \times (\frac{(a+d)^2}{a^2} - 1)$$

As the closest distance is 10mm, the resulting tolerance $SAR_{tolerance}[\%]$ is <2%.

5.2 VALIDATION RESULTS

SYSTEM VALIDATION TEST OF SIMULATING LIQUID					
FREQUENCY (MHz)	**REQUIRED SAR (mW/g)**	**MEASURED SAR (mW/g)**	**DEVIATION (%)**	**SEPARATION DISTANCE**	**TESTED DATE**
HSL835	2.37 (1g)	2.45	3.38	15mm	Jun. 06, 2010
MSL835	2.52 (1g)	2.56	1.59	15mm	Jun. 06, 2010
HSL1900	10.00 (1g)	10.20	2.00	10mm	Jun. 06, 2010
MSL1900	10.30 (1g)	10.40	0.97	10mm	Jun. 06, 2010
TESTED BY	Kevin Liang				

NOTE: Please see Appendix for the photo of system validation test.

5.3 SYSTEM VALIDATION UNCERTAINTIES

In the table below, the system validation uncertainty with respect to the analytically assessed SAR value of a dipole source as given in the IEEE 1528 standard is given. This uncertainty is smaller than the expected uncertainty for mobile phone measurements due to the simplified setup and the symmetric field distribution.

Error Description	Tolerance (±%)	Probability Distribution	Divisor	(C_i)		Standard Uncertainty (±%)		(v_i)
				(1g)	(10g)	(1g)	(10g)	
Measurement System								
Probe Calibration	5.50	Normal	1	1	1	5.50	5.50	∞
Axial Isotropy	0.50	Rectangular	$\sqrt{3}$	0.7	0.7	0.20	0.20	∞
Hemispherical Isotropy	2.60	Rectangular	$\sqrt{3}$	0.7	0.7	1.05	1.05	∞
Boundary effects	1.00	Rectangular	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	0.60	Rectangular	$\sqrt{3}$	1	1	0.35	0.35	∞
System Detection Limits	1.00	Rectangular	$\sqrt{3}$	1	1	0.58	0.58	∞
Readout Electronics	0.30	Normal	1	1	1	0.30	0.30	∞
Response Time	0.80	Rectangular	$\sqrt{3}$	1	1	0.46	0.46	∞
Integration Time	2.60	Rectangular	$\sqrt{3}$	1	1	1.50	1.50	∞
RF Ambient Noise	3.00	Rectangular	$\sqrt{3}$	1	1	1.73	1.73	∞
RF Ambient Reflections	3.00	Rectangular	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe Positioner	0.40	Rectangular	$\sqrt{3}$	1	1	0.23	0.23	∞
Probe Positioning	2.90	Rectangular	$\sqrt{3}$	1	1	1.67	1.67	∞
Max. SAR Eval.	1.00	Rectangular	$\sqrt{3}$	1	1	0.58	0.58	∞
Dipole Related								
Dipole Axis to Liquid Distance	2.00	Rectangular	$\sqrt{3}$	1	1	1.15	1.15	145
Input Power Drift	5.00	Rectangular	$\sqrt{3}$	1	1	2.89	2.89	∞
Phantom and Tissue parameters								
Phantom Uncertainty	4.00	Rectangular	$\sqrt{3}$	1	1	2.31	2.31	∞
Liquid Conductivity (target)	5.00	Rectangular	$\sqrt{3}$	0.64	0.43	1.85	1.24	∞
Liquid Conductivity (measurement)	3.86	Normal	1	0.64	0.43	2.47	1.66	∞
Liquid Permittivity (target)	5.00	Rectangular	$\sqrt{3}$	0.6	0.49	1.73	1.41	∞
Liquid Permittivity (measurement)	3.21	Normal	1	0.6	0.49	1.93	1.57	∞
Combined Standard Uncertainty						**8.67**	**8.23**	
Coverage Factor for 95%						**Kp=2**		
Expanded Uncertainty (K=2)						**17.34**	**16.46**	

NOTE: About the system validation uncertainty assessment, please reference the section 7.

6. TEST RESULTS

6.1 TEST PROCEDURES

The EUT makes a phone call to the communication simulator station. Establish the simulation communication configuration rather the actual communication. Then the EUT could continuous the transmission mode. Adjust the PCL of the base station could controlled the EUT to transmitted the maximum output power. The base station also could control the transmission channel. The SAR value was calculated via the 3D spline interpolation algorithm that has been implemented in the software of DASY5 SAR measurement system manufactured and calibrated by SPEAG. According to the IEEE 1528 / EN 62209-1, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

- Power reference measurement
- Verification of the power reference measurement
- Area scan
- Zoom scan
- Power reference measurement

The area scan was performed for the highest spatial SAR location. The zoom scan with 30mm x 30mm x 30mm volume was performed for SAR value averaged over 1g and 10g spatial volumes.

In the zoom scan, the distance between the measurement point at the probe sensor location (geometric center behind the probe tip) and the phantom surface is 3mm and maintained at a constant distance of ±0.5mm during a zoom scan to determine peak SAR locations. The distance is 3mm between the first measurement point and the bottom surface of the phantom. The secondary measurement point to the bottom surface of the phantom is with 8mm separation distance. The cube size is 7 x 7 x 7 points consists of 343 points and the grid space is 5mm.

The measurement time is 0.5s at each point of the zoom scan. The probe boundary effect compensation shall be applied during the SAR test. Because of the tip of the probe to the Phantom surface separated distances are longer than half a tip probe diameter.

In the area scan, the separation distance is 3mm between the each measurement point and the phantom surface. The scan size shall be included the transmission portion of the EUT. The measurement time is the same as the zoom scan. At last the reference power drift shall be less than ±5%.

