



RADIO TEST REPORT

Test Report No. : 12541464H-A-R1

Applicant : Panasonic Corporation of North America
Type of Equipment : WAM HI
Model No. : IM1135AA
FCC ID : ACJ932IM1135AA
Test regulation : FCC Part 15 Subpart C: 2018
Test Result : Complied (Refer to SECTION 3.2)

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
6. The all test items in this test report are conducted by UL Japan, Inc. Ise EMC Lab.
7. 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.
8. The information provided from the customer for this report is identified in SECTION 1.
9. This report is a revised version of 12541464H-A. 12541464H-A is replaced with this report.

Date of test: January 17 to 23, 2019

Representative test engineer:

K. Yamamoto

Koji Yamamoto
Engineer

Consumer Technology Division

Approved by:

S. Miyazono

Shinichi Miyazono
Engineer

Consumer Technology Division



NVLAP LAB CODE: 200572-0

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*As for the range of Accreditation in NVLAP, you may refer to the WEB address,
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REVISION HISTORY

Original Test Report No.: 12541464H-A

[illegible]

CONTENTS	PAGE
SECTION 1: Customer information	4
SECTION 2: Equipment under test (E.U.T.).....	4
SECTION 3: Test specification, procedures & results	5
SECTION 4: Operation of E.U.T. during testing	8
SECTION 5: Radiated emission (Fundamental and Spurious Emission)	10
SECTION 6: -26dB Bandwidth.....	13
SECTION 7: 99% Occupied Bandwidth.....	13
APPENDIX 1: Test data	14
Radiated Emission below 30 MHz (Fundamental and Spurious Emission)	14
Radiated Emission above 30 MHz (Spurious Emission).....	20
-26 dB Bandwidth and 99 % Occupied Bandwidth	25
APPENDIX 2: Test instruments	30
APPENDIX 3: Photographs of test setup	31
Radiated Emission.....	31
Worst Case Position	32

SECTION 1: Customer information

Company Name	:	Panasonic Corporation of North America ^{*1)}
Address	:	Two Riverfront Plaza, 9th Floor Newark, NJ 07102-5490
Telephone Number	:	+1-201-348-7760
Facsimile Number	:	+1-201-348-7760
Contact Person	:	Ben Botros

*1) Panasonic Corporation of North America designates Panasonic Automotive Systems Asia Pacific Co.,Ltd as manufacturer of the product (WAM HI).

The information provided from the customer is as follows;

- Applicant, Type of Equipment, Model No. on the cover and other relevant pages
- SECTION 1: Customer information
- SECTION 2: Equipment under test (E.U.T.)
- SECTION 4: Operation of E.U.T. during testing

* The laboratory is exempted from liability of any test results affected from the above information in SECTION 2 and 4.

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

2.1 Identification of E.U.T.

Type of Equipment	:	WAM HI
Model No.	:	IM1135AA
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 12.0 V
Receipt Date of Sample (Information from test lab.)	:	December 27, 2019
Country of Mass-production	:	Thailand
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

Model No: IM1135AA, (referred to as the EUT in this report), is the WAM HI.

Radio Specification

[Transmitter]

Radio Type	:	Transmitter
Frequency of Operation	:	125 kHz
Modulation	:	ASK
Antenna type	:	Immobilizer: Air core coil inductive antenna Other: Ferrite core coil inductive antenna
Clock frequency (Maximum)	:	16 MHz

[Receiver]

Radio Type	:	Receiver
Frequency of Operation	:	433.92 MHz

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
FCC Part 15 final revised on March 12, 2018 and effective April 11, 2018

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.209 Radiated emission limits; general requirements.

* Also the EUT complies with FCC Part 15 Subpart B.

3.2 Procedures and results

Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
Conducted Emission	<FCC> ANSI C63.10:2013 6 Standard test methods <IC> RSS-Gen 8.8	<FCC> Section 15.207 <IC> RSS-Gen 8.8	-	N/A	N/A *1)	N/A
Electric Field Strength of Fundamental Emission	<FCC> ANSI C63.10:2013 6 Standard test methods <IC> RSS-Gen 6.5, 6.12	<FCC> Section 15.209 <IC> RSS-210 4.4 RSS-Gen 8.9	Radiated	N/A	2.4 dB 125 kHz 0 deg. PK with Duty factor <Mode 3>	Complied a)#
Electric Field Strength of Spurious Emission	<FCC> ANSI C63.10:2013 6 Standard test methods <IC> RSS-Gen 6.5, 6.6, 6.13	<FCC> Section 15.209 <IC> RSS-210 4.4 RSS-Gen 8.9	Radiated	N/A	8.3 dB 43.001 MHz, QP, Vertical <Mode 2>	Complied a)
-26dB Bandwidth	<FCC> ANSI C63.10:2013 6 Standard test methods <IC> -	<FCC> Reference data <IC> -	Radiated	N/A	N/A	Complied b)
Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422. *1) The test is not applicable since the EUT is not the device that is designed to be connected to the public utility (AC) power line. a) Refer to APPENDIX 1 (data of Radiated emission) b) Refer to APPENDIX 1 (data of -26 dB Bandwidth and 99 % Occupied Bandwidth) Symbols: Complied The data of this test item has enough margin, more than the measurement uncertainty. Complied# The data of this test item meets the limits unless the measurement uncertainty is taken into consideration.						

FCC 15.31 (e)

This EUT provides stable voltage constantly to RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

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

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3.3 Addition to standard

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99 % Occupied Band Width	RSS-Gen 6.7	-	Radiated	N/A	N/A	Complied

Symbols:

Complied The data of this test item has enough margin, more than the measurement uncertainty.

Complied# The data of this test item meets the limits unless the measurement uncertainty is taken into consideration.

Other than above, no addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

There is no applicable rule of uncertainty in this applied standard. Therefore, the following results are derived depending on whether or not laboratory uncertainty is applied.

EMI

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

Test distance	Radiated emission (+/-)
	9 kHz to 30 MHz
3 m	3.8 dB
10 m	3.6 dB

*Measurement distance

Polarity	Radiated emission (Below 1 GHz)			
	(3 m*)(+/-)		(10 m*)(+/-)	
	30 MHz to 200 MHz	200 MHz to 1000 MHz	30 MHz to 200 MHz	200 MHz to 1000 MHz
Horizontal	4.8 dB	5.2 dB	4.8 dB	5.0 dB
Vertical	5.0 dB	6.3 dB	4.9 dB	5.0 dB

Radiated emission (Above 1 GHz)				
(3 m*)(+/-)		(1 m*)(+/-)		(10 m*)(+/-)
1 GHz to 6 GHz	6 GHz to 18 GHz	10 GHz to 26.5 GHz	26.5 GHz to 40 GHz	1 GHz to 18 GHz
5.2 dB	5.5 dB	5.9 dB	5.9 dB	5.5 dB

* Measurement distance

Bandwidth
0.96 %

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3.5 Test Location

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Telephone: +81 596 24 8999, Facsimile: +81 596 24 8124
NVLAP Lab. code: 200572-0 / FCC Test Firm Registration Number: 199967

Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms	Maximum measurement distance
No.1 semi-anechoic chamber	2973C-1	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room	10 m
No.2 semi-anechoic chamber	2973C-2	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	2973C-3	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room	3 m
No.3 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber	2973C-4	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room	3 m
No.4 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber	-	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.6 shielded room	-	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room	-	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room	-	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room	-	3.1 x 5.0 x 2.7	3.1 x 5.0	-	-
No.9 measurement room	-	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.11 measurement room	-	6.2 x 4.7 x 3.0	4.8 x 4.6	-	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 m 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

Mode	Remarks*
Mode1	Transmitting mode (Tx) 125 kHz Modulated on (Mod on) CENTER Ant
Mode2	Transmitting mode (Tx) 125 kHz Modulated on (Mod on) REAR DR Ant
Mode3	Transmitting mode (Tx) 125 kHz Modulated on (Mod on) DOOR DR Ant
Mode4	Transmitting mode (Tx) 125 kHz Modulated on (Mod on) DOOR AS Ant
Mode5	Transmitting mode (Tx) 125 kHz Modulated on (Mod on) START SW

* “REAR DR Ant” and “REAR AS Ant” are completely identical in RF characteristics.

