



# EMI TEST REPORT

**Test Report No. : 11380560H-B**

**Applicant** : Sharp Corporation, Consumer Electronics Company,  
Communication Systems Division

**Type of Equipment** : Cellular Phone

**Model No.** : HR241

**FCC ID** : APYHRO00241

**Test standard** : FCC Part 15 Subpart B 2016 Class B

**Test Result** : Complied

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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 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.
6. This test report covers EMC technical requirements. It does not cover administrative issues such as Manual or non-EMC test related Requirements. (if applicable)

**Date of test:**

July 23 and 24, 2016

**Representative  
test engineer:**

Ken Fujita  
Engineer

Consumer Technology Division

**Approved by :**

Tsubasa Takayama  
Engineer

Consumer Technology Division



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://japan.ul.com/resources/emc\\_accredited/](http://japan.ul.com/resources/emc_accredited/)

**UL Japan, Inc.**

**Ise EMC Lab.**

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## **SECTION 1: Customer information**

Company Name : Sharp Corporation, Consumer Electronics Company, Communication Systems Division  
Address : 2-13-1 Iida Hachihonmatsu HigashiHiroshima-City, Hiroshima, 739-0192 Japan  
Telephone Number : +81-82-420-1552  
Facsimile Number : +81-82-420-1555  
Contact Person : Hiroyuki Uwatoko

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

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

Type of Equipment : Cellular Phone  
Model No. : HR241  
Serial No. : Refer to Section 4, Clause 4.2  
Receipt Date of Sample : July 23, 2016  
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 : HR241 is Tri-band LTE(Band 1 / 3 / SB specific), Dual-band WCDMA(FDD I / VIII) & Tri-band GSM(900 / 1800 / 1900) Multi-mode Cellular Phone.  
The EUT has the function that Bluetooth and Wireless-LAN technology interface for establishing contact and transmitting data with certain device.  
Clock frequencies in the system : CPU: 1.0944GHz (max)  
Source oscillation: 19.2MHz, 27MHz(DTV), 96MHz(BT/WLAN)  
The maximum frequency for radio use : 2480 MHz (Bluetooth 79ch)

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

#### **3.1 Test specification**

Test specification : FCC Part 15 Subpart B  
FCC part 15 final revised on April 6, 2016.

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

#### **3.2 Procedures and results**

<b>Item</b>	<b>Test Procedure</b>	<b>Limits</b>	<b>Deviation</b>	<b>Worst margin</b>	<b>Result</b>
Conducted emission	ANSI C63.4: 2014 7. AC power - line conducted emission measurements	Class B	N/A	[QP] 14.4 dB 0.15000 MHz, N [AV] 18.0 dB 0.28076 MHz, N	Complied
Radiated emission	ANSI C63.4: 2014 8. Radiated emission measurements	Class B	N/A	7.2 dB 719.989 MHz, Vertical, QP	Complied

\*Note: UL Japan, Inc's EMI Work Procedure 13-EM-W0420.

#### **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  $k = 2$ .

Frequency range	Conducted emission using AMN(LISN) (+/-)
0.009 – 0.15MHz	3.5 dB
0.15 – 30MHz	3.0 dB

Polarity	Radiated emission (Below 1GHz)			
	(3 m*)(+/-)		(10 m*)(+/-)	
	30 – 200 MHz	200 – 1000MHz	30 – 200 MHz	200 – 1000MHz
Horizontal	5.0 dB	5.3 dB	5.0 dB	5.0 dB
Vertical	4.7 dB	5.9 dB	5.0 dB	5.1 dB

Radiated emission (Above 1GHz)				
(3 m*)(+/-)		(1 m*)(+/-)		(10 m*)(+/-)
1 – 6GHz	6 – 18GHz	10 – 26.5 GHz	26.5 – 40GHz	1 -18 GHz
5.2 dB	5.4 dB	5.5 dB	5.5 dB	5.4 dB

#### Conducted Emission test

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

#### Radiated emission test(3 m)

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

### 3.5 Test Location

UL Japan, Inc. Ise EMC Lab. \*NVLAP Lab. code: 200572-0  
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN  
Telephone : +81 596 24 8999 Facsimile : +81 596 24 8124

	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	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	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	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	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	4.0 x 4.5 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	-	8.8 x 4.6 x 2.8m	2.4 x 2.4m	-
No.11 measurement room	-	6.2 x 4.7 x 3.0m	4.8 x 4.6m	-