6.2 MEASURED SAR RESULT

HEAD			
CH	RIGHT CHEEK	CH	LEFTCHEEK
CDMA850		CDMA1900	
384	0.783	1175	**1.300**

Body			
CH	Bottom	CH	Bottom
CDMA850		CDMA1900	
384	0.487	**600**	**0.599**

NOTE:

1. In this testing, the limit for General Population Spatial Peak averaged over 1g, **1.6 W/kg**, is applied
2. Please see the Appendix A for the data.
3. The variation of the EUT conducted power measured before and after SAR testing should not over 5%.
4. Temperature of Liquid is 22±1°C
5. Per DA-02-1438A1, when 1-g SAR for the middle channel is less than 0.8 W/kg, testing for the other channels is not required
6. Test positions and channels are the worst test configuration of head and body of original test report

6.3 SAR LIMITS

HUMAN EXPOSURE	SAR (W/kg)	
	(GENERAL POPULATION / UNCONTROLLED EXPOSURE ENVIRONMENT)	**(OCCUPATIONAL / CONTROLLED EXPOSURE ENVIRONMENT)**
Spatial Peak (averaged over 1 g)	**1.6**	8.0

NOTE:

1. This limits accord to 47 CFR 2.1093 – Safety Limit.
2. The EUT property been complied with the partial body exposure limit under the general population environment.

7. INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml. If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF Lab:
Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab:
Tel: 886-3-3183232
Fax: 886-3-3185050
Web Site: www.adt.com.tw

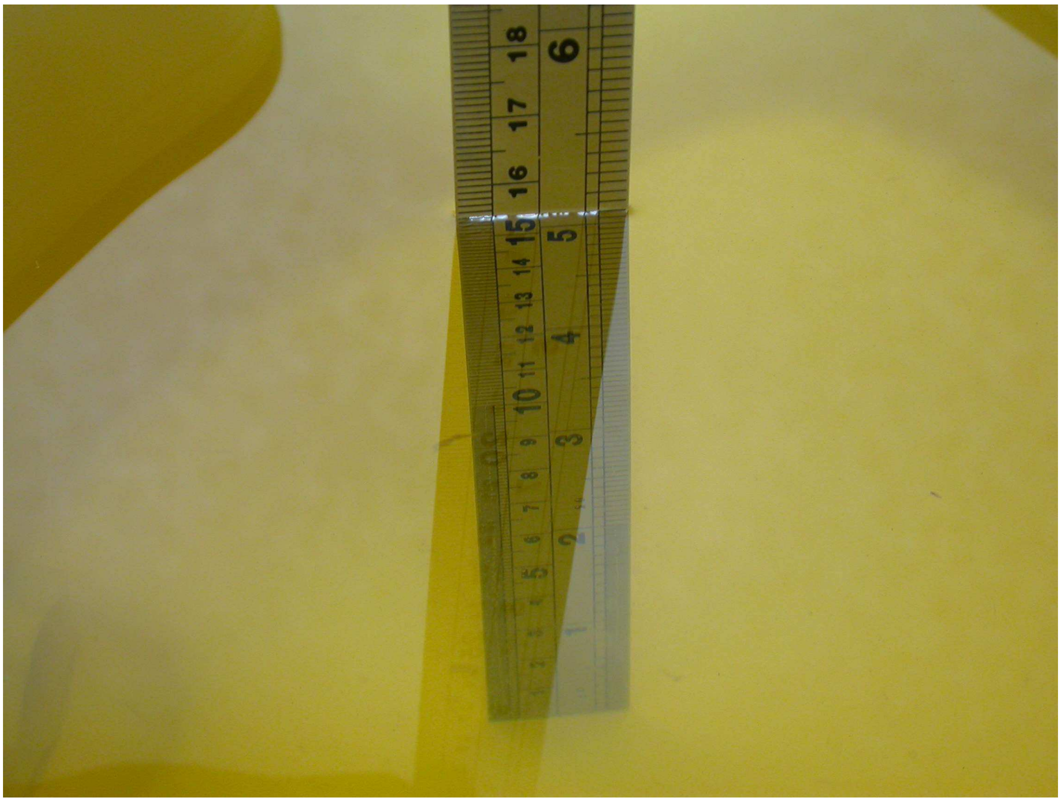
The address and road map of all our labs can be found in our web site also.

