



# EMI TEST REPORT

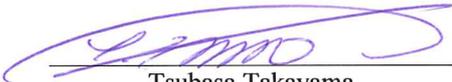
**Test Report No. : 31JE0239-HO-B**

**Applicant** : SHARP CORPORATION  
**Type of Equipment** : Cellular Phone  
**Model No.** : SH-01D  
**FCC ID** : APYHRO00159  
**Test standard** : FCC Part 15 Subpart B 2011 Class B  
**Test Result** : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

**Date of test:** October 15, 2011

**Representative test engineer:**

  
Tsubasa Takayama  
Engineer of WiSE Japan,  
UL Verification Service

**Approved by:**

  
Masanori Nishiyama  
Leader of WiSE Japan,  
UL Verification Service



NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation. \*As for the range of Accreditation in NVLAP, you may refer to the WEB address, <http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

**UL Japan, Inc.**

**Head Office EMC Lab.**

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## **SECTION 1: Customer information**

Company Name : SHARP CORPORATION  
Address : 2-13-1 Iida, Hachihonmatsu, Higashi-Hiroshima City, Hiroshima,  
739-0192 Japan  
Telephone Number : +81-82-420-1825  
Facsimile Number : +81-82-420-1829  
Contact Person : Kazuo Sugimoto

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

### **2.1 Identification of E.U.T.**

Type of Equipment : Cellular Phone  
Model No. : SH-01D  
Serial No. : Refer to Section 4, Clause 4.2  
Receipt Date of Sample : October 13, 2011  
Country of Mass-production : Japan  
Condition of EUT : Production prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Modification of EUT : No Modification by the test lab

### **2.2 Product description**

Feature of EUT : Quad-band (800/850/1700/2000)WCDMA & GSM Dual mode Cellular Phone /  
Bluetooth/W-LAN , Felica & 1.5GHz Band Satellite Receiver (GPS) enable  
- GSM (EU:900/1800M, 1900M)  
- WCDMA (EU:2000M, US:850M, JPN: 800/1700/2000)  
Clock frequency(ies) in the system : CPU: 1.0GHz  
Source oscillation:48MHz

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## **SECTION 3: Test specification, procedures & results**

### **3.1 Test specification**

Test Specification : FCC Part 15 Subpart B: 2011, final revised on July 8, 2011 and effective August 8, 2011

Title : FCC 47CFR Part15 Radio Frequency Device  
Subpart B Unintentional Radiators

### **3.2 Procedures and results**

Item	Test Procedure	Limits	Deviation	Worst margin	Result
Conducted emission	ANSI C63.4: 2003 7. AC powerline conducted emission measurements	Class B	N/A	N/A *1)	N/A
Radiated emission	ANSI C63.4: 2003 8. Radiated emission measurements	Class B	N/A	8.3dB 798.001MHz, Horizontal, QP	Complied

\*Note: UL Japan, Inc's EMI Work Procedure 13-EM-W0420.  
\*1) The test was not performed according to the customer's request.

### **3.3 Addition to standard**

No addition, exclusion nor deviation has been made from the standard.

### **3.4 Uncertainty**

#### **EMI**

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

Test room (semi- anechoic chamber)	Radiated emission						
	(3m*)(+dB)				(1m*)(+dB)		(0.5m*)(+dB)
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	1GHz -10GHz	10GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	4.2dB	5.0dB	5.1dB	5.6dB	5.9dB	4.4dB	4.3dB
No.2	4.1dB	5.2dB	5.1dB	5.7dB	5.8dB	4.3dB	4.2dB
No.3	4.5dB	5.0dB	5.2dB	5.7dB	5.8dB	4.5dB	4.2dB
No.4	4.7dB	5.2dB	5.2dB	5.7dB	5.8dB	5.1dB	4.2dB

\*3m/1m/0.5m = Measurement distance

#### Radiated emission test(3m)

The data listed in this test report has enough margin, more than the site margin.