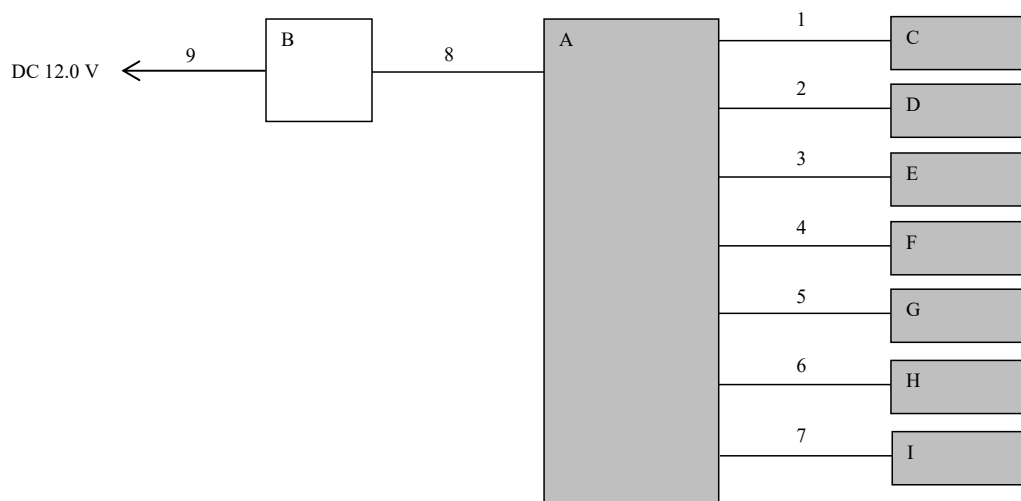
Therefore, the test was performed with “REAR DR Ant” as representative.

Also, “DOOR AS Ant” and “BUMPER Ant” are completely identical in RF characteristics.

Thus, the test was performed with “DOOR AS Ant” as representative.

Justification : The system was configured in typical fashion (as a user would normally use it) for testing.

4.2 Configuration and peripherals



* Cabling and setup(s) 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	WAM HI	IM1135AA	500091-0 181031	Panasonic Automotive Systems Asia Pacific Co.,Ltd	EUT
B	Antenna Test Box	-	-	-	-
C	LF Antenna (CENTER Ant)	EMU7117401	002	Panasonic Automotive Systems Asia Pacific Co.,Ltd	EUT
D	LF Antenna (REAR DR Ant)	EMU7117401	001	Panasonic Automotive Systems Asia Pacific Co.,Ltd	EUT
E	LF Antenna (DOOR DR Ant)	EMU7117301	001	Panasonic Automotive Systems Asia Pacific Co.,Ltd	EUT
F	LF Antenna (DOOR AS Ant)	EMU7117401	005	Panasonic Automotive Systems Asia Pacific Co.,Ltd	EUT
G	LF Antenna (BUMPER Ant)	EMU7117401	003	Panasonic Automotive Systems Asia Pacific Co.,Ltd	EUT
H	LF Antenna (REAR AS Ant)	EMU7117401	004	Panasonic Automotive Systems Asia Pacific Co.,Ltd	EUT
I	Immobilizer (Start Switch)	EMU470602	001	Panasonic Automotive Systems Asia Pacific Co.,Ltd	EUT

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Antenna Cable	2.0	Unshielded	Unshielded	-
2	Antenna Cable	2.0	Unshielded	Unshielded	-
3	Antenna Cable	2.0	Unshielded	Unshielded	-
4	Antenna Cable	2.0	Unshielded	Unshielded	-
5	Antenna Cable	2.0	Unshielded	Unshielded	-
6	Antenna Cable	2.0	Unshielded	Unshielded	-
7	Signal and DC Cable	0.8	Unshielded	Unshielded	-
8	Signal and DC Cable	2.0	Unshielded	Unshielded	-
9	DC cable	1.2	Unshielded	Unshielded	-

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SECTION 5: Radiated emission (Fundamental and Spurious Emission)

Test Procedure

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 Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

Frequency : From 9 kHz to 30 MHz

The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for vertical polarization (antenna angle: 0 deg., 45 deg., 90 deg., and 135 deg.) and horizontal polarization.

*Refer to Figure 1 about Direction of the Loop Antenna.

Frequency: From 30 MHz to 1 GHz

The measuring antenna height 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.

The test was made with the detector (RBW / VBW) in the following table.

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

Test Antennas are used as below;

Frequency	Below 30 MHz	30 MHz to 200 MHz	200 MHz to 1 GHz
Antenna Type	Loop	Biconical	Logperiodic

Frequency	From 9 kHz to 90 kHz and From 110 kHz to 150 kHz	From 90 kHz to 110 kHz	From 150 kHz to 490 kHz	From 490 kHz to 30 MHz	From 30 MHz to 1 GHz
Instrument used	Test Receiver				
Detector	PK / AV	QP	PK / AV	QP	QP
IF Bandwidth	200 Hz	200 Hz	9 kHz	9 kHz	120 kHz
Test Distance	3 m *1)	3 m *1)	3 m *1)	3 m *2)	3 m

*1) Distance Factor: $40 \times \log(3 \text{ m} / 300 \text{ m}) = -80 \text{ dB}$

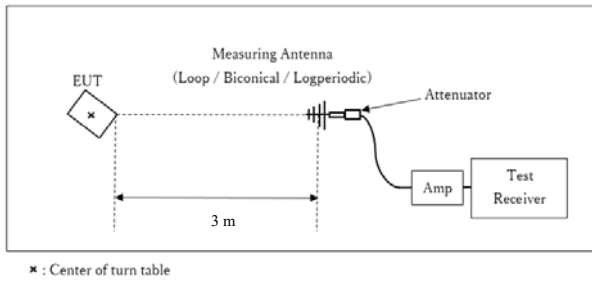
*2) Distance Factor: $40 \times \log(3 \text{ m} / 30 \text{ m}) = -40 \text{ dB}$

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 414788.

These tests were performed in semi anechoic chamber. Therefore the measured level of emissions may be higher than if measurements were made without a ground plane.

However test results were confirmed to pass against standard limit.

[Test Setup]
Below 1 GHz



Test Distance: 3 m

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.

