RADIO TEST REPORT

Test Report No. : 11084189H-A-R1

Applicant	:	**TOYOTA TECHNICAL DEVELOPMENT CORPORATION**
Type of Equipment	:	**Realtime radio module**
Model No.	:	**TM4969**
FCC ID	:	**2AHCI-TM4969**
Test regulation	:	**FCC Part 15 Subpart C: 2015**
Test Result	:	**Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. This report is a revised version of 11084189H-A. 11084189H-A is replaced with this report.

Date of test: December 21, 2015 to January 20, 2016

Representative test engineer:
Shinichi Miyazono
Engineer
Consumer Technology Division

Approved by:
Takayuki Shimada
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/

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

REVISION HISTORY

Original Test Report No.: 11084189H-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	11084189H-A	February 17, 2016	-	-
1	11084189H-A-R1	March 10, 2016	P.9	Correction of Configuration and peripherals
1	11084189H-A-R1	March 10, 2016	P.25 to 41	Correction of Calculation

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

CONTENTS PAGE

SECTION 1: Customer information

[Applicant]

Company Name	:	TOYOTA TECHNICAL DEVELOPMENT CORPORATION
Address	:	1-9 Imae, Hanamoto-cho, Toyota, Aichi 470-0334, Japan
Telephone Number	:	+81-565-50-6447
Facsimile Number	:	+81-565-50-6700
Contact Person	:	Yasuyuki Moriyama

[Manufacturer]

Company Name	:	KEITSU ELECTRONIC CO., LTD.
Address	:	3-7-14, AKUTAGAWA-CHO TAKATSUKI-CITY, OSAKA 569-1123 JAPAN
Telephone Number	:	+81-72-685-8847
Facsimile Number	:	+81-72-685-8847
Contact Person	:	KUNIO TANAKA

*Remarks:
TOYOTA TECHNICAL DEVELOPMENT CORPORATION designates KEITSU ELECTRONIC CO., LTD. as manufacturer of the product (Realtime radio module).

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

2.1 Identification of E.U.T.

Type of Equipment	:	Realtime radio module
Model No.	:	TM4969
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 2.0 V - DC 3.6V (DC 3.3 V typ.)
Receipt Date of Sample	:	December 24, 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

Model: TM4969 (referred to as the EUT in this report) is a Realtime radio module.

General Specification

Clock frequency(ies) in the system	:	32 MHz

Radio Specification

Radio Type	:	Transceiver	
Frequency of Operation	:	2402 MHz to 2479 MHz	
Modulation	:	GFSK	
Operating voltage (inner)	:	DC 3.3 V	
Antenna type	:	Chip antenna, Patch antenna	
Antenna Gain	:	Chip antenna	: 0.5 dBi
		Patch antenna (PA2409S) with 3.0 m Cable	: 8.1 dBi
		Patch antenna (PAT209S-24) with 3.0 m Cable	: 8.1 dBi
Number of channel	:	78	
Channel spacing	:	1 MHz	

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C: 2015, final revised on November 23, 2015 *Some parts are effective on and after December 17, 2015 or December 23, 2015. The revision does not affect the test specification applied to the EUT.
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted limits Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
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	**QP** 15.3 dB, 0.21800 MHz, N **AV** 8.5 dB, 0.71080 MHz, L	Complied	-
6dB Bandwidth	**FCC:** KDB 558074 D01 DTS Meas Guidance v03r04 **IC:** -	**FCC:** Section 15.247(a)(2) **IC:** RSS-247 5.2(1)	See data.	Complied	Conducted
Maximum Peak Output Power	**FCC:** KDB 558074 D01 DTS Meas Guidance v03r04 **IC:** RSS-Gen 6.12	**FCC:** Section 15.247(b)(3) **IC:** RSS-247 5.4(4)		Complied	Conducted
Power Density	**FCC:** KDB 558074 D01 DTS Meas Guidance v03r04 **IC:** -	**FCC:** Section 15.247(e) **IC:** RSS-247 5.2(2)		Complied	Conducted
Spurious Emission Restricted Band Edges	**FCC:** KDB 558074 D01 DTS Meas Guidance v03r04 **IC:** RSS-Gen 6.13	**FCC:** Section15.247(d) **IC:** RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	0.2 dB 4804.000 MHz, AV, Vertical 4880.000 MHz, AV, Vertical	Complied	Conducted (below 30 MHz)/ Radiated (above 30 MHz) *1)

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.
*1) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 DTS Meas Guidance v03r04 12.2.7.

* In case any questions arise about test procedure, ANSI C63.10: 2013 is also referred.

FCC Part 15.31 (e)

This EUT provides stable voltage (DC 3.3 V) constantly to RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203/212 Antenna requirement

[Chip antenna]
The antenna is not removable from the EUT.
Therefore, the equipment complies with the antenna requirement of Section 15.203.

[Patch antenna]
The EUT has an external antenna connector, but it is installed by the professionals.
Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	**IC:** RSS-Gen 6.6	**IC:** -	N/A	-	Conducted

Other than above, 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 $k = 2$.
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	1.7 dB	2.8 dB	2.8 dB	2.9 dB	2.6 dB

Frequency range	Conducted emission using AMN(LISN) (±dB)
0.009 – 0.15MHz	3.5 dB
0.15 – 30MHz	2.9 dB

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

Polarity	Radiated emission (Below 1GHz)			
	(3 m*)(±dB)		(10 m*)(±dB)	
	30 – 300 MHz	300 – 1000MHz	30 – 300 MHz	300 – 1000MHz
Horizontal	4.8 dB	5.2 dB	4.8 dB	5.0 dB
Vertical	4.5 dB	5.9 dB	4.8 dB	5.1 dB

Radiated emission				
(3 m*)(±dB)		(1 m*)(±dB)	(0.5 m*)(±dB)	(10 m*)(±dB)
1 – 6GHz	6 – 18GHz	10 – 26.5 GHz	26.5 – 40GHz	1 -18 GHz
5.1 dB	5.3 dB	5.1 dB	5.1 dB	5.3 dB

*Measurement distance

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

Radiated emission test
The data listed in this report meets the limits unless the uncertainty is taken into consideration.

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

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	N/A	-	-
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.

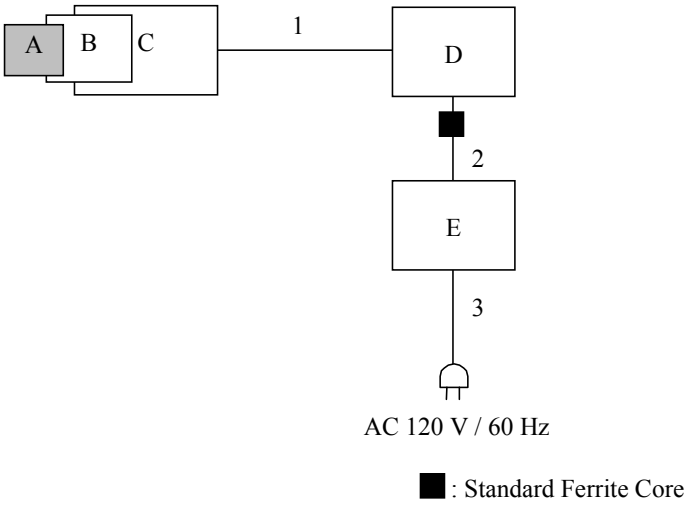
SECTION 4: Operation of E.U.T. during testing

4.1 Operating Mode(s)

Mode	Tested Frequency
Transmitting mode (Tx mode)	2402 MHz 2440 MHz 2479 MHz
*Power of the EUT was set by the software as follows; Power settings: E5(hex) - 00H(hex) Software: continuous emission test: NA_RMT(test) hopping emission test: NA_RMT(Hoptest) communication operation test: NAANT303 *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.	