\* 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 data, Test instruments, and Test set up

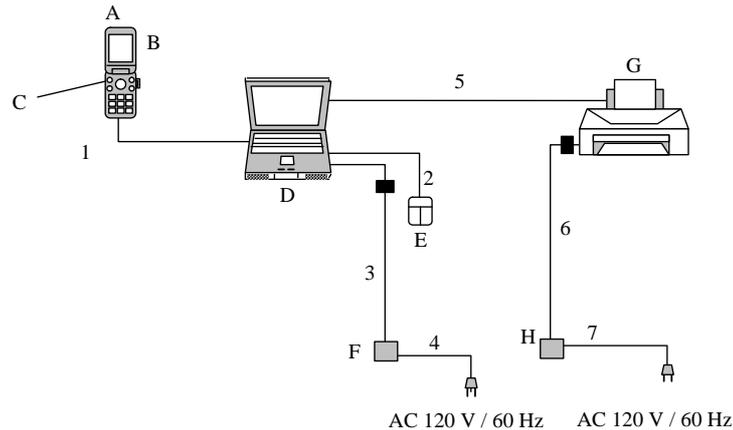
Refer to APPENDIX.

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

### 4.1 Operating modes

The mode(s) : 1) USB Data Com Mode  
The USB data is communicated between EUT and Personal computer (Pair of EUT).  
2) Standby Mode  
Standby state for USB communication.

### 4.2 Configuration and peripherals



■ : Ferrite core which has been standard on support equipment.

\*Cabling and setup were taken into consideration and test data was taken under worse case conditions.

### Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Cellular Phone	HR241	004401/11/587408/9	Sharp Corporation	EUT
B	microSD Memory Card	SD-C02G	None	TOSHIBA	-
C	Lithium-Ion Battery	SHBGC1	-	Sharp Corporation	EUT
D	Personal Computer	PP11L	CN-0D4571-48643-58P-1053	Dell	-
E	Mouse	M-UAG120	LZ733B70EVV	TOSHIBA	-
F	AC Adapter(PC)	PA-1900-02D	CN-09T215-71615-52C-1062	Dell	-
G	Printer	895Cxi	SG8BA1W18J	Hewlett Packard	-
H	AC Adapter(Printer)	C4557-60004	C8L01B	Hewlett Packard	-

### List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	USB Data Cable	0.95	Shielded	Shielded	-
2	Mouse Cable	0.72	Unshielded	Unshielded	-
3	AC Adapter Cable (PC)	1.76	Unshielded	Unshielded	-
4	AC Power Cable (PC)	0.85	Unshielded	Unshielded	-
5	Parallel Cable	1.85	Shielded	Shielded	-
6	AC Adapter Cable (printer)	2.00	Unshielded	Unshielded	-
7	AC Power Cable (printer)	1.75	Unshielded	Unshielded	-

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## **SECTION 5: Conducted 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, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane.

The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT and its peripherals was aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80 cm from any other grounded conducting surface. EUT was located 80 cm from the LISN/AMN and excess AC cable was bundled in center. I/O cables that were connected to the other peripherals were bundled in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane. Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN/AMN to the input power source. All unused 50 ohm connectors of the LISN/AMN were resistivity terminated in 50 ohm when not connected to the measuring equipment.

Photographs of the set up are shown in Appendix 3.

Frequency range : 0.15 MHz - 30 MHz  
EUT position : Table top  
EUT operation mode : See Clause 4.1

### **5.3 Test procedure**

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT within a semi anechoic chamber. The EUT was connected to a Line Impedance Stabilization Network (LISN)/ Artificial Mains network (AMN). An overview sweep with peak detection has been performed. The measurements have been performed with a quasi-peak detector and if required, with an average detector.

The conducted emission measurements were made with the following detector function of the test receiver.

Detector Type : Quasi-Peak and CISPR AV  
IF Bandwidth : 9 kHz

### **5.4 Test result**

Summary of the test results: Pass

Date: July 24, 2016

Test engineer: Ken Fujita

## **SECTION 6: Radiated Emission**

### **6.1 Operating environment**

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

### **6.2 Test configuration**

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane.

The EUT was set on the center 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.