As for the START SW, it has two modes which transponder key is inserted or not. The worst case was confirmed with and without transponder key, as a result, the test without transponder key was the worst case. Therefore the test without transponder key was performed only.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

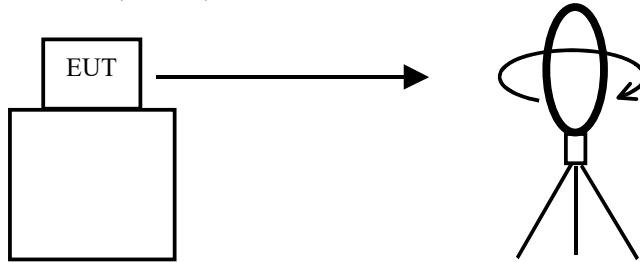
Measurement range	: 9 kHz - 1 GHz
Test data	: APPENDIX 1
Test result	: Pass

Date: January 17, 2019
January 18, 2019
January 23, 2019

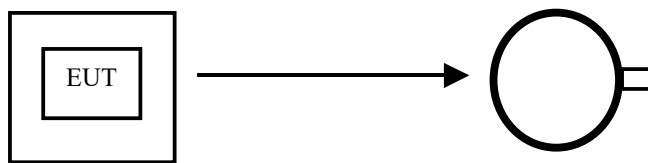
Test engineer: Koji Yamamoto
Shinya Watanabe
Koji Yamamoto

Figure 1: Direction of the Loop Antenna

Side View (Vertical)



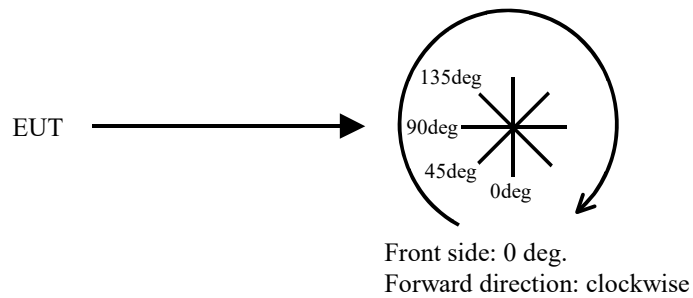
.....
Top View (Horizontal)



Antenna was not rotated.

.....

Top View (Vertical)



SECTION 6: -26dB Bandwidth

Test Procedure

The test was measured with a spectrum analyzer using a test fixture.

Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
-26 dB Bandwidth	100 kHz	1 kHz	3 kHz	Auto	Peak	Max Hold	Spectrum Analyzer

Test data : APPENDIX 1
Test result : Pass

SECTION 7: 99% Occupied Bandwidth

Test Procedure

The test was measured with a spectrum analyzer using a test fixture.

Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
99 % Occupied Bandwidth	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak *1)	Max Hold *1)	Spectrum Analyzer

*1) The measurement was performed with Peak detector, Max Hold since the duty cycle was not 100 %.
Peak hold was applied as Worst-case measurement.

Test data : APPENDIX 1
Test result : Pass

APPENDIX 1: Test data

Radiated Emission below 30 MHz (Fundamental and Spurious Emission) **CENTER**

Report No. 12541464H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date January 17, 2019
Temperature/ Humidity 22 deg. C / 35 % RH
Engineer Koji Yamamoto
Mode Mode 1

PK or QP

Ant Deg [deg] or Polarity [Hori/Vert]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
45	0.12500	PK	102.5	19.7	-69.7	32.3	-	20.2	45.6	25.4	Fundamental
45	0.25000	PK	70.7	19.7	-69.7	32.3	-	-11.6	39.6	51.2	
45	0.37500	PK	64.1	19.6	-69.7	32.3	-	-18.3	36.1	54.4	
45	0.50000	QP	49.3	19.6	-29.6	32.2	-	7.1	33.6	26.5	
45	0.62500	QP	52.7	19.6	-29.6	32.2	-	10.5	31.7	21.2	
45	0.75000	QP	35.6	19.6	-29.6	32.2	-	-6.6	30.1	36.7	
45	0.87500	QP	48.2	19.6	-29.6	32.2	-	6.0	28.7	22.7	
45	1.00000	QP	35.5	19.6	-29.6	32.2	-	-6.7	27.6	34.3	
45	1.12500	QP	41.2	19.6	-29.6	32.2	-	-1.0	26.5	27.5	
45	1.25000	QP	34.2	19.6	-29.6	32.2	-	-8.0	25.6	33.6	

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

PK with Duty factor

Ant Deg [deg]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
45	0.12500	AV	102.5	19.7	-69.7	32.3	0.0	20.2	25.6	5.4	Fundamental
45	0.25000	AV	70.7	19.7	-69.7	32.3	0.0	-11.6	19.6	31.2	
45	0.37500	AV	64.1	19.6	-69.7	32.3	0.0	-18.3	16.1	34.4	

Result = Reading + Ant Factor + Loss (Cable + Attenuator + Filter + D.Factor) - Gain(Amplifier) + Duty factor *

* Since the peak emission result satisfied the average limit, duty factor was omitted.

Result of the fundamental emission at 3m without Distance factor

PK or QP

Ant Deg [deg]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
45	0.12500	PK	102.5	19.7	10.3	32.3	-	100.2	-	-	Fundamental

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

* All spurious emissions lower than this result.

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

Radiated Emission below 30 MHz (Fundamental and Spurious Emission)

REAR DR

Report No. 12541464H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date January 17, 2019
Temperature/ Humidity 22 deg. C / 35 % RH
Engineer Koji Yamamoto
Mode Mode 2

PK or QP

Ant Deg [deg] or Polarity [Hori/Vert]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
45	0.12500	PK	96.7	19.7	-69.7	32.3	-	14.4	45.6	31.2	Fundamental
45	0.25000	PK	70.4	19.7	-69.7	32.3	-	-11.9	39.6	51.5	
45	0.37500	PK	63.8	19.6	-69.7	32.3	-	-18.6	36.1	54.7	
45	0.50000	QP	54.0	19.6	-29.6	32.2	-	11.8	33.6	21.8	
45	0.62500	QP	49.2	19.6	-29.6	32.2	-	7.0	31.7	24.7	
45	0.75000	QP	34.0	19.6	-29.6	32.2	-	-8.2	30.1	38.3	
45	0.87500	QP	42.9	19.6	-29.6	32.2	-	0.7	28.7	28.0	
45	1.00000	QP	42.6	19.6	-29.6	32.2	-	0.4	27.6	27.2	
45	1.12500	QP	35.0	19.6	-29.6	32.2	-	-7.2	26.5	33.7	
45	1.25000	QP	38.0	19.6	-29.6	32.2	-	-4.2	25.6	29.8	

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

PK with Duty factor

Ant Deg [deg]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
45	0.12500	AV	96.7	19.7	-69.7	32.3	0.0	14.4	25.6	11.2	Fundamental
45	0.25000	AV	70.4	19.7	-69.7	32.3	0.0	-11.9	19.6	31.5	
45	0.37500	AV	63.8	19.6	-69.7	32.3	0.0	-18.6	16.1	34.7	

Result = Reading + Ant Factor + Loss (Cable + Attenuator + Filter + D.Factor) - Gain(Amplifier) + Duty factor *

* Since the peak emission result satisfied the average limit, duty factor was omitted.

