



SAR TEST REPORT

Test Report No. : 28LE0042-HO-02-B

Applicant : Sony EMCS Corporation
Type of Equipment : Digital Still Camera
Model No. : DSC-G3
FCC ID : AK8DSCG3
Test regulation : FCC47CFR 2.1093
FCC OET BULLETIN 65, SUPPLEMENT C
Test Result : Complied
Max. SAR Value : 0.260W/kg (Body, 2437MHz)

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Date of test:

August 6 to 8, 2008

Tested by:

Miyo Kishimoto
EMC Services

Approved by :

Tetsuo Maeno
Site Manager of EMC Services



NVLAP LAB CODE: 200572-0

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SECTION 1: Customer information

Company Name	Sony EMCS Corporation
Brand Name	SONY
Address	1 Suzumegairi Sakazaki, Kohda-cho, Nukata-gun, Aichi-ken, 444-0194, Japan
Telephone Number	+81-564-62-6649
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Contact Person	Yuuki Koyama

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment	Digital Still Camera	
Model No.	DSC-G3	
Serial No.	0000187	
Rating	DC3.6V(Battery), DC4.2V(AC-adapter <Input 120V/60Hz>)	
Battery	Type	Li-ion Battery
	Model name	NP-BD1
	Rating	DC3.6V/2.4Wh
	Manufacturer	SONY
Receipt Date of Sample	August 6, 2008	
Country of Manufacture	Japan	
Condition of EUT	Engineering prototype (Not for sale: This sample is equivalent to mass-produced items.)	
Category Identified	Portable device	
Accessories	N/A	
Modification of EUT	No modification by the test lab.	

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2.2 Product Description

Sony EMCS Corporation, Model No: DSC-G3 is the Digital Still Camera.

Feature of EUT	Model No: DSC-G3 is the Digital Still Camera which incorporates Wireless LAN (IEEE802.11b/g). It can communicate with Access Point of Wireless LAN.
Operation Clock	CPU1:12MHz,27MHz,132MHz CPU2:32.768kHz,27MHz,66MHz,266MHz LCDCLK:27MHz CAM_Motor_CPU:27MHz CAM_HCLK:38MHz/19MHz USB(HSmode):240MHz USB(FSmode):6MHz MemoryStick(Pro_mode):38.4MHz MemoryStick(NegotiationOnly):19.2MHz WLAN:38.4MHz,2.4GHz,16MHz NANDCLK : 44MHz

Equipment Type	Transceiver
Frequency of Operation	2412-2462 MHz
Other Clock Frequency	38.4MHz
Bandwidth & Channel spacing	20MHz & 5MHz
Type of Modulation	DSSS,OFDM
Antenna model	Chip Antenna
Antenna Connector Type	HSC(murata)
Antenna Gain	-5 dBi
Method of frequency generation	Crystal
Operating voltage (Inner)	DC2.9V & DC1.8V (internal WLAN)
Operating temperature range	0-40degree

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SECTION 3 : Test standard information

3.1 Requirements for compliance testing defined by the FCC

The US Federal Communications Commission has released the report and order "Guidelines for Evaluating the Environmental Effects of RF Radiation", ET Docket No. 93-62 in August 1996. The order requires routine SAR evaluation prior to equipment authorization of portable transmitter devices, including portable telephones. For consumer products, the applicable limit is 1.6 mW/g for an uncontrolled environment and 8.0 mW/g for an occupational/controlled environment as recommended by the ANSI/IEEE standard C95.1-1992. According to the Supplement C of OET Bulletin 65 "Evaluating Compliance with FCC Guide-lines for Human Exposure to Radio frequency Electromagnetic Fields", released on Jun 29, 2001 by the FCC, the device should be evaluated at

maximum output power (radiated from the antenna) under "worst-case" conditions for normal or intended use, incorporating normal antenna operating positions, device peak performance frequencies and positions for maximum RF energy coupling.

1 Specific Absorption Rate (SAR) is a measure of the rate of energy absorption due to exposure to an RF transmitting source (wireless portable device).