### **6.3 Test conditions**

Frequency range : 30 MHz - 200 MHz (Biconical antenna) / 200 MHz - 1000 MHz (Logperiodic antenna)  
1000 MHz – 13 GHz (Horn antenna)  
Test distance : 3 m  
EUT position : Table top  
EUT operation mode : See Clause 4.1

### **6.4 Test procedure**

The height of the measuring antenna varied between 1 and 4 m 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.

The radiated emission measurements were made with the following detector function of the Test Receiver.

Frequency	Below 1 GHz	Above 1 GHz
Instrument used	Test Receiver	Test Receiver
IF Bandwidth	QP: BW 120 kHz	PK: BW 1 MHz, CISPR AV: BW 1 MHz

- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

### **6.5 Test result**

Summary of the test results: Pass

Date: July 23, 2016  
July 24, 2016

Test engineer: Masafumi Niwa  
Ken Fujita

**APPENDIX 1: Test data**

**Conducted Emission**

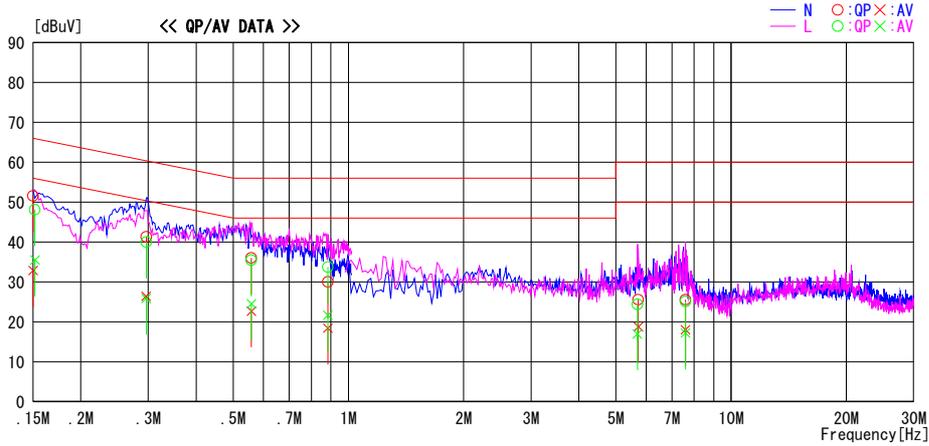
**DATA OF CONDUCTED EMISSION TEST**

UL Japan, Inc. Ise EMC Lab. No.1 Semi Anechoic Chamber  
Date : 2016/07/24

Report No. : 11380560H  
Temp./Humi. : 23deg. / 43% RH  
Engineer : Ken Fujita

Mode / Remarks : USB Data Com Mode

LIMIT : FCC15.107(a) QP ClassB  
FCC15.107(a) AV ClassB



Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15000	38.4	19.7	13.2	51.6	32.9	66.0	56.0	14.4	23.1	N	
0.29645	28.0	13.1	13.3	41.3	26.4	60.3	50.3	19.0	23.9	N	
0.55798	22.7	9.4	13.3	36.0	22.7	56.0	46.0	20.0	23.3	N	
0.88401	16.6	5.0	13.4	30.0	18.4	56.0	46.0	26.0	27.6	N	
5.72404	11.6	4.8	14.0	25.6	18.8	60.0	50.0	34.4	31.2	N	
7.59623	11.5	4.0	14.1	25.6	18.1	60.0	50.0	34.4	31.9	N	
0.15174	34.9	22.3	13.2	48.1	35.5	65.9	55.9	17.8	20.4	L	
0.29645	26.7	12.6	13.3	40.0	25.9	60.3	50.3	20.3	24.4	L	
0.55798	22.2	11.2	13.3	35.5	24.5	56.0	46.0	20.5	21.5	L	
0.88401	20.3	8.3	13.4	33.7	21.7	56.0	46.0	22.3	24.3	L	
5.68769	10.4	3.0	14.0	24.4	17.0	60.0	50.0	35.6	33.0	L	
7.59623	11.0	3.1	14.1	25.1	17.2	60.0	50.0	34.9	32.8	L	

CHART : WITH FACTOR, Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + ATTEN + CABLE)  
Except for the above table : adequate margin data below the limits.

\*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.