Result of the fundamental emission at 3m without Distance factor

PK or QP

Ant Deg [deg]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
45	0.12500	PK	96.7	19.7	10.3	32.3	-	94.4	-	-	Fundamental

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

* All spurious emissions lower than this result.

*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 30 MHz (Fundamental and Spurious Emission)

DOOR DR

Report No. 12541464H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date January 17, 2019
Temperature/ Humidity 22 deg. C / 35 % RH
Engineer Koji Yamamoto
Mode Mode 3

PK or QP

Ant Deg [deg] or Polarity [Hori/Vert]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
0	0.12500	PK	105.5	19.7	-69.7	32.3	-	23.2	45.6	22.4	Fundamental
0	0.25000	PK	72.0	19.7	-69.7	32.3	-	-10.3	39.6	49.9	
0	0.37500	PK	65.4	19.6	-69.7	32.3	-	-17.0	36.1	53.1	
0	0.50000	QP	57.7	19.6	-29.6	32.2	-	15.5	33.6	18.1	
0	0.62500	QP	59.7	19.6	-29.6	32.2	-	17.5	31.7	14.2	
0	0.75000	QP	30.9	19.6	-29.6	32.2	-	-11.3	30.1	41.4	
0	0.87500	QP	54.4	19.6	-29.6	32.2	-	12.2	28.7	16.5	
0	1.00000	QP	40.0	19.6	-29.6	32.2	-	-2.2	27.6	29.8	
0	1.12500	QP	47.7	19.6	-29.6	32.2	-	5.5	26.5	21.0	
0	1.25000	QP	30.7	19.6	-29.6	32.2	-	-11.5	25.6	37.1	

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

PK with Duty factor

Ant Deg [deg]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
0	0.12500	AV	105.5	19.7	-69.7	32.3	0.0	23.2	25.6	2.4	Fundamental
0	0.25000	AV	72.0	19.7	-69.7	32.3	0.0	-10.3	19.6	29.9	
0	0.37500	AV	65.4	19.6	-69.7	32.3	0.0	-17.0	16.1	33.1	

Result = Reading + Ant Factor + Loss (Cable + Attenuator + Filter + D.Factor) - Gain(Amplifier) + Duty factor *

* Since the peak emission result satisfied the average limit, duty factor was omitted.

Result of the fundamental emission at 3m without Distance factor

PK or QP

Ant Deg [deg]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
0	0.12500	PK	105.5	19.7	10.3	32.3	-	103.2	-	-	Fundamental

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

* All spurious emissions lower than this result.

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

UL Japan, Inc.

Ise EMC Lab.

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Telephone : +81 596 24 8999

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Radiated Emission below 30 MHz (Fundamental and Spurious Emission)

DOOR AS

Report No. 12541464H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date January 17, 2019
Temperature/ Humidity 22 deg. C / 35 % RH
Engineer Koji Yamamoto
Mode Mode 4

PK or QP

Ant Deg [deg] or Polarity [Hori/Vert]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
45	0.12500	PK	104.3	19.7	-69.7	32.3	-	22.0	45.6	23.6	Fundamental
45	0.25000	PK	70.6	19.7	-69.7	32.3	-	-11.7	39.6	51.3	
45	0.37500	PK	64.0	19.6	-69.7	32.3	-	-18.4	36.1	54.5	
45	0.50000	QP	49.6	19.6	-29.6	32.2	-	7.4	33.6	26.2	
45	0.62500	QP	56.8	19.6	-29.6	32.2	-	14.6	31.7	17.1	
45	0.75000	QP	37.2	19.6	-29.6	32.2	-	-5.0	30.1	35.1	
45	0.87500	QP	51.6	19.6	-29.6	32.2	-	9.4	28.7	19.3	
45	1.00000	QP	36.5	19.6	-29.6	32.2	-	-5.7	27.6	33.3	
45	1.12500	QP	45.4	19.6	-29.6	32.2	-	3.2	26.5	23.3	
45	1.25000	QP	33.6	19.6	-29.6	32.2	-	-8.6	25.6	34.2	

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

PK with Duty factor

Ant Deg [deg]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
45	0.12500	AV	104.3	19.7	-69.7	32.3	0.0	22.0	25.6	3.6	Fundamental
45	0.25000	AV	70.6	19.7	-69.7	32.3	0.0	-11.7	19.6	31.3	
45	0.37500	AV	64.0	19.6	-69.7	32.3	0.0	-18.4	16.1	34.5	

Result = Reading + Ant Factor + Loss (Cable + Attenuator + Filter + D.Factor) - Gain(Amplifier) + Duty factor *

* Since the peak emission result satisfied the average limit, duty factor was omitted.

Result of the fundamental emission at 3m without Distance factor

PK or QP

Ant Deg [deg]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
45	0.12500	PK	104.3	19.7	10.3	32.3	-	102.0	-	-	Fundamental

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

* All spurious emissions lower than this result.

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

UL Japan, Inc.

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Radiated Emission below 30 MHz (Fundamental and Spurious Emission)

START SW

Report No. 12541464H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date January 17, 2019
Temperature/ Humidity 22 deg. C / 35 % RH
Engineer Koji Yamamoto
Mode Mode 5

PK or QP

Ant Deg [deg] or Polarity [Hori/Vert]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
0	0.12500	PK	97.7	19.7	-69.7	32.3	-	15.4	45.6	30.2	Fundamental
0	0.25000	PK	59.0	19.7	-69.7	32.3	-	-23.3	39.6	62.9	
0	0.37500	PK	52.7	19.6	-69.7	32.3	-	-29.7	36.1	65.8	
0	0.50000	QP	55.8	19.6	-29.6	32.2	-	13.6	33.6	20.0	
0	0.62500	QP	41.0	19.6	-29.6	32.2	-	-1.2	31.7	32.9	
0	0.75000	QP	27.1	19.6	-29.6	32.2	-	-15.1	30.1	45.2	
0	0.87500	QP	40.0	19.6	-29.6	32.2	-	-2.2	28.7	30.9	
0	1.00000	QP	43.3	19.6	-29.6	32.2	-	1.1	27.6	26.5	
0	1.12500	QP	34.7	19.6	-29.6	32.2	-	-7.5	26.5	34.0	
0	1.25000	QP	26.5	19.6	-29.6	32.2	-	-15.7	25.6	41.3	

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

PK with Duty factor

Ant Deg [deg]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
0	0.12500	AV	97.7	19.7	-69.7	32.3	0.0	15.4	25.6	10.2	Fundamental
0	0.25000	AV	59.0	19.7	-69.7	32.3	0.0	-23.3	19.6	42.9	
0	0.37500	AV	52.7	19.6	-69.7	32.3	0.0	-29.7	16.1	45.8	

Result = Reading + Ant Factor + Loss (Cable + Attenuator + Filter + D.Factor) - Gain(Amplifier) + Duty factor *

* Since the peak emission result satisfied the average limit, duty factor was omitted.

Result of the fundamental emission at 3m without Distance factor

PK or QP

Ant Deg [deg]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
0	0.12500	PK	97.7	19.7	10.3	32.3	-	95.4	-	-	Fundamental

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

* All spurious emissions lower than this result.