4.2 Configuration and peripherals

[Chip antenna]



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

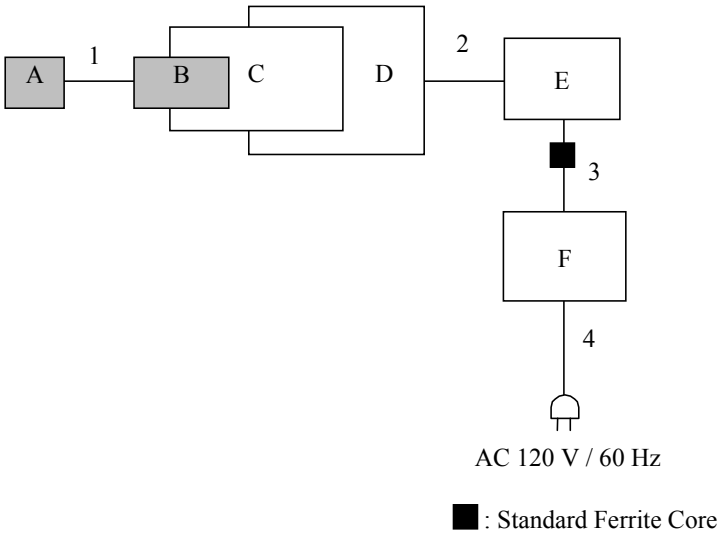
Description of EUT

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Module	TM4969	001	KEITSU ELECTRONIC CO., LTD.	EUT
B	Jig	-	-	KEITSU ELECTRONIC CO., LTD.	-
C	Jig	-	-	KEITSU ELECTRONIC CO., LTD.	-
D	Laptop PC	DF-W5	7HKSA86870	Panasonic	-
E	AC Adapter	CF-AA6282A	6282AM107619146A	Panasonic	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	USB Cable	1.5	Shielded	Shielded	-
2	DC Cable	1.4	Unshielded	Unshielded	-
3	AC Cable	1.8	Unshielded	Unshielded	-

[Patch antenna]



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

Description of EUT

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Patch antenna	PA2409S	001	NATEC CO., LTD.	EUT
		PAT209S-24	002		
B	Module	TM4969	002	KEITSU ELECTRONIC CO., LTD.	EUT
C	Jig	-	-	KEITSU ELECTRONIC CO., LTD.	-
D	Jig	-	-	KEITSU ELECTRONIC CO., LTD.	-
E	Laptop PC	DF-W5	7HKSA86870	Panasonic	-
F	AC Adapter	CF-AA6282A	6282AM107619146A	Panasonic	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Antenna Cable	3.0 *1)	Shielded	Shielded	-
2	USB Cable	1.5	Shielded	Shielded	-
3	DC Cable	1.4	Unshielded	Unshielded	-
4	AC Cable	1.8	Unshielded	Unshielded	-

*1) The worst antenna cable was selected by comparing the length.

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 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, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80 cm from a Line Impedance Stabilization Network (LISN) / Artificial mains Network (AMN) and excess AC cable was bundled in center.

1) For the tests on EUT with other peripherals (as a whole system)
I/O cables that were connected to the 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. All unused 50ohm connectors of the LISN (AMN) were resistivity terminated in 50 ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber.
The EUT was connected to a LISN (AMN).
An overview sweep with peak detection has been performed.

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

Detector	**: QP and CISPR AV**
Measurement range	**: 0.15 MHz – 30 MHz**
Test data	**: APPENDIX**
Test result	**: Pass**

SECTION 6: Radiated Spurious Emission

Test Procedure

It was measured based on "11.0 Emissions in non-restricted frequency bands" of "558074 D01 DTS Meas Guidance v03r04".

[For below 1GHz]
EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 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.

[For above 1GHz]
EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane.
The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane.

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 strength.
The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.
The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).
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	30 MHz to 300 MHz	300 MHz to 1 GHz	Above 1 GHz
Antenna Type	Biconical	Logperiodic	Horn

In any 100 kHz bandwidth outside the restricted band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9(IC) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (IC).

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV *3)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	Average Power Method: 12.2.5.2 RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: 100 traces Duty factor was added to the results.	RBW: 100 kHz VBW: 300kHz
Test Distance	3m	3 m (below 1 GHz), 3 m *1) (1 GHz -10 GHz), 1 m *2) (10 GHz - 26.5 GHz)		3 m (below 1 GHz), 3 m *1) (1 GHz - 10 GHz), 1 m *2) (10 GHz - 26.5 GHz)

*1) Distance Factor: 20 x log (4.5 m / 3.0 m) = 3.5 dB (Chip Antenna)
Distance Factor: 20 x log (4.4 m / 3.0 m) = 3.3 dB (Patch antenna)
*2) Distance Factor: 20 x log (1.0 m / 3.0 m) = -9.5 dB
*3) Average Power Measurement was performed based on 6.0 & 12.2.5 of "KDB 558074 D01 DTS Meas Guidance v03r04"

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

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

Measurement range : 30 M - 26.5 GHz
Test data : APPENDIX
Test result : Pass

SECTION 7: Antenna Terminal Conducted Tests

Test Procedure

The tests were made with below setting connected to the antenna port.

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
6dB Bandwidth	20 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth *1)	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak/ Average *2)	-	Power Meter (Sensor: 50 MHz BW)
Peak Power Density	1.5 times the 6dB Bandwidth	3 kHz	10 kHz	Auto	Peak	Max Hold	Spectrum Analyzer *3)
Conducted Spurious Emission *4)	9kHz to 150kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150kHz to 30MHz	9.1 kHz	27 kHz				

*1) Peak hold was applied as Worst-case measurement.
*2) Reference data
*3) Section 10.2 Method PKPSD (peak PSD) of "KDB 558074 D01 DTS Meas Guidance v03r04".
*4) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.
Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.
(9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 9.1 kHz)

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

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Test data

Conducted Emission
(Chip Antenna)

DATA OF CONDUCTED EMISSION TEST

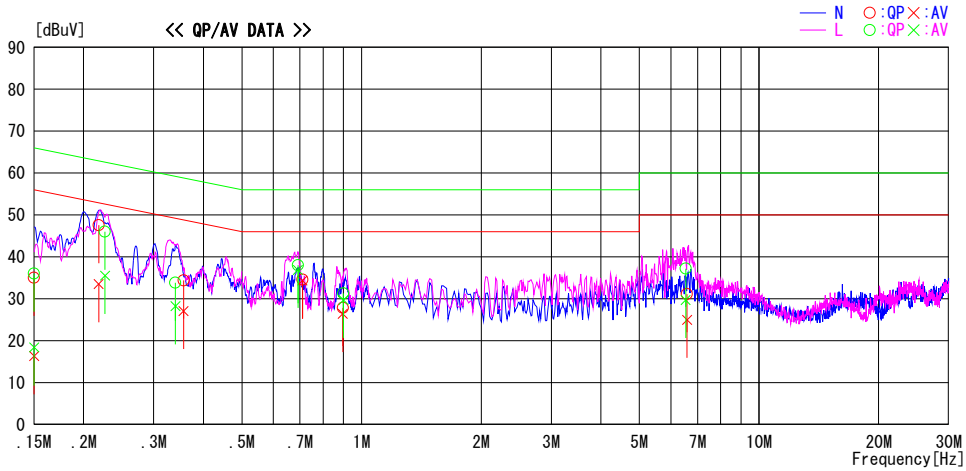
UL Japan, Inc. Ise EMC Lab. No.2 Semi Anechoic Chamber
Date : 2016/01/21