## Conducted Emission

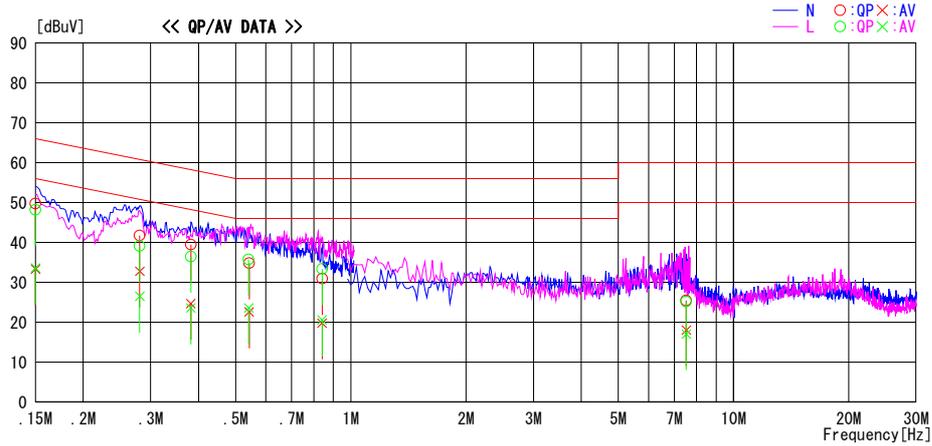
### DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.1 Semi Anechoic Chamber  
Date : 2016/07/24

Report No. : 11380560H  
Power :  
Temp./Humi. : 23deg. / 43% RH  
Engineer : Ken Fujita

Mode / Remarks : Standby

LIMIT : FCC15.107(a) QP ClassB  
FCC15.107(a) AV ClassB



Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15000	36.5	20.1	13.2	49.7	33.3	66.0	56.0	16.3	22.7	N	
0.28076	28.4	19.5	13.3	41.7	32.8	60.8	50.8	19.1	18.0	N	
0.38188	26.2	11.4	13.3	39.5	24.7	58.2	48.2	18.7	23.5	N	
0.54229	21.5	9.3	13.3	34.8	22.6	56.0	46.0	21.2	23.4	N	
0.84217	17.5	6.4	13.4	30.9	19.8	56.0	46.0	25.1	26.2	N	
7.52352	11.4	4.0	14.1	25.5	18.1	60.0	50.0	34.5	31.9	N	
0.15000	35.0	20.4	13.2	48.2	33.6	66.0	56.0	17.8	22.4	L	
0.28076	25.8	13.2	13.3	39.1	26.5	60.8	50.8	21.7	24.3	L	
0.38188	23.2	10.3	13.3	36.5	23.6	58.2	48.2	21.7	24.6	L	
0.54054	22.4	10.3	13.3	35.7	23.6	56.0	46.0	20.3	22.4	L	
0.84217	20.0	7.2	13.4	33.4	20.6	56.0	46.0	22.6	25.4	L	
7.52352	11.1	3.0	14.1	25.2	17.1	60.0	50.0	34.8	32.9	L	

CHART : WITH FACTOR, Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + ATTEN + CABLE)  
Except for the above table : adequate margin data below the limits.

\*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.

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

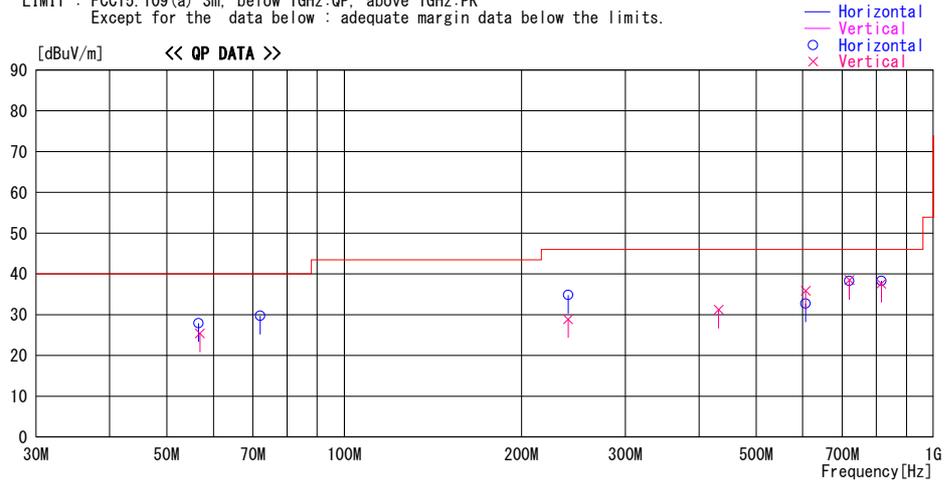
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Ise EMC Lab. No.1 Semi Anechoic Chamber  
Date : 2016/07/23

