



FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

RFID MODULE

MODEL NUMBER: RI16A

FCC ID: ACJ9TGRI16A

REPORT NUMBER: 11576086H-A-R2

ISSUE DATE: March 2, 2017

Prepared for

**PANASONIC CORPORATION OF NORTH AMERICA
Two Riverfront Plaza, 9th Floor, Newark, NJ 07102-5490**

Prepared by

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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>

Revision History

Rev.	Issue Date	Revisions	Revised By
--	02/23/2017	Initial Issue	T. Hatakeda
1	02/27/2017	Correction of clause 6.3.DESRIPTION OF AVAILABLE ANTENNAS	T. Hatakeda
1	02/27/2017	Correction of Section 13.MAXIMUM PERMISSIBLE EXPOSURE	T. Hatakeda
*This report is a revised version of 11576086H-A, which is replaced with this report.			
2	03/02/2017	Correction of "TEST PROCEDURE" in clause 8.1. LIMITS AND PROCEDURE 30 MHz - 1000 MHz →9 kHz to 1000 MHz	T. Hatakeda
2	03/02/2017	Deletion of Section 13.MAXIMUM PERMISSIBLE EXPOSURE in 1576086H-A-R1	T. Hatakeda
*This report is a revised version of 11576086H-A-R1, which is replaced with this report.			

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: PANASONIC CORPORATION OF NORTH AMERICA
Two Riverfront Plaza, 9th Floor, Newark, NJ 07102-5490

EUT DESCRIPTION: RFID MODULE

MODEL: RI16A

SERIAL NUMBER: 6LTSA00093

DATE TESTED: February 11 to 16, 2017

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	Pass

UL Japan, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Japan, Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

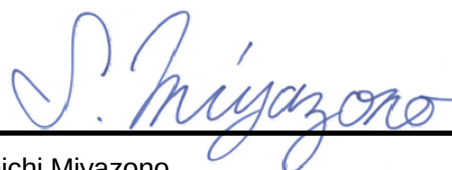
Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Japan, Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Japan, Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For UL Japan, Inc. By:

Tested By:



Takahiro Hatakeda
Leader
Consumer Technology Division



Shinichi Miyazono
Engineer
Consumer Technology Division

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN.

UL Japan, Inc. is accredited by NVLAP, Laboratory Code 200572-0
The full scope of accreditation can be viewed at
<http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamplifier Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

EMI

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

Ise EMC Lab.

Antenna terminal test Uncertainty (+/-)							
Power meter		Conducted emission and Power density			Conducted emission		Channel power
Below 1 GHz	Above 1 GHz	Below 1 GHz	1 GHz -3 GHz	3 GHz -18 GHz	18 GHz -26.5 GHz	26.5 GHz -40 GHz	
0.9 dB	1.0 dB	1.4 dB	1.5 dB	2.8 dB	2.8 dB	2.9 dB	

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

Test distance	Radiated emission (+/-) 9 kHz - 30 MHz
3m	3.8 dB
10m	3.7 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

*Measurement distance

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.

5. TEST PROCEDURE AND RESULTS

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted emission	ANSI C63.10:2013 6 Standard test methods	Section 15.207	[QP] 20.1 dB	Complied	-
	<IC>RSS-Gen 8.8	<IC>RSS-Gen 8.8	0.15000 MHz, L1 [AV] 18.3 dB 0.18960 MHz, L1		
Electric Field Strength of Fundamental Emission	ANSI C63.10:2013 6 Standard test methods	Section 15.225(a)	50.6dB, 13.56000MHz, QP, 0deg.	Complied	Radiated
	<IC> RSS-Gen 6.4, 6.12	<IC>RSS-210 B.6			
Spectrum Mask	ANSI C63.10:2013 6 Standard test methods	Section 15.225(b)(c)	31.5dB, 13.56700MHz, QP, 90deg.	Complied	Radiated
	<IC>RSS-Gen 6.4, 6.13	<IC> RSS-210 B.6			
20dB Bandwidth	ANSI C63.10:2013 6 Standard test methods	Section15.215(c)	See data	Complied	Radiated
	<IC> -	<IC> -			
Electric Field Strength of Spurious Emission	ANSI C63.10:2013 6 Standard test methods	Section 15.209, Section 15.225 (d)	6.2dB 40.680MHz, Vertical, QP	Complied	Radiated
	<IC>RSS-Gen 6.4, 6.13	<IC>RSS-210 B.6			
Frequency Tolerance	ANSI C63.10:2013 6 Standard test methods	Section 15.225(e)	See data	Complied	Radiated
	<IC>RSS-Gen 6.11, 8.11	<IC> RSS-210 B.6			
Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422					

6. EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF EUT

The EUT is an RFID module that is embedded inside Panasonic PC model CF-33. The radio module is manufactured by NXP.

6.2. MAXIMUM TRANSMITTER FIELD STRENGTH

The field strength of the transmitter is as follows:

Frequency Range (MHz)	Mode	Output Power (dBuV/m @ 30m)
13.56	Without Tag	33.3
13.56	Normal Mode Type A	17.0
13.56	Normal Mode Type B	17.1

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a Loop antenna.

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

6.4. SOFTWARE AND FIRMWARE

The test utility software used during testing was Regulation test EMVco_loopback.exe

6.5. WORST-CASE CONFIGURATION AND MODE

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

6.6. MODIFICATIONS

No modifications were made during testing.

6.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Personal Computer	Panasonic	CF-33	6LTSA00550	-
AC Adapter	Panasonic	CF-AA5713A M3	5713AM316904288C	-
Tag board	-	-	-	-

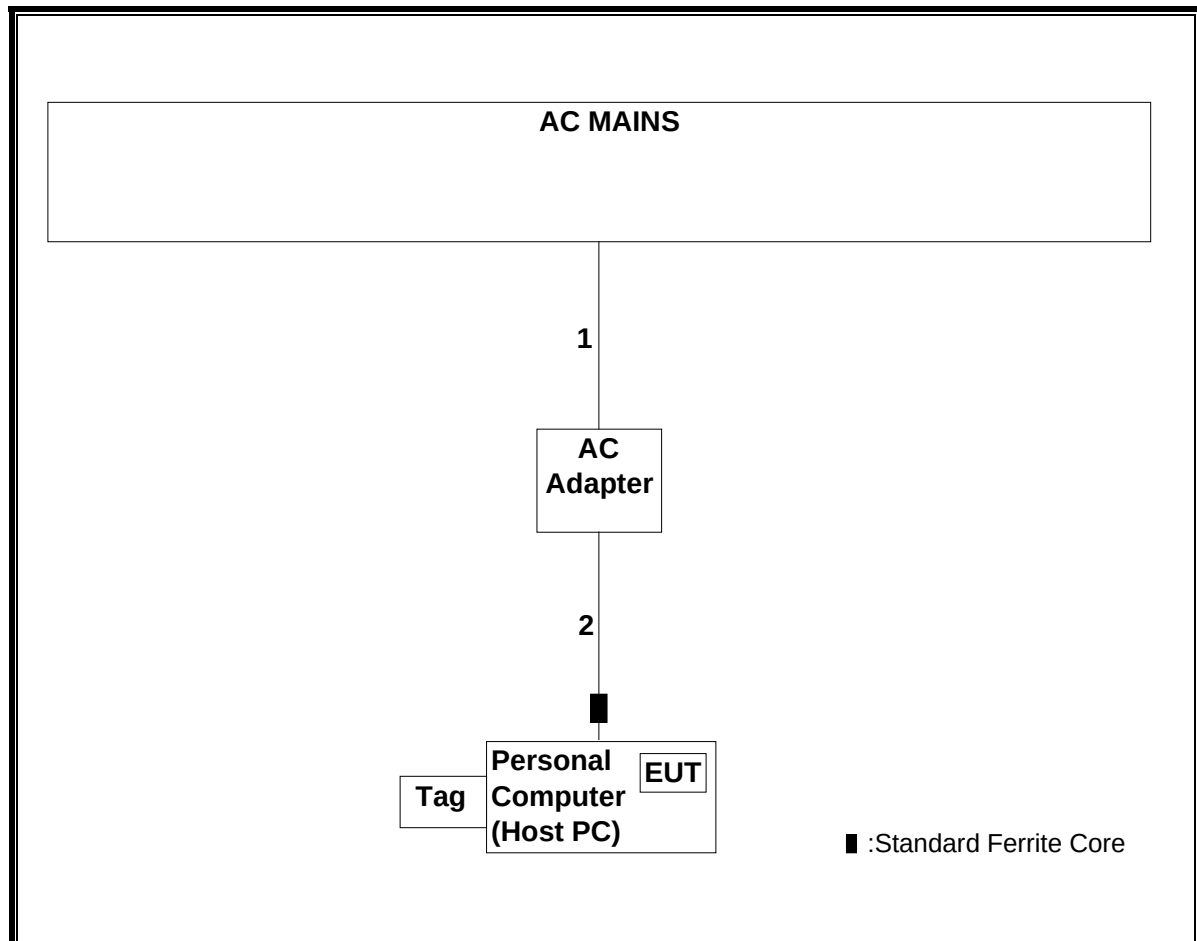
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	DC	1	DC	Un-Shielded	1.4 m	N/A
2	AC	1	AC	Un-Shielded	1.8 m	N/A