Report No. : 11084189H

Temp./Humi. : 22deg. C / 34% RH
Engineer : Hiroyuki Furutaka

Mode / Remarks : Tx 2402MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



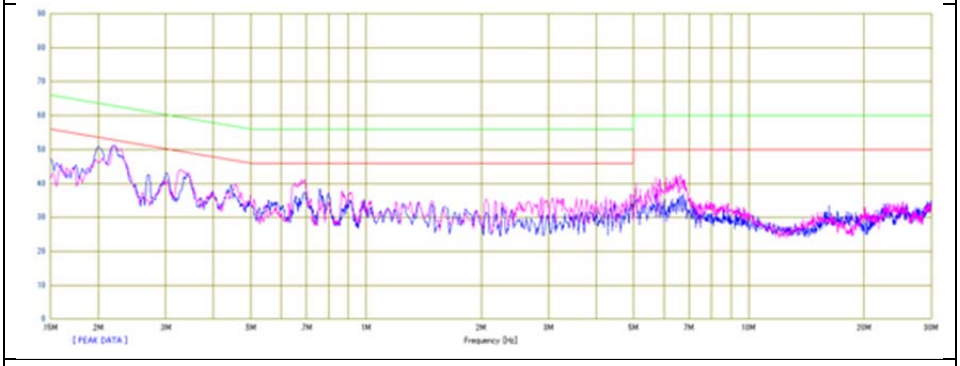
Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV	Factor	QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.15000	21.8	3.1	13.2	35.0	16.3	66.0	56.0	31.0	39.7	N	
0.15000	22.8	5.2	13.2	36.0	18.4	66.0	56.0	30.0	37.6	L	
0.21800	34.4	20.3	13.2	47.6	33.5	62.9	52.9	15.3	19.4	N	
0.22620	32.8	22.3	13.2	46.0	35.5	62.6	52.6	16.6	17.1	L	
0.34040	20.6	15.0	13.2	33.8	28.2	59.2	49.2	25.4	21.0	L	
0.35690	21.2	13.9	13.2	34.4	27.1	58.8	48.8	24.4	21.7	N	
0.69180	24.7	23.6	13.3	38.0	36.9	56.0	46.0	18.0	9.1	L	
0.71040	21.3	21.0	13.3	34.6	34.3	56.0	46.0	21.4	11.7	N	
0.89780	14.5	13.1	13.3	27.8	26.4	56.0	46.0	28.2	19.6	N	
0.90080	18.0	16.4	13.3	31.3	29.7	56.0	46.0	24.7	16.3	L	
6.54200	23.3	15.8	13.9	37.2	29.7	60.0	50.0	22.8	20.3	L	
6.58700	17.2	11.1	13.9	31.1	25.0	60.0	50.0	28.9	25.0	N	

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.

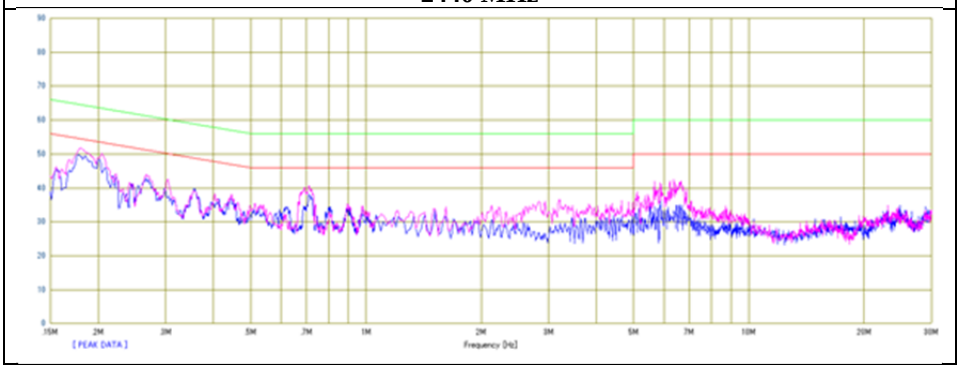
Conducted Emission
(Chip Antenna)

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11084189H
Date	January 21, 2016
Temperature / Humidity	22 deg. C / 34 % RH
Engineer	Hiroyuki Furutaka
Mode	Tx

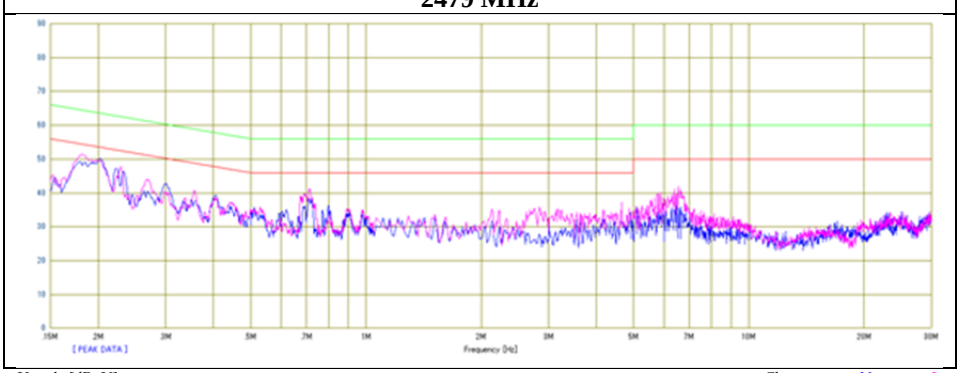
2402 MHz



2440 MHz



2479 MHz



Y scale [dBuV] Chart — N — L

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

Conducted Emission
(Patch antenna: PA2409S)

DATA OF CONDUCTED EMISSION TEST

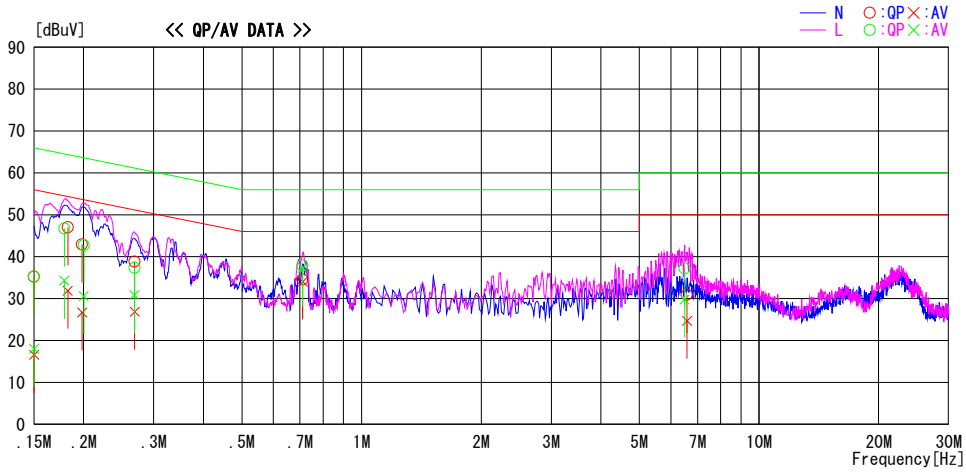
UL Japan, Inc. Ise EMC Lab. No.2 Semi Anechoic Chamber
Date : 2016/01/21

