SAR TEST REPORT (15.407)

REPORT NO.: SA981005A05-1

MODEL NO.: T7MD1(refer to item 2.2 for more details)

RECEIVED: Oct. 05, 2009

TESTED: Feb. 09 ~ Feb. 12, 2010

ISSUED: Mar. 31, 2010

APPLICANT: TWINHEAD INTERNATIONAL CORP.

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ISSUED BY: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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Testing Laboratory
2021

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1. CERTIFICATION

PRODUCT: Tablet PC

MODEL: T7MD1 (refer to item 2.2 for more details)

BRAND NAME: DURABOOK (refer to item 2.2 for more details)

APPLICANT: TWINHEAD INTERNATIONAL CORP.

TESTED: Feb. 09 ~ Feb. 12, 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: T7MD1, T7MK1, T7ML1) 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 :** Mar. 31, 2010

TECHNICAL ACCEPTANCE : Mason Chang / Engineer , **DATE :** Mar. 31, 2010
Responsible for RF

APPROVED BY : Gary Chang / Assistant Manager , **DATE :** Mar. 31, 2010

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Tablet PC
MODEL NO.	T7Mxxxxxx – multiple listing see below
FCC ID	FKGT7M
POWER SUPPLY	19Vdc from AC adapter or 7.4Vdc from Battery
MODULATION TYPE	64QAM, 16QAM, QPSK, BPSK
MODULATION TECHNOLOGY	OFDM
TRANSFER RATE	54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 300.0Mbps
OPERATING FREQUENCY	5180 ~ 5320MHz & 5500 ~ 5700MHz
NUMBER OF CHANNEL	5180 ~ 5320MHz: 8 for 802.11a, 802.11n (20MHz) 4 for 802.11n (40MHz) 5500 ~ 5700MHz: 11 for 802.11a, 802.11n (20MHz) 5 for 802.11n (40MHz)
CHANNEL FREQUENCIES UNDER TEST AND ITS CONDUCTED OUTPUT POWER	Refer to item 5.2
MAXIMUM SAR (1g)	1.470W/kg
ANTENNA TYPE	**2.4GHz:** PIFA antenna with 1.01dBi gain **5.0GHz:** PIFA antenna with 2.87dBi gain
ANTENNA CONNECTOR	Antenna connector is U.FL not a standard connector.
I/O PORTS	Refer to user's manual
DATA CABLE	NA
ACCESSORY DEVICES	Refer to note below

NOTE:

1. The EUT is an EDA (Enterprise Digital Assistant). The functions of EUT listed as below:

	REFERENCE REPORT
WLAN 802.11b/g **WLAN 802.11a (5745~5825 MHz)**	SA981005A05
WLAN 802.11a (5180~5320MHz, 5500~5700MHz)	SA981005A05-1
BLUETOOTH	SA981005A05-2

2. The EUT has several models, which are identical to each other except for their brand name differences only, as the following:

BRAND	MODEL NO.	DESCRIPTION
DURABOOK	T7Mxxxxxx ("x" = 0~9, A~Z or blank)	For marketing different
TabletKiosk	a72xxxx ("x" = 0~9, A~Z or blank)	
MobileDemand™	xTablet® T7000XXXX ("x" = 0~9, A~Z or blank)	
PaceBlade	Pacebook RD7 series	
LOGIC INSTRUMENT	FIELDBOOK	

3. The Model: T7Mxxxxxx has three samples, which are identical to each other except for their interface differences only, as the below:

MODEL NO.	T7MD1	T7MK1	T7ML1
INTERFACE DESCRIPTION	USB x2 DB9 Card Reader (Express card & SD Card)	Audio x2 (Microphone & headphone) USB x2 RJ-45 Card Reader (Express card & SD Card)	Audio x2 (Microphone & headphone) USB x2 RJ-45 Card Reader (PCMCIA & SD Card)

4. The EUT consumes power from an AC adapter or battery, as follows:

BRAND	MODEL NO.	SPEC.
FSP	FSP065-RAB	AC I/P: 100-240V, 1.5A, 50-60Hz DC O/P: 19V, 3.42A Non-shielded AC 3-pin (1.8m) Non-shielded DC (1.8m) with one ferrite core
FSP	T7M	7.4Vdc 2580mAh

5. The frequency bands used in this EUT are listed as follows:

Frequency Band (MHz)	2412~2462	5180~5320	5500~5700	5745~5825
802.11b	√			
802.11g	√			
802.11a		√	√	√
802.11n (20MHz)	√	√	√	√
802.11n (40MHz)	√	√	√	√

6. The EUT incorporates a SIMO function. Physically, the EUT provides one completed transmitter and two receivers.

MODULATION MODE	TX FUNCTION
802.11b	1TX
802.11g	1TX
802.11a	1TX
802.11n (20MHz)	1TX
802.11n (40MHz)	1TX

7. 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 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.

2.3 GENERAL INOFRMATION OF THE SAR SYSTEM

DASY5 **(software 5.2 Build 157)** 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 to > 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.