TEST SETUP

The EUT is installed in a host tablet computer during the tests. Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS



7. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/CE	2016/10/20 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	1301	RE/CE	2017/01/20 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE/CE	2016/08/17 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE/CE	2016/09/15 * 12
MLPA-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100017	RE	2016/10/14 * 12
MCC-112	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SFM141(3m)/sucoform141-PE(1m)/421-010(1.5m)/RFM-E321(Switcher)	-/00640	RE/CE	2016/07/26 * 12
MCC-143	Coaxial Cable	UL Japan	-	-	RE	2016/06/20 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2016/03/24 * 12
MAT-98	Attenuator	KEYSIGHT	8491A	MY52462349	RE	2016/12/05 * 12
MMM-08	DIGITAL HiTESTER	Hioki	3805	051201197	RE/CE	2017/01/19 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2016/10/15 * 12
MLA-22	Logperiodic Antenna(200-1000MHz)	Schwarzbeck	VUSLP9111B	911B-191	RE	2017/01/26 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2016/07/26 * 12
MLS-23	LISN(AMN)	Schwarzbeck	NSLK8127	8127-729	CE(EUT)	2016/07/07 * 12
MAT-66	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2016/12/24 * 12
MFC-01	Microwave Counter	Advantest	R5373	120100309	FT	2016/06/01 * 12
MCH-04	Temperature and Humidity Chamber	Tabai Espec	PL-2KP	14015723	FT	2016/08/30 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-201	1401	FT	2017/01/20 * 12

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

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

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

Test Item:

CE: Conducted emission

RE: Radiated emission

FT: Frequency Tolerance

8. RADIATED EMISSION TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMIT

§15.225

(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/ meter at 30 meters.

(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110– 14.010 MHz and shall not exceed the general radiated emission limits in § 15.209 as follows:

§15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (µV/m)	Measurement Distance (m)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 – 88	100**	3
88 - 216	150**	3
216 – 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

Formula for converting the field strength from µV/m to dBµV/m is:

Limit (dBµV/m) = 20 log limit (µV/m)

In addition:

§15.209 (d) The emission limits shown the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

§15.209 (d) The provisions in § 15.225, measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this part.

TEST PROCEDURE

ANSI C63.10-2013

The EUT is an intentional radiator that incorporates a digital device, the highest fundamental frequency generated or used in the device is 13.56 MHz; therefore, the frequency range was investigated from 9 kHz to 1000 MHz.

Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open field test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 937606.

RESULTS

9. FUNDAMENTAL EMISSION and Spectrum Mask

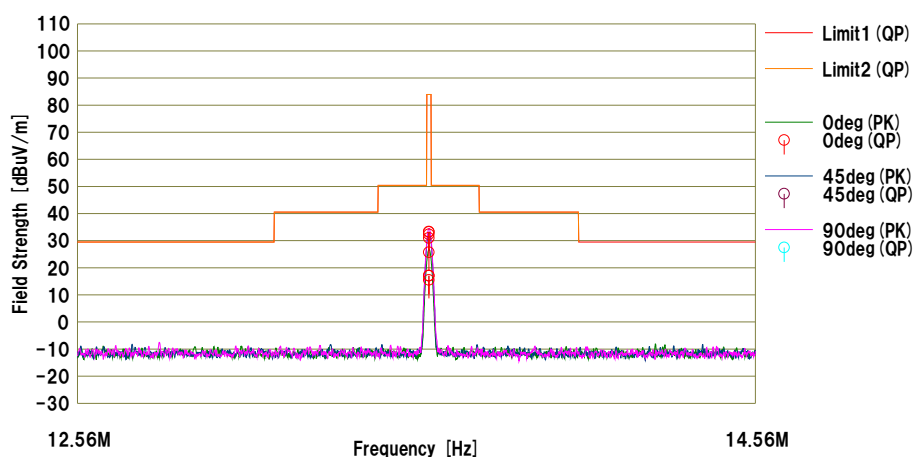
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2017/02/11

Report No. : 11576086H
Power : AC120V / 60Hz
Temp./Humi. : 20deg. C / 32% RH
Engineer : Shinichi Miyazono

Mode / Remarks : Tx 13.56MHz without Tag Worst-Axis (Tablet style_X-Axis)

Limit1 : FCC15_225_PKQP, 9-90kHz:PK, 110-490kHz:PK, other:QP
Limit2 : FCC15_225_AVQP, 9-90kHz:AV, 110-490kHz:AV, other:QP



No.	Freq.	Reading	Ant.Fac	Loss	Gain	Result	Limit		Margin		Antenna	Table	Comment
		<QP>				<QP>	<QP>	<QP>	<QP>	<QP>			
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]		[deg]	
1	13.56000	71.8	19.4	~33.3	32.2	25.7	83.9	83.9	58.2	58.2	Odeg	33	Odeg
2	13.56000	78.4	19.4	~33.3	32.2	32.3	83.9	83.9	51.6	51.6	Odeg	247	45deg
3	13.56000	79.4	19.4	~33.3	32.2	33.3	83.9	83.9	50.6	50.6	Odeg	205	90deg
4	13.56000	77.1	19.4	~33.3	32.2	31.0	83.9	83.9	52.9	52.9	Odeg	60	135deg
5	13.56000	79.3	19.4	~33.3	32.2	33.2	83.9	83.9	50.7	50.7	Odeg	218	270deg
6	13.56000	63.1	19.4	~33.3	32.2	17.0	83.9	83.9	66.9	66.9	Odeg	205	90deg with Tag (Type A)
7	13.56000	63.2	19.4	~33.3	32.2	17.1	83.9	83.9	66.8	66.8	Odeg	205	90deg with Tag (Type B)
8	13.56000	61.6	19.4	~33.3	32.2	15.5	83.9	83.9	68.4	68.4	Odeg	44	Hori

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

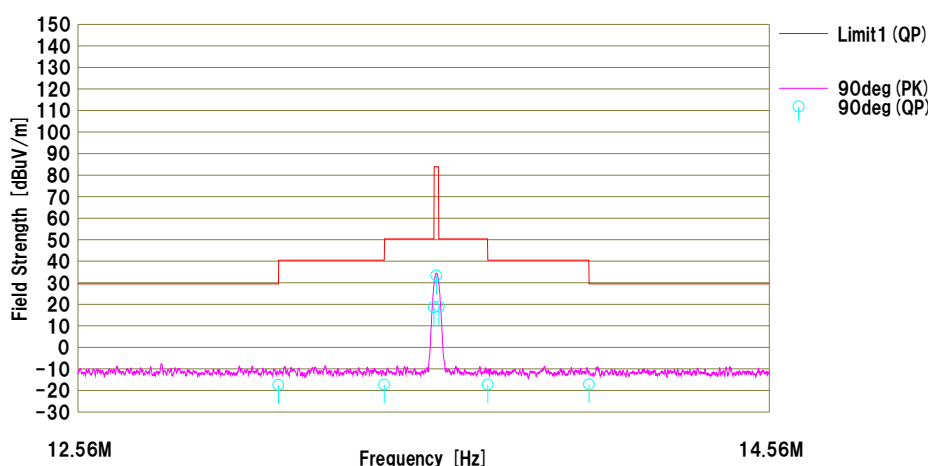
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UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2017/02/11

Report No. : 11576086H
Power : AC120V / 60Hz
Temp./Humi. : 20deg. C / 32% RH
Engineer : Shinichi Miyazono

Mode / Remarks : Tx 13.56MHz without Tag Worst-Axis (Tablet style_X-Axis)

Limit1 : FCC15_225_PQKP, 9-90kHz:PK, 110-490kHz:PK, other:QP



No.	Freq. [MHz]	Reading <QP> [dBuV]	AntFac [dB/m]	Loss [dB]	Gain [dB]	Result <QP> [dBuV/m]	Limit <QP> [dBuV/m]	Margin <QP> [dB]	Antenna	Table [deg]	Comment
1	13.11000	28.7	19.4	-33.4	32.2	-17.5	29.5	47.0	90deg	205	
2	13.41000	28.8	19.4	-33.3	32.2	-17.3	40.5	57.8	90deg	205	
3	13.55300	64.7	19.4	-33.3	32.2	18.6	50.4	31.8	90deg	205	
4	13.56000	79.4	19.4	-33.3	32.2	33.3	83.9	50.6	90deg	205	
5	13.56700	65.0	19.4	-33.3	32.2	18.9	50.4	31.5	90deg	205	
6	13.71000	28.8	19.4	-33.3	32.2	-17.3	40.5	57.8	90deg	205	
7	14.01000	28.9	19.4	-33.3	32.2	-17.2	29.5	46.7	90deg	205	