Report No. : 11084189H

Temp./Humi. : 22deg. C / 34% RH
Engineer : Hiroyuki Furutaka

Mode / Remarks : Tx 2402MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



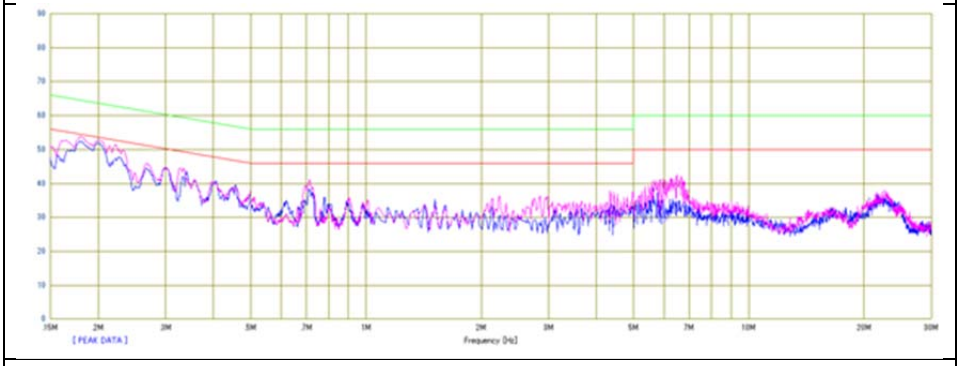
Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV	Factor	QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.15000	22.0	3.4	13.2	35.2	16.6	66.0	56.0	30.8	39.4	N	
0.15000	22.1	4.9	13.2	35.3	18.1	66.0	56.0	30.7	37.9	L	
0.17880	33.5	21.1	13.2	46.7	34.3	64.5	54.5	17.8	20.2	L	
0.18250	33.8	18.7	13.2	47.0	31.9	64.4	54.4	17.4	22.5	N	
0.19820	29.7	13.5	13.2	42.9	26.7	63.7	53.7	20.8	27.0	N	
0.20010	29.5	17.4	13.2	42.7	30.6	63.6	53.6	20.9	23.0	L	
0.26850	24.2	17.7	13.2	37.4	30.9	61.2	51.2	23.8	20.3	L	
0.26860	25.6	13.7	13.2	38.8	26.9	61.2	51.2	22.4	24.3	N	
0.71100	21.3	20.8	13.3	34.6	34.1	56.0	46.0	21.4	11.9	N	
0.71118	24.6	24.0	13.3	37.9	37.3	56.0	46.0	18.1	8.7	L	
6.49600	23.3	15.9	13.9	37.2	29.8	60.0	50.0	22.8	20.2	L	
6.58860	17.0	10.8	13.9	30.9	24.7	60.0	50.0	29.1	25.3	N	

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.

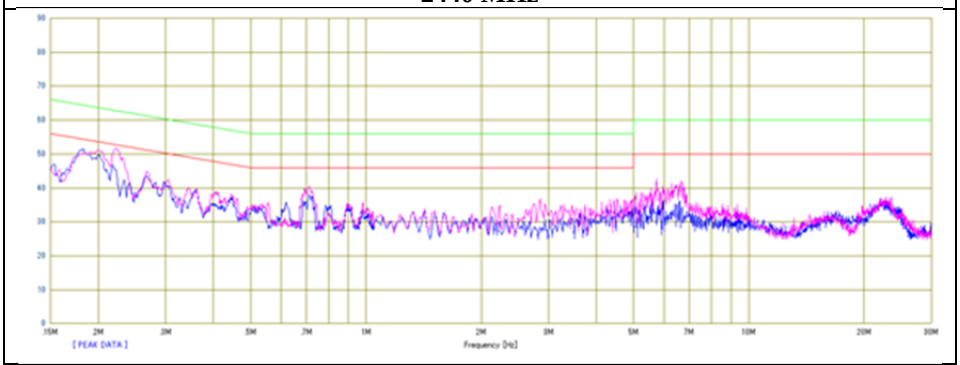
Conducted Emission
(Patch antenna: PA2409S)

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11084189H
Date	January 21, 2016
Temperature / Humidity	22 deg. C / 34 % RH
Engineer	Hiroyuki Furutaka
Mode	Tx

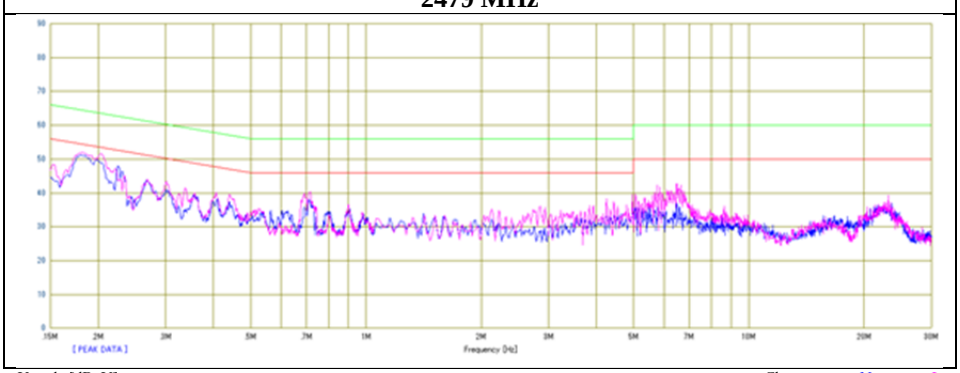
2402 MHz



2440 MHz



2479 MHz



Y scale [dBuV] Chart — N — L

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

Conducted Emission
(Patch antenna: PAT209S-24)

DATA OF CONDUCTED EMISSION TEST

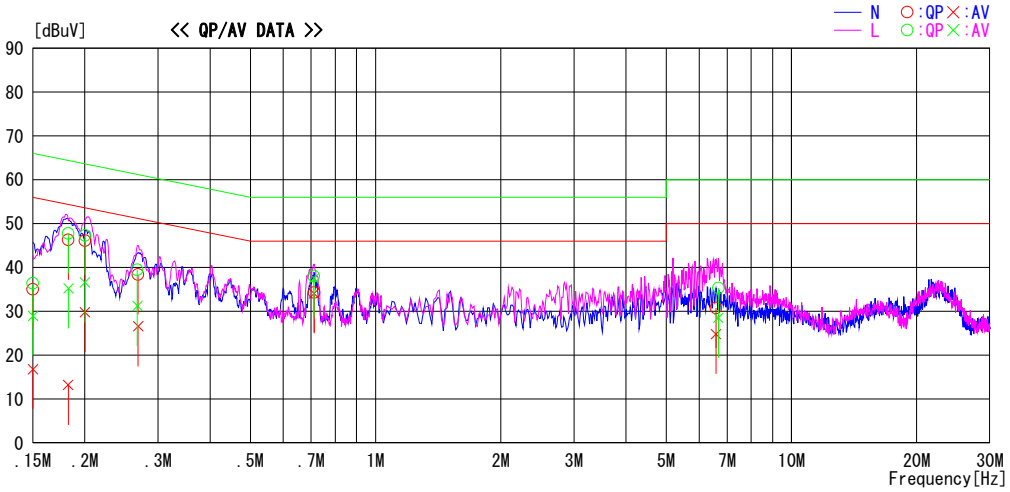
UL Japan, Inc. Ise EMC Lab. No.2 Semi Anechoic Chamber
Date : 2016/01/21

Report No. : 11084189H

Temp./Humi. : 22deg. C / 34% RH
Engineer : Hiroyuki Furutaka

Mode / Remarks : Tx 2402MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase
	QP	AV	Factor	QP	AV	QP	AV	QP	AV	
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]	
0.15000	21.8	3.6	13.2	35.0	16.8	66.0	56.0	31.0	39.2	N
0.15000	23.2	15.8	13.2	36.4	29.0	66.0	56.0	29.6	27.0	L
0.18250	33.1	0.0	13.2	46.3	13.2	64.4	54.4	18.1	41.2	N
0.18260	34.5	22.0	13.2	47.7	35.2	64.4	54.4	16.7	19.2	L
0.20015	32.9	16.6	13.2	46.1	29.8	63.6	53.6	17.5	23.8	N
0.20017	34.1	23.4	13.2	47.3	36.6	63.6	53.6	16.3	17.0	L
0.26760	26.3	18.0	13.2	39.5	31.2	61.2	51.2	21.7	20.0	L
0.26860	25.2	13.4	13.2	38.4	26.6	61.2	51.2	22.8	24.6	N
0.71080	24.7	24.2	13.3	38.0	37.5	56.0	46.0	18.0	8.5	L
0.71150	21.0	20.8	13.3	34.3	34.1	56.0	46.0	21.7	11.9	N
6.58400	16.8	10.9	13.9	30.7	24.8	60.0	50.0	29.3	25.2	N
6.66800	21.4	14.6	13.9	35.3	28.5	60.0	50.0	24.7	21.5	L