OVAL FLAT PHANTOM ELI 4.0

CONSTRUCTION	Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with the latest draft of the standard IEC 62209 Part II and all known tissue simulating liquids. ELI4 has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is supported by software version DASY4.5 and higher and is compatible with all SPEAG dosimetric probes and dipoles.
SHELL THICKNESS	2.0 ± 0.2 mm (sagging: <1%)
FILLING VOLUME	approx. 30 liters
DIMENSIONS	Major ellipse axis: 600 mm Minor axis: 400 mm

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	5200MHz, 5500MHz
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.

2.4 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

The EUT has been tested as an independent unit.

4. DESCRIPTION OF TEST MODES AND CONFIGURATIONS

4.1. ENHANCED ENERGY COUPLING AT INCREASED SEPARATION DISTANCES

INITIAL POSITION:

The probe tip is positioned at the peak SAR location of test mode 9 & 36 at a distance of one half the probe tip diameter from the phantom surface. Under this condition to get a single sar value.

5mm INCREMENTS FROM INITIAL POSITION:

With the probe fixed at this location, the device is moved away from the phantom in 5mm increments from the initial touching or minimum separation position. A single point SAR is measured for each of these device positions until the SAR is less than 50% of that measured at the initial position.

CHAN.	FREQ. (MHz)	DEVICE TEST POSITION MODE	INITIAL POSITION MEASURED 1g SAR (W/kg)	5mm INCREMENTS FROM INITIAL POSITION MEASURED 1g SAR (W/kg)
118	5590	802.11n (40MHz)	3.610	1.700
118	5590	802.11n (40MHz)	0.294	0.132

RESULT: No Enhancement Energy Coupling observed.

5. TEST RESULTS

5.1 TEST PROCEDURES

Use the software to control the EUT channel and transmission power. Then record the conducted power before the testing. Place the EUT to the specific test location. After the testing, must writing down the conducted power of the EUT into the report. 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 standards, 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%.

5.2 CHANNEL FREQUENCIES UNDER TEST AND ITS CONDUCTED OUTPUT POWER

FOR MODEL: T7ML1					
CHANNEL	FREQ(MHz)	AV (dBm)	CHANNEL	FREQ(MHz)	AV (dBm)
802.11a			802.11n (20MHz)		
36	5180	13.8	36	5180	14.0
40	5200	14.8	40	5200	15.0
44	5220	14.9	44	5220	15.0
48	5240	15.1	48	5240	15.1
52	5260	15.0	52	5260	14.2
56	5280	15.0	56	5280	13.9
60	5300	14.9	60	5300	13.0
64	5320	15.1	64	5320	14.8
100	5500	12.4	100	5500	12.1
104	5520	12.2	104	5520	12.2
108	5540	12.1	108	5540	12.1
112	5560	11.9	112	5560	12.1
116	5580	11.5	116	5580	12.1
120	5600	11.3	120	5600	12.3
124	5620	10.8	124	5620	12.2
128	5640	10.4	128	5640	12.0
132	5660	10.0	132	5660	12.1
136	5680	9.5	136	5680	11.9
140	5700	9.1	140	5700	8.9
802.11n (40MHz)					
38	5190	10.6			
46	5230	15.3			
54	5270	14.9			
62	5310	9.7			
102	5510	8.4			
110	5550	12.5			
118	5590	12.7			
126	5630	12.4			
134	5670	11.9			

FOR MODEL: T7MK1					
CHANNEL	FREQ(MHz)	AV (dBm)	CHANNEL	FREQ(MHz)	AV (dBm)
802.11a			802.11n (20MHz)		
36	5180	13.7	36	5180	13.9
40	5200	14.8	40	5200	14.9
44	5220	14.8	44	5220	14.9
48	5240	15.1	48	5240	15.0
52	5260	14.9	52	5260	14.1
56	5280	14.9	56	5280	13.8
60	5300	14.9	60	5300	12.9
64	5320	15.0	64	5320	14.8
100	5500	12.3	100	5500	12.0
104	5520	12.1	104	5520	12.2
108	5540	12.0	108	5540	12.1
112	5560	11.8	112	5560	12.0
116	5580	11.4	116	5580	12.2
120	5600	11.2	120	5600	12.3
124	5620	10.8	124	5620	12.2
128	5640	10.4	128	5640	12.1
132	5660	10.0	132	5660	12.2
136	5680	9.5	136	5680	11.9
140	5700	9.0	140	5700	8.8
802.11n (40MHz)					
38	5190	10.5			
46	5230	15.1			
54	5270	14.8			
62	5310	9.6			
102	5510	8.3			
110	5550	12.4			
118	5590	12.5			
126	5630	12.3			
134	5670	11.8			