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

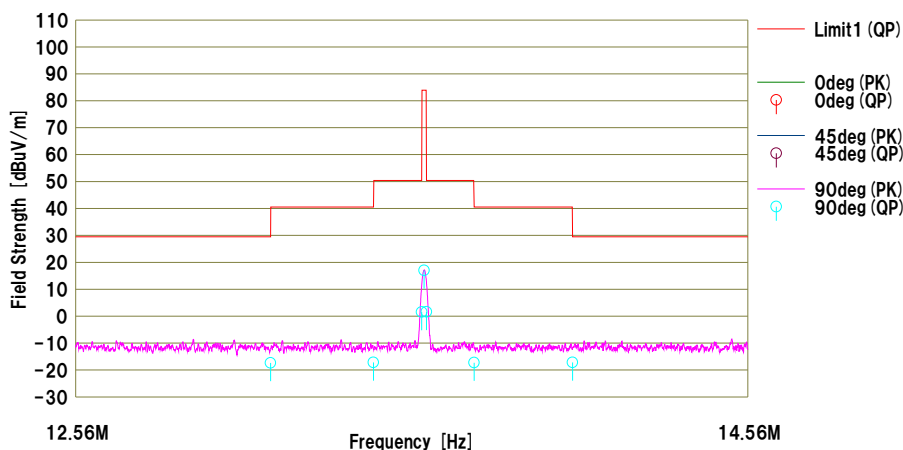
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Temp./Humi. : 20deg. C / 32% RH
Engineer : Shinichi Miyazono

Mode / Remarks : Tx 13.56MHz with Tag (Type A) Worst-Axis (Tablet style X-Axis)

Limit1 : FCC15_225_PKQP, 9-90kHz:PK, 110-490kHz:PK, other:QP



No.	Freq.	Reading	Ant.Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[deg]	[deg]	
1	13.11000	28.8	19.4	-33.4	32.2	-17.4	29.5	46.9	90deg	205	
2	13.41000	28.9	19.4	-33.3	32.2	-17.2	40.5	57.7	90deg	205	
3	13.55300	47.6	19.4	-33.3	32.2	1.5	50.4	48.9	90deg	205	
4	13.56000	63.1	19.4	-33.3	32.2	17.0	83.9	66.9	90deg	205	
5	13.56700	47.7	19.4	-33.3	32.2	1.6	50.4	48.8	90deg	205	
6	13.71000	28.8	19.4	-33.3	32.2	-17.3	40.5	57.8	90deg	205	
7	14.01000	28.9	19.4	-33.3	32.2	-17.2	29.5	46.7	90deg	205	

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

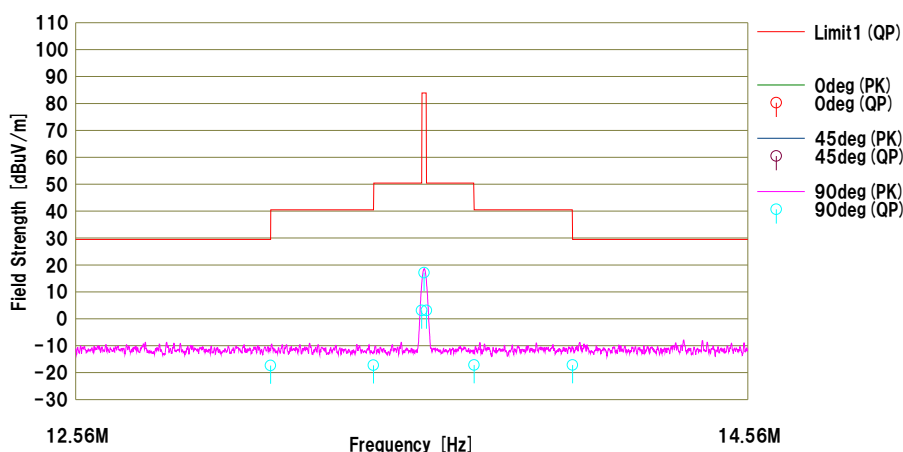
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Power : AC120V / 60Hz
Temp./Humi. : 20deg. C / 32% RH
Engineer : Shinichi Miyazono

Mode / Remarks : Tx 13.56MHz with Tag (Type B) Worst-Axis (Tablet style_X-Axis)

Limit1 : FCC15_225_PKQP, 9-90kHz:PK, 110-490kHz:PK, other:QP



No.	Freq. [MHz]	Reading <QP> [dBuV]	AntFac [dB/m]	Loss [dB]	Gain [dB]	Result <QP> [dBuV/m]	Limit <QP> [dBuV/m]	Margin <QP> [dB]	Antenna [deg]	Table [deg]	Comment
1	13.11000	28.8	19.4	-33.4	32.2	-17.4	29.5	46.9	90deg	205	
2	13.41000	28.8	19.4	-33.3	32.2	-17.3	40.5	57.8	90deg	205	
3	13.55300	49.2	19.4	-33.3	32.2	3.1	50.4	47.3	90deg	205	
4	13.56000	63.2	19.4	-33.3	32.2	17.1	83.9	66.8	90deg	205	
5	13.56700	49.2	19.4	-33.3	32.2	3.1	50.4	47.3	90deg	205	
6	13.71000	28.9	19.4	-33.3	32.2	-17.2	40.5	57.7	90deg	205	
7	14.01000	28.9	19.4	-33.3	32.2	-17.2	29.5	46.7	90deg	205	

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

Result of the fundamental emission at 3m without Distance factor

QP

Ant Deg [deg]	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Duty Factor	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
90	13.56000	QP	79.4	19.4	6.6	32.2	-	73.2	-	-	without Tag
90	13.56000	QP	63.1	19.4	6.6	32.2	-	56.9	-	-	with Type A tag
90	13.56000	QP	63.2	19.4	6.6	32.2	-	57.0	-	-	with Type B tag

Result = Reading + Ant Factor + Loss (Cable+Attenuator) - Gain(Amplifier)

9.1. SPURIOUS EMISSIONS (0.009 – 30 MHz)

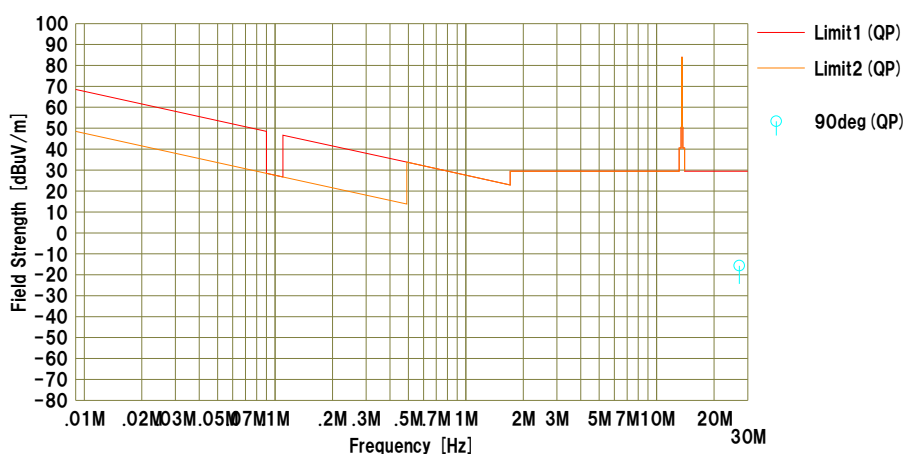
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2017/02/11

Report No. : 11576086H
Power : AC120V / 60Hz
Temp./Humi. : 20deg. C / 32% RH
Engineer : Shinichi Miyazono

Mode / Remarks : Tx 13.56MHz without Tag Worst-Axis (Tablet style_X-Axis)

Limit1 : FCC15_225_PKQP, 9-90kHz:PK, 110-490kHz:PK, other:QP
Limit2 : FCC15_225_AVQP, 9-90kHz:AV, 110-490kHz:AV, other:QP



No.	Freq.	Reading	Ant.Fac	Loss	Gain	Result	Limit		Margin		Antenna	Table	Comment
		<QP>					<QP>	<QP>	<QP>	<QP>			
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]		[deg]	
1	27.12000	29.2	20.3	-33.0	32.2	-15.7	29.5	---	45.2	---	90deg	129	