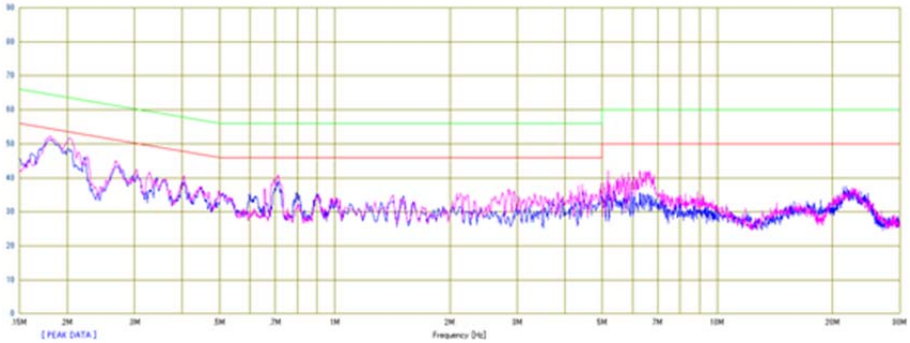
CHART : WITH FACTOR, Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + ATTEN. + CABLE)
Except for the above table : adequate margin data below the limits.

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

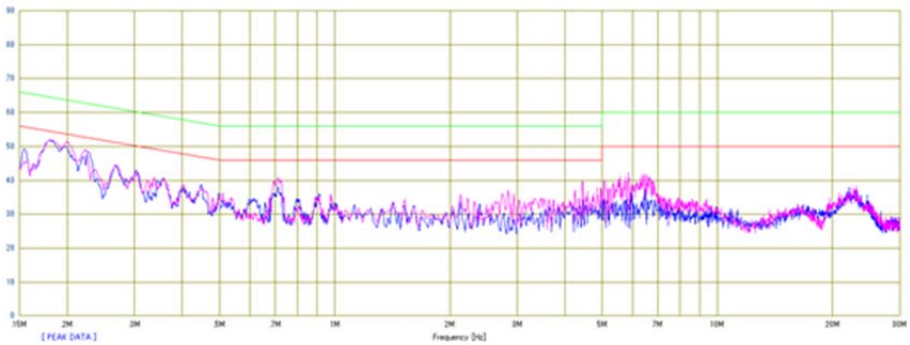
Conducted Emission
(Patch antenna: PAT209S-24)

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11084189H
Date	January 21, 2016
Temperature / Humidity	22 deg. C / 34 % RH
Engineer	Hiroyuki Furutaka
Mode	Tx

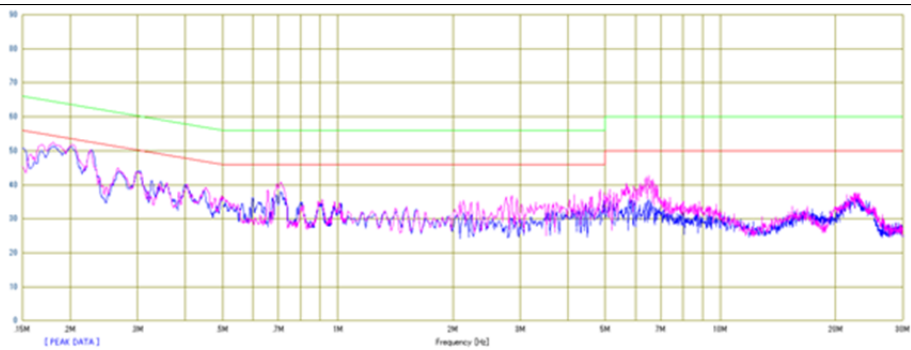
2402 MHz



2440 MHz



2479 MHz



Y scale [dBuV] Chart N L

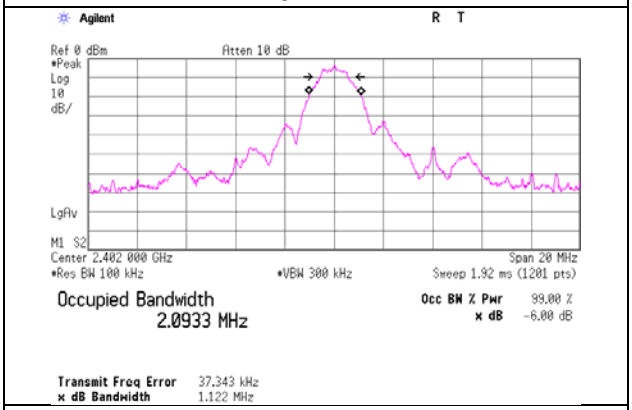
UL Japan, Inc.
Ise EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8999
Facsimile : +81 596 24 8124

6dB Bandwidth

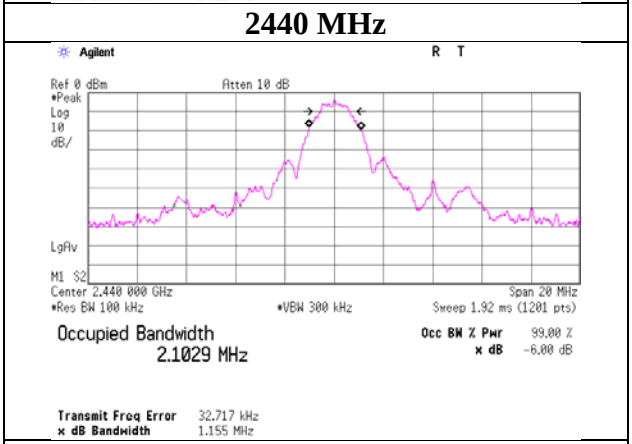
Test place	Ise EMC Lab. No.11 and 6 Measurement Room	
Report No.	11084189H	
Date	December 21, 2015	January 20, 2016
Temperature / Humidity	21 deg. C / 32 % RH	25 deg. C / 41 % RH
Engineer	Shinya Watanabe	Koji Yamamoto
Mode	Tx	

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2402	1.122	> 500
2440	1.155	> 500
2479	1.121	> 500

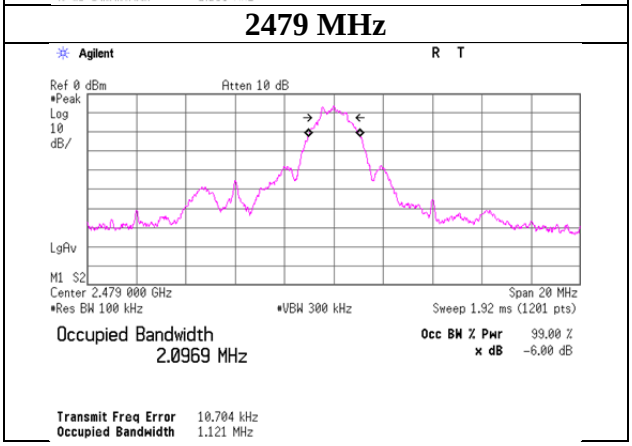
2402 MHz



2440 MHz



2479 MHz



Maximum Peak Output Power

Test place	Ise EMC Lab. No.6 Measurement Room	
Report No.	11084189H	
Date	January 20, 2016	January 21, 2016
Temperature / Humidity	23 deg. C / 39 % RH	23 deg. C / 30 % RH
Engineer	Koji Yamamoto	Masafumi Niwa
Mode	Tx	

Maximum output power settings

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2402	-5.19	0.00	10.06	4.87	3.07	27.90	616.59	23.03
2440	-5.38	0.00	10.06	4.68	2.94	27.90	616.59	23.22
2479	-5.63	0.00	10.06	4.43	2.77	27.90	616.59	23.47

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

*The equipment and cables were not used for factor 0 dB of the data sheets.