---END---

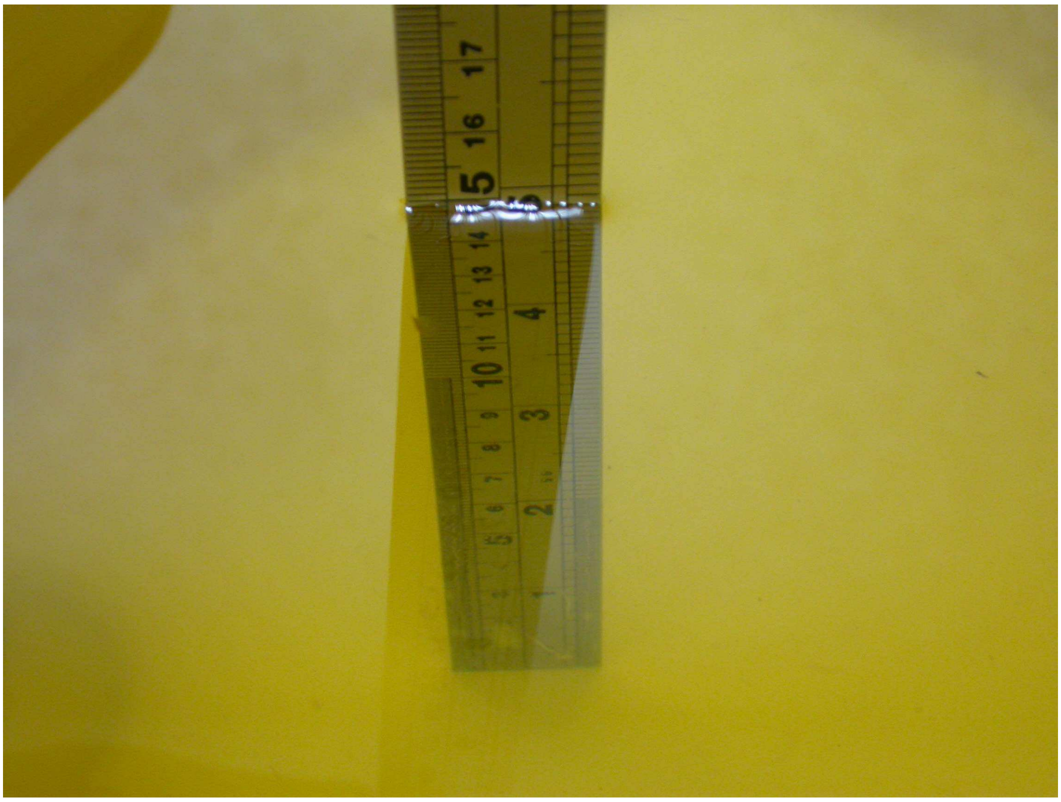
APPENDIX A: TEST DATA

Liquid Level Photo

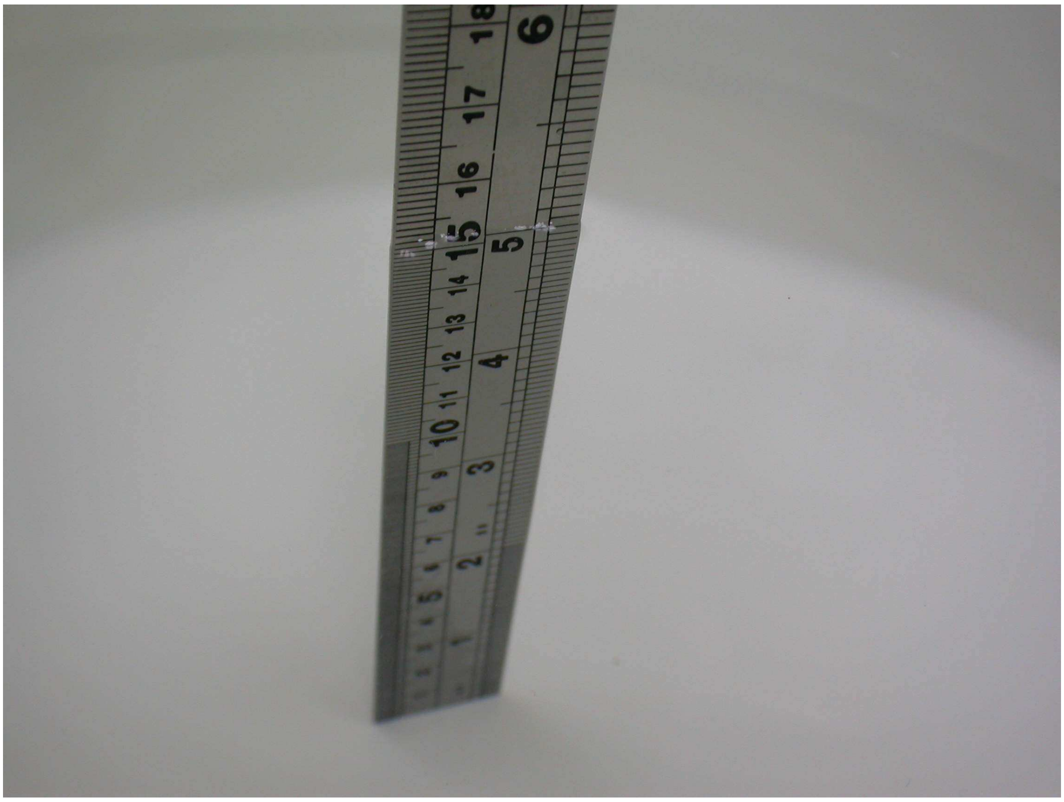
Tissue HSL850MHz D=155mm



Tissue MSL850MHz D=150mm



Tissue HSL1900MHz D=152mm



Tissue MSL1900MHz D=155mm

Date/Time: 2010/6/6 01:03:54

Test Laboratory: Bureau Veritas ADT

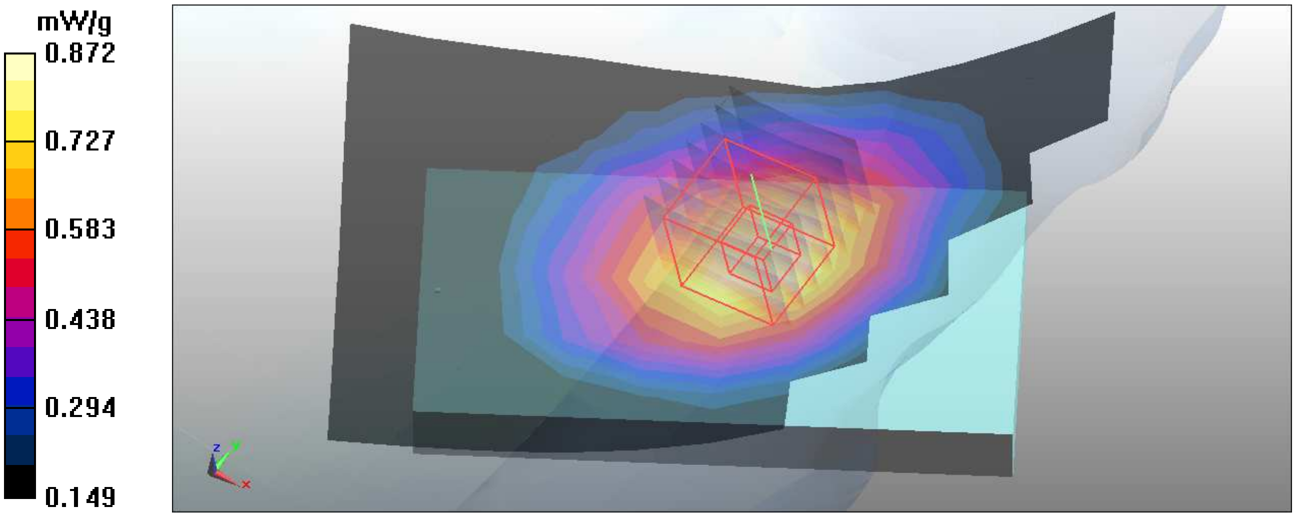
M01 Right Head Cheek CDMA850 CH384 new battery