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

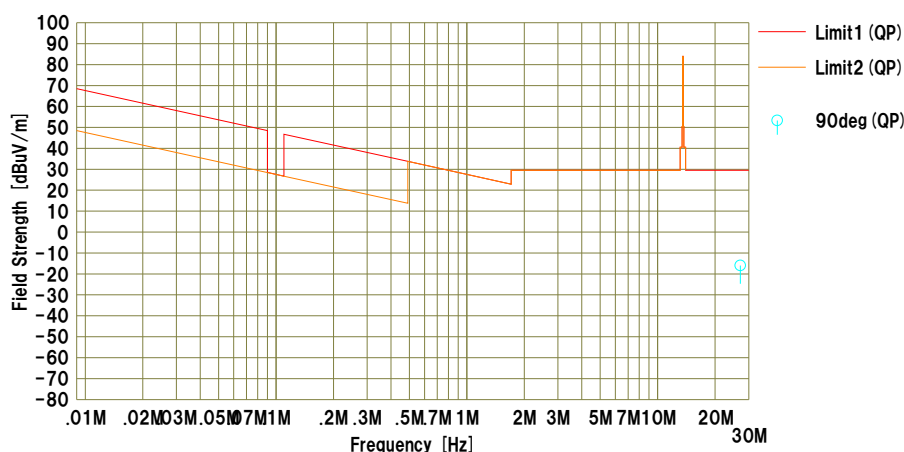
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2017/02/11

Report No. : 11576086H
Power : AC120V / 60Hz
Temp./Humi. : 20deg. C / 32% RH
Engineer : Shinichi Miyazono

Mode / Remarks : Tx 13.56MHz with Tag (Type A) Worst-Axis (Tablet style_X-Axis)

Limit1 : FCC15_225_PKQP, 9-90kHz:PK, 110-490kHz:PK, other:QP
Limit2 : FCC15_225_AVQP, 9-90kHz:AV, 110-490kHz:AV, other:QP



No.	Freq. [MHz]	Reading <QP> [dBuV]	AntFac [dB/m]	Loss [dB]	Gain [dB]	Result <QP> [dBuV/m]	Limit <QP> [dBuV/m]		Margin <QP> [dB]		Antenna [deg]	Table [deg]	Comment
1	27.12000	28.9	20.3	-33.0	32.2	-16.0	29.5	---	45.5	---	90deg	129	

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

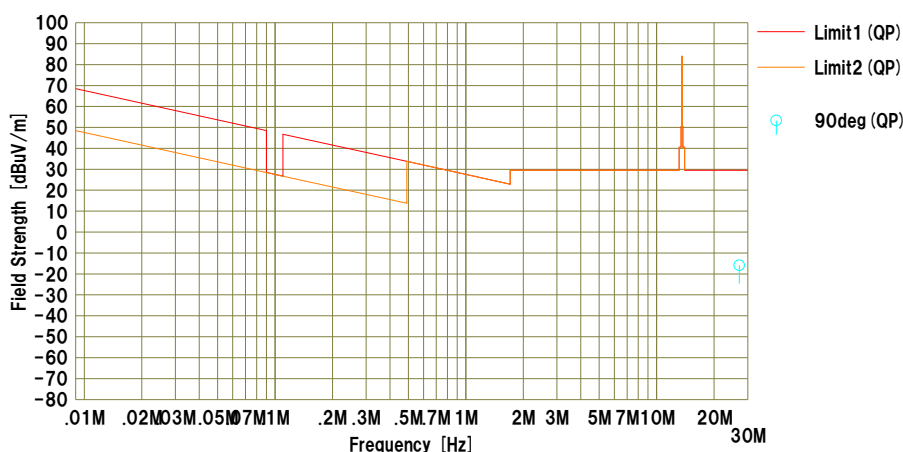
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2017/02/11

Report No. : 11576086H
Power : AC120V / 60Hz
Temp./Humi. : 20deg. C / 32% RH
Engineer : Shinichi Miyazono

Mode / Remarks : Tx 13.56MHz with Tag (Type B) Worst-Axis (Tablet style_X-Axis)

Limit1 : FCC15_225_PKQP, 9-90kHz:PK, 110-490kHz:PK, other:QP
Limit2 : FCC15_225_AVQP, 9-90kHz:AV, 110-490kHz:AV, other:QP



No.	Freq. [MHz]	Reading <QP> [dBuV]	AntFac [dB/m]	Loss [dB]	Gain [dB]	Result <QP> [dBuV/m]	Limit <QP> [dBuV/m]		Margin <QP> [dB]		Antenna [deg]	Table [deg]	Comment
1	27.12000	29.0	20.3	-33.0	32.2	-15.9	29.5	---	45.4	---	90deg	129	

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

9.2. SPURIOUS EMISSION 30 TO 1000 MHz

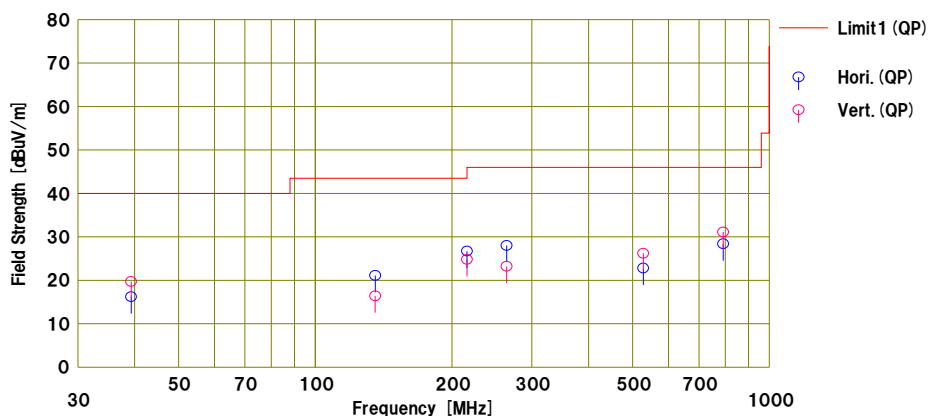
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2017/02/12

Report No. : 11576086H
Power : AC120V / 60Hz
Temp./Humi. : 20deg. C / 30% RH
Engineer : Ryota Yamanaka

Mode / Remarks : Tx 13.56MHz without Tag (TypeA) Worst Axis (PC style_X-Axis)

Limit1 : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK



No.	Freq. [MHz]	Reading [dBuV]	AntFac [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
1	39.324	26.5	14.6	7.3	32.2	16.2	40.0	23.8	Hori.	400	2	BA	
2	135.591	30.5	14.2	8.5	32.1	21.1	43.5	22.4	Hori.	100	0	BA	
3	216.000	37.6	11.8	9.3	32.0	26.7	43.5	16.8	Hori.	143	273	LA22	
4	264.000	37.6	12.7	9.7	32.0	28.0	46.0	18.0	Hori.	115	265	LA22	
5	528.000	25.3	18.0	11.5	32.0	22.8	46.0	23.2	Hori.	160	244	LA22	
6	792.000	26.5	20.6	12.9	31.6	28.4	46.0	17.6	Hori.	100	288	LA22	
7	39.324	30.0	14.6	7.3	32.2	19.7	40.0	20.3	Vert.	100	0	BA	
8	135.570	25.8	14.2	8.5	32.1	16.4	43.5	27.1	Vert.	100	0	BA	
9	216.000	35.7	11.8	9.3	32.0	24.8	43.5	18.7	Vert.	100	0	LA22	
10	264.000	32.8	12.7	9.7	32.0	23.2	46.0	22.8	Vert.	100	288	LA22	
11	528.000	28.7	18.0	11.5	32.0	26.2	46.0	19.8	Vert.	100	0	LA22	
12	792.000	29.2	20.6	12.9	31.6	31.1	46.0	14.9	Vert.	120	0	LA22	

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

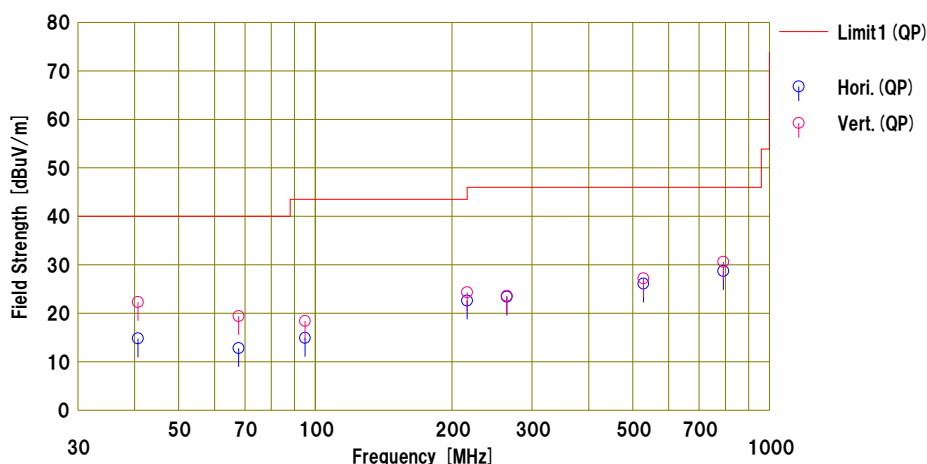
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2017/02/12