FOR MODEL: T7MD1					
CHANNEL	FREQ(MHz)	AV (dBm)	CHANNEL	FREQ(MHz)	AV (dBm)
802.11a			802.11n (20MHz)		
36	5180	13.9	36	5180	14.1
40	5200	14.9	40	5200	15.1
44	5220	14.9	44	5220	15.1
48	5240	15.1	48	5240	15.1
52	5260	15.1	52	5260	14.3
56	5280	15.1	56	5280	13.9
60	5300	15.0	60	5300	13.1
64	5320	15.2	64	5320	14.9
100	5500	12.4	100	5500	12.2
104	5520	12.2	104	5520	12.2
108	5540	12.0	108	5540	12.3
112	5560	11.9	112	5560	12.2
116	5580	11.4	116	5580	12.3
120	5600	11.3	120	5600	12.4
124	5620	11.0	124	5620	12.6
128	5640	10.5	128	5640	12.2
132	5660	10.0	132	5660	12.2
136	5680	9.6	136	5680	11.9
140	5700	9.2	140	5700	9.0
802.11n (40MHz)					
38	5190	10.7			
46	5230	15.4			
54	5270	15.0			
62	5310	9.8			
102	5510	8.5			
110	5550	12.5			
118	5590	12.6			
126	5630	12.5			
134	5670	12.1			

5.3 MEASURED SAR RESULTS

TEST CONDITION

TEST DATE	TISSUE TYPE / FREQ.	TEST MODE	TEMPERATURE (°C)		HUMIDITY (%RH)	TESTED BY
			AIMBENT	LIQUID		
Feb. 09, 2010	MSL 5800	1 ~ 9	23.2	21.6	61	Sam Onn
Feb. 10, 2010	MSL 5800	9 ~ 26	22.6	21.5	61	Sam Onn
Feb. 11, 2010	MSL 5800	27 ~ 42	23.1	21.7	62	Sam Onn
Feb. 12, 2010	MSL 5800	42 ~ 54	22.8	21.6	61	Sam Onn

TEST POSITION	TX MODE	CHAN.	FREQ. (MHz)	MEASURED 1g SAR (W/kg)		
				MODEL: T7MD1	MODEL: T7MK1	TEST MODE MODEL: T7ML1
Tip	802.11a	36	5180	0.761	NOTE 1	NOTE 1
Tip	802.11a	40	5200	0.878		
Tip	802.11a	48	5240	0.937	0.552	0.362
Tip	802.11a	52	5260	0.976	NOTE 1	NOTE 1
Tip	802.11a	60	5300	1.090		
Tip	802.11a	64	5320	1.110	0.451	0.459
Tip	802.11a	100	5500	1.060	0.387	0.434
Tip	802.11a	104	5520	1.120	NOTE 2	0.461
Tip	802.11a	116	5580	1.010		0.618
Tip	802.11a	120	5600	0.851		0.639
Tip	802.11a	124	5620	0.703		0.572
Tip	802.11a	136	5680	0.405		0.392
Tip	802.11a	140	5700	0.397		0.363
Tip	802.11n (20MHz)	36	5180	0.753	NOTE 1	NOTE 1
Tip	802.11n (20MHz)	40	5200	0.940		
Tip	802.11n (20MHz)	48	5240	0.983	0.586	0.387
Tip	802.11n (20MHz)	52	5260	0.876	NOTE 1	NOTE 1
Tip	802.11n (20MHz)	60	5300	0.792		
Tip	802.11n (20MHz)	64	5320	1.250	0.439	0.498
Tip	802.11n (20MHz)	100	5500	1.350	0.358	0.523
Tip	802.11n (20MHz)	104	5520	1.390	0.384	0.566
Tip	802.11n (20MHz)	116	5580	1.430	0.624	0.851
Tip	802.11n (20MHz)	120	5600	1.450	0.910	1.140
Tip	802.11n (20MHz)	124	5620	1.150	0.722	0.842
Tip	802.11n (20MHz)	136	5680	0.553	0.424	0.475
Tip	802.11n (20MHz)	140	5700	0.392	0.298	0.320
Tip	802.11n (40MHz)	38	5190	0.542	NOTE 1	NOTE 1
Tip	802.11n (40MHz)	46	5230	1.220	0.575	0.477
Tip	802.11n (40MHz)	54	5270	1.240	0.501	0.451
Tip	802.11n (40MHz)	62	5310	0.584	NOTE 1	NOTE 1
Tip	802.11n (40MHz)	102	5510	0.757	0.223	0.316
Tip	802.11n (40MHz)	118	5590	**1.470**	0.926	1.270
Tip	802.11n (40MHz)	134	5670	0.916	0.676	0.715

TEST POSITION	TX MODE	CHAN.	FREQ. (MHz)	MEASURED 1g SAR (W/kg)					
				TEST MODE	MODEL: T7MD1	TEST MODE	MODEL: T7MK1	TEST MODE	MODEL: T7ML1
Back	802.11a	48	5240		0.024		0.036		0.021
Back	802.11a	64	5320		0.026		0.038		0.026
Back	802.11a	100	5500		0.029		0.034		0.028
Back	802.11n (20MHz)	48	5240		0.025		0.038		0.023
Back	802.11n (20MHz)	64	5320		0.027		0.035		0.025
Back	802.11n (20MHz)	120	5600		NOTE 2		0.106		0.036
Back	802.11n (20MHz)	124	5620		0.034		NOTE 2		NOTE 2
Back	802.11n (40MHz)	46	5230		0.026		0.054		0.023
Back	802.11n (40MHz)	54	5270		0.028		0.040		0.024
Back	802.11n (40MHz)	118	5590		0.035		0.114		0.037

NOTE

1. Per KDB 447498, when 1-g SAR for the highest output channel is less than 0.8 W/kg, where the transmission band corresponding to all channels is ≤ 100 MHz, testing for the other channels is not required
2. Per KDB 447498, when 1-g SAR for the highest output channel is less than 0.4 W/kg, where the transmission band corresponding to all channels is ≤ 200 MHz, testing for the other channels is not required
3. In this testing, the limit for General Population Spatial Peak averaged over 1g, **1.6 W/kg**, is applied
4. Please see the Appendix A for the data.
5. The variation of the EUT conducted power measured before and after SAR testing should not over 5%.