DUT: PDA Phone ; Type: PB31200
Communication System: CDMA ; Frequency: 836.52 MHz ; Duty Cycle: 1:1
Medium: HSL850 Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.9 mho/m; ε_r = 42.3; ρ = 1000 kg/m^3
Phantom section: Right Section ; DUT test position : Cheek ; Modulation type: OQPSK

DASY5 Configuration:
- Probe: EX3DV3 - SN3504 ; ConvF(9.8, 9.8, 9.8) ; Calibrated: 2010/1/26
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2009/12/16
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1485
- SEMCAD X Version 14.0 Build 61

CDMA/Mid Channel/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.831 mW/g

CDMA/Mid Channel/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 10.3 V/m; Power Drift = -0.122 dB
Peak SAR (extrapolated) = 1.000 W/kg
SAR(1 g) = 0.783 mW/g; SAR(10 g) = 0.585 mW/g
Maximum value of SAR (measured) = 0.872 mW/g



Date/Time: 2010/6/6   06:08:57

Test Laboratory: Bureau Veritas ADT

M02 Left Head Cheek CDMA1900 CH1175 new battery

DUT: PDA Phone ; Type: PB31200

Communication System: CDMA ; Frequency: 1908.75 MHz ; Duty Cycle: 1:1

Medium: HSL1900 Medium parameters used (interpolated): f = 1908.75 MHz; σ = 1.44 mho/m; ε_r = 41; ρ = 1000 kg/m^3

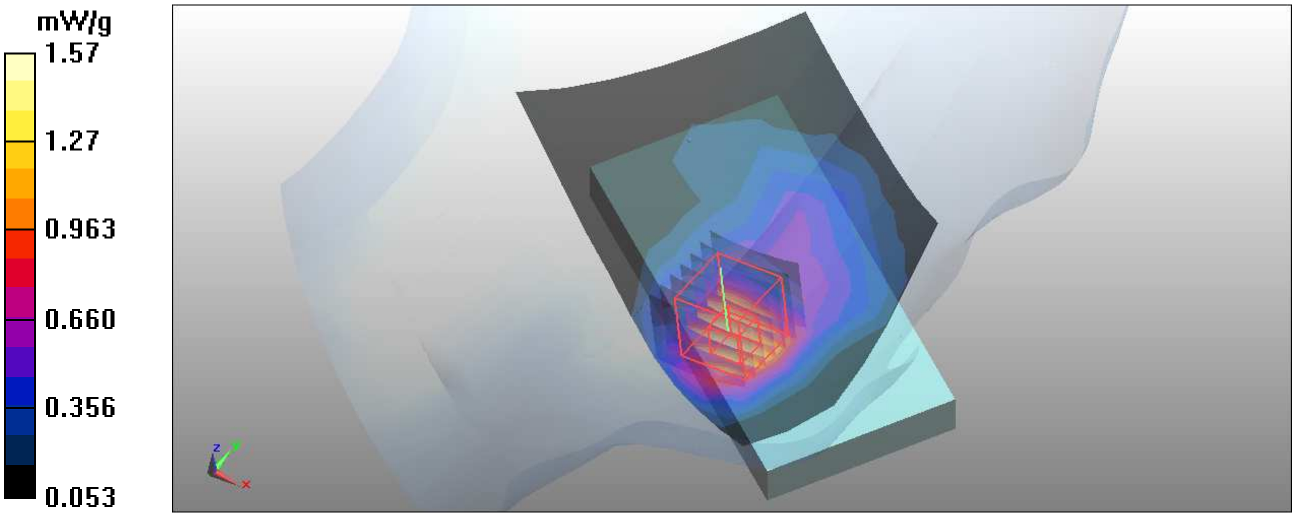
Phantom section: Left Section ; DUT test position : Cheek ; Modulation type: GMSK

DASY5 Configuration:

- Probe: EX3DV3 - SN3504 ; ConvF(8.2, 8.2, 8.2) ; Calibrated: 2010/1/26
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2009/12/16
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1485
- SEMCAD X Version 14.0 Build 61

CDMA/High Channel/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.32 mW/g

CDMA/High Channel/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 10.9 V/m; Power Drift = 0.105 dB
Peak SAR (extrapolated) = 2.11 W/kg
SAR(1 g) = 1.3 mW/g; SAR(10 g) = 0.769 mW/g
Maximum value of SAR (measured) = 1.57 mW/g