Report No. : 11576086H
Power : AC120V / 60Hz
Temp./Humi. : 20deg. C / 30% RH
Engineer : Ryota Yamanaka

Mode / Remarks : Tx 13.56MHz with Tag (TypeA) Worst Axis (PC style_X-Axis)

Limit1 : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK



No.	Freq.	Reading	Ant.Fac	Loss	Gain	Result	Limit	Margin	Pola.	Height	Angle	Ant.	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	40.680	25.6	14.1	7.3	32.2	14.8	40.0	25.2	Hori.	300	146	BA	
2	67.804	30.6	6.7	7.7	32.2	12.8	40.0	27.2	Hori.	100	0	BA	
3	94.923	30.0	9.0	8.1	32.2	14.9	43.5	28.6	Hori.	237	0	BA	
4	216.000	33.5	11.8	9.3	32.0	22.6	43.5	20.9	Hori.	100	308	LA22	
5	264.000	33.0	12.7	9.7	32.0	23.4	46.0	22.6	Hori.	100	290	LA22	
6	528.000	28.6	18.0	11.5	32.0	26.1	46.0	19.9	Hori.	159	214	LA22	
7	792.000	26.8	20.6	12.9	31.6	28.7	46.0	17.3	Hori.	100	315	LA22	
8	40.680	33.1	14.1	7.3	32.2	22.3	40.0	17.7	Vert.	100	256	BA	
9	67.804	37.2	6.7	7.7	32.2	19.4	40.0	20.6	Vert.	100	297	BA	
10	94.923	33.5	9.0	8.1	32.2	18.4	43.5	25.1	Vert.	100	0	BA	
11	216.000	35.2	11.8	9.3	32.0	24.3	43.5	19.2	Vert.	100	0	LA22	
12	264.000	33.2	12.7	9.7	32.0	23.6	46.0	22.4	Vert.	100	304	LA22	
13	528.000	29.7	18.0	11.5	32.0	27.2	46.0	18.8	Vert.	100	0	LA22	
14	792.000	28.7	20.6	12.9	31.6	30.6	46.0	15.4	Vert.	118	0	LA22	

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

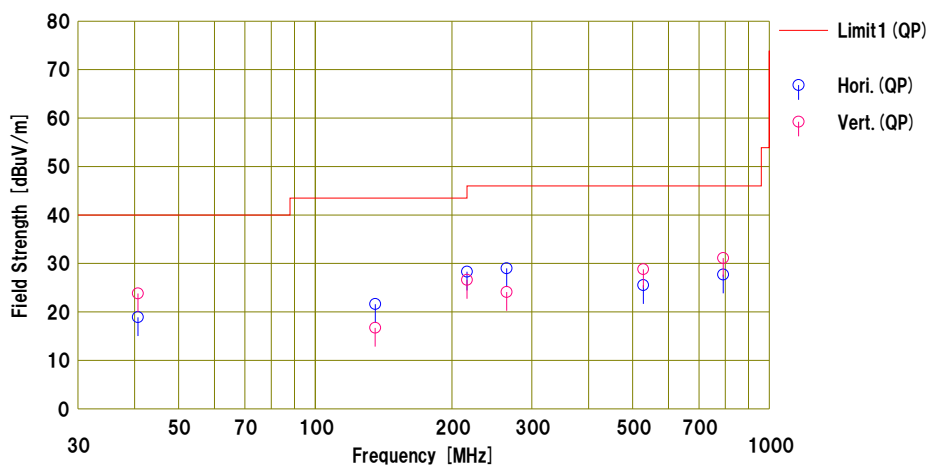
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2017/02/12

Report No. : 11576086H
Power : AC120V / 60Hz
Temp./Humi. : 20deg. C / 30% RH
Engineer : Ryota Yamanaka

Mode / Remarks : Tx 13.56MHz without Tag (TypeB) Worst Axis (PC style_X-Axis)

Limit1 : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK



No.	Freq. [MHz]	Reading	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result	Limit	Margin	Pola.	Height [cm]	Angle [deg]	Ant. Type	Comment
		[dBuV]				[dBuV/m]	[dBuV/m]	[dB]					
1	40.680	29.7	14.1	7.3	32.2	18.9	40.0	21.1	Hori.	100	0	BA	
2	135.591	31.0	14.2	8.5	32.1	21.6	43.5	21.9	Hori.	100	0	BA	
3	216.000	39.2	11.8	9.3	32.0	28.3	43.5	15.2	Hori.	100	282	LA22	
4	264.000	38.6	12.7	9.7	32.0	29.0	46.0	17.0	Hori.	127	261	LA22	
5	528.000	28.0	18.0	11.5	32.0	25.5	46.0	20.5	Hori.	158	271	LA22	
6	792.000	25.8	20.6	12.9	31.6	27.7	46.0	18.3	Hori.	100	248	LA22	
7	40.680	34.6	14.1	7.3	32.2	23.8	40.0	16.2	Vert.	100	0	BA	
8	135.570	26.1	14.2	8.5	32.1	16.7	43.5	26.8	Vert.	100	0	BA	
9	216.000	37.5	11.8	9.3	32.0	26.6	43.5	16.9	Vert.	100	0	LA22	
10	264.000	33.7	12.7	9.7	32.0	24.1	46.0	21.9	Vert.	100	288	LA22	
11	528.000	31.3	18.0	11.5	32.0	28.8	46.0	17.2	Vert.	100	0	LA22	
12	792.000	29.2	20.6	12.9	31.6	31.1	46.0	14.9	Vert.	120	0	LA22	

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

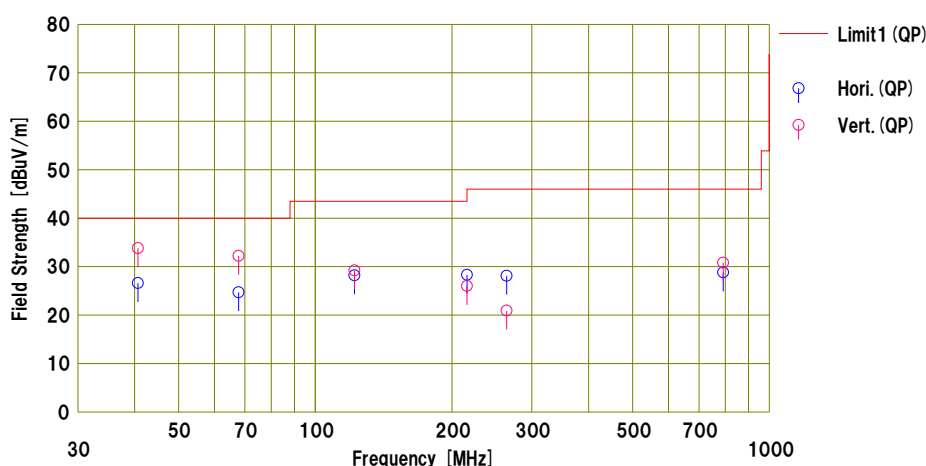
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2017/02/12

Report No. : 11576086H
Power : AC120V / 60Hz
Temp./Humi. : 20deg. C / 30% RH
Engineer : Ryota Yamanaka

Mode / Remarks : Tx 13.56MHz with Tag (TypeB) Worst Axis (PC style_X-Axis)