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

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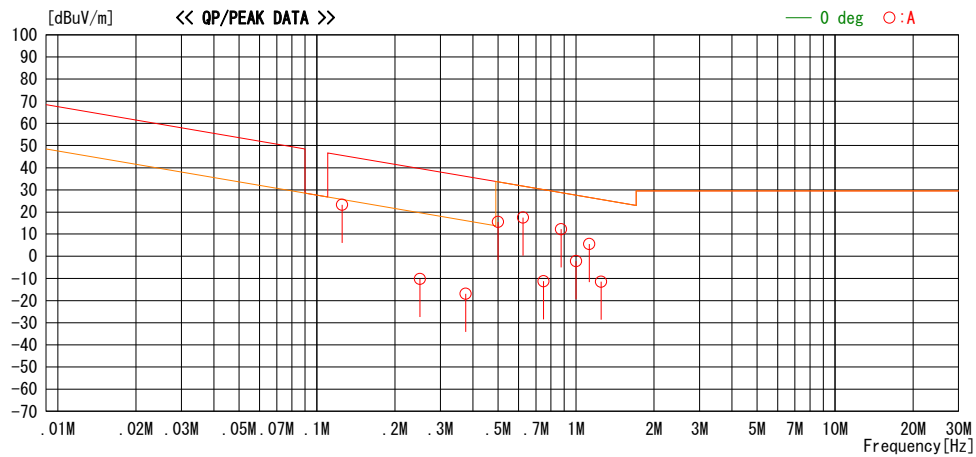
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Emission below 30 MHz (Fundamental and Spurious Emission)
(Plot data, Worst case)

Report No. 12541464H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date January 17, 2019
Temperature/ Humidity 22 deg. C / 35 % RH
Engineer Koji Yamamoto
Mode Mode 3

LIMIT : FCC15. 209 (a), 9-90kHz:PK, 110-490kHz:PK, other:QP
FCC15. 209 (a), 9-90kHz:AV, 110-490kHz:AV, other:QP

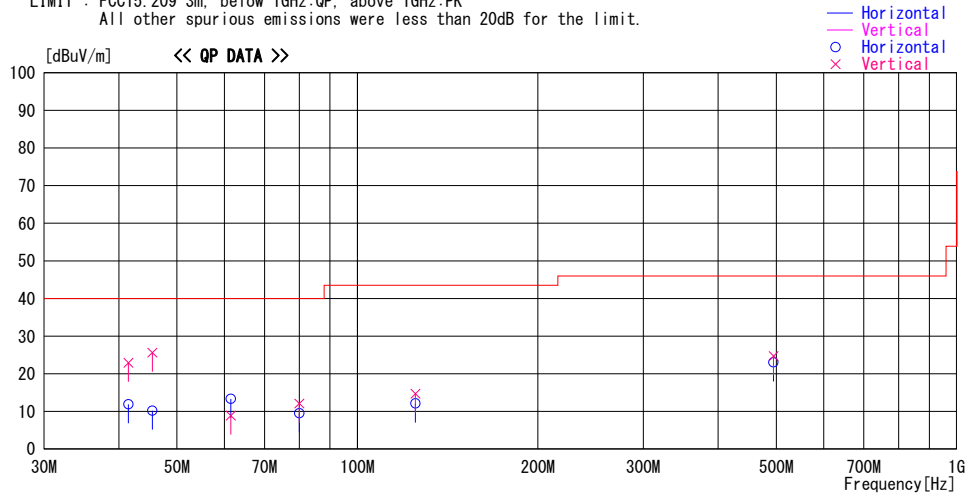


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

Radiated Emission above 30 MHz (Spurious Emission) CENTER

Report No. 12541464H
Test place Ise EMC Lab. No.4 Semi Anechoic Chamber
Date January 23, 2019
Temperature/ Humidity 21 deg. C / 36 % RH
Engineer Koji Yamamoto
Mode Mode 1

LIMIT : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK
All other spurious emissions were less than 20dB for the limit.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit	Margin	Comment
			Factor [dB/m]	Gain [dB]					[dBuV/m]	[dB]	
41.501	22.5	QP	14.1	-24.7	11.9	0	300	Hori.	40.0	28.1	
41.501	33.5	QP	14.1	-24.7	22.9	287	100	Vert.	40.0	17.1	
45.499	22.1	QP	12.7	-24.6	10.2	0	300	Hori.	40.0	29.8	
45.499	37.5	QP	12.7	-24.6	25.6	267	100	Vert.	40.0	14.4	
61.501	30.5	QP	7.2	-24.4	13.3	171	300	Hori.	40.0	26.7	
61.501	26.1	QP	7.2	-24.4	8.9	286	100	Vert.	40.0	31.1	
80.000	26.7	QP	6.9	-24.1	9.5	171	300	Hori.	40.0	30.5	
80.000	29.3	QP	6.9	-24.1	12.1	78	100	Vert.	40.0	27.9	
125.000	22.5	QP	13.2	-23.6	12.1	0	300	Hori.	43.5	31.4	
125.000	25.1	QP	13.2	-23.6	14.7	0	100	Vert.	43.5	28.8	
494.748	25.9	QP	17.9	-20.8	23.0	11	100	Hori.	46.0	23.0	
494.748	27.6	QP	17.9	-20.8	24.7	88	100	Vert.	46.0	21.3	

CHART: WITH FACTOR

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

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

UL Japan, Inc.

Ise EMC Lab.

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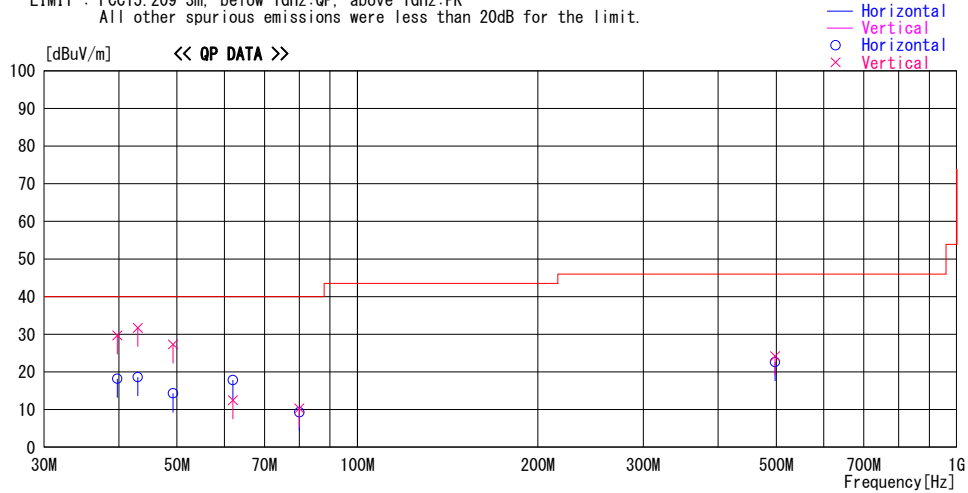
Facsimile : +81 596 24 8124

Radiated Emission above 30 MHz (Spurious Emission)