Order No. : 11380560H  
Temp./Humi. : 23deg./ 53% RH  
Engineer : Masafumi Niwa

Mode / Remarks : USB Data Com Mode Worst Axis X

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	Loss&	Level	Angle	Height	Polar.	Limit	Margin	Comment
			Factor	Gain					[dBuV/m]	[dB]	
			[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
56.581	50.6	QP	8.5	-31.2	27.9	218	328	Hori.	40.0	12.1	
56.937	48.2	QP	8.4	-31.2	25.4	244	100	Vert.	40.0	14.6	
72.025	54.7	QP	6.2	-31.2	29.7	285	242	Hori.	40.0	10.3	
239.997	45.6	QP	12.3	-29.0	28.9	330	100	Vert.	46.0	17.1	
239.998	51.5	QP	12.3	-29.0	34.8	157	116	Hori.	46.0	11.2	
431.991	41.8	QP	16.3	-26.9	31.2	300	116	Vert.	46.0	14.8	
607.135	39.2	QP	19.1	-25.6	32.7	129	187	Hori.	46.0	13.3	
607.132	42.4	QP	19.1	-25.6	35.9	351	100	Vert.	46.0	10.1	
719.989	43.6	QP	20.0	-25.1	38.5	186	122	Vert.	46.0	7.5	
720.000	43.4	QP	20.0	-25.1	38.3	163	105	Hori.	46.0	7.7	
815.981	41.8	QP	21.0	-24.5	38.3	289	100	Hori.	46.0	7.7	
815.982	41.1	QP	21.0	-24.5	37.6	250	113	Vert.	46.0	8.4	

CHART: WITH FACTOR ANT TYPE: -30MHz: LOOP, 30-200MHz: BICONICAL, 200MHz-1000MHz: LOGPERIODIC, 1000MHz-: HORN  
CALCULATION : RESULT = READING + ANT FACTOR + LOSS & GAIN (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)**

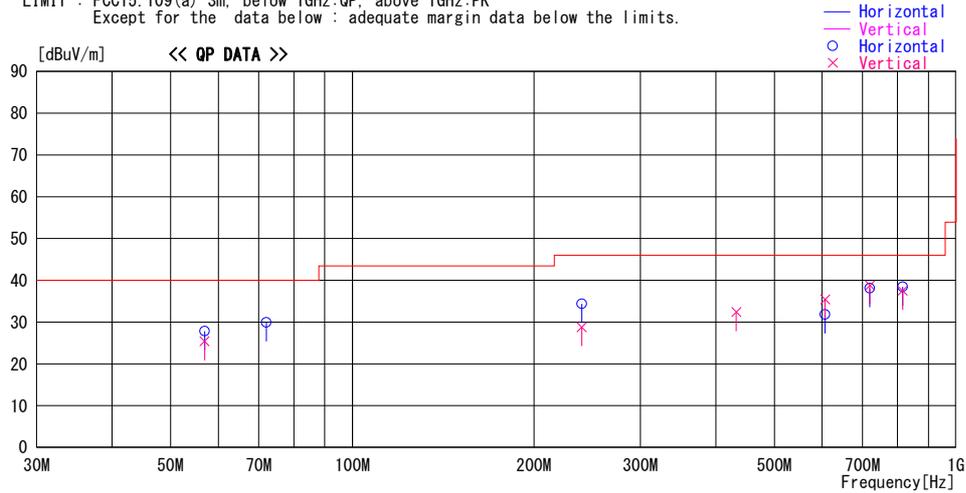
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Ise EMC Lab. No.1 Semi Anechoic Chamber  
Date : 2016/07/23

