

APPENDIX 4 : Additional Test

1. Outline of additional test

The output power was tested with the test sample used for SAR testing.

The difference of the power between at SAR testing and EMC testing was within +5%.

To correlate it with the SAR data taken on October 19, 2006, SAR test was performed under the worst condition on November 8, 2006.

As a result, the correlation between the SAR data of October 19 and November 8, 2006 was confirmed.

Because both SAR values are almost equal.

2. Additional test result

DATE	SAR [W/kg]
October 19	0.83
November 8	0.86

3. Correlation of EMC power and SAR power

SAR power

Date: November 8

[IEEE802.11b:11Mbps]

Ch	Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Correlation with EMC power [%]
					[dBm]	[mW]	
Low	2412.0	5.78	0.94	10.14	16.86	48.53	+ 4.71
Mid	2437.0	5.24	0.94	10.14	16.32	42.85	+ 2.33
High	2462.0	4.99	0.94	10.14	16.07	40.46	+ 3.99

[IEEE802.11g:9Mbps]

Ch	Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Correlation with EMC power [%]
					[dBm]	[mW]	
Low	2412.0	6.32	0.94	10.14	17.40	54.95	+ 2.80
Mid	2437.0	6.00	0.94	10.14	17.08	51.05	+ 4.71
High	2462.0	6.11	0.94	10.14	17.19	52.36	+ 4.23

EMC power

Date: October 13

[IEEE802.11b:11Mbps]

Ch	Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm]	[mW]
Low	2412.0	5.58	0.94	10.14	16.66	46.34
Mid	2437.0	5.14	0.94	10.14	16.22	41.88
High	2462.0	4.82	0.94	10.14	15.90	38.90

[IEEE802.11g:9Mbps]

Ch	Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm]	[mW]
Low	2412.0	6.20	0.94	10.14	17.28	53.46
Mid	2437.0	5.80	0.94	10.14	16.88	48.75
High	2462.0	5.93	0.94	10.14	17.01	50.23

Sample Calculation:

Result = Reading + Cable Loss (supplied by customer)+ Attenuator

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4. Power drift measurement

The power drift was not within $\pm 5\%$ on SAR re-testing with full-charged battery.

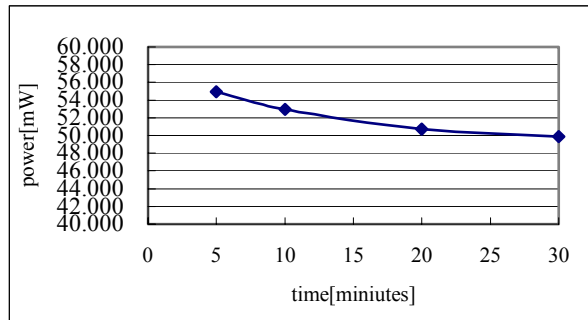
Therefore the conducted power was measured in elapsed time. The conducted power was measured under the condition of Max. power of IEEE802.11b/g.

As a result, power changed by -9.2% . The result is shown in the following.

So the uncertainty of power drift was expanded to $\pm 10\%$.

2412 MHz(IEEE 802.11g 9Mbps) Max power

Time [Minutes]	Result [dBm]	Converted [mW]	Diviation [%]
5	17.40	54.954	-
10	17.24	52.966	-3.6
20	17.05	50.699	-7.7
30	16.98	49.888	-9.2



Caplio 500SE-W / Body / Right Side / 2437MHz / 11b BPSK(1Mbps)

Crest factor: 1.1

Medium parameters used: $f = 2450$ MHz; $\sigma = 2$ mho/m; $\epsilon_r = 50.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASYS4 (High Precision Assessment)

DASY4 Configuration:

Probe: EX3DV3 - SN3507; ConvF(8.24, 8.24, 8.24); Calibrated: 2006/05/26

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE3 Sn509; Calibrated: 2006/06/15

Phantom: SAM 1196

Measurement SW: DASYS4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.124 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.68 V/m; Power Drift = 0.146 dB