5.4 SAR LIMITS

HUMAN EXPOSURE	SAR (W/kg)	
	(GENERAL POPULATION / UNCONTROLLED EXPOSURE ENVIRONMENT)	(OCCUPATIONAL / CONTROLLED EXPOSURE ENVIRONMENT)
Spatial Average (whole body)	0.08	0.4
Spatial Peak (averaged over 1 g)	**1.6**	8.0
Spatial Peak (hands / wrists / feet / ankles averaged over 10 g)	4.0	20.0

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.

5.5 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 is a short description of some typical ingredients used in the Simulating Liquids ：

• **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 INFORMATION FOR 5GHz SIMULATING LIQUID

The 5GHz liquids was purchased from SPEAG.

Body liquid model: HSL 5800, P/N: SL AAH 5800 AA

Head liquid model: M 5800, P/N: SL AAM 580 AD

5GHz liquids contain the following ingredients:

Water 64 - 78%

Mineral Oil 11 - 18%

Emulsifiers 9 - 15%

Additives and Salt 2 - 3%

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 WLAN 5GHz BAND SIMULATING LIQUID

LIQUID TYPE		MSL-5800		
SIMULATING LIQUID TEMP.		21.6		
TEST DATE		Feb. 09, 2010		
TESTED BY		Sam Onn		
FREQ. (MHz)	**LIQUID PARAMETER**	**STANDARD VALUE**	**MEASUREMENT VALUE**	**ERROR PERCENTAGE (%)**
5180	Permitivity (ε)	49.00	50.20	2.45
5190		49.00	50.20	2.45
5200		49.00	50.10	2.24
5230		49.00	50.10	2.24
5240		49.00	50.10	2.24
5260		48.90	50.00	2.25
5270		48.90	50.00	2.25
5300		48.90	50.00	2.25
5310		48.90	50.00	2.25
5320		48.90	49.90	2.04
5500		48.60	49.60	2.06
5510		48.60	49.50	1.85
5520		48.60	49.50	1.85
5580		48.50	49.40	1.86
5590		48.50	49.30	1.65
5600		48.50	49.30	1.65
5620		48.40	49.30	1.86
5670		48.40	49.20	1.65
5680		48.40	49.20	1.65
5700		48.30	49.10	1.66

FREQ. (MHz)	LIQUID PARAMETER	STANDARD VALUE	MEASUREMENT VALUE	ERROR PERCENTAGE (%)
5180	Conductivity (σ) S/m	5.28	5.17	-2.08
5190		5.29	5.18	-2.08
5200		5.30	5.19	-2.08
5230		5.33	5.24	-1.69
5240		5.35	5.25	-1.87
5260		5.37	5.28	-1.68
5270		5.38	5.29	-1.67
5300		5.42	5.33	-1.66
5310		5.43	5.35	-1.47
5320		5.44	5.36	-1.47
5500		5.65	5.62	-0.53
5510		5.66	5.63	-0.53
5520		5.67	5.65	-0.35
5580		5.74	5.74	0.00
5590		5.75	5.75	0.00
5600		5.77	5.76	-0.17
5620		5.79	5.79	0.00
5670		5.85	5.87	0.34
5680		5.86	5.89	0.51
5700		5.88	5.92	0.68
Dielectric Parameters Required at 22℃				

LIQUID TYPE		MSL-5800		
SIMULATING LIQUID TEMP.		21.5		
TEST DATE		Feb. 10, 2010		
TESTED BY		Sam Onn		
FREQ. (MHz)	LIQUID PARAMETER	STANDARD VALUE	MEASUREMENT VALUE	ERROR PERCENTAGE (%)
5180	Permitivity (ε)	49.00	50.80	3.67
5190		49.00	50.80	3.67
5200		49.00	50.70	3.47
5230		49.00	50.70	3.47
5240		49.00	50.70	3.47
5260		48.90	50.60	3.48
5270		48.90	50.60	3.48
5300		48.90	50.60	3.48
5310		48.90	50.60	3.48
5320		48.90	50.50	3.27
5500		48.60	50.20	3.29
5510		48.60	50.10	3.09
5520		48.60	50.10	3.09
5580		48.50	50.00	3.09
5590		48.50	49.90	2.89
5600		48.50	49.90	2.89
5620		48.40	49.90	3.10
5670		48.40	49.80	2.89
5680		48.40	49.80	2.89
5700		48.30	49.70	2.90