2 IEEE/ANSI Std. C95.1-1992 limits are used to determine compliance with FCC ET Docket 93-62.

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3.2 Procedure and result

No.	Item	Test Procedure	Limit	Remarks	Exclusion	Result
1	Human Exposure	FCC OET BULLETIN 65, SUPPLEMENT C	FCC47CFR 2.1093	SAR Measurement	N/A	Complied Max.SAR = 0.260 W/kg
Note: UL Japan, Inc. 's SAR Work Procedures QPM46 and QPM47						

Result of Max. SAR value

Max. SAR Value (IEEE 802.11b) : 0.260W/kg (Body 2437MHz)

3.3 Exposure limit

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

Spatial Average (averaged over the whole body)	Spatial Peak (averaged over any 1g of tissue)	Spatial Peak (hands/wrists/feet/ankles averaged over 10g)
0.4	8.0	20.0

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

Spatial Average (averaged over the whole body)	Spatial Peak (averaged over any 1g of tissue)	Spatial Peak (hands/wrists/feet/ankles averaged over 10g)
0.08	1.6	4.0

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

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

**NOTE:GENERAL POPULATION/UNCONTROLLED EXPOSURE
SPATIAL PEAK(averaged over any 1g of tissue) LIMIT
1.6 W/kg**

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3.4 Test Location

*Shielded room for SAR testings

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3.5 Confirmation before SAR testing

Correlation of Output Power between EMC and SAR tests (WLAN IEEE802.11b/g)

It was checked that the antenna port power was correlated within 0~+5% (FCC requirements)

SAR power is equal to DATA of EMC test. (August 6, 2008) based on the following reason.

- EMC and SAR tests are performed with the same test sample (S/N: 0000187) under the same condition.
- EMC and SAR tests are performed at the same laboratory.
- The test mode setting is simple, and there is no possibility that the power (value) is changed by the wrong setting.
- The SAR test (August 6 to 8, 2008) was performed continuously after EMC test.
In the mean time, this sample was not used for other measurement.

The result is shown in Section 6.

3.6 Confirmation after SAR testing

It was checked that the power drift is within $\pm 5\%$ in the evaluation procedure of SAR testing.
The result is shown in APPENDIX 2.

3.7 Measurement procedure (Body Measurement)

1. IEEE 802.11b(Radiated power is always monitored by Spectrum Analyzer.)

The 11b (DSSS) mode test was performed on the CCK[11Mbps] modulation, because it was the highest peak power and data rate.

Step1. The searching for the worst position

Step2. Change to the Low and High channels

This test was performed at the worst position of Step 1.

2. IEEE 802.11g(Radiated power is always monitored by Spectrum Analyzer.)

Step3. The searching for the worst modulation.

The data rate in the higher average power*¹ each modulation was decided, then the worst modulation was searched in the SAR testing.

Step4. The searching for the worst position

This test was performed at the worst modulation of Step 3.

Step5. Change to the Low and High channels

This test was performed at the worst position of Step 4.

Change distance between EUT and SAM Twin Phantom

Step6. Change separation

The measurement was performed with the distance, 5mm,10mm and 15mm to check if the shortest distance may not have the worst value at the conditions of the highest SAR value.

3.8 Measurement procedure (Head SAR measurement)

Head SAR measurement is only for reference because the EUT has not the finder.

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3.9 Test setup of EUT

When users operate or carry the EUT, it could be considered to touch or get close to their bodies. In order to assume this situation, we performed the test at the following positions. Please refer to "APPENDIX 1" for more details.

(1) Top :

The test was performed in touch with Top edge of the EUT to the flat section of SAM Twin phantom.

(2) Front:

The test was performed in touch with Front surface of the EUT to the flat section of SAM Twin phantom.

(3) Rear :

The test was performed in touch with Rear surface of the EUT to the flat section of SAM Twin phantom.

(4) Left Side :

The test was performed in touch with Left Side edge of the EUT to the flat section of SAM Twin phantom.

(5) Right Side :

The test was performed in touch with Right Side edge of the EUT to the flat section of SAM Twin phantom.

(6) Bottom :

The test was performed in touch with Bottom surface of the EUT to the flat section of SAM Twin phantom.

(7) Front (Cover Open):

The test was performed in touch with Front surface of the EUT with opened cover to the flat section of SAM Twin phantom.

(8) Top (5mm) :

The measurement opened 5mm distance between the EUT and flat section of SAM Twin Phantom.

(9) Top (10mm) :

The measurement opened 10mm distance between the EUT and flat section of SAM Twin Phantom.

(10) Top (15mm) :

The measurement opened 15mm distance between the EUT and flat section of SAM Twin Phantom.

Note: The positions other than in "(7) Front (Cover open)" were tested in the EUT with closed cover.

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SECTION 4 : Operation of E.U.T. during testing

4.1 Operating modes for SAR testing

4.1.1 Setting of EUT

This EUT has IEEE.802.11b/g continuous transmitting modes.

The frequency band and the modulation used in the testing of IEEE.802.11b/g were shown as a following.