REAR DR

Report No. 12541464H
Test place Ise EMC Lab. No.4 Semi Anechoic Chamber
Date January 23, 2019
Temperature/ Humidity 21 deg. C / 36 % RH
Engineer Koji Yamamoto
Mode Mode 2

LIMIT : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK
All other spurious emissions were less than 20dB for the limit.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit	Margin	Comment
			Factor [dB/m]	Gain [dB]					[dBuV/m]	[dB]	
39.750	28.2	QP	14.7	-24.7	18.2	176	300	Hori.	40.0	21.8	
39.750	39.7	QP	14.7	-24.7	29.7	206	100	Vert.	40.0	10.3	
43.001	29.6	QP	13.6	-24.6	18.6	0	300	Hori.	40.0	21.4	
43.001	42.7	QP	13.6	-24.6	31.7	272	100	Vert.	40.0	8.3	
49.250	27.5	QP	11.4	-24.6	14.3	210	300	Hori.	40.0	25.7	
49.250	40.5	QP	11.4	-24.6	27.3	272	100	Vert.	40.0	12.7	
62.000	35.1	QP	7.1	-24.4	17.8	0	300	Hori.	40.0	22.2	
62.000	29.8	QP	7.1	-24.4	12.5	285	100	Vert.	40.0	27.5	
80.000	26.5	QP	6.9	-24.1	9.3	0	300	Hori.	40.0	30.7	
80.000	27.5	QP	6.9	-24.1	10.3	0	100	Vert.	40.0	29.7	
497.499	25.3	QP	18.0	-20.7	22.6	0	100	Hori.	46.0	23.4	
497.499	26.9	QP	18.0	-20.7	24.2	87	100	Vert.	46.0	21.8	

CHART: WITH FACTOR

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

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

UL Japan, Inc.

Ise EMC Lab.

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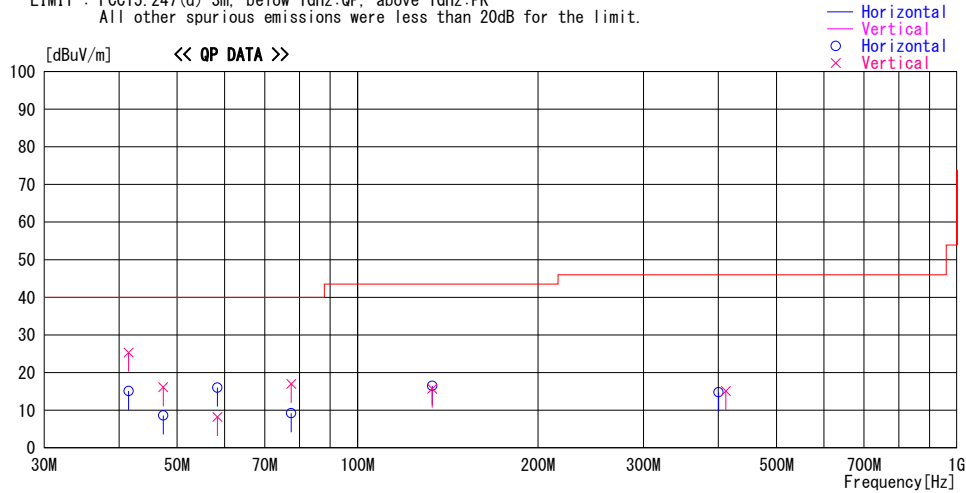
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Emission above 30 MHz (Spurious Emission) DOOR DR

Report No. 12541464H
Test place Ise EMC Lab. No.4 Semi Anechoic Chamber
Date January 18, 2019
Temperature/ Humidity 21 deg. C / 32 % RH
Engineer Shinya Watanabe
Mode Mode 3

LIMIT : FCC15.247(d) 3m, below 1GHz:QP, above 1GHz:PK
All other spurious emissions were less than 20dB for the limit.



Frequency	Reading	DET	Antenna	Loss&	Level	Angle	Height	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		Factor	Gain	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
41.500	25.7	QP	14.1	-24.7	15.1	0	338	Hori.	40.0	24.9	
41.500	35.9	QP	14.1	-24.7	25.3	247	100	Vert.	40.0	14.7	
47.375	21.1	QP	12.1	-24.6	8.6	0	300	Hori.	40.0	31.4	
47.375	28.6	QP	12.1	-24.6	16.1	88	100	Vert.	40.0	23.9	
58.375	32.2	QP	8.2	-24.4	16.0	197	393	Hori.	40.0	24.0	
58.375	24.4	QP	8.2	-24.4	8.2	0	100	Vert.	40.0	31.8	
77.498	26.8	QP	6.6	-24.2	9.2	0	303	Hori.	40.0	30.8	
77.498	34.6	QP	6.6	-24.2	17.0	278	100	Vert.	40.0	23.0	
133.227	26.0	QP	14.0	-23.5	16.5	0	316	Hori.	43.5	27.0	
133.227	25.2	QP	14.0	-23.5	15.7	102	100	Vert.	43.5	27.8	
400.401	20.3	QP	15.9	-21.4	14.8	0	100	Hori.	46.0	31.2	
411.624	20.4	QP	16.0	-21.3	15.1	0	200	Vert.	46.0	30.9	

CHART: WITH FACTOR

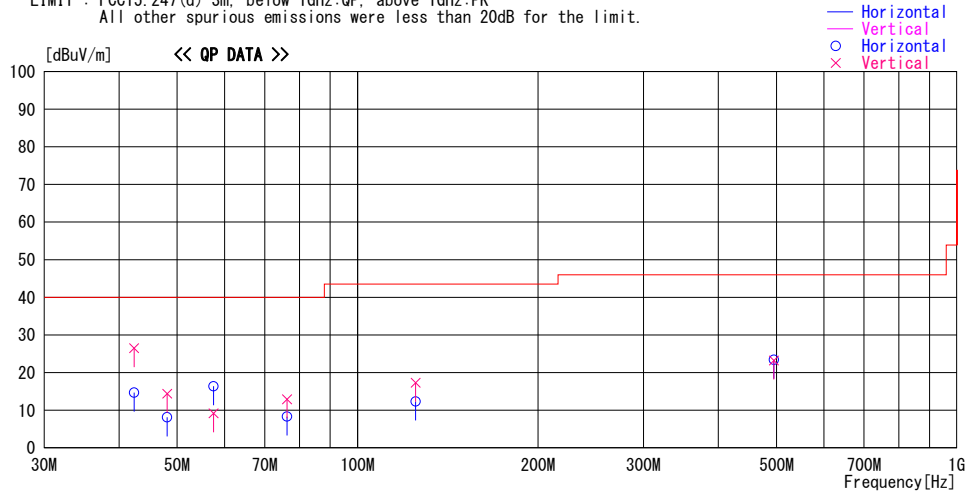
ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS & GAIN (CABLE + ATT - GAIN(AMP))

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

Radiated Emission above 30 MHz (Spurious Emission) DOOR AS

Report No. 12541464H
Test place Ise EMC Lab. No.4 Semi Anechoic Chamber
Date January 18, 2019
Temperature/ Humidity 21 deg. C / 32 % RH
Engineer Shinya Watanabe
Mode Mode 4

LIMIT : FCC15.247(d) 3m, below 1GHz:QP, above 1GHz:PK
All other spurious emissions were less than 20dB for the limit.