FREQ. (MHz)	LIQUID PARAMETER	STANDARD VALUE	MEASUREMENT VALUE	ERROR PERCENTAGE (%)
5180	Conductivity (σ) S/m	5.28	5.14	-2.65
5190		5.29	5.15	-2.65
5200		5.30	5.16	-2.64
5230		5.33	5.21	-2.25
5240		5.35	5.22	-2.43
5260		5.37	5.25	-2.23
5270		5.38	5.26	-2.23
5300		5.42	5.30	-2.21
5310		5.43	5.32	-2.03
5320		5.44	5.33	-2.02
5500		5.65	5.59	-1.06
5510		5.66	5.60	-1.06
5520		5.67	5.62	-0.88
5580		5.74	5.71	-0.52
5590		5.75	5.72	-0.52
5600		5.77	5.73	-0.69
5620		5.79	5.76	-0.52
5670		5.85	5.84	-0.17
5680		5.86	5.86	0.00
5700		5.88	5.89	0.17
Dielectric Parameters Required at 22℃				

LIQUID TYPE		MSL-5800		
SIMULATING LIQUID TEMP.		21.7		
TEST DATE		Feb. 11, 2010		
TESTED BY		Sam Onn		
FREQ. (MHz)	**LIQUID PARAMETER**	**STANDARD VALUE**	**MEASUREMENT VALUE**	**ERROR PERCENTAGE (%)**
5180	Permitivity (ε)	49.00	51.00	4.08
5190		49.00	51.00	4.08
5200		49.00	50.90	3.88
5230		49.00	50.90	3.88
5240		49.00	50.90	3.88
5260		48.90	50.80	3.89
5270		48.90	50.80	3.89
5300		48.90	50.80	3.89
5310		48.90	50.80	3.89
5320		48.90	50.70	3.68
5500		48.60	50.40	3.70
5510		48.60	50.30	350
5520		48.60	50.30	3.50
5580		48.50	50.20	3.51
5590		48.50	50.10	3.30
5600		48.50	50.10	3.30
5620		48.40	50.10	3.51
5670		48.40	50.00	3.31
5680		48.40	50.00	3.31
5700		48.30	49.90	3.31

FREQ. (MHz)	LIQUID PARAMETER	STANDARD VALUE	MEASUREMENT VALUE	ERROR PERCENTAGE (%)
5180	Conductivity (σ) S/m	5.28	5.19	-1.70
5190		5.29	5.20	-1.70
5200		5.30	5.21	-1.70
5230		5.33	5.26	-1.31
5240		5.35	5.27	-1.50
5260		5.37	5.30	-1.30
5270		5.38	5.31	-1.30
5300		5.42	5.35	-1.29
5310		5.43	5.37	-1.10
5320		5.44	5.38	-1.10
5500		5.65	5.64	-0.18
5510		5.66	5.65	-0.18
5520		5.67	5.67	0.00
5580		5.74	5.76	0.35
5590		5.75	5.77	0.35
5600		5.77	5.78	0.17
5620		5.79	5.81	0.35
5670		5.85	5.89	0.68
5680		5.86	5.91	0.85
5700		5.88	5.94	1.02
Dielectric Parameters Required at 22℃				

LIQUID TYPE		MSL-5800		
SIMULATING LIQUID TEMP.		21.6		
TEST DATE		Feb. 12, 2010		
TESTED BY		Sam Onn		
FREQ. (MHz)	LIQUID PARAMETER	STANDARD VALUE	MEASUREMENT VALUE	ERROR PERCENTAGE (%)
5180	Permitivity (ε)	49.00	50.50	3.06
5190		49.00	50.50	3.06
5200		49.00	50.40	2.86
5230		49.00	50.40	2.86
5240		49.00	50.40	2.86
5260		48.90	50.30	2.86
5270		48.90	50.30	2.86
5300		48.90	50.30	2.86
5310		48.90	50.30	2.86
5320		48.90	50.20	2.66
5500		48.60	49.90	2.67
5510		48.60	49.80	2.47
5520		48.60	49.80	2.47
5580		48.50	49.70	2.47
5590		48.50	49.60	2.27
5600		48.50	49.60	2.27
5620		48.40	49.60	2.48
5670		48.40	49.50	2.27
5680		48.40	49.50	2.27
5700		48.30	49.40	2.28

FREQ. (MHz)	LIQUID PARAMETER	STANDARD VALUE	MEASUREMENT VALUE	ERROR PERCENTAGE (%)
5180	Conductivity (σ) S/m	5.28	5.18	-1.89
5190		5.29	5.19	-1.89
5200		5.30	5.20	-1.89
5230		5.33	5.25	-1.50
5240		5.35	5.26	-1.68
5260		5.37	5.29	-1.49
5270		5.38	5.30	-1.49
5300		5.42	5.34	-1.48
5310		5.43	5.36	-1.29
5320		5.44	5.37	-1.29
5500		5.65	5.63	-0.35
5510		5.66	5.64	-0.35
5520		5.67	5.66	-0.18
5580		5.74	5.75	0.17
5590		5.75	5.76	0.17
5600		5.77	5.77	0.00
5620		5.79	5.80	0.17
5670		5.85	5.88	0.51
5680		5.86	5.90	0.68
5700		5.88	5.93	0.85
Dielectric Parameters Required at 22℃				

5.6 TEST EQUIPMENT FOR TISSUE PROPERTY

ITEM	NAME	BRAND	TYPE	SERIES NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
1	Network Analyzer	Agilent	E8358A	US41480538	Nov. 26, 2007	Nov. 25, 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.