Order No. : 11380560H  
Temp./Humi. : 23deg./ 53% RH  
Engineer : Masafumi Niwa

Mode / Remarks : Standby Worst Axis X

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]							
56.937	50.6	QP	8.4	-31.2	27.8	212	328	Hori.	40.0	12.2	
56.941	48.2	QP	8.4	-31.2	25.4	247	100	Vert.	40.0	14.6	
72.023	54.9	QP	6.2	-31.2	29.9	284	257	Hori.	40.0	10.1	
239.995	45.5	QP	12.3	-29.0	28.8	320	100	Vert.	46.0	17.2	
239.996	51.1	QP	12.3	-29.0	34.4	160	116	Hori.	46.0	11.6	
432.601	43.0	QP	16.3	-26.9	32.4	188	100	Vert.	46.0	13.6	
607.134	38.3	QP	19.1	-25.6	31.8	133	188	Hori.	46.0	14.2	
607.134	41.9	QP	19.1	-25.6	35.4	351	100	Vert.	46.0	10.6	
719.989	43.9	QP	20.0	-25.1	38.8	183	134	Vert.	46.0	7.2	
719.998	43.2	QP	20.0	-25.1	38.1	165	104	Hori.	46.0	7.9	
815.981	42.0	QP	21.0	-24.5	38.5	288	100	Hori.	46.0	7.5	
815.981	41.0	QP	21.0	-24.5	37.5	250	113	Vert.	46.0	8.5	

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-200MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN  
CALCULATION : RESULT = READING + ANT FACTOR + LOSS & GAIN(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**  
**(Above 1GHz)**

**DATA OF RADIATED EMISSION TEST**

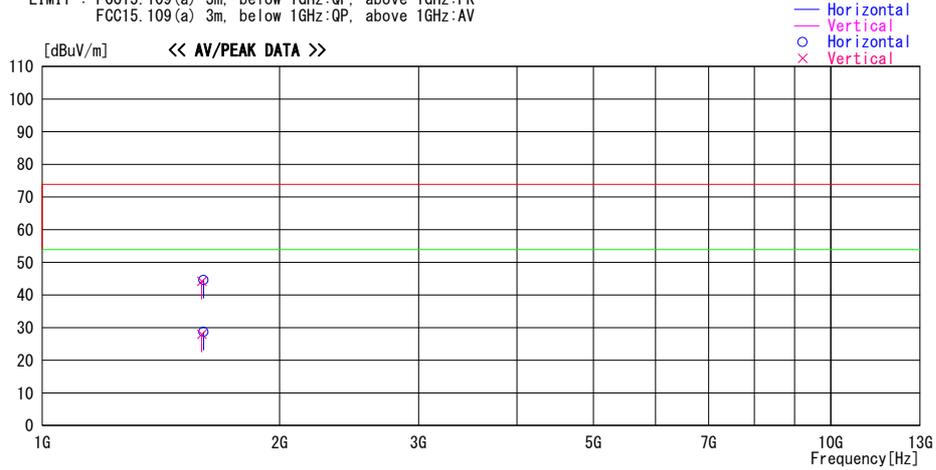
UL Japan, Inc. Ise EMC Lab. No.1 Semi Anechoic Chamber  
Date : 2016/07/24

Order No. : 11380560H

Temp./Humi. : 23deg./43% RH  
Engineer : Ken Fujita

Mode / Remarks : USB Data Com Mode Worst Axis X

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 [dB/m]	Gain [dB]							
1593.792	53.0	PK	25.3	-34.1	44.2	240	100	Vert.	73.9	29.7	
1593.792	36.8	AV	25.3	-34.1	28.0	240	100	Vert.	53.9	25.9	
1601.243	53.4	PK	25.3	-34.1	44.6	323	100	Hori.	73.9	29.3	
1601.243	37.5	AV	25.3	-34.1	28.7	323	100	Hori.	53.9	25.2	

CHART: WITH FACTOR ANT TYPE: -30MHz: LOOP, 30-200MHz: BICONICAL, 200MHz-1000MHz: LOGPERIODIC, 1000MHz-: HORN  
CALCULATION : RESULT = READING + ANT FACTOR + LOSS & GAIN (CABLE - GAIN (AMP) + D. factor)