Limit1 : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK



No.	Freq. [MHz]	Reading	AntFac [dB/m]	Loss [dB]	Gain [dB]	Result	Limit	Margin	Pola. [H/V]	Height [cm]	Angle [deg]	Ant Type	Comment
		[dBuV]				[dBuV/m]	[dBuV/m]	[dB]					
1	40.680	37.4	14.1	7.3	32.2	28.6	40.0	13.4	Hori.	357	190	BA	
2	67.804	42.5	6.7	7.7	32.2	24.7	40.0	15.3	Hori.	298	189	BA	
3	122.040	38.8	13.2	8.4	32.2	28.2	43.5	15.3	Hori.	155	25	BA	
4	216.000	39.2	11.8	9.3	32.0	28.3	43.5	15.2	Hori.	143	272	LA22	
5	264.000	37.7	12.7	9.7	32.0	28.1	46.0	17.9	Hori.	116	250	LA22	
6	792.000	26.9	20.6	12.9	31.6	28.8	46.0	17.2	Hori.	100	131	LA22	
7	40.680	44.6	14.1	7.3	32.2	33.8	40.0	6.2	Vert.	100	111	BA	
8	67.800	50.0	6.7	7.7	32.2	32.2	40.0	7.8	Vert.	100	257	BA	
9	122.040	39.8	13.2	8.4	32.2	29.2	43.5	14.3	Vert.	100	351	BA	
10	216.000	36.9	11.8	9.3	32.0	26.0	43.5	17.5	Vert.	100	0	LA22	
11	264.000	30.5	12.7	9.7	32.0	20.9	46.0	25.1	Vert.	100	0	LA22	
12	792.000	28.9	20.6	12.9	31.6	30.8	46.0	15.2	Vert.	114	0	LA22	

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

10. AC MAINS LINE CONDUCTED EMISSIONS

LIMITS

§15.207

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Notes: 1. The lower limit shall apply at the transition frequencies 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

TEST PROCEDURE

ANSI C63.10-2013

RESULTS

Modulation Type A without Card

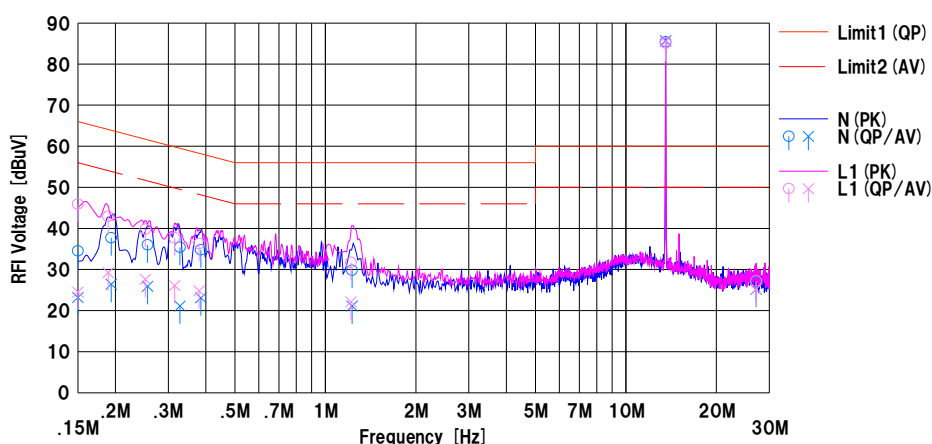
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2017/02/12

Report No. : 11576086H
Power : AC120V / 60Hz
Temp./Humi. : 20deg. C / 30% RH
Engineer : Ryota Yamanaka

Mode / Remarks : Tx 13.56MHz without Tag (Type A) PC style

Limit1 : FCC15.207 QP
Limit2 : FCC15.207 AV



No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15000	21.3	10.0	13.2	34.5	23.2	66.0	56.0	31.5	32.8	N	
2	0.19372	24.5	13.2	13.2	37.7	26.4	63.8	53.8	26.1	27.4	N	
3	0.25600	22.7	12.6	13.3	36.0	25.9	61.5	51.5	25.5	25.6	N	
4	0.32800	22.1	7.8	13.3	35.4	21.1	59.5	49.5	24.1	28.4	N	
5	0.38480	21.5	9.8	13.3	34.8	23.1	58.1	48.1	23.3	25.0	N	
6	1.22640	16.5	7.8	13.3	29.8	21.1	56.0	46.0	26.2	24.9	N	
7	13.56000	71.2	71.5	14.2	85.4	85.7	60.0	50.0	-	-	N	Refer to Page 31
8	27.12000	12.0	10.4	14.8	26.8	25.2	60.0	50.0	33.2	24.8	N	
9	0.15000	32.7	11.3	13.2	45.9	24.5	66.0	56.0	20.1	31.5	L1	
10	0.18932	29.7	16.0	13.2	42.9	29.2	64.0	54.0	21.1	24.8	L1	
11	0.25170	26.5	14.3	13.3	39.8	27.6	61.7	51.7	21.9	24.1	L1	
12	0.31470	24.4	12.8	13.3	37.7	26.1	59.8	49.8	22.1	23.7	L1	
13	0.38001	23.0	11.5	13.3	36.3	24.8	58.2	48.2	21.9	23.4	L1	
14	1.21640	18.4	8.8	13.3	31.7	22.1	56.0	46.0	24.3	23.9	L1	
15	13.56000	70.9	71.3	14.2	85.1	85.5	60.0	50.0	-	-	L1	Refer to Page 31
16	27.12000	12.4	10.4	14.8	27.2	25.2	60.0	50.0	32.8	24.8	L1	

CHART:WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + ATTEN + CABLE)

Modulation Type A with Card

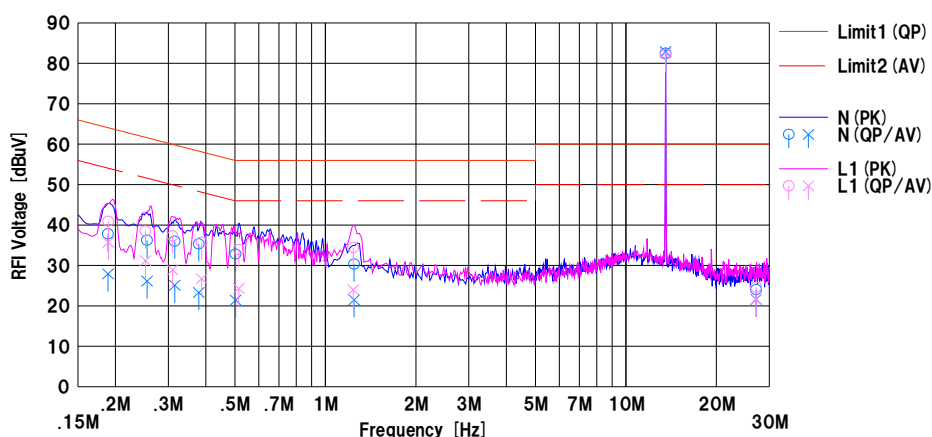
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2017/02/12

Report No. : 11576086H
Power : AC120V / 60Hz
Temp./Humi. : 20deg, C / 30% RH
Engineer : Ryota Yamanaka

Mode / Remarks : Tx 13.56MHz with Tag (Type A) PC style

Limit1 : FCC15.207 QP
Limit2 : FCC15.207 AV



No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.18910	24.6	14.7	13.2	37.8	27.9	64.0	54.0	26.2	26.1	N	
2	0.25510	22.9	12.8	13.3	36.2	26.1	61.5	51.5	25.3	25.4	N	
3	0.31530	22.7	11.8	13.3	36.0	25.1	59.8	49.8	23.8	24.7	N	
4	0.37890	22.0	10.0	13.3	35.3	23.3	58.3	48.3	23.0	25.0	N	
5	0.50250	19.5	8.1	13.3	32.8	21.4	56.0	46.0	23.2	24.6	N	
6	1.24612	17.0	8.2	13.3	30.3	21.5	56.0	46.0	25.7	24.5	N	
7	13.56000	68.3	68.7	14.2	82.5	82.9	60.0	50.0	-	-	N	Refer to Page 31
8	27.12000	9.2	6.8	14.8	24.0	21.6	60.0	50.0	36.0	28.4	N	
9	0.18960	27.7	22.5	13.2	40.9	35.7	64.0	54.0	23.1	18.3	L1	
10	0.25180	25.2	17.9	13.3	38.5	31.2	61.6	51.6	23.1	20.4	L1	
11	0.31010	24.0	15.6	13.3	37.3	28.9	59.9	49.9	22.6	21.0	L1	
12	0.38730	22.4	13.4	13.3	35.7	26.7	58.1	48.1	22.4	21.4	L1	
13	0.51480	20.6	11.0	13.3	33.9	24.3	56.0	46.0	22.1	21.7	L1	
14	1.23812	21.1	10.7	13.3	34.4	24.0	56.0	46.0	21.6	22.0	L1	
15	13.56000	68.0	68.4	14.2	82.2	82.6	60.0	50.0	-	-	L1	Refer to Page 31
16	27.12000	9.8	6.8	14.8	24.6	21.6	60.0	50.0	35.4	28.4	L1	

CHART:WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + ATTEN + CABLE)