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### 3.5 Test Location

UL Japan, Inc. Head Office EMC Lab. \*NVLAP Lab. code: 200572-0  
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN  
Telephone : +81 596 24 8116 Facsimile : +81 596 24 8124

	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	4.75 x 5.4 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	-	8.0 x 4.5 x 2.8m	2.0 x 2.0m	-
No.10 measurement room	-	-	2.6 x 2.8 x 2.5m	2.4 x 2.4m	-
No.11 measurement room	-	-	3.1 x 3.4 x 3.0m	2.4 x 3.4m	-

\* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

### 3.6 Test set up, Data of EMI, and Test instruments

Refer to APPENDIX.



**Description of EUT and Support equipment**

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Cellular Phone	SH-01D	004401113535195	Sharp Corporation	EUT
B	Lithium-Ion Battery	Battery Pack SH31	-	Sharp Corporation	EUT
C	MicroSD Memory Card	SD-C02G	1011CS75546	TOSHIBA	-
D	Desktop Holder	SH36	-	Sharp Corporation	EUT
E	Personal Computer	PP11L	CN-0D4571-48643-51T-0549	DELL	-
F	Mouse	M-UAG120	G83C0007F310	TOSHIBA	-
G	AC Adapter(PC)	PA-1650-05D	CN-0F7970-71615-77H-0D63	DELL	-
H	Printer	C6410A	SG8BA1W18J	Hewlett-Packard	-
I	AC Adapter (Printer)	AT3018A-0101	C4557-60004	Hewlett-Packard	-
J	AC Charger	MAS-BH0008-A002	-	NEC	-

**List of cables used**

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	USB Data Cable	0.80	Shielded	Shielded	-
2	Mouse Cable	0.71	Shielded	Shielded	-
3	Printer Cable	2.00	Shielded	Shielded	-
4	DC Power Cable(Printer)	2.00	Unshielded	Unshielded	-
5	AC Power Cable(Printer)	1.75	Unshielded	Unshielded	-
6	DC Power Cable(PC)	1.80	Unshielded	Unshielded	-
7	AC Power Cable(PC)	0.90	Unshielded	Unshielded	-
8	DC Power Cable(set)	1.50	Unshielded	Unshielded	-
9	AC Power Cable(set)	1.80	Unshielded	Unshielded	-

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## **SECTION 5: Radiated Emission**

### **5.1 Operating environment**

Test place : No.1 semi anechoic chamber  
Temperature : See data  
Humidity : See data

### **5.2 Test configuration**

EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 0.8m above the conducting ground plane. The EUT was set on the edge of the tabletop.  
Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength. Photographs of the set up are shown in Appendix 3.

### **5.3 Test conditions**

Frequency range : 30MHz-300MHz (Biconical antenna) / 300MHz-1000MHz (Logperiodic antenna)  
1000MHz - 5000MHz (Horn antenna)  
Test distance : 3m  
EUT position : Table top  
EUT operation mode : See Clause 4.1

### **5.4 Test procedure**

The height of the measuring antenna varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.  
The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.  
The radiated emission measurements were made with the following detector function of the test receiver and the Spectrum analyzer.

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver	Spectrum Analyzer
IF Bandwidth	QP: BW 120kHz	PK: RBW:1MHz/VBW: 3MHz AV *1): RBW:1MHz/VBW:10Hz

\*1) When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

-The test was made on EUT at the normal use position.

### **5.5 Test result**

Summary of the test results: Pass

Date: October 15, 2011

Test engineer: Tsubasa Takayama

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**APPENDIX 1: Data of EMI test**

**Radiated Emission  
(Below 1GHz)**

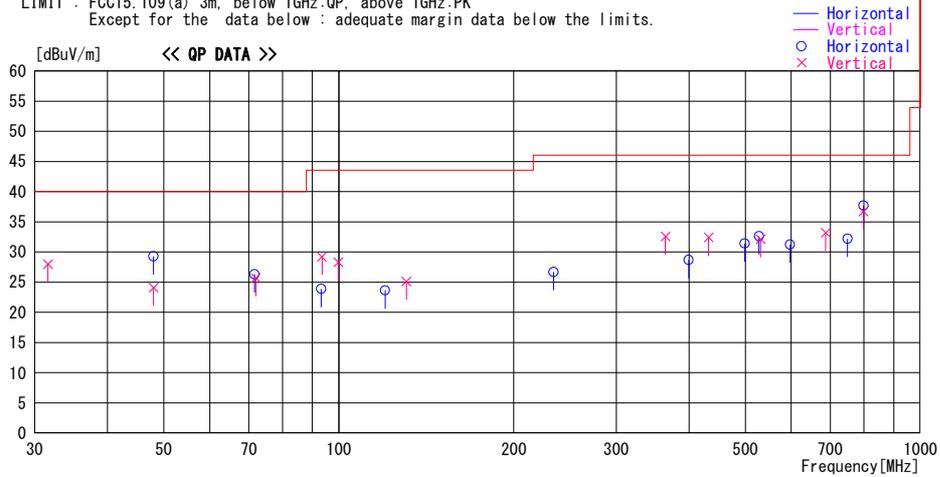
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber  
Date : 2011/10/15