Peak SAR (extrapolated) = 0.150 W/kg

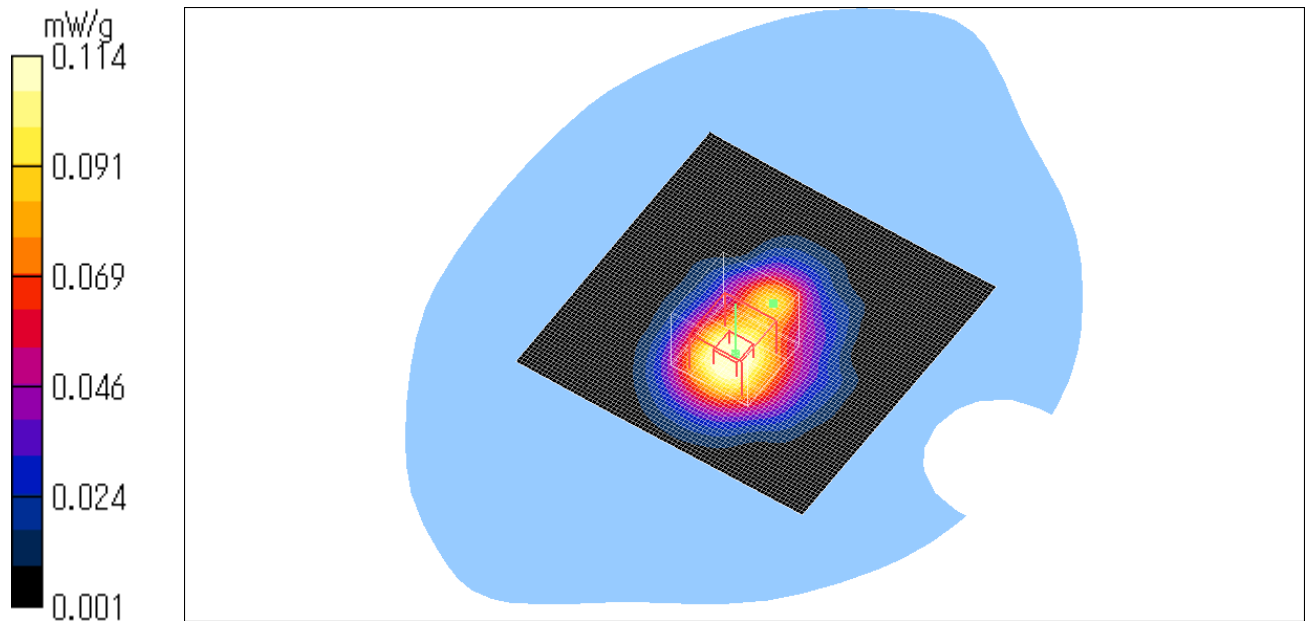
SAR(1 g) = 0.086 mW/g; SAR(10 g) = 0.049 mW/g

Maximum value of SAR (measured) = 0.114 mW/g

Test Date = 11/8/06

Ambient Temperature = 24.0 degree.C.

Liquid Temperature = Before 23.5 degree C. , After 23.5 degree C.