Modulation Type B with Card

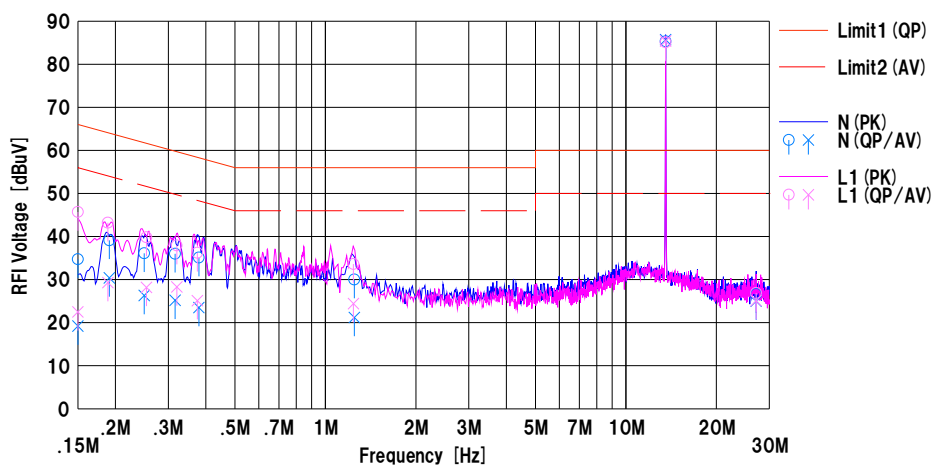
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2017/02/12

Report No. : 11576086H
Power : AC120V / 60Hz
Temp./Humi. : 20deg. C / 30% RH
Engineer : Ryota Yamanaka

Mode / Remarks : Tx 13.56MHz without Tag (Type B) PC style

Limit1 : FCC15.207 QP
Limit2 : FCC15.207 AV



No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15000	21.5	6.0	13.2	34.7	19.2	66.0	56.0	31.3	36.8	N	
2	0.113.56000	25.9	17.2	13.2	39.1	30.4	63.9	53.9	24.8	23.5	N	
3	0.24950	22.9	13.1	13.2	36.1	26.3	61.7	51.7	25.6	25.4	N	
4	0.31606	22.7	11.9	13.3	36.0	25.2	59.8	49.8	23.8	24.6	N	
5	0.37910	21.8	10.2	13.3	35.1	23.5	58.2	48.2	23.1	24.7	N	
6	1.24880	16.7	7.9	13.3	30.0	21.2	56.0	46.0	26.0	24.8	N	
7	13.56000	71.1	71.5	14.2	85.3	85.7	60.0	50.0	-	-	N	Refer to Page 31
8	27.12000	11.8	10.2	14.8	26.6	25.0	60.0	50.0	33.4	25.0	N	
9	0.15000	32.5	9.3	13.2	45.7	22.5	66.0	56.0	20.3	33.5	L1	
10	0.18880	30.0	16.1	13.2	43.2	29.3	64.0	54.0	20.8	24.7	L1	
11	0.25371	26.5	14.9	13.3	39.8	28.2	61.6	51.6	21.8	23.4	L1	
12	0.32030	24.6	15.0	13.3	37.9	28.3	59.6	49.6	21.7	21.3	L1	
13	0.37470	22.9	11.8	13.3	36.2	25.1	58.3	48.3	22.1	23.2	L1	
14	1.23960	20.3	11.1	13.3	33.6	24.4	56.0	46.0	22.4	21.6	L1	
15	13.56000	70.9	71.2	14.2	85.1	85.4	60.0	50.0	-	-	L1	Refer to Page 31
16	27.12000	12.1	10.3	14.8	26.9	25.1	60.0	50.0	33.1	24.9	L1	

CHART:WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + ATTEN + CABLE)

Modulation Type B without Card

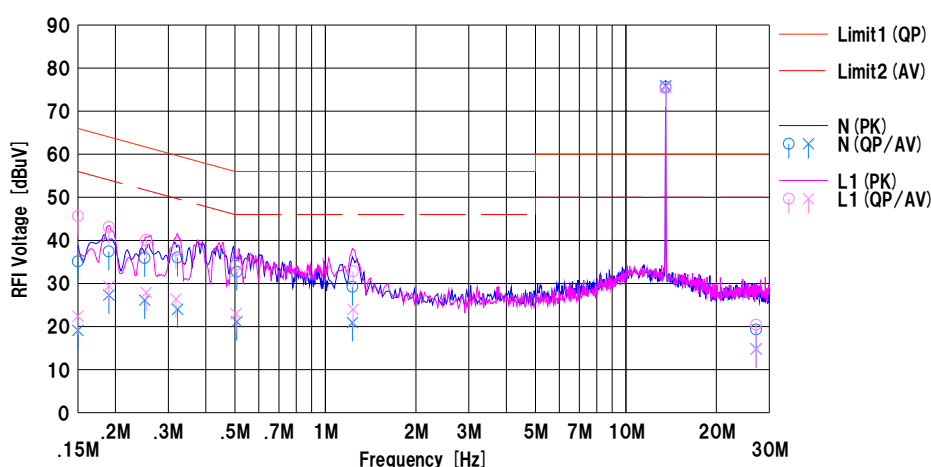
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2017/02/12

Report No. : 11576086H
Power : AC120V / 60Hz
Temp./Humi. : 20deg, C / 30% RH
Engineer : Ryota Yamanaka

Mode / Remarks : Tx 13.56MHz with Tag (Type B) PC style

Limit1 : FCC15.207 QP
Limit2 : FCC15.207 AV



No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15000	21.9	5.9	13.2	35.1	19.1	66.0	56.0	30.9	36.9	N	
2	0.19010	24.2	14.1	13.2	37.4	27.3	64.0	54.0	26.6	26.7	N	
3	0.25038	22.6	12.8	13.3	35.9	26.1	61.7	51.7	25.8	25.6	N	
4	0.32198	22.7	10.7	13.3	36.0	24.0	59.6	49.6	23.6	25.6	N	
5	0.50692	19.4	7.8	13.3	32.7	21.1	56.0	46.0	23.3	24.9	N	
6	1.22944	15.9	7.6	13.3	29.2	20.9	56.0	46.0	26.8	25.1	N	
7	13.56000	61.4	61.7	14.2	75.6	75.9	60.0	50.0	-	-	N	Refer to Page 31
8	27.12000	4.5	0.0	14.8	19.3	14.8	60.0	50.0	40.7	35.2	N	
9	0.15000	32.4	9.2	13.2	45.6	22.4	66.0	56.0	20.4	33.6	L1	
10	0.19016	29.9	16.2	13.2	43.1	29.4	64.0	54.0	20.9	24.6	L1	
11	0.25304	26.8	14.6	13.3	40.1	27.9	61.6	51.6	21.5	23.7	L1	
12	0.31820	24.5	13.1	13.3	37.8	26.4	59.7	49.7	21.9	23.3	L1	
13	0.50389	21.0	9.7	13.3	34.3	23.0	56.0	46.0	21.7	23.0	L1	
14	1.23500	19.5	10.7	13.3	32.8	24.0	56.0	46.0	23.2	22.0	L1	
15	13.56000	61.1	61.4	14.2	75.3	75.6	60.0	50.0	-	-	L1	Refer to Page 31
16	27.12000	5.6	0.0	14.8	20.4	14.8	60.0	50.0	39.6	35.2	L1	

CHART:WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + ATTEN + CABLE)

RFID ANT Termination

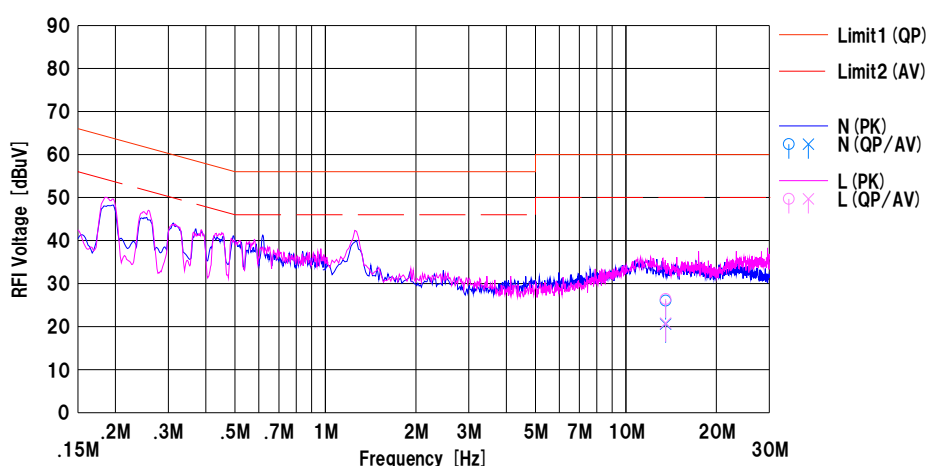
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2017/02/16