Report No. : 31JE0239-HO  
Temp./Humi. : 23deg. C / 51% RH  
Engineer : Tsubasa Takayama

Mode / Remarks : USB Data com Mode

LIMIT : FCC15.109(a) 3m. below 1GHz:QP, above 1GHz:PK  
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Loss& Gain [dB]							
31.623	41.3	QP	17.7	-31.0	28.0	156	100	Vert.	40.0	12.0	
48.000	48.4	QP	11.6	-30.7	29.3	65	220	Hori.	40.0	10.7	
48.031	43.3	QP	11.5	-30.7	24.1	72	100	Vert.	40.0	15.9	
71.663	50.3	QP	6.6	-30.6	26.3	187	277	Hori.	40.0	13.7	
72.002	49.7	QP	6.6	-30.6	25.7	174	100	Vert.	40.0	14.3	
93.307	45.6	QP	8.6	-30.3	23.9	190	156	Hori.	43.5	19.6	
93.522	50.8	QP	8.7	-30.3	29.2	68	100	Vert.	43.5	14.3	
99.835	48.7	QP	9.8	-30.2	28.3	199	100	Vert.	43.5	15.2	
120.041	40.7	QP	12.9	-30.0	23.6	182	123	Hori.	43.5	19.9	
130.641	41.2	QP	13.8	-29.9	25.1	146	100	Vert.	43.5	18.4	
233.987	38.2	QP	17.1	-28.6	26.7	106	150	Hori.	46.0	19.3	
364.529	43.4	QP	16.4	-27.2	32.6	159	126	Vert.	46.0	13.4	
399.599	38.0	QP	17.5	-26.8	28.7	339	151	Hori.	46.0	17.3	
432.610	41.2	QP	17.7	-26.5	32.4	34	100	Vert.	46.0	13.6	
499.198	39.2	QP	18.2	-26.0	31.4	0	200	Hori.	46.0	14.6	
527.980	39.7	QP	18.6	-25.7	32.6	7	200	Hori.	46.0	13.4	
531.463	39.2	QP	18.6	-25.7	32.1	359	100	Vert.	46.0	13.9	
597.396	36.9	QP	19.3	-25.0	31.2	2	168	Hori.	46.0	14.8	
687.252	37.4	QP	20.1	-24.3	33.2	129	100	Vert.	46.0	12.8	
750.304	34.9	QP	21.2	-23.9	32.2	85	121	Hori.	46.0	13.8	
798.001	39.3	QP	22.0	-23.6	37.7	312	132	Hori.	46.0	8.3	
798.001	38.3	QP	22.0	-23.6	36.7	359	100	Vert.	46.0	9.3	

CHART: WITH FACTOR ANT TYPE: -30MHz: LOOP, 30-300MHz: BICONICAL, 300MHz-1000MHz: LOGPERIODIC, 1000MHz-: HORN  
CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

\*The limit is rounded down to one decimal place.

\*The test result is rounded off to one or two decimal places, so some differences might be observed.