\*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**  
**(Above 1GHz)**

**DATA OF RADIATED EMISSION TEST**

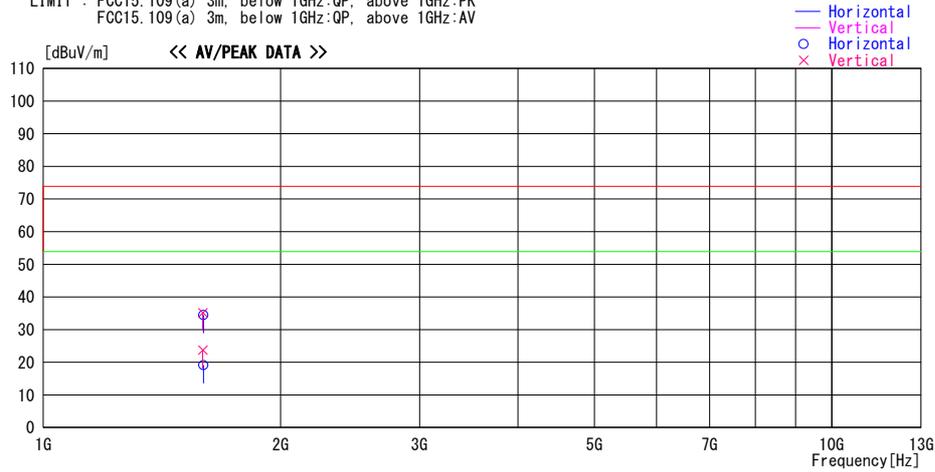
UL Japan, Inc. Ise EMC Lab. No.1 Semi Anechoic Chamber  
Date : 2016/07/24

Order No. : 11380560H

Temp./Humi. : 23deg./43% RH  
Engineer : Ken Fujita

Mode / Remarks : Standby Worst Axis X

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 [dB/m]	Gain [dB]							
1593.320	44.0	PK	25.3	-34.1	35.2	221	100	Vert.	73.9	38.7	
1593.320	32.5	AV	25.3	-34.1	23.7	221	100	Vert.	53.9	30.2	
1595.620	43.3	PK	25.3	-34.1	34.5	267	100	Hori.	73.9	39.4	
1595.620	27.9	AV	25.3	-34.1	19.1	267	100	Hori.	53.9	34.8	

CHART: WITH FACTOR ANT TYPE: -30MHz: LOOP, 30-200MHz: BICONICAL, 200MHz-1000MHz: LOGPERIODIC, 1000MHz-: HORN  
CALCULATION : RESULT = READING + ANT FACTOR + LOSS & GAIN (CABLE - GAIN (AMP) + D. Factor)

\*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**

<b>Control No.</b>	<b>Instrument</b>	<b>Manufacturer</b>	<b>Model No</b>	<b>Serial No</b>	<b>Test Item</b>	<b>Calibration Date * Interval(month)</b>
MAEC-01	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	RE/CE	2015/09/19 * 12
MOS-27	Thermo-Hygrometer	CUSTOM	CTH-201	A08Q26	RE/CE	2016/01/21 * 12
MJM-25	Measure	KOMELON	KMC-36	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MTR-09	EMI Test Receiver	Rohde & Schwarz	ESU26	100412	RE/CE	2016/06/25 * 12
KBA-05	Biconical Antenna	Schwarzbeck	BBA9106	2513	RE	2015/11/02 * 12
MLA-20	Logperiodic Antenna(200-1000MHz)	Schwarzbeck	VUSLP9111B	911B-189	RE	2016/01/30 * 12
MAT-08	Attenuator(6dB)	Weinschel Corp	2	BK7971	RE	2015/11/10 * 12
MCC-02	Coaxial Cable	Suhner/storm/Agilent/T SJ	-	-	RE	2015/09/29 * 12
MPA-19	Pre Amplifier	MITEQ	MLA-10K01-B01-35	1237616	RE	2016/02/25 * 12
MMM-03	Digital Tester	Fluke	FLUKE 26-3	78030621	RE	2015/08/19 * 12
MHA-05	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	253	RE	2016/05/29 * 12
MPA-01	Pre Amplifier	Agilent	8449B	3008A01671	RE	2016/02/26 * 12
MCC-165	Microwave Cable	Junkosha	MWX221	1203S213(1m) / 1311S166(5m)	RE	2015/11/10 * 12
MLS-26	LISN(AMN)	Schwarzbeck	NSLK8127	8127-732	CE	2015/07/17 * 12
MLS-23	LISN(AMN)	Schwarzbeck	NSLK8127	8127-729	CE(EUT)	2016/07/07 * 12
MTA-30	Terminator	TME	CT-01	-	CE	2016/01/15 * 12
MCC-03	Coaxial Cable	Fujikura/Suhner/TSJ	5D-2W(20m)/3D-2W(7.5m)/RG400u(1.5m)/RFM-E421(Switcher)	- /01068(Switcher)	CE	2016/06/29 * 12
MAT-64	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2016/01/14 * 12

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

All equipment is calibrated with valid calibrations. Each measurement data 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:**

**CE: Conducted Emission**

**RE: Radiated Emission**

**UL Japan, Inc.**

**Ise EMC Lab.**

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