Date/Time: 2010/6/6 3:39:12

Test Laboratory: Bureau Veritas ADT

Body Bottom CDMA850 Ch384 new battery

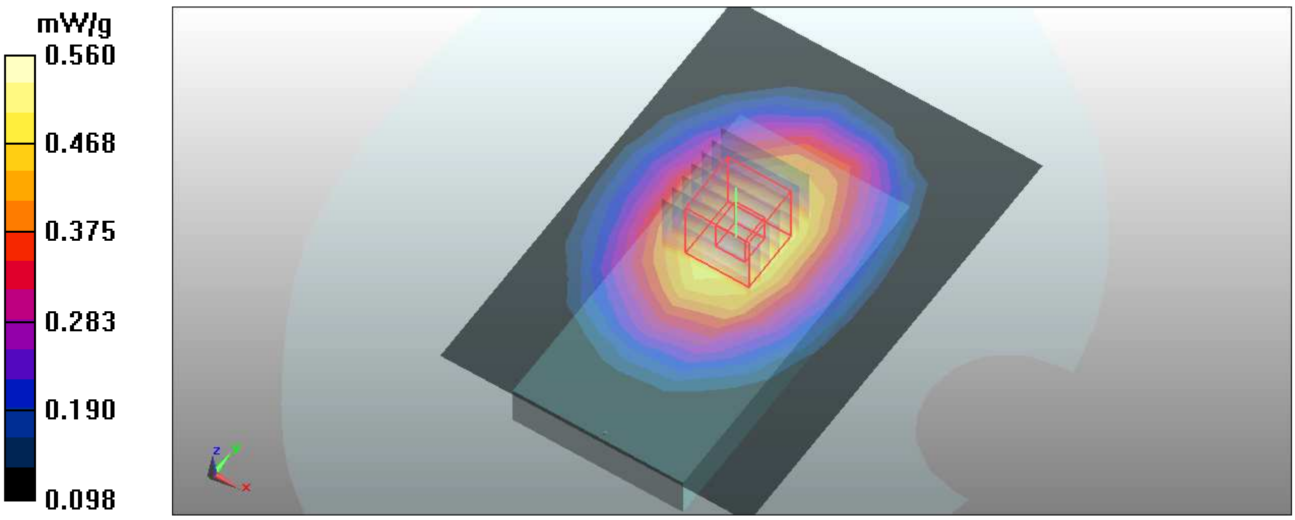
DUT: PDA Phone ; Type: PB31200

Communication System: CDMA ; Frequency: 836.52 MHz ; Duty Cycle: 1:1 ; Modulation type: OQPSK
Medium: MSL850 Medium parameters used: f = 836.52 MHz; σ = 0.98 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Separation distance : 15 mm (The bottom side of the EUT to the Phantom)

DASY5 Configuration:
- Probe: EX3DV3 - SN3504 ; ConvF(9.83, 9.83, 9.83) ; Calibrated: 2010/1/26
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510 ; Calibrated: 2009/12/16
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1485
- SEMCAD X Version 14.0 Build 61

CDMA 850 Back 15mm/Low 15mm New Battery/Area Scan (8x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.545 mW/g

CDMA 850 Back 15mm/Low 15mm New Battery/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 19.8 V/m; Power Drift = -0.089 dB
Peak SAR (extrapolated) = 0.673 W/kg
SAR(1 g) = 0.487 mW/g; SAR(10 g) = 0.354 mW/g
Maximum value of SAR (measured) = 0.560 mW/g



Date/Time: 2010/6/6 08:38:20

Test Laboratory: Bureau Veritas ADT

Body Bottom CDMA1900 Ch600 new battery

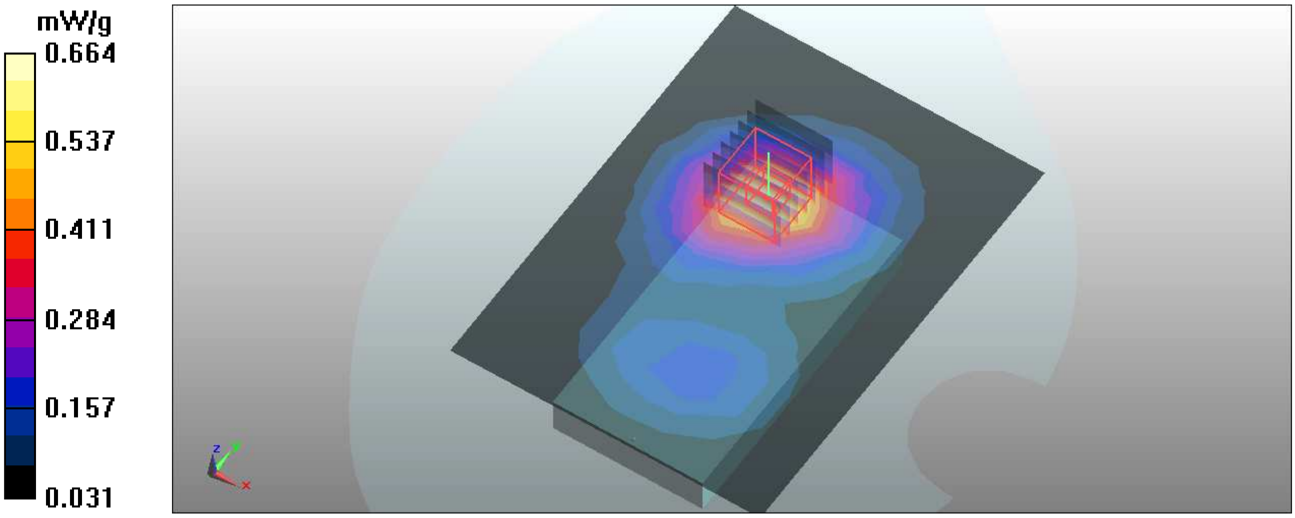
DUT: PDA Phone ; Type: PB31200

Communication System: CDMA ; Frequency: 1880 MHz ; Duty Cycle: 1:1 ; Modulation type: OQPSK
Medium: MSL1900 Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Separation distance : 15 mm (The bottom side of the EUT to the Phantom)

DASY5 Configuration:
- Probe: EX3DV3 - SN3504 ; ConvF(8.52, 8.52, 8.52) ; Calibrated: 2010/1/26
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510 ; Calibrated: 2009/12/16
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1485
- SEMCAD X Version 14.0 Build 61

CDMA 1900 Back 15mm/Mid 15mm New Battery 2/Area Scan (9x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.614 mW/g