**Radiated Emission**  
**(Below 1GHz)**

**DATA OF RADIATED EMISSION TEST**

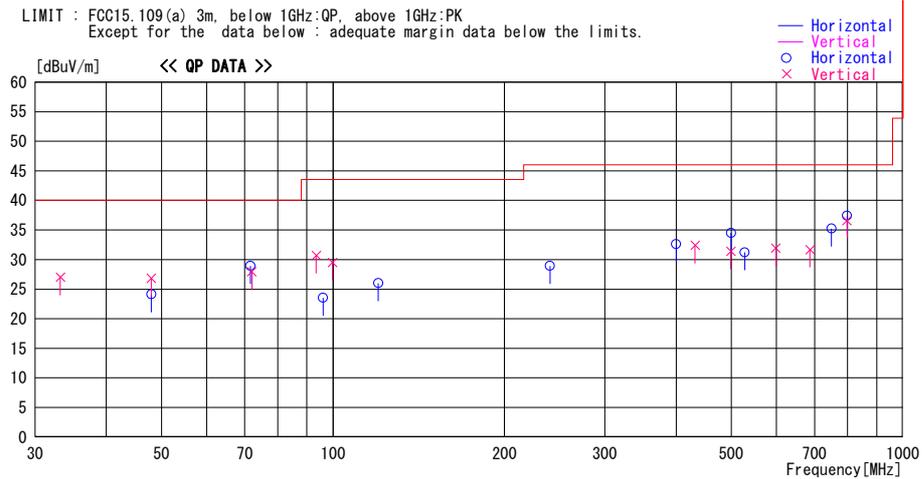
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Report No. : 31JE0239-H0

Temp./Humi. : 23deg. C / 51% RH  
Engineer : Tsubasa Takayama

Mode / Remarks : Standby Mode

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK  
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBUV]	DET	Antenna		Level [dBUV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBUV/m]	Margin [dB]	Comment
			Factor [dB/m]	Loss& Gain [dB]							
33.246	40.9	QP	17.1	-31.0	27.0	198	100	Vert.	40.0	13.0	
48.000	43.2	QP	11.6	-30.7	24.1	108	303	Hori.	40.0	15.9	
48.000	45.9	QP	11.6	-30.7	26.8	212	100	Vert.	40.0	13.2	
71.663	52.9	QP	6.6	-30.6	28.9	88	229	Hori.	40.0	11.1	
72.025	51.9	QP	6.6	-30.6	27.9	123	100	Vert.	40.0	12.1	
93.452	52.3	QP	8.7	-30.3	30.7	102	100	Vert.	43.5	12.8	
96.012	44.7	QP	9.1	-30.3	23.5	306	154	Hori.	43.5	20.0	
99.800	49.9	QP	9.8	-30.2	29.5	359	100	Vert.	43.5	14.0	
120.045	43.1	QP	12.9	-30.0	26.0	82	180	Hori.	43.5	17.5	
240.480	40.2	QP	17.2	-28.5	28.9	182	120	Hori.	46.0	17.1	
399.890	41.9	QP	17.5	-26.8	32.6	331	116	Hori.	46.0	13.4	
431.863	41.2	QP	17.7	-26.5	32.4	0	100	Vert.	46.0	13.6	
499.198	39.2	QP	18.2	-26.0	31.4	132	100	Vert.	46.0	14.6	
499.854	42.3	QP	18.2	-26.0	34.5	3	200	Hori.	46.0	11.5	
527.992	38.3	QP	18.6	-25.7	31.2	312	161	Hori.	46.0	14.8	
598.799	37.6	QP	19.3	-25.0	31.9	0	100	Vert.	46.0	14.1	
687.177	35.9	QP	20.1	-24.3	31.7	0	100	Vert.	46.0	14.3	
750.000	37.9	QP	21.2	-23.9	35.2	51	123	Hori.	46.0	10.8	
798.000	39.0	QP	22.0	-23.6	37.4	159	100	Hori.	46.0	8.6	
798.001	38.2	QP	22.0	-23.6	36.6	0	100	Vert.	46.0	9.4	