6. 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.

6.1 TEST EQUIPMENT

ITEM	NAME	BRAND	TYPE	SERIES NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
1	SAM Phantom	S & P	QD000 P40 CA	TP-1150	NA	NA
2	Signal Generator	Angilent	E4438C	MY45092849	Nov. 19, 2009	Nov. 18, 2010
3	E-Field Probe	S & P	EX3DV3	3504	Jan. 26, 2010	Jan, 25, 2011
4	DAE	S & P	DAE	510	Dec. 16, 2009	Dec. 15, 2010
5	Robot Positioner	Staubli Unimation	NA	NA	NA	NA
6	Validation Dipole	S & P	D5GHzV2	1019	Feb. 20, 2009	Feb. 19, 2010

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

6.2 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%.

6.3 VALIDATION RESULTS

SYSTEM VALIDATION TEST OF SIMULATING LIQUID					
FREQUENCY (MHz)	**REQUIRED SAR (mW/g)**	**MEASURED SAR (mW/g)**	**DEVIATION (%)**	**SEPARATION DISTANCE**	**TESTED DATE**
MSL 5200	7.69 (1g)	7.46	-2.99	10mm	Feb. 09, 2010
MSL 5500	8.30 (1g)	7.84	-5.54	10mm	Feb. 09, 2010
MSL 5200	7.69 (1g)	7.49	-2.60	10mm	Feb. 10, 2010
MSL 5500	8.30 (1g)	7.75	-6.63	10mm	Feb. 10, 2010
MSL 5200	7.69 (1g)	7.45	-3.12	10mm	Feb. 11, 2010
MSL 5500	8.30 (1g)	7.83	-5.66	10mm	Feb. 11, 2010
MSL 5200	7.69 (1g)	7.43	3.38	10mm	Feb. 12, 2010
MSL 5500	8.30 (1g)	7.79	-6.14	10mm	Feb. 12, 2010
TESTED BY	Sam Onn				

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

6.4 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	6.55	Normal	1	1	1	6.55	6.55	∞
Axial Isotropy	4.70	Rectangular	$\sqrt{3}$	0.7	0.7	1.90	1.90	∞
Hemispherical Isotropy	9.60	Rectangular	$\sqrt{3}$	0.7	0.7	3.88	3.88	∞
Boundary effects	2.00	Rectangular	$\sqrt{3}$	1	1	1.15	1.15	∞
Linearity	4.70	Rectangular	$\sqrt{3}$	1	1	2.71	2.71	∞
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	0.80	Rectangular	$\sqrt{3}$	1	1	0.46	0.46	∞
Probe Positioning	9.90	Rectangular	$\sqrt{3}$	1	1	5.72	5.72	∞
Max. SAR Eval.	4.00	Rectangular	$\sqrt{3}$	1	1	2.31	2.31	∞
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)	3.33	Normal	1	0.64	0.43	2.13	1.43	∞
Liquid Permittivity (target)	5.00	Rectangular	$\sqrt{3}$	0.6	0.49	1.73	1.41	∞
Liquid Permittivity (measurement)	4.55	Normal	1	0.6	0.49	2.73	2.23	∞
Combined Standard Uncertainty						**12.28**	**11.96**	
Coverage Factor for 95%						**Kp=2**		
Expanded Uncertainty (K=2)						**24.56**	**23.91**	

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

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

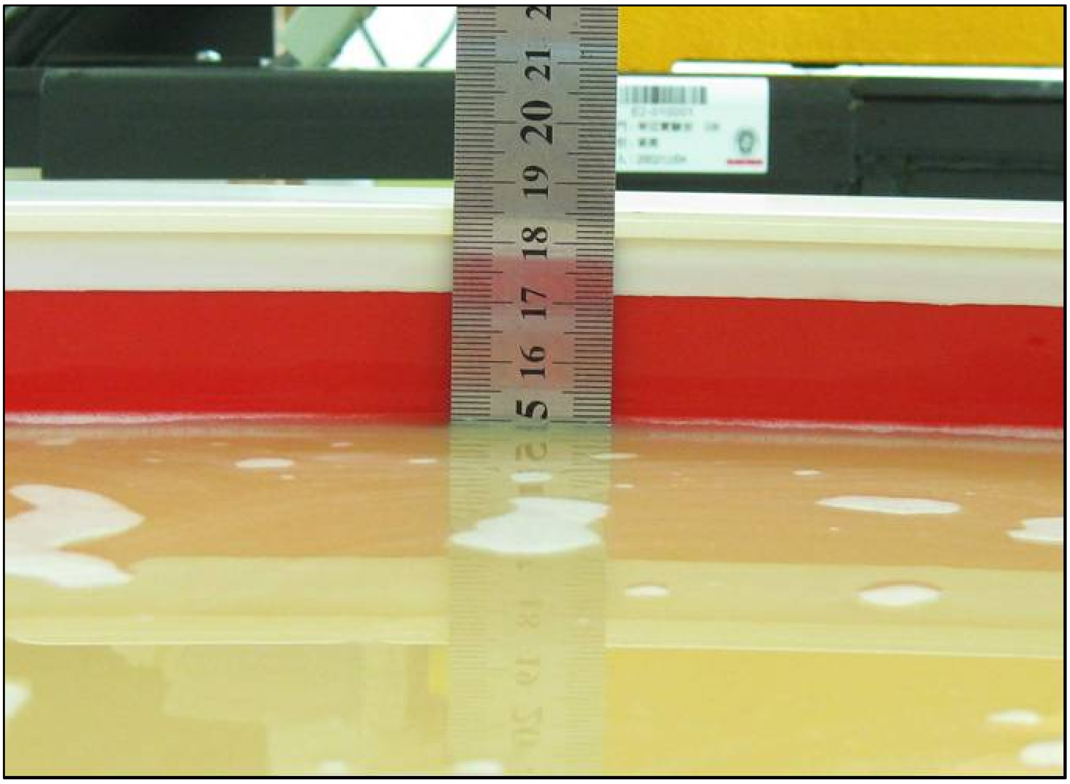
The address and road map of all our labs can be found in our web site also.