Minimum output power settings

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2402	-22.84	1.36	0.00	-21.48	0.01	27.90	616.59	49.38
2440	-23.13	1.36	0.00	-21.77	0.01	27.90	616.59	49.67
2479	-23.53	1.36	0.00	-22.17	0.01	27.90	616.59	50.07

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

*The equipment and cables were not used for factor 0 dB of the data sheets.

This limit was reduced by the amount in dB that the antenna gain of the antenna exceeds 6dBi.

Average Output Power
(Reference data for RF Exposure)

Test place	Ise EMC Lab. No.6 Measurement Room	
Report No.	11084189H	
Date	January 20, 2016	January 21, 2016
Temperature / Humidity	23 deg. C / 39 % RH	23 deg. C / 30 % RH
Engineer	Koji Yamamoto	Masafumi Niwa
Mode	Tx	

Maximum output power settings

Freq.	Reading	Cable Loss	Atten. Loss	Result (Frame power)		Duty factor	Result (Burst power)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2402	-8.43	0.00	10.06	1.63	1.46	2.63	4.26	2.67
2440	-8.66	0.00	10.06	1.40	1.38	2.63	4.03	2.53
2479	-8.92	0.00	10.06	1.14	1.30	2.63	3.77	2.38

Sample Calculation:
Result (Frame power) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator
Result (Burst power) = Frame power + Duty factor

*The equipment and cables were not used for factor 0 dB of the data sheets.

Minimum output power settings

Freq.	Reading	Cable Loss	Atten. Loss	Result (Frame power)		Duty factor	Result (Burst power)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2402	-26.51	1.36	0.00	-25.15	0.00	2.63	-22.52	0.006
2440	-26.89	1.37	0.00	-25.52	0.00	2.63	-22.89	0.005
2479	-27.36	1.38	0.00	-25.98	0.00	2.63	-23.35	0.005

Sample Calculation:
Result (Frame power) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator
Result (Burst power) = Frame power + Duty factor

*The equipment and cables were not used for factor 0 dB of the data sheets.

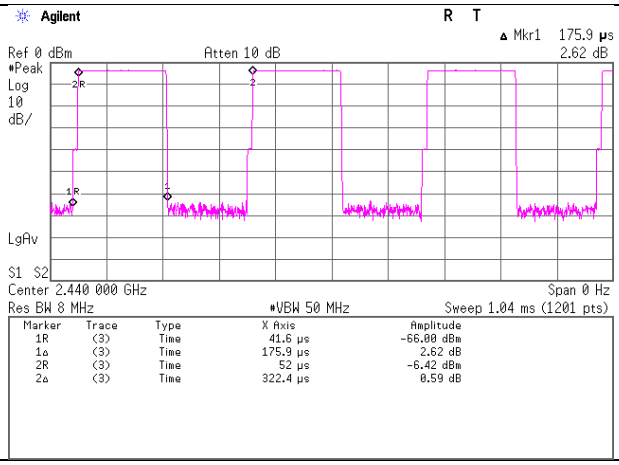
Burst rate confirmation

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11084189H
Date	December 21, 2015
Temperature / Humidity	21 deg. C / 32 % RH
Engineer	Shinya Watanabe
Mode	Tx

Tx on / (Tx on + Tx off) = 0.546

Tx on / (Tx on + Tx off) * 100 = 54.6 %

Duty factor = 10 * log (322.4 / 175.9) = 2.63 dB



Radiated Spurious Emission
(Chip Antenna)

Test place	Ise EMC Lab.			
Report No.	11084189H			
Semi Anechoic Camber	No.1	No.3	No.1	No.4
Date	January 14, 2016	January 15, 2016	January 19, 2016	January 20, 2016
Temperature / Humidity	22 deg. C / 31 % RH	23 deg. C / 32 % RH	22 deg. C / 30 % RH	22 deg. C / 30 % RH
Engineer	Shinichi Miyazono (1 GHz - 10 GHz)	Shinichi Miyazono (1 GHz - 10 GHz)	Shinichi Miyazono (30 MHz - 1000 MHz)	Shinichi Miyazono (10 GHz - 26.5 GHz)
Mode	Tx 2402 MHz			

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	79.798	QP	51.0	6.6	8.1	38.8	-	26.9	40.0	13.1	
Hori	271.481	QP	42.2	18.7	10.3	38.9	-	32.3	46.0	13.7	
Hori	390.930	QP	38.3	17.4	11.2	38.6	-	28.3	46.0	17.7	
Hori	431.999	QP	41.1	17.8	11.5	38.5	-	31.9	46.0	14.1	
Hori	508.276	QP	39.5	18.2	12.0	38.2	-	31.5	46.0	14.5	
Hori	532.220	QP	33.8	18.5	12.2	38.1	-	26.4	46.0	19.6	
Hori	701.338	QP	38.4	20.4	13.2	38.2	-	33.8	46.0	12.2	
Hori	2369.620	PK	54.1	26.8	5.8	36.1	-	50.6	73.9	23.3	
Hori	2390.000	PK	49.4	26.8	5.8	36.1	-	45.9	73.9	28.0	
Hori	4804.000	PK	44.6	31.8	9.0	31.3	-	54.1	73.9	19.8	
Hori	4806.000	PK	47.4	31.8	9.0	31.3	-	56.9	73.9	17.0	
Hori	7206.000	PK	44.6	36.1	9.2	35.6	-	54.3	-	-	Floor Noise
Hori	9608.000	PK	44.5	38.6	10.2	36.3	-	57.0	-	-	Floor Noise
Hori	12010.000	PK	41.5	39.9	-1.1	33.2	-	47.1	73.9	26.8	
Hori	2369.620	AV	47.1	26.8	5.8	36.1	2.6	46.2	53.9	7.7	
Hori	2390.000	AV	40.3	26.8	5.8	36.1	2.6	39.4	53.9	14.5	*1)
Hori	4804.000	AV	35.6	31.8	9.0	31.3	2.6	47.7	53.9	6.2	
Hori	4806.000	AV	43.6	31.8	9.0	31.3	-	53.1	53.9	0.8	Not Duty Cycle
Hori	7206.000	AV	34.9	36.1	9.2	35.6	-	44.6	-	-	Floor Noise
Hori	9608.000	AV	35.3	38.6	10.2	36.3	-	47.8	-	-	Floor Noise
Hori	12010.000	AV	34.3	39.9	-1.1	33.2	2.6	42.5	53.9	11.4	
Vert	79.578	QP	54.7	6.6	8.1	38.8	-	30.6	40.0	9.4	
Vert	268.200	QP	41.1	18.6	10.3	38.9	-	31.1	46.0	14.9	
Vert	390.930	QP	40.4	17.4	11.2	38.6	-	30.4	46.0	15.6	
Vert	432.966	QP	39.2	17.8	11.5	38.5	-	30.0	46.0	16.0	
Vert	508.277	QP	36.5	18.2	12.0	38.2	-	28.5	46.0	17.5	
Vert	532.498	QP	37.5	18.5	12.2	38.1	-	30.1	46.0	15.9	
Vert	701.320	QP	35.7	20.4	13.2	38.2	-	31.1	46.0	14.9	
Vert	2369.620	PK	48.9	26.9	6.7	32.1	-	50.4	73.9	23.5	
Vert	2390.000	PK	34.9	26.9	6.8	32.0	-	36.6	73.9	37.3	
Vert	4804.000	PK	43.1	31.8	9.0	31.3	-	52.6	73.9	21.3	
Vert	4806.000	PK	47.3	31.8	9.0	31.3	-	56.8	73.9	17.1	
Vert	7206.000	PK	42.8	36.0	10.2	32.0	-	57.0	-	-	Floor Noise
Vert	9608.000	PK	43.9	38.2	11.0	32.4	-	60.7	-	-	Floor Noise
Vert	12010.000	PK	47.0	39.9	-1.9	33.2	-	51.8	73.9	22.1	
Vert	2369.620	AV	41.8	26.9	6.7	32.1	2.6	45.9	53.9	8.0	
Vert	2390.000	AV	44.2	26.9	6.8	32.0	2.6	48.5	53.9	5.4	*1)
Vert	4804.000	AV	34.6	31.8	9.0	31.3	2.6	46.7	53.9	7.2	
Vert	4806.000	AV	43.0	31.8	9.0	31.3	-	52.5	53.9	1.4	Not Duty Cycle
Vert	7206.000	AV	34.1	36.0	10.2	32.0	-	48.3	-	-	Floor Noise
Vert	9608.000	AV	34.3	38.2	11.0	32.4	-	51.1	-	-	Floor Noise
Vert	12010.000	AV	38.7	39.9	-1.9	33.2	2.6	46.1	53.9	7.8	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (4.5 m / 3.0 m) = 3.5 dB