Frequency	Reading	DET	Antenna	Loss&	Level	Angle	Height	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		Factor	Gain	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
42.374	25.6	QP	13.8	-24.7	14.7	0	318	Hori.	40.0	25.3	
42.374	37.4	QP	13.8	-24.7	26.5	291	100	Vert.	40.0	13.5	
48.125	20.9	QP	11.8	-24.6	8.1	359	300	Hori.	40.0	31.9	
48.125	27.2	QP	11.8	-24.6	14.4	0	100	Vert.	40.0	25.6	
57.500	32.3	QP	8.5	-24.4	16.4	176	390	Hori.	40.0	23.6	
57.500	25.1	QP	8.5	-24.4	9.2	225	100	Vert.	40.0	30.8	
76.250	26.0	QP	6.5	-24.2	8.3	177	289	Hori.	40.0	31.7	
76.250	30.6	QP	6.5	-24.2	12.9	285	100	Vert.	40.0	27.1	
125.001	22.7	QP	13.2	-23.6	12.3	235	271	Hori.	43.5	31.2	
125.001	27.7	QP	13.2	-23.6	17.3	69	100	Vert.	43.5	26.2	
494.996	26.3	QP	17.9	-20.8	23.4	172	100	Hori.	46.0	22.6	
494.996	26.1	QP	17.9	-20.8	23.2	71	100	Vert.	46.0	22.8	

CHART: WITH FACTOR

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

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

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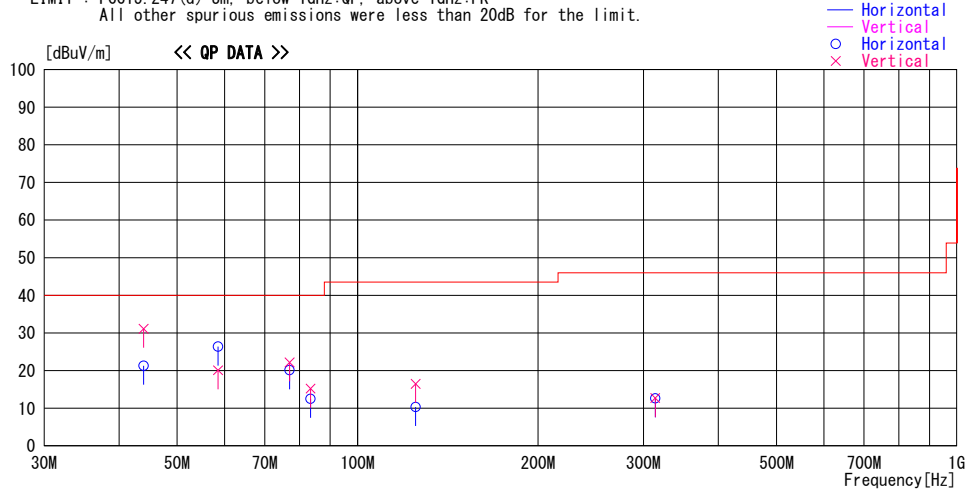
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Emission above 30 MHz (Spurious Emission) START SW

Report No. 12541464H
Test place Ise EMC Lab. No.4 Semi Anechoic Chamber
Date January 18, 2019
Temperature/ Humidity 21 deg. C / 32 % RH
Engineer Shinya Watanabe
Mode Mode 5

LIMIT : FCC15.247(d) 3m, below 1GHz:QP, above 1GHz:PK
All other spurious emissions were less than 20dB for the limit.



Frequency	Reading	DET	Antenna	Loss&	Level	Angle	Height	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		Factor	Gain	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
43.968	32.7	QP	13.2	-24.6	21.3	0	371	Hori.	40.0	18.7	
43.968	42.5	QP	13.2	-24.6	31.1	266	100	Vert.	40.0	8.9	
58.499	42.6	QP	8.2	-24.4	26.4	359	381	Hori.	40.0	13.6	
58.499	36.3	QP	8.2	-24.4	20.1	273	100	Vert.	40.0	19.9	
77.000	37.7	QP	6.6	-24.2	20.1	190	203	Hori.	40.0	19.9	
77.000	39.8	QP	6.6	-24.2	22.2	266	100	Vert.	40.0	17.8	
83.500	29.4	QP	7.2	-24.1	12.5	0	236	Hori.	40.0	27.5	
83.500	32.1	QP	7.2	-24.1	15.2	81	100	Vert.	40.0	24.8	
124.996	20.7	QP	13.2	-23.6	10.3	0	300	Hori.	43.5	33.2	
124.996	26.9	QP	13.2	-23.6	16.5	168	100	Vert.	43.5	27.0	
313.828	20.5	QP	14.0	-21.9	12.6	0	100	Hori.	46.0	33.4	
313.828	20.6	QP	14.0	-21.9	12.7	0	100	Vert.	46.0	33.3	

CHART: WITH FACTOR

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

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

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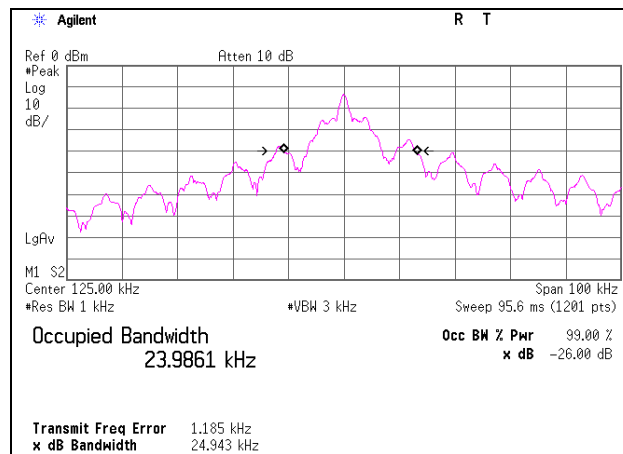
Telephone : +81 596 24 8999

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-26 dB Bandwidth and 99 % Occupied Bandwidth CENTER

Report No. 12541464H
Test place Ise EMC Lab. No.4 Semi Anechoic Chamber
Date January 23, 2019
Temperature/ Humidity 21 deg. C / 35 % RH
Engineer Koji Yamamoto
Mode Mode 1

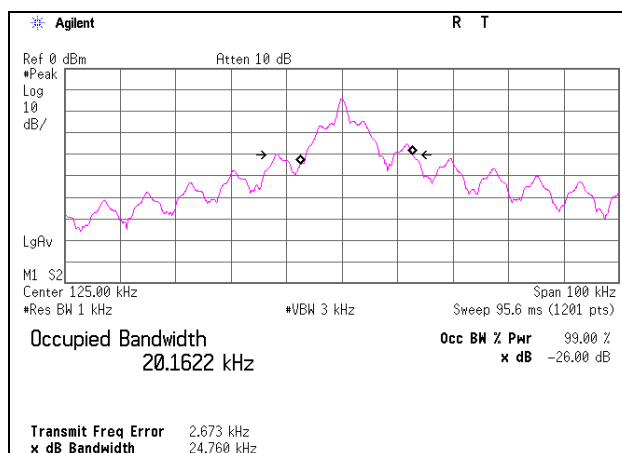
-26 dB Bandwidth [kHz]	99 % Occupied Bandwidth [kHz]
24.9430	23.9861