---END---

APPENDIX A: TEST DATA

Liquid Level Photo

MSL 5800MHz D=150mm



Date/Time: 2010/2/9 02:08:06

Test Laboratory: Bureau Veritas ADT

M01-11a Band1-Ch36 / D1

DUT: Tablet PC ; Type: T7M

Communication System: 802.11a ; Frequency: 5180 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK
Medium: MSL5800 Medium parameters used: f = 5180 MHz; σ = 5.17 mho/m; ε_r = 50.2; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Separation distance : 0 mm (The Tip side of the EUT to the Phantom)

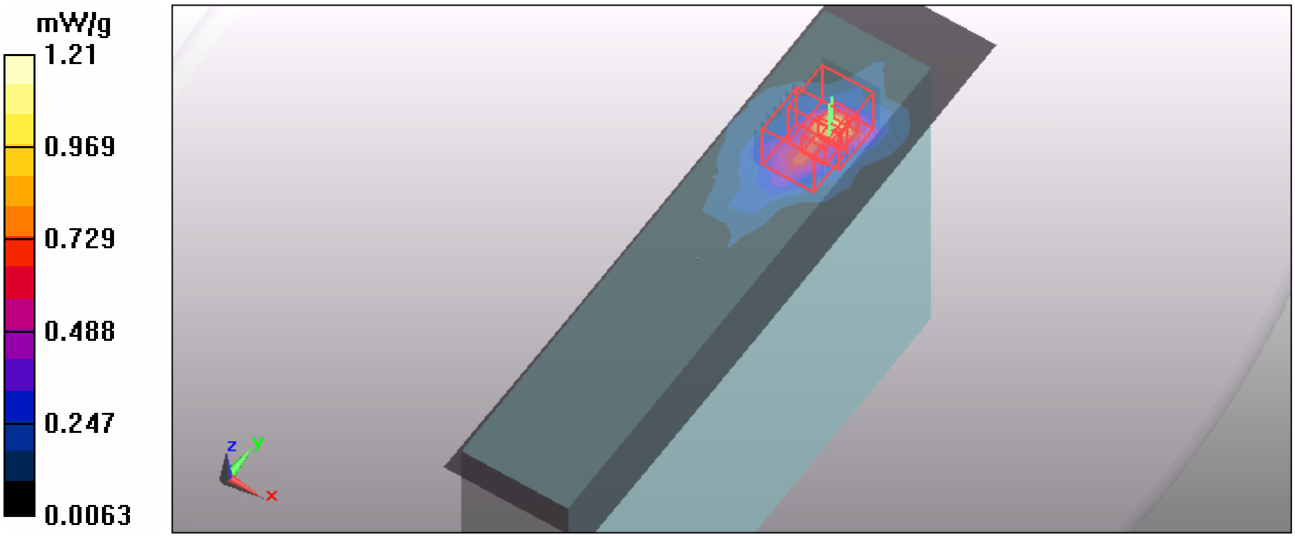
DASY5 Configuration:

- Probe: EX3DV3 - SN3504; ConvF(4.45, 4.45, 4.45); Calibrated: 2010/1/26
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2009/12/16
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1043
- Measurement SW: DASY5, V5.2 Build 157; SEMCAD X Version 14.0 Build 57

Channel 36/Area Scan (7x27x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.12 mW/g

Channel 36/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 16.7 V/m; Power Drift = -0.114 dB
Peak SAR (extrapolated) = 2.77 W/kg
SAR(1 g) = 0.761 mW/g; SAR(10 g) = 0.333 mW/g
Maximum value of SAR (measured) = 1.21 mW/g

Channel 36/Zoom Scan (7x7x9)/Cube 1: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 16.7 V/m; Power Drift = -0.114 dB
Peak SAR (extrapolated) = 2.46 W/kg
SAR(1 g) = 0.543 mW/g; SAR(10 g) = 0.299 mW/g
Maximum value of SAR (measured) = 1.05 mW/g