Distance factor: 10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

*1) Not Out of Band emission(Leakage Power)

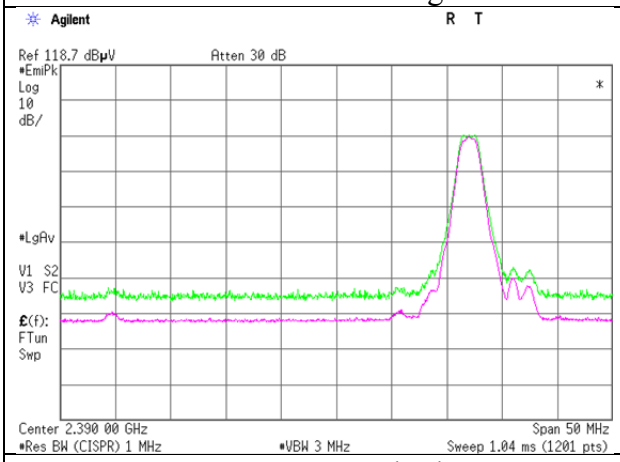
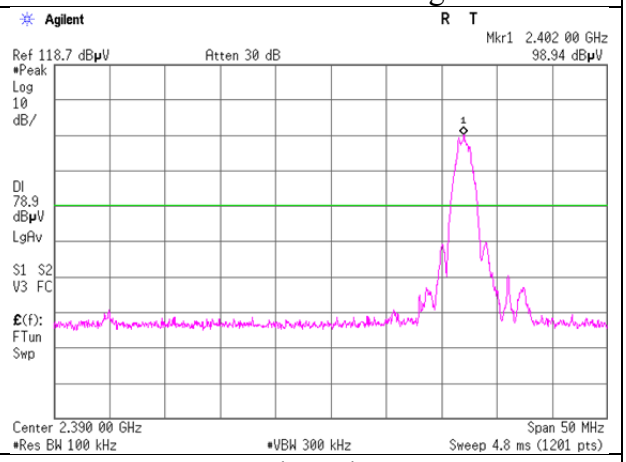
20dBc Data Sheet

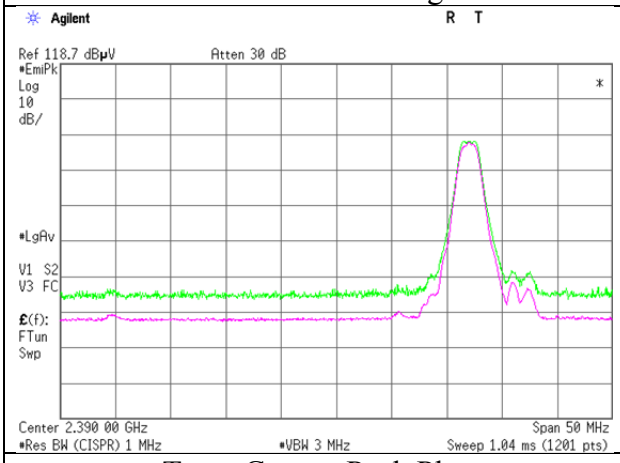
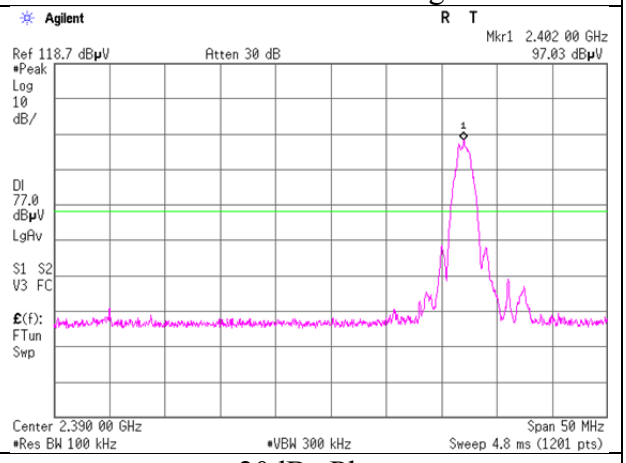
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	98.9	26.9	6.8	32.0	100.6	-	-	Carrier
	2400.000	PK	73.1	26.8	5.8	36.1	69.6	80.6	11.0	
Vert	2402.000	PK	97.0	26.9	6.8	32.0	98.7	-	-	Carrier
	2400.000	PK	65.9	26.9	6.8	32.0	67.6	78.7	11.1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amprifier)

Radiated Spurious Emission
(Chip Antenna)
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.1 and No.3 Semi Anechoic Chamber	
Report No.	11084189H	
Date	January 14, 2016	January 15, 2016
Temperature / Humidity	22 deg. C / 31 % RH	23 deg. C / 32 % RH
Engineer	Shinichi Miyazono (1 GHz - 10 GHz)	Shinichi Miyazono (1 GHz - 10 GHz)
Mode	Tx 2402 MHz	

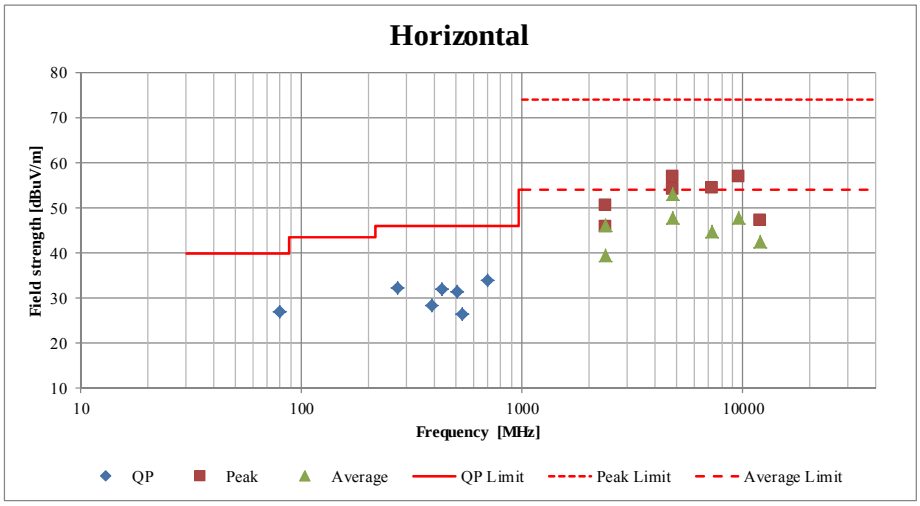
Horizontal	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