-26 dB Bandwidth and 99 % Occupied Bandwidth REAR DR

Report No. 12541464H
Test place Ise EMC Lab. No.4 Semi Anechoic Chamber
Date January 23, 2019
Temperature/ Humidity 21 deg. C / 35 % RH
Engineer Koji Yamamoto
Mode Mode 2

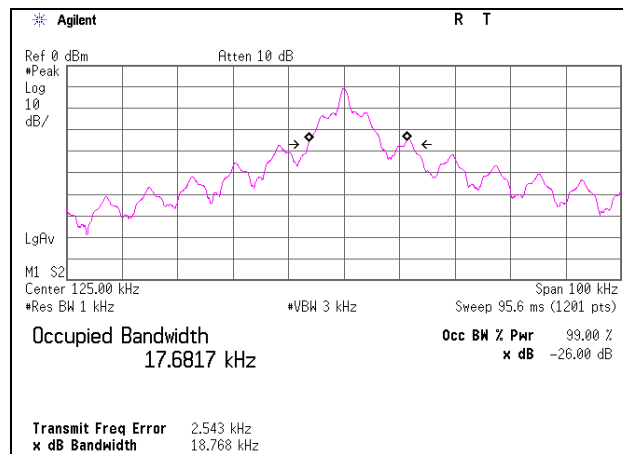
-26 dB Bandwidth [kHz]	99 % Occupied Bandwidth [kHz]
24.7600	20.1622



-26 dB Bandwidth and 99 % Occupied Bandwidth DOOR DR

Report No.	12541464H
Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Date	January 23, 2019
Temperature/ Humidity	21 deg. C / 35 % RH
Engineer	Koji Yamamoto
Mode	Mode 3

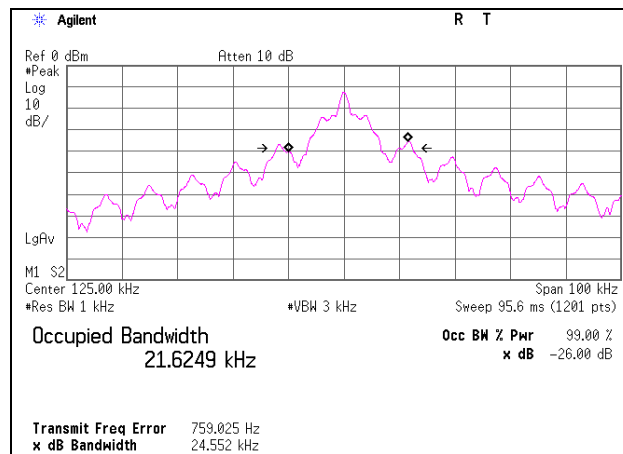
-26 dB Bandwidth [kHz]	99 % Occupied Bandwidth [kHz]
18.7680	17.6817



-26 dB Bandwidth and 99 % Occupied Bandwidth DOOR AS

Report No.	12541464H
Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Date	January 23, 2019
Temperature/ Humidity	21 deg. C / 35 % RH
Engineer	Koji Yamamoto
Mode	Mode 4

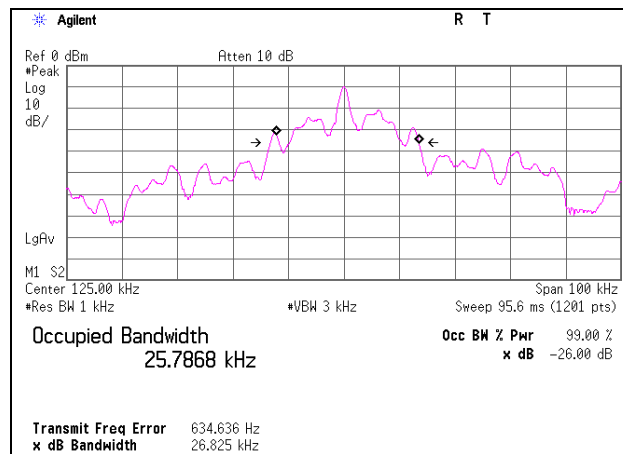
-26 dB Bandwidth [kHz]	99 % Occupied Bandwidth [kHz]
24.5520	21.6249



-26 dB Bandwidth and 99 % Occupied Bandwidth START SW

Report No.	12541464H
Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Date	January 23, 2019
Temperature/ Humidity	21 deg. C / 35 % RH
Engineer	Koji Yamamoto
Mode	Mode 5

-26 dB Bandwidth [kHz]	99 % Occupied Bandwidth [kHz]
26.8250	25.7868



APPENDIX 2: Test instruments

Test Instruments

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Due Date	Cal Int
RE	141583	Pre Amplifier	SONOMA INSTRUMENT	310	260833	2/27/2018	2/28/2019	12
RE	141951	EMI Test Receiver	Rohde & Schwarz	ESR26	101408	1/30/2018	1/31/2019	12
RE	141267	Logperiodic Antenna(200-1000MHz)	Schwarzbeck	VUSLP9111B	911B-192	6/1/2018	6/30/2019	12
RE	141425	Biconical Antenna	Schwarzbeck	BBA9106	1302	6/1/2018	6/30/2019	12
RE	141152	EMI measurement program	TSJ	TEPTO-DV	-	-	-	-
RE	141562	Thermo-Hygrometer	CUSTOM	CTH-201	0010	1/11/2019	1/31/2020	12
RE	141397	Coaxial Cable	UL Japan	-	-	6/13/2018	6/30/2019	12
RE	148898	Attenuator	KEYSIGHT	8491A	MY52462282	10/3/2018	10/31/2019	12
RE	141532	DIGITAL HiTESTER	HIOKI	3805	51201197	1/29/2019	1/31/2020	12
RE	141582	Pre Amplifier	SONOMA INSTRUMENT	310	260834	2/27/2018	2/28/2019	12
RE	141363	Attenuator(10dB)	JFW	50FP-010-H2	43608 46-202-1	2/28/2018	2/28/2019	12
RE	141216	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W/SFM14/sucoform141-PE/421-010	-/00640	7/3/2018	7/31/2019	12
RE	141413	Coaxial Cable	UL Japan	-	-	6/12/2018	6/30/2019	12
RE	141254	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100017	10/11/2018	10/31/2019	12
RE	141950	EMI Test Receiver	Rohde & Schwarz	ESU26	100412	6/15/2018	6/30/2019	12
RE	142183	Measure	KOMELON	KMC-36	-	-	-	-
RE	141554	Thermo-Hygrometer	CUSTOM	CTH-180	1301	1/11/2019	1/31/2020	12
RE	142008	AC3_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	6/26/2018	6/30/2020	24
RE	141899	Spectrum Analyzer	AGILENT	E4448A	MY46180655	8/10/2018	8/31/2019	12
RE	142645	Loop Antenna	UL Japan	-	-	-	-	-
RE	142011	AC4_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	6/28/2018	6/30/2020	24

*Hyphens for Last Calibration Date, Calibration Due Date and Cal Int (month) are instruments that Calibration is not required (e.g. software), or instruments checked in advance before use.

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:

RE: Spurious emission

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