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7. Equipment used

Control No.	Instrument	Manufacturer	Model No	Serial number	Test Item	Calibration Date * Interval(month)
MPM-01	Power Meter	Agilent	E4417A	GB41290639	SAR	2005/11/09 * 12
MPSE-01	Power Sensor	Agilent	E9300B	US40010300	SAR	2005/11/28 * 12
MPSE-03	Power sensor	Agilent	E9327A		SAR	2005/11/23 * 12
MNA-01	Network Analyzer	Agilent/HP	E8358A	US41080381	SAR	2006/02/10 * 36
MSG-01	Signal Generator	Rohde & Schwarz	SMR40	100023	SAR	2006/01/05 * 12
MRFA-08	Pre Amplifier	TSJ	TCBP0206	US40440576	SAR	2006/03/11 * 12
MBTH-14	Dual Directional Coupler	hp	87300C	3239A01236	SAR	Pre Check
MPB-03	Dosimetric E-Field Probe	Schmid&Partner Engineering AG	EX3DV3	3507	SAR	2006/05/26 * 12
MRBT-01	SAR measurement System	Schmid&Partner Engineering AG	DASY4	I021834	SAR	Pre Check
MDA-07	Dipole Antenna	Schmid&Partner Engineering AG	D2450V2	713	SAR	2006/09/27* 24
MAT-15	Attenuator(30dB)	Agilent	US40010300	08498-60012	SAR	2005/12/16 * 12
MPS-01	SAM Phantom	Schmid&Partner Engineering AG	SAM Twin Phantom V4.0	1196	SAR	N/A
MSA-02	Spectrum Analyzer	Advantest	R3265A	55060359	SAR	Pre Check
MOS-05	Thermo- Hygrometer	Custom	CTH-190	810201	SAR	2006/04/25 * 12
MOS-10	Digital thermometer	HANNA	Checktemp-2	MOS-10	SAR	2005/03/07 * 24
MSTW-16	SAR measurement System	Schmid&Partner Engineering AG	DASY4	I021834	SAR	Pre Check
MDAE-01	Data Acquisition Electronics	Schmid&Partner Engineering AG	DAE3 V1	509	SAR	2006/06/15*12
Head 2450MHz	-	-	-	-	SAR	Daily check Target value ± 5%
Body 2450MHz	-	-	-	-	SAR	Daily check Target value ± 5%
SAR room	-	-	-	-	SAR	Daily check Ambient Noise < 0.012W/kg

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8. Validation Measurement

Simulated Tissue Liquid Parameter confirmation

The dielectric parameters were checked prior to assessment using the HP85070D dielectric probe kit. The dielectric parameters measurement are reported in each correspondent section.

8-a. Head 2450 MHz

Type of liquid : **Head 2450 MHz**
Ambient temperature (deg.c.) : **24.0**
Relative Humidity (%) : **48**
Liquid depth (cm) : **15.0**

DIELECTRIC PARAMETERS MEASUREMENT RESULTS								
Date	Frequency	Liquid Temp [deg.c]		Parameters	Target Value	Measured	Deviation [%]	Limit [%]
		Before	After					
8-Nov	2450	24.0	24.0	Relative Permittivity ϵ_r	39.2	37.5	-4.3	+/-5
				Conductivity σ [mho/m]	1.80	1.85	2.8	+/-5

8-b. Muscle 2450 MHz

Type of liquid : **Muscle 2450 MHz**
Ambient temperature (deg.c.) : **24.0**
Relative Humidity (%) : **48**
Liquid depth (cm) : **15.0**

DIELECTRIC PARAMETERS MEASUREMENT RESULTS								
Date	Frequency	Liquid Temp [deg.c]		Parameters	Target Value	Measured	Deviation [%]	Limit [%]
		Before	After					
8-Nov	2450	24.0	24.0	Relative Permittivity ϵ_r	52.7	50.3	-4.6	+/-5
				Conductivity σ [mho/m]	1.95	2.00	2.6	+/-5

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8-c. System validation data

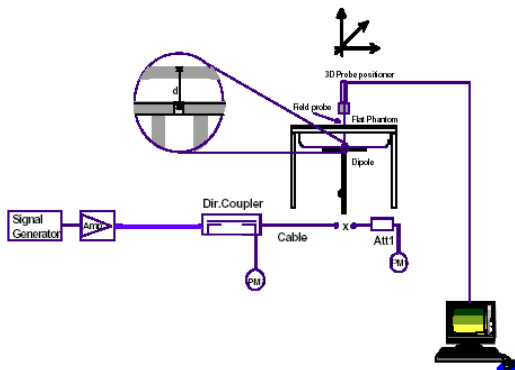
Prior to the assessment, the system validation kit was used to test whether the system was operating within its specifications of +/-10%. The validation results are in the table below.