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**(Above 1GHz)**

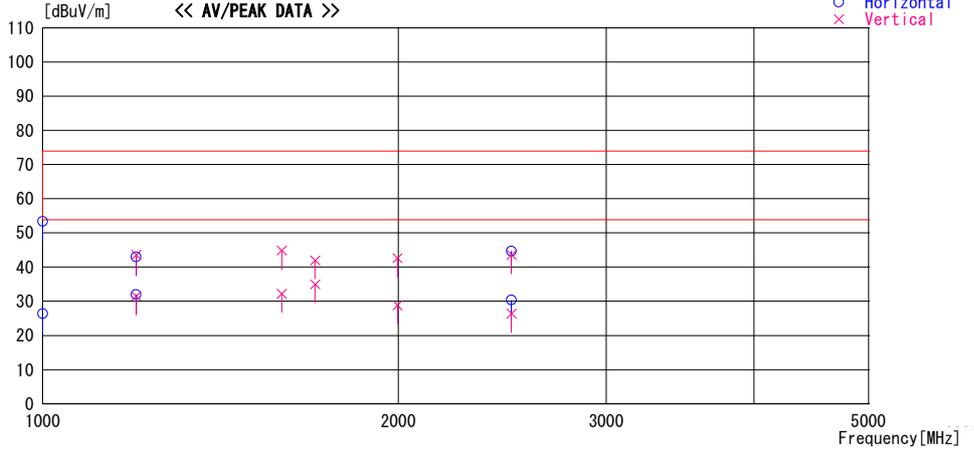
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Engineer : Tsubasa Takayama

Mode / Remarks : Standby Mode

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK  
FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:AV



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Loss& Gain [dB]							
1000.020	65.9	PK	23.4	-36.0	53.3	320	109	Hori.	73.9	20.6	
1000.020	38.9	AV	23.4	-36.0	26.3	320	109	Hori.	53.9	27.6	
1200.002	42.5	AV	24.6	-35.6	31.5	332	110	Vert.	53.9	22.4	
1200.002	54.0	PK	24.6	-35.6	43.0	335	125	Hori.	73.9	30.9	
1200.002	43.0	AV	24.6	-35.6	32.0	335	125	Hori.	53.9	21.9	
1200.002	54.6	PK	24.6	-35.6	43.6	332	110	Vert.	73.9	30.3	
1593.340	40.8	AV	26.2	-34.8	32.2	82	100	Vert.	53.9	21.7	
1593.340	53.4	PK	26.2	-34.8	44.8	82	100	Vert.	73.9	29.1	
1700.008	50.4	PK	26.3	-34.7	42.0	199	100	Vert.	73.9	31.9	
1700.008	43.4	AV	26.3	-34.7	35.0	199	100	Vert.	53.9	18.9	
1996.678	50.0	PK	26.8	-34.2	42.6	91	110	Vert.	73.9	31.3	
1996.678	36.2	AV	26.8	-34.2	28.8	91	110	Vert.	53.9	25.1	
2493.335	38.0	AV	26.5	-34.1	30.4	191	103	Hori.	53.9	23.5	
2493.335	51.2	PK	26.5	-34.1	43.6	189	214	Vert.	73.9	30.3	
2493.335	52.3	PK	26.5	-34.1	44.7	191	103	Hori.	73.9	29.2	
2493.335	34.0	AV	26.5	-34.1	26.4	189	214	Vert.	53.9	27.5	

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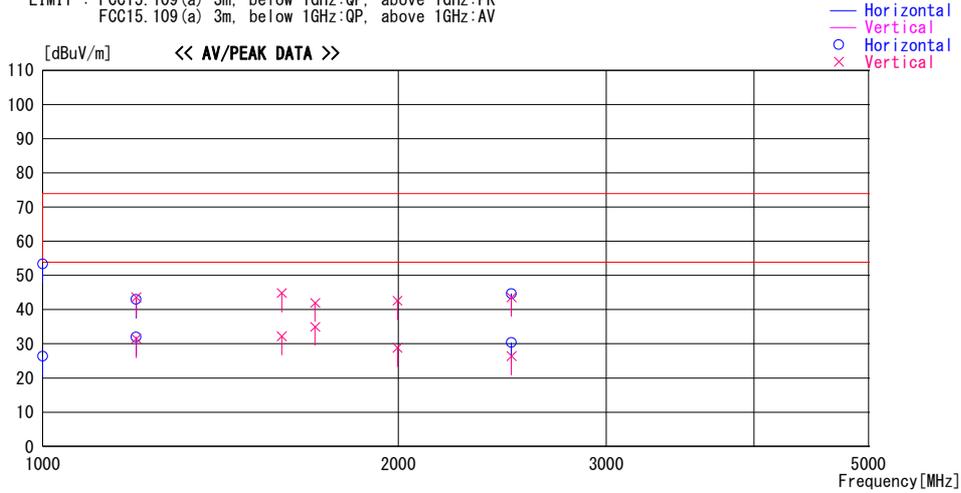
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Report No. : 31JE0239-HO  
Temp./Humi. : 23deg. C / 51% RH  
Engineer : Tsubasa Takayama