Date/Time: 2010/2/9 02:54:31

Test Laboratory: Bureau Veritas ADT

M01-11a Band1-Ch40 / D1

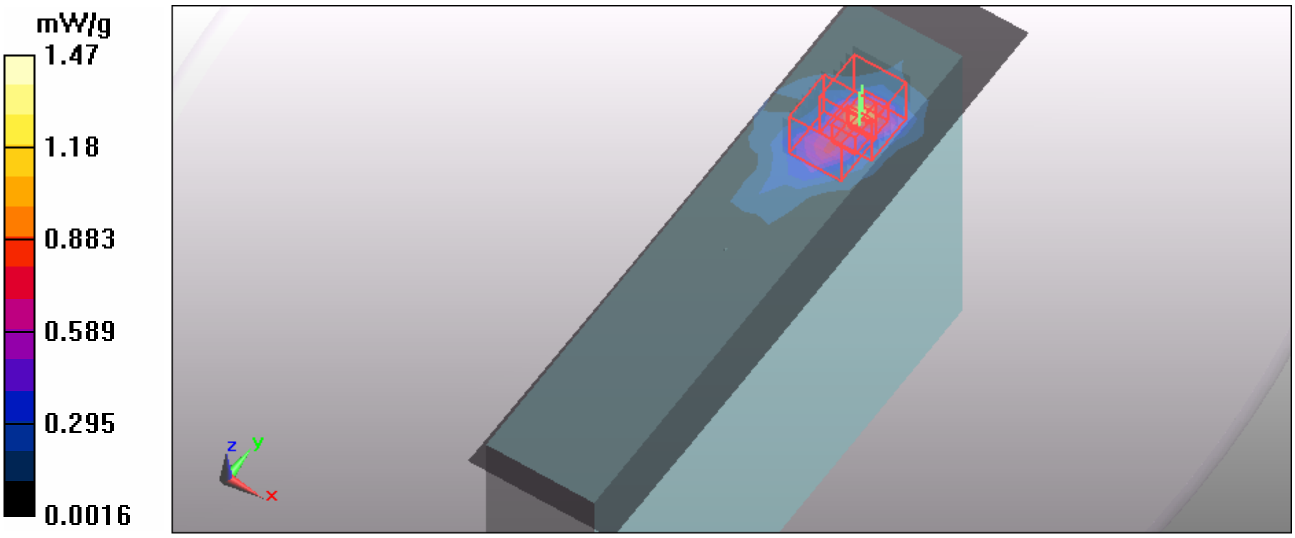
DUT: Tablet PC ; Type: T7M

Communication System: 802.11a ; Frequency: 5200 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK
Medium: MSL5800 Medium parameters used: f = 5200 MHz; $\sigma = 5.19$ mho/m; $\varepsilon_r = 50.1$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section ; Separation distance : 0 mm (The Tip side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV3 - SN3504; ConvF(4.45, 4.45, 4.45); Calibrated: 2010/1/26
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2009/12/16
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1043
- Measurement SW: DASY5, V5.2 Build 157; SEMCAD X Version 14.0 Build 57

Channel 40/Area Scan (7x27x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.2 mW/g
Channel 40/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 16.5 V/m; Power Drift = -0.165 dB
Peak SAR (extrapolated) = 3.24 W/kg
SAR(1 g) = 0.878 mW/g; SAR(10 g) = 0.367 mW/g
Maximum value of SAR (measured) = 1.47 mW/g
Channel 40/Zoom Scan (7x7x9)/Cube 1: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 16.5 V/m; Power Drift = -0.165 dB
Peak SAR (extrapolated) = 2.8 W/kg
SAR(1 g) = 0.627 mW/g; SAR(10 g) = 0.331 mW/g
Maximum value of SAR (measured) = 1.28 mW/g



Date/Time: 2010/2/9 03:45:01

Test Laboratory: Bureau Veritas ADT

M01-11a Band1-Ch48 / D1

DUT: Tablet PC ; Type: T7M

Communication System: 802.11a ; Frequency: 5240 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK
Medium: MSL5800 Medium parameters used: f = 5240 MHz; σ = 5.25 mho/m; ε_r = 50.1; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Separation distance : 0 mm (The Tip side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV3 - SN3504; ConvF(4.45, 4.45, 4.45); Calibrated: 2010/1/26
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2009/12/16
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1043
- Measurement SW: DASY5, V5.2 Build 157; SEMCAD X Version 14.0 Build 57

Channel 48/Area Scan (7x27x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.35 mW/g

Channel 48/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 16.9 V/m; Power Drift = -0.116 dB
Peak SAR (extrapolated) = 3.34 W/kg
SAR(1 g) = 0.937 mW/g; SAR(10 g) = 0.382 mW/g
Maximum value of SAR (measured) = 1.57 mW/g

Channel 48/Zoom Scan (7x7x9)/Cube 1: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 16.9 V/m; Power Drift = -0.116 dB
Peak SAR (extrapolated) = 2.82 W/kg
SAR(1 g) = 0.646 mW/g; SAR(10 g) = 0.347 mW/g
Maximum value of SAR (measured) = 1.29 mW/g