1. IEEE 802.11b mode

Tx frequency band : 2412-2462MHz
Channel : 1ch(2412MHz),6ch(2437MHz),11ch(2462MHz)
Modulation : DSSS (CCK)
Crest factor : 1
Test data sequence : Random Pattern (PN)

2. IEEE 802.11g mode

Tx frequency band : 2412-2462MHz
Channel : 1ch(2412MHz),6ch(2437MHz),11ch(2462MHz)
Modulation : OFDM (BPSK, QPSK, 16QAM, 64QAM)
Crest factor : 1
Test data sequence : Random Pattern (PN)

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SECTION 5 : Test surrounding

5.1 Measurement uncertainty

The uncertainty budget has been determined for the DASY4 measurement system according to the SPEAG documents[6][7] and is given in the following Table.

Error Description	Uncertainty value \pm %	Probability distribution	divisor	(ci) 1g	Standard Uncertainty (1g)	vi or veff
Measurement System						
Probe calibration	± 6.8	Normal	1	1	± 6.8	∞
Axial isotropy of the probe	± 4.7	Rectangular	$\sqrt{3}$	$(1-cp)^{1/2}$	± 1.9	∞
Spherical isotropy of the probe	± 9.6	Rectangular	$\sqrt{3}$	$(cp)^{1/2}$	± 3.9	∞
Boundary effects	± 2.0	Rectangular	$\sqrt{3}$	1	± 1.2	∞
Probe linearity	± 4.7	Rectangular	$\sqrt{3}$	1	± 2.7	∞
Detection limit	± 1.0	Rectangular	$\sqrt{3}$	1	± 0.6	∞
Readout electronics	± 0.3	Normal	1	1	± 0.3	∞
Response time	± 0.8	Rectangular	$\sqrt{3}$	1	± 0.5	∞
Integration time	± 2.6	Rectangular	$\sqrt{3}$	1	± 1.5	∞
RF ambient Noise	± 3.0	Rectangular	$\sqrt{3}$	1	± 1.7	∞
RF ambient Reflections	± 3.0	Rectangular	$\sqrt{3}$	1	± 1.7	∞
Probe Positioner	± 0.8	Rectangular	$\sqrt{3}$	1	± 0.5	∞
Probe positioning	± 9.9	Rectangular	$\sqrt{3}$	1	± 5.7	∞
Max.SAR Eval.	± 4.0	Rectangular	$\sqrt{3}$	1	± 2.3	∞
Test Sample Related						
Device positioning	± 2.9	Normal	1	1	± 2.9	35
Device holder uncertainty	± 3.6	Normal	1	1	± 3.6	9
Power drift	± 5.0	Rectangular	$\sqrt{3}$	1	± 5.8	∞
Phantom and Setup						
Phantom uncertainty	± 4.0	Rectangular	$\sqrt{3}$	1	± 2.3	∞
Liquid conductivity (target)	± 5.0	Rectangular	$\sqrt{3}$	0.64	± 1.8	∞
Liquid conductivity (meas.)	± 5.0	Rectangular	1	0.64	± 3.2	∞
Liquid permittivity (target)	± 5.0	Rectangular	$\sqrt{3}$	0.6	± 1.7	∞
Liquid permittivity (meas.)	± 5.0	Rectangular	1	0.6	± 3.0	∞
Combined Standard Uncertainty					± 14.360	
Expanded Uncertainty (k=2)					± 28.7	

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SECTION 6 : Confirmation before/after testing

6.1 Conducted power before

6.1.1 Correlation of EMC power and SAR power

This data is reference data of EMC test. (Report No. 28LE0042-HO-02-A)

Date of test: August 6, 2008

IEEE802.11b , 11Mbps

Ch	Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm]	[mW]
Low	2412.0	3.25	0.60	9.98	13.83	24.15
Mid	2437.0	4.01	0.60	9.98	14.59	28.77
High	2462.0	4.48	0.60	9.98	15.06	32.06

Sample Calculation:

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

IEEE802.11g , 54Mbps

Ch	Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm]	[mW]
Low	2412.0	9.64	0.60	9.98	20.22	105.20
Mid	2437.0	9.91	0.60	9.98	20.49	111.94
High	2462.0	10.08	0.60	9.98	20.66	116.41

Sample Calculation:

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

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6.1.2 Reference data of SAR test (Data rate determination)

Date of test: August 6, 2008

[IEEE802.11b]						
Rate	Freq.	P/M	Cable	Atten.	Result	
[Mbps]	[MHz]	Reading(AV)	Loss	[dB]	[dBm]	[mW]
		[dBm]	[dB]			
1.0	2437.0	1.32	0.60	9.98	11.90	15.49
2.0	2437.0	0.91	0.60	9.98	11.49	14.09
5.5	2437.0	1.36	0.60	9.98	11.94	15.63
11.0	2437.0	1.42	0.60	9.98	12.00	15.85