CDMA 1900 Back 15mm/Mid 15mm New Battery 2/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 12.4 V/m; Power Drift = 0.451 dB
Peak SAR (extrapolated) = 0.854 W/kg
SAR(1 g) = 0.599 mW/g; SAR(10 g) = 0.357 mW/g
Maximum value of SAR (measured) = 0.664 mW/g



Date/Time: 2010/6/6 00:25:35

Test Laboratory: Bureau Veritas ADT

System validation Check HSL835

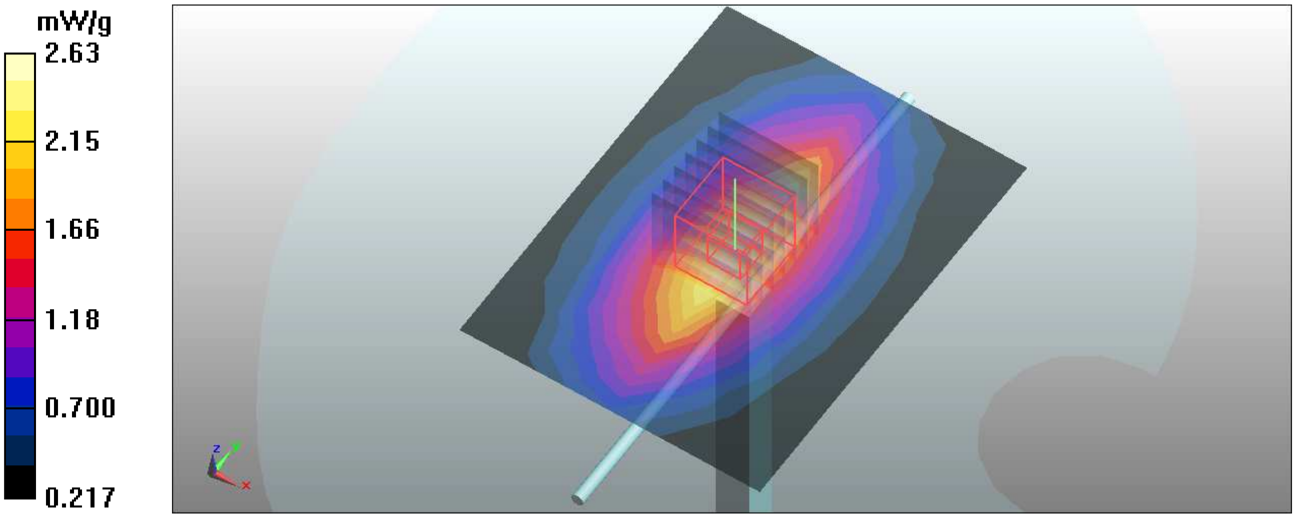
DUT: Dipole 835 MHz ; Type: D835V2 ; Serial: 4d021 ; Test Frequency: 835 MHz

Communication System: CW ; Frequency: 835 MHz; Duty Cycle: 1:1; Modulation type: CW
Medium: HSL835;Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 42.3; ρ = 1000 kg/m^3 ;
Liquid level : 155 mm
Phantom section: Flat Section ; Separation distance : 15 mm (The feetpoint of the dipole to the Phantom)Air temp. : 22.4 degrees ; Liquid temp. : 21.2 degrees

DASY5 Configuration:
- Probe: EX3DV3 - SN3504 ; ConvF(9.8, 9.8, 9.8) ; Calibrated: 2010/1/26
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2009/12/16
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1485
- ; SEMCAD X Version 14.0 Build 61

d=15mm, Pin=250 mW, dist=3.0mm (EX-Probe)/Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 3.2 mW/g

d=15mm, Pin=250 mW, dist=3.0mm (EX-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.8 V/m; Power Drift = 0.051 dB
Peak SAR (extrapolated) = 4.05 W/kg
SAR(1 g) = 2.45 mW/g; SAR(10 g) = 1.59 mW/g
Maximum value of SAR (measured) = 2.63 mW/g



Date/Time: 2010/6/6 03:11:29

Test Laboratory: Bureau Veritas ADT

System validation Check MSL835

DUT: Dipole 835 MHz ; Type: D835V2 ; Serial: 4d021 ; Test Frequency: 835 MHz

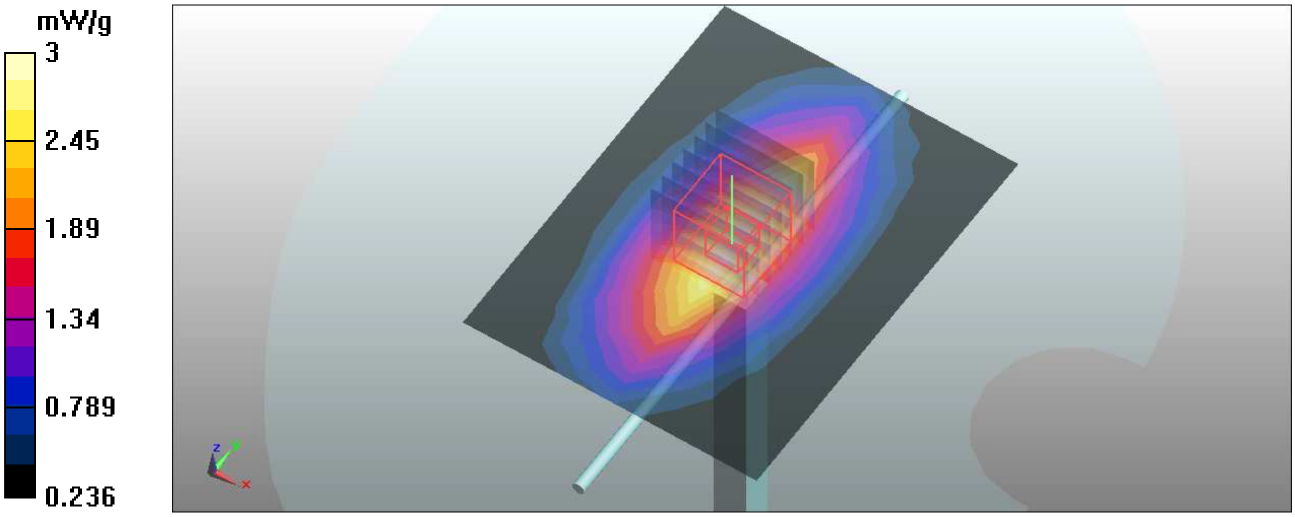
Communication System: CW ; Frequency: 835 MHz; Duty Cycle: 1:1; Modulation type: CW
Medium: MSL835;Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3 ;
Liquid level : 150 mm
Phantom section: Flat Section ; Separation distance : 15 mm (The feetpoint of the dipole to the Phantom)Air temp. : 23.5 degrees ; Liquid temp. : 22.8 degrees