Report No. : 11576086H
Power : AC120V / 60Hz
Temp./Humi. : 24deg. C / 34% RH
Engineer : Ryota Yamanaka

Mode / Remarks : Tx 13.56MHz RFID ANT Termination

Limit1 : FCC15.207 QP
Limit2 : FCC15.207 AV



No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	13.56000	11.8	6.4	14.2	26.0	20.6	60.0	50.0	34.0	29.4	N	
2	13.56000	12.2	6.6	14.2	26.4	20.8	60.0	50.0	33.6	29.2	L	

CHART:WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + ATTEN + CABLE)

11. FREQUENCY STABILITY

LIMIT

§15.225 (e)

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency, over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

TEST PROCEDURE

ANSI C63.10-2013

RESULTS

Test Condition deg.C Volts		Test Timing	Measured freq [MHz]	Freq error [MHz]	Result [ppm]	Limit (+/- 0.01%) [+/- ppm]	Margin [ppm]
20deg.C	138V	Power on	13.560084	0.000084	6.19	100.00	93.81
		on 2min.	13.560080	0.000080	5.90	100.00	94.10
		on 5min.	13.560079	0.000079	5.83	100.00	94.17
		on 10min.	13.560079	0.000079	5.83	100.00	94.17
	120V	Power on	13.560098	0.000098	7.23	100.00	92.77
		on 2min.	13.560089	0.000089	6.56	100.00	93.44
		on 5min.	13.560086	0.000086	6.34	100.00	93.66
		on 10min.	13.560081	0.000081	5.97	100.00	94.03
	102V	Power on	13.560080	0.000080	5.90	100.00	94.10
		on 2min.	13.560078	0.000078	5.75	100.00	94.25
		on 5min.	13.560078	0.000078	5.75	100.00	94.25
		on 10min.	13.560077	0.000077	5.68	100.00	94.32
50deg.C.	120V	Power on	13.560009	0.000009	0.66	100.00	99.34
		on 2min.	13.560008	0.000008	0.59	100.00	99.41
		on 5min.	13.560009	0.000009	0.66	100.00	99.34
		on 10min.	13.560008	0.000008	0.59	100.00	99.41
40deg.C.		Power on	13.560028	0.000028	2.06	100.00	97.94
		on 2min.	13.560024	0.000024	1.77	100.00	98.23
		on 5min.	13.560024	0.000024	1.77	100.00	98.23
		on 10min.	13.560024	0.000024	1.77	100.00	98.23
30deg.C.		Power on	13.560060	0.000060	4.42	100.00	95.58
		on 2min.	13.560055	0.000055	4.06	100.00	95.94
		on 5min.	13.560055	0.000055	4.06	100.00	95.94
		on 10min.	13.560054	0.000054	3.98	100.00	96.02
20deg.C.		Power on	13.560098	0.000098	7.23	100.00	92.77
		on 2min.	13.560089	0.000089	6.56	100.00	93.44
		on 5min.	13.560086	0.000086	6.34	100.00	93.66
		on 10min.	13.560081	0.000081	5.97	100.00	94.03
10deg.C.		Power on	13.560137	0.000137	10.10	100.00	89.90
		on 2min.	13.560130	0.000130	9.59	100.00	90.41
		on 5min.	13.560129	0.000129	9.51	100.00	90.49
		on 10min.	13.560129	0.000129	9.51	100.00	90.49
0deg.C.		Power on	13.560162	0.000162	11.95	100.00	88.05
		on 2min.	13.560157	0.000157	11.58	100.00	88.42
		on 5min.	13.560157	0.000157	11.58	100.00	88.42
		on 10min.	13.560157	0.000157	11.58	100.00	88.42
-10deg.C.		Power on	13.560172	0.000172	12.68	100.00	87.32
		on 2min.	13.560171	0.000171	12.61	100.00	87.39
		on 5min.	13.560171	0.000171	12.61	100.00	87.39
		on 10min.	13.560171	0.000171	12.61	100.00	87.39
-20deg.C		Power on	13.560159	0.000159	11.73	100.00	88.27
		on 2min.	13.560165	0.000165	12.17	100.00	87.83
		on 5min.	13.560165	0.000165	12.17	100.00	87.83
		on 10min.	13.560165	0.000165	12.17	100.00	87.83
Limit :		13.56	13.56 MHz +/-0.01 % (+/- 100ppm) =			+/- 0.001356 MHz	

Limit : 13.56 13.56 MHz +/-0.01 % (+/- 100ppm) = +/- 0.001356 MHz

*The test was begun from 50 deg.C and the temperature was lowered each 10 deg.C.

12. 20dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

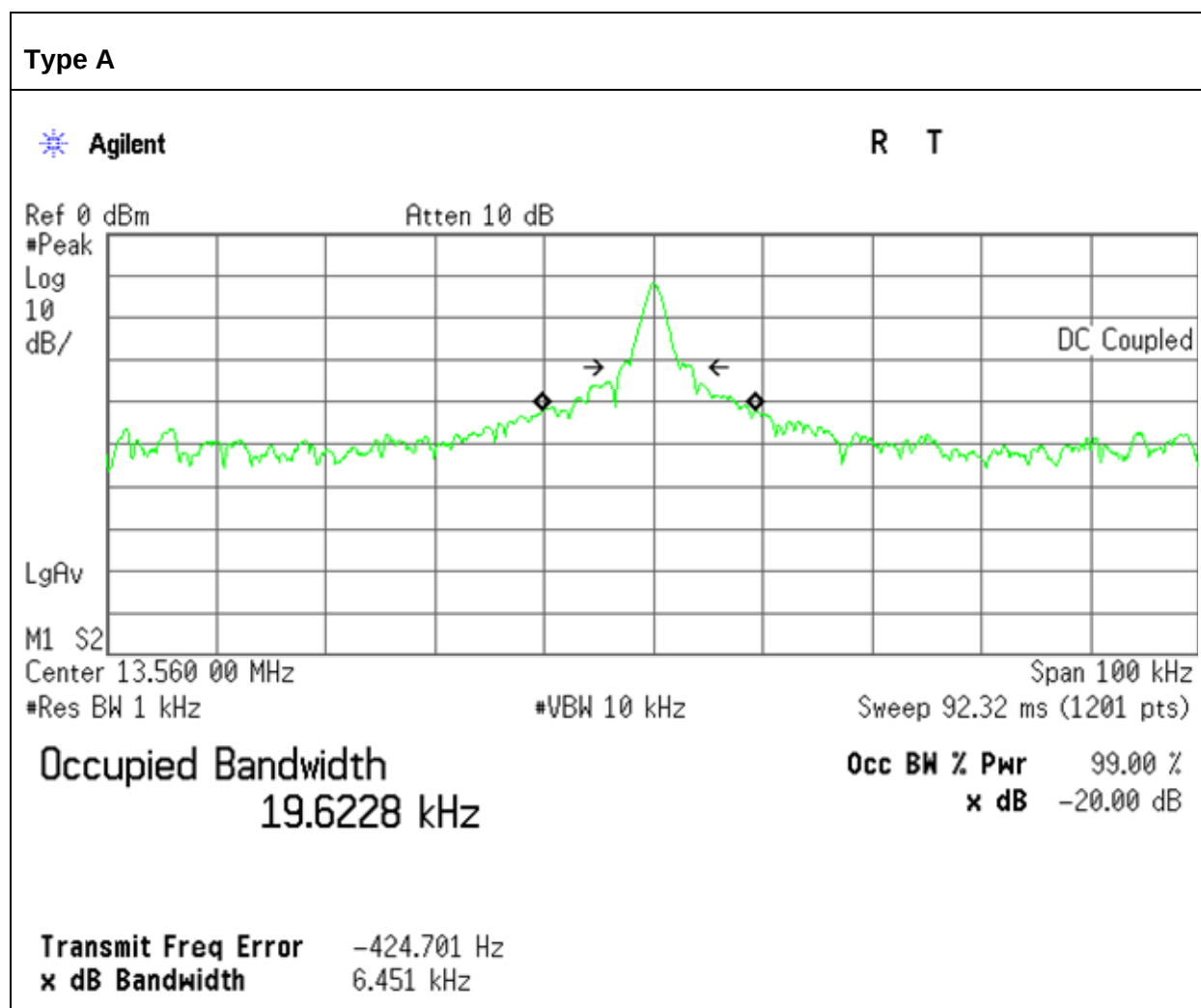
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 20dB bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 20dB bandwidth function is utilized.

RESULTS

Frequency (MHz)	20dB Bandwidth (KHz)
13.56, Type A	6.45
13.56, Type B	4.05

20dB BANDWIDTH

FREQ [MHz]	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	6.45	19.62



20dB BANDWIDTH

FREQ [MHz]	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	4.05	24.03