[IEEE802.11g]						
Rate	Freq.	P/M	Cable	Atten.	Result	
[Mbps]	[MHz]	Reading(AV)	Loss	[dB]	[dBm]	[mW]
		[dBm]	[dB]			
6.0	2437.0	0.48	0.60	9.98	11.06	12.76
9.0	2437.0	0.94	0.60	9.98	11.52	14.19
12.0	2437.0	0.96	0.60	9.98	11.54	14.26
18.0	2437.0	0.91	0.60	9.98	11.49	14.09
24.0	2437.0	0.88	0.60	9.98	11.46	14.00
36.0	2437.0	0.87	0.60	9.98	11.45	13.96
48.0	2437.0	0.83	0.60	9.98	11.41	13.84
54.0	2437.0	1.40	0.60	9.98	11.98	15.78

Sample Calculation:

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

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SECTION 7 : Measurement results

7.1 Body SAR 2450MHz

Liquid Depth (cm) : 15.0 Model : DSC-G3
Parameters : $\epsilon_r = 50.4, \sigma = 2.03$ (6-Aug) Serial No. : 0000187
: $\epsilon_r = 51.1, \sigma = 1.98$ (7-Aug) Modulation : DSSS,OFDM
Ambient temperature(deg.c.) : 23.5(6-Aug), 24.0(7-Aug) Crest factor : 1
Relative Humidity (%) : 52(6-Aug), 59(7-Aug) Measured By : Miyo Kishimoto
Date : August 6 to 7, 2008

BODY SAR MEASUREMENT RESULTS											
Frequency			Modulation	Phantom Section	EUT Set-up Conditions			Liquid Temp.[deg.c]		SAR(1g) [W/kg]	
Mode	Ch	[MHz]			Antenna	Position	Separation [mm]	Before	After	Maximum value of multi-peak	
Step 1. Search for the worst position											
11b	6	2437	CCK(11Mbps)	Flat	Fixed	Top	0	23.3	23.3	0.232	
	6	2437	CCK(11Mbps)	Flat	Fixed	Front	0	23.3	23.3	0.045	
	6	2437	CCK(11Mbps)	Flat	Fixed	Rear	0	23.3	23.5	0.072	
	6	2437	CCK(11Mbps)	Flat	Fixed	Left side	0	23.5	23.6	0.022	
	6	2437	CCK(11Mbps)	Flat	Fixed	Right Side	0	23.6	23.6	0.011	
	6	2437	CCK(11Mbps)	Flat	Fixed	Bottom	0	23.6	23.8	0.028	
	6	2437	CCK(11Mbps)	Flat	Fixed	Front (Opened)	0	23.8	23.8	0.029	
Step 2. Change to the channels											
	1	2412	CCK(11Mbps)	Flat	Fixed	Top	0	24.2	24.2	0.171	
	11	2462	CCK(11Mbps)	Flat	Fixed	Top	0	24.2	24.2	0.219	
Step 3. Search for the worst modulation											
11g	6	2437	BPSK(9Mbps)	Flat	Fixed	Top	0	24.2	24.0	0.232	
	6	2437	QPSK(12Mbps)	Flat	Fixed	Top	0	24.0	24.0	0.260	
	6	2437	16QAM(24Mbps)	Flat	Fixed	Top	0	24.0	24.0	0.226	
	6	2437	64QAM(54Mbps)	Flat	Fixed	Top	0	24.0	24.0	0.208	
	Step 4. Search for the worst position										
	6	2437	QPSK(12Mbps)	Flat	Fixed	Front	0	24.0	24.0	0.040	
	6	2437	QPSK(12Mbps)	Flat	Fixed	Rear	0	24.0	24.1	0.060	
6	2437	QPSK(12Mbps)	Flat	Fixed	Left side	0	24.1	24.2	0.025		
6	2437	QPSK(12Mbps)	Flat	Fixed	Right Side	0	-	-	No tested *		
6	2437	QPSK(12Mbps)	Flat	Fixed	Bottom	0	-	-	No tested *		
6	2437	QPSK(12Mbps)	Flat	Fixed	Front (Opened)	0	-	-	No tested *		
Step 5. Change to the channels											
	1	2412	QPSK(12Mbps)	Flat	Fixed	Top	0	24.2	24.2	0.238	
	11	2462	QPSK(12Mbps)	Flat	Fixed	Top	0	24.2	24.2	0.186	
Step 6. Change to the separation											
11g	6	2437	QPSK(12Mbps)	Flat	Fixed	Top	5	24.2	24.2	0.111	
	6	2437	QPSK(12Mbps)	Flat	Fixed	Top	10	24.2	24.2	0.019	
	6	2437	QPSK(12Mbps)	Flat	Fixed	Top	15	24.2	24.2	0.00795	

*Note: Since the distance between the antenna and the surface of EUT is 5cm or more and SAR level was low as compared to the Top position by the 11b mode, these positions was no tested.