DASY5 Configuration:

- Probe: EX3DV3 - SN3504 ; ConvF(9.83, 9.83, 9.83) ; Calibrated: 2010/1/26
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2009/12/16
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1485
- ; SEMCAD X Version 14.0 Build 61

d=15mm, Pin=250 mW, dist=3.0mm (EX-Probe)/Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 3 mW/g

d=15mm, Pin=250 mW, dist=3.0mm (EX-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.4 V/m; Power Drift = -0.092 dB
Peak SAR (extrapolated) = 3.93 W/kg
SAR(1 g) = 2.56 mW/g; SAR(10 g) = 1.69 mW/g



Date/Time: 2010/6/6 05:21:48

Test Laboratory: Bureau Veritas ADT

System validation Check HSL1900

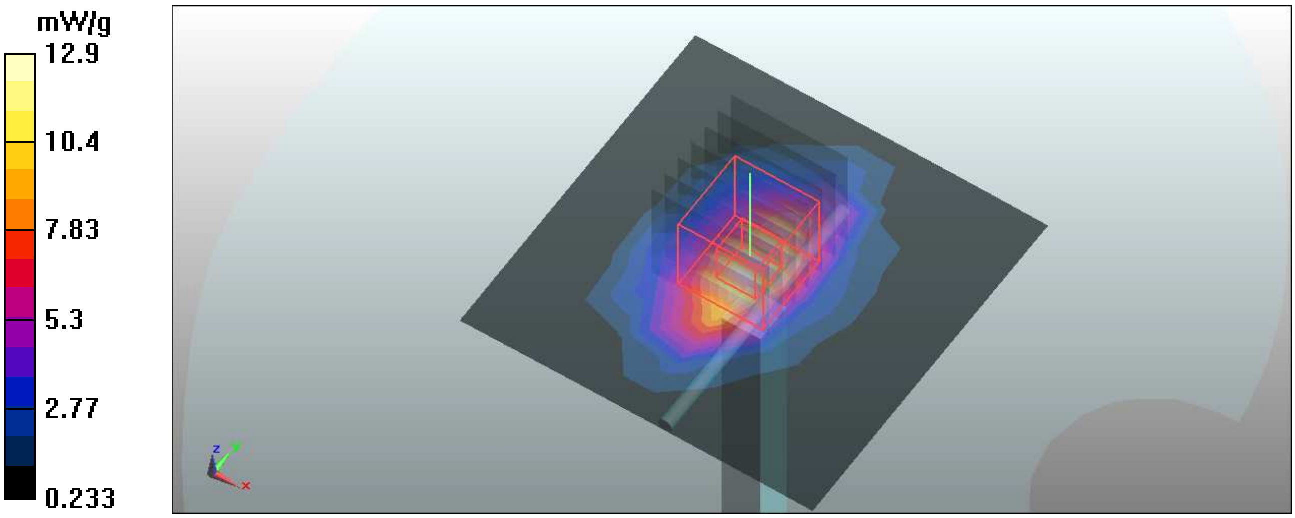
DUT: Dipole 1900 MHz ; Type: D1900V2 ; Serial: 5d036 ; Test Frequency: 1900 MHz

Communication System: CW ; Frequency: 1900 MHz; Duty Cycle: 1:1; Modulation type: CW
Medium: HSL1900;Medium parameters used: f = 1900 MHz; σ = 1.42 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3 ;
Liquid level : 152 mm
Phantom section: Flat Section ; Separation distance : 10 mm (The feetpoint of the dipole to the Phantom)Air temp. : 23.3 degrees ; Liquid temp. : 22.8 degrees

DASY5 Configuration:
- Probe: EX3DV3 - SN3504 ; ConvF(8.2, 8.2, 8.2) ; Calibrated: 2010/1/26
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2009/12/16
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1485
- ; SEMCAD X Version 14.0 Build 61

d=10mm, Pin=250 mW, dist=3.0mm (EX-Probe)/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 12.9 mW/g

d=10mm, Pin=250 mW, dist=3.0mm (EX-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.3 V/m; Power Drift = -0.051 dB
Peak SAR (extrapolated) = 18.9 W/kg
SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.37 mW/g