System validation of 2450MHz

Type of liquid : **HEAD 2450MHz**
 Frequency : **2450MHz**
 Ambient temperature (deg.c.) : **24.0**
 Relative Humidity (%) : **48**
 Dipole : **D2450V2 SN:713**
 Power : **250mW**

SYSTEM PERFORMANCE CHECK										
Date	Liquid (HEAD 2450MHz)					System dipole validation target & measured				
	Liquid Temp [deg.c.]		Relative Permittivity ϵ_r		Conductivity σ [mho/m]		SAR 1g [W/kg]		Deviation [%]	Limit [%]
	Before	After	Target	Measured	Target	Measured	Target	Measured		
8-Nov	23.5	23.5	39.2	37.5	1.80	1.85	13.1	13.8	5.3	+/-10

Note: Please refer to Attachment for the result representation in plot format



2450MHz System performance check setup

Test system for the system performance check setup diagram

Validation Measurement data

System Validation / Dipole 2450 MHz / Forward Conducted Power : 250mW

Dipole 2450 MHz;

Type: D2450V2; Serial:713

Communication System: CW; Frequency: 2450 MHz; Crest factor: 1

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.85$ mho/m; $\epsilon_r = 37.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASYS4 (High Precision Assessment)

DASY4 Configuration:

Probe: EX3DV3 - SN3507; ConvF(8.26, 8.26, 8.26); Calibrated: 2006/05/26

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE3 Sn509; Calibrated: 2006/06/15

Phantom: SAM 1196

Measurement SW: DASYS4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 25.8 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 91.3 V/m; Power Drift = 0.047 dB

Peak SAR (extrapolated) = 28.5 W/kg

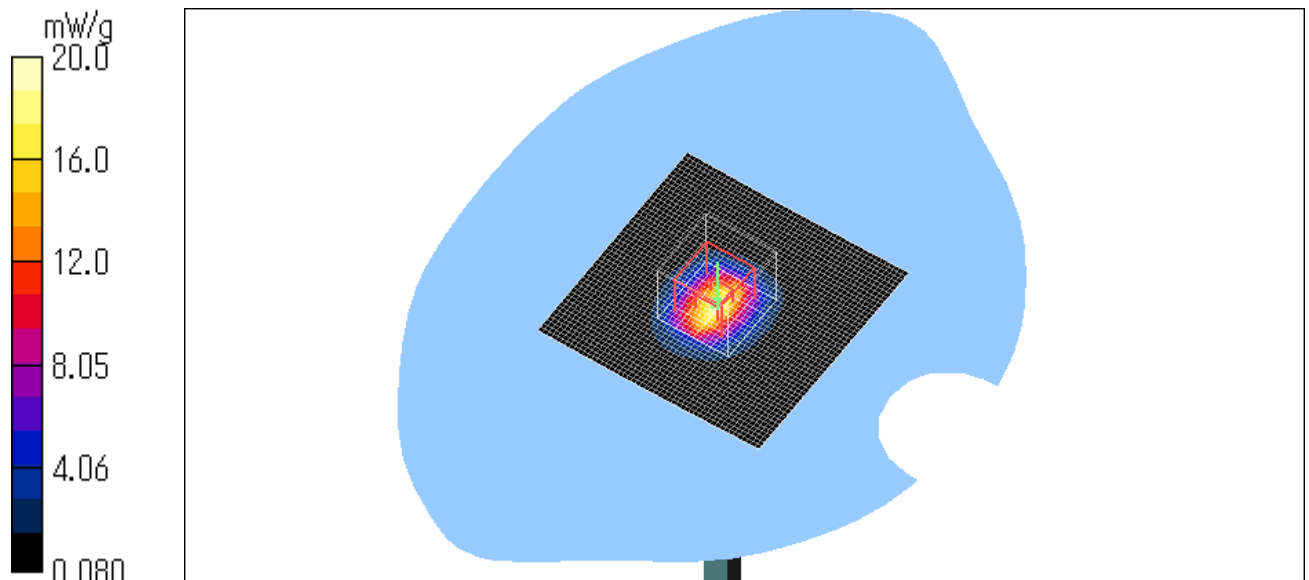
SAR(1 g) = 13.8 mW/g; SAR(10 g) = 6.02 mW/g

Maximum value of SAR (measured) = 21.0 mW/g

Test Date = 11/08/06

Ambient Temperature = 24.0 degree C.

Liquid Temperature = Before 23.5 degree C. , After 23.5 degree C.



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