Mode / Remarks : Standby Mode

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK  
FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:AV



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level	Angle	Height	Polar.	Limit	Margin	Comment
			Factor	Gain							
			[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
1000.020	65.9	PK	23.4	-36.0	53.3	320	109	Hori.	73.9	20.6	
1000.020	38.9	AV	23.4	-36.0	26.3	320	109	Hori.	53.9	27.6	
1200.002	42.5	AV	24.6	-35.6	31.5	332	110	Vert.	53.9	22.4	
1200.002	54.0	PK	24.6	-35.6	43.0	335	125	Hori.	73.9	30.9	
1200.002	43.0	AV	24.6	-35.6	32.0	335	125	Hori.	53.9	21.9	
1200.002	54.6	PK	24.6	-35.6	43.6	332	110	Vert.	73.9	30.3	
1593.340	40.8	AV	26.2	-34.8	32.2	82	100	Vert.	53.9	21.7	
1593.340	53.4	PK	26.2	-34.8	44.8	82	100	Vert.	73.9	29.1	
1700.008	50.4	PK	26.3	-34.7	42.0	199	100	Vert.	73.9	31.9	
1700.008	43.4	AV	26.3	-34.7	35.0	199	100	Vert.	53.9	18.9	
1996.678	50.0	PK	26.8	-34.2	42.6	91	110	Vert.	73.9	31.3	
1996.678	36.2	AV	26.8	-34.2	28.8	91	110	Vert.	53.9	25.1	
2493.335	38.0	AV	26.5	-34.1	30.4	191	103	Hori.	53.9	23.5	
2493.335	51.2	PK	26.5	-34.1	43.6	189	214	Vert.	73.9	30.3	
2493.335	52.3	PK	26.5	-34.1	44.7	191	103	Hori.	73.9	29.2	
2493.335	34.0	AV	26.5	-34.1	26.4	189	214	Vert.	53.9	27.5	

CHART: WITH FACTOR ANT TYPE: -30MHz: LOOP, 30-300MHz: BICONICAL, 300MHz-1000MHz: LOGPERIODIC, 1000MHz-: HORN  
CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

\*The limit is rounded down to one decimal place.

\*The test result is rounded off to one or two decimal places, so some differences might be observed.

## **APPENDIX 2: Test instruments**

### **EMI Test Instruments**

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-01	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	RE	2011/07/10 * 12
MOS-01	Digital Humidity Indicator	N.T	NT-1800	MOS01	RE	2011/02/23 * 12
MJM-01	Measure	KDS	ES19-55	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MTR-01	Test Receiver	Rohde & Schwarz	ES140	100084	RE	2010/12/07 * 12
KBA-05	Biconical Antenna	Schwarzbeck	BBA9106	2513	RE	2011/09/10 * 12
KLA-04	Logperiodic Antenna	Schwarzbeck	USLP9143	361	RE	2011/08/17 * 12
MAT-08	Attenuator(6dB)	Weinschel Corp	2	BK7971	RE	2010/11/05 * 12
MCC-02	Coaxial Cable	Suhner/storm/Agilent/T SJ	-	-	RE	2011/09/17 * 12
MPA-19	Pre Amplifier	MITEQ	MLA-10K01-B01-35	1237616	RE	2011/02/28 * 12
MHA-05	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	253	RE	2011/06/19 * 12
MCC-134	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336167/4(1m) / 340641(5m)	RE	2011/09/07 * 12
MPA-01	Pre Amplifier	Agilent	8449B	3008A01671	RE	2011/02/24 * 12
MRENT-95	Spectrum Analyzer	Agilent	E4440A	MY46185820	RE/CE/AT	2011/06/30 * 12

**The expiration date of the calibration is the end of the expired month.**

**All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.**

**As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.**

**Test Item:**

**RE: Radiated Emissions**

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