Date/Time: 2010/6/6 07:49:17

Test Laboratory: Bureau Veritas ADT

System Validation Check MSL1900

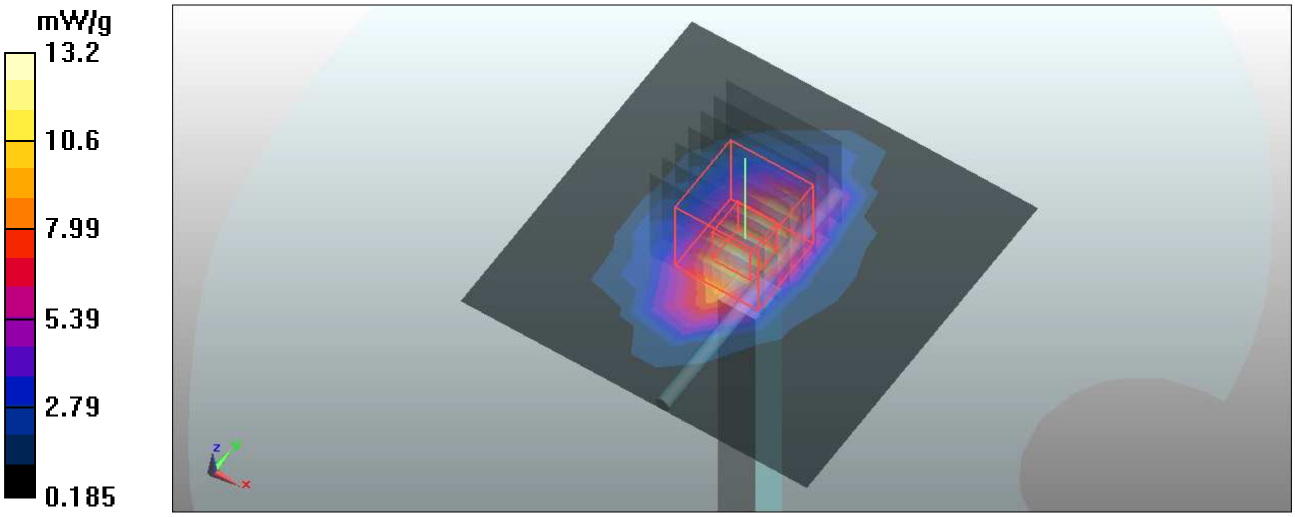
DUT: Dipole 1900 MHz ; Type: D1900V2 ; Serial: 5d036 ; Test Frequency: 1900 MHz

Communication System: CW ; Frequency: 1900 MHz; Duty Cycle: 1:1; Modulation type: CW
Medium: MSL1900;Medium parameters used: f = 1900 MHz; σ = 1.54 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3 ; Liquid level : 155 mm
Phantom section: Flat Section ; Separation distance : 10 mm (The feetpoint of the dipole to the Phantom)Air temp. : 23.4 degrees ; Liquid temp. : 22.8 degrees

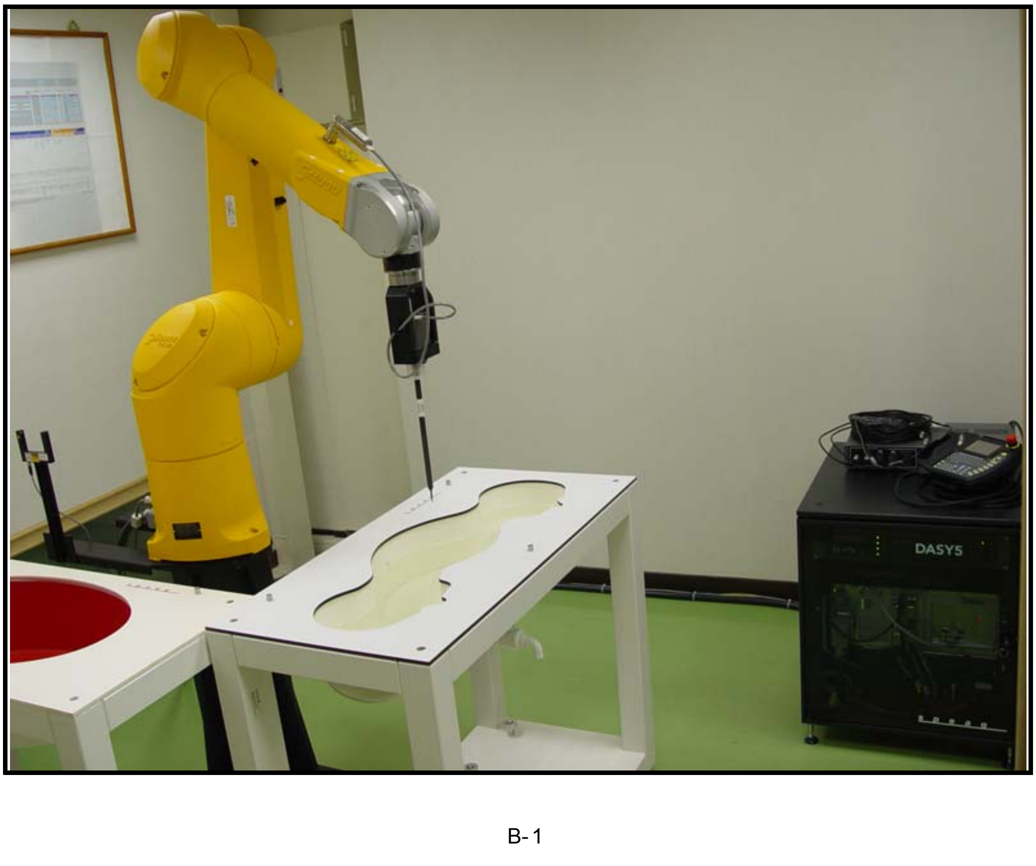
DASY5 Configuration:
- Probe: EX3DV3 - SN3504 ; ConvF(8.52, 8.52, 8.52) ; Calibrated: 2010/1/26
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2009/12/16
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1485
- ; SEMCAD X Version 14.0 Build 61

d=10mm, Pin=250mW, dist=3.0mm (EX-Probe)/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 11.6 mW/g

d=10mm, Pin=250mW, dist=3.0mm (EX-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.6 V/m; Power Drift = -0.029 dB
Peak SAR (extrapolated) = 18.7 W/kg
SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.55 mW/g
Maximum value of SAR (measured) = 13.2 mW/g



APPENDIX B: BV ADT SAR MEASUREMENT SYSTEM



APPENDIX C: PHOTOGRAPHS OF SYSTEM VALIDATION