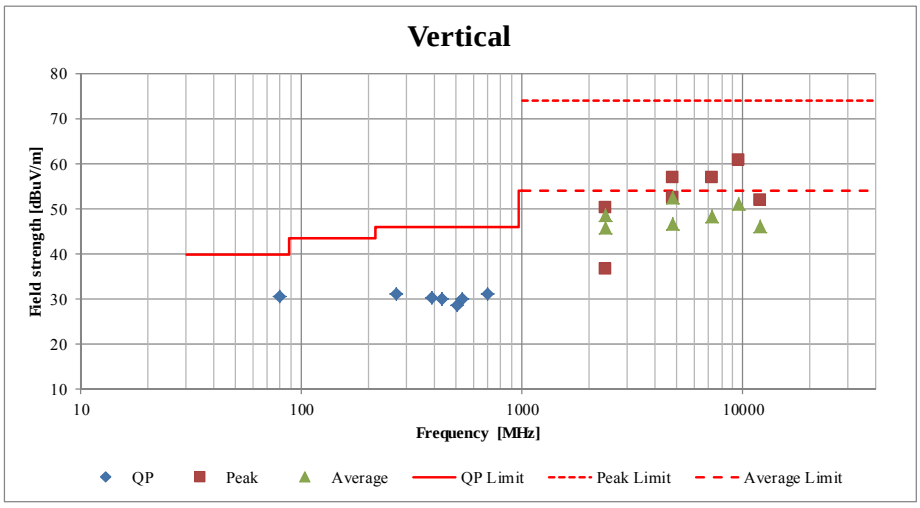
Vertical	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission
(Chip Antenna)
(Plot data, Worst case)

Test place	Ise EMC Lab.			
Report No.	11084189H			
Semi Anechoic Chamber	No.1	No.3	No.1	No.4
Date	January 14, 2016	January 15, 2016	January 19, 2016	January 20, 2016
Temperature / Humidity	22 deg. C / 31 % RH	23 deg. C / 32 % RH	22 deg. C / 30 % RH	22 deg. C / 30 % RH
Engineer	Shinichi Miyazono	Shinichi Miyazono	Shinichi Miyazono	Shinichi Miyazono
	(1 GHz - 10 GHz)	(1 GHz - 10 GHz)	(30 MHz - 1000 MHz)	(10 GHz - 26.5 GHz)
Mode	Tx 2402 MHz			





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

Radiated Spurious Emission
(Chip Antenna)

Test place	Ise EMC Lab.		
Report No.	11084189H		
Semi Anechoic Chamber	No.3	No.1	No.4
Date	January 15, 2016	January 19, 2016	January 20, 2016
Temperature / Humidity	23 deg. C / 32 % RH	22 deg. C / 30 % RH	22 deg. C / 30 % RH
Engineer	Shinichi Miyazono (1 GHz - 10 GHz)	Shinichi Miyazono (30 MHz - 1000 MHz)	Shinichi Miyazono (10 GHz - 26.5 GHz)
Mode	Tx 2440 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	79.688	QP	51.1	6.6	8.1	38.8	-	27.0	40.0	13.0	
Hori	268.123	QP	41.2	18.6	10.3	38.9	-	31.2	46.0	14.8	
Hori	390.899	QP	38.4	17.4	11.2	38.6	-	28.4	46.0	17.6	
Hori	432.003	QP	41.3	17.8	11.5	38.5	-	32.1	46.0	13.9	
Hori	508.270	QP	39.6	18.2	12.0	38.2	-	31.6	46.0	14.4	
Hori	532.223	QP	33.9	18.5	12.2	38.1	-	26.5	46.0	19.5	
Hori	701.329	QP	38.3	20.4	13.2	38.2	-	33.7	46.0	12.3	
Hori	4880.000	PK	44.1	31.9	9.0	31.3	-	53.7	73.9	20.2	
Hori	4882.000	PK	48.8	31.9	9.0	31.3	-	58.4	73.9	15.5	
Hori	7320.000	PK	42.6	36.0	10.3	32.0	-	56.9	-	-	Floor Noise
Hori	9760.000	PK	42.7	38.2	11.0	32.5	-	59.4	-	-	Floor Noise
Hori	12200.000	PK	43.4	39.9	-1.0	33.0	-	49.3	73.9	24.6	
Hori	4880.000	AV	34.7	31.9	9.0	31.3	2.6	46.9	53.9	7.0	
Hori	4882.000	AV	43.9	31.9	9.0	31.3	-	53.5	53.9	0.4	Not Duty Cycle
Hori	7320.000	AV	34.0	36.0	10.3	32.0	-	48.3	-	-	Floor Noise
Hori	9760.000	AV	33.9	38.2	11.0	32.5	-	50.6	-	-	Floor Noise
Hori	12200.000	AV	35.9	39.9	-1.0	33.0	2.6	44.4	53.9	9.5	
Vert	79.611	QP	54.6	6.6	8.1	38.8	-	30.5	40.0	9.5	
Vert	269.112	QP	41.3	18.7	10.3	38.9	-	31.4	46.0	14.6	
Vert	390.940	QP	40.6	17.4	11.2	38.6	-	30.6	46.0	15.4	
Vert	432.967	QP	39.2	17.8	11.5	38.5	-	30.0	46.0	16.0	
Vert	508.279	QP	36.3	18.2	12.0	38.2	-	28.3	46.0	17.7	
Vert	532.435	QP	37.7	18.5	12.2	38.1	-	30.3	46.0	15.7	
Vert	701.321	QP	35.7	20.4	13.2	38.2	-	31.1	46.0	14.9	
Vert	4880.000	PK	43.6	31.9	9.0	31.3	-	53.2	73.9	20.7	
Vert	4882.000	PK	47.2	31.9	9.0	31.3	-	56.8	73.9	17.1	
Vert	7320.000	PK	42.9	36.0	10.3	32.0	-	57.2	-	-	Floor Noise
Vert	9760.000	PK	42.8	38.2	11.0	32.5	-	59.5	-	-	Floor Noise
Vert	12200.000	PK	49.9	39.9	-1.0	33.0	-	55.8	73.9	18.1	
Vert	4880.000	AV	34.6	31.9	9.0	31.3	2.6	46.8	53.9	7.1	
Vert	4882.000	AV	43.7	31.9	9.0	31.3	-	53.3	53.9	0.6	Not Duty Cycle
Vert	7320.000	AV	34.1	36.0	10.3	32.0	-	48.4	-	-	Floor Noise
Vert	9760.000	AV	34.0	38.2	11.0	32.5	-	50.7	-	-	Floor Noise
Vert	12200.000	AV	41.7	39.9	-1.0	33.0	2.6	50.2	53.9	3.7	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (4.5 m / 3.0 m) = 3.5 dB

Distance factor: 10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

*1) Not Out of Band emission(Leakage Power)

Radiated Spurious Emission
(Chip Antenna)

Test place	Ise EMC Lab.		
Report No.	11084189H		
Semi Anechoic Chamber	No.1	No.1	No.4
Date	January 18, 2016	January 19, 2016	January 20, 2016
Temperature / Humidity	22 deg. C / 41 % RH	22 deg. C / 30 % RH	22 deg. C / 30 % RH
Engineer	Shinichi Miyazono (1 GHz - 10 GHz)	Shinichi Miyazono (30 MHz - 1000 MHz)	Shinichi Miyazono (10 GHz - 26.5 GHz)
Mode	Tx 2479 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	79.602	QP	51.0	6.6	8.1	38.8	-	26.9	40.0	13.1	
Hori	269.004	QP	41.1	18.6	10.3	38.9	-	31.1	46.0	14.9	
Hori	390.945	QP	38.5	17.4	11.2	38.6	-	28.5	46.0	17.5	
Hori	432.012	QP	41.5	17.8	11.5	38.5	-	32.3	46.0	13.7	
Hori	508.255	QP	39.8	18.2	12.0	38.2	-	31.8	46.0	14.2	
Hori	532.119	QP	33.6	18.5	12.2	38.1	-	26.2	46.0	19.8	
Hori	701.324	QP	38.4	20.4	13.2	38.2	-	33.8	46.0	12.2	
Hori	2483.500	PK	53.1	26.9	5.8	36.1	-	49.7	73.9	24.2	
Hori	4956.062	PK	50.3	32.1	8.2	35.6	-	55.0	73.9	18.9	
Hori	4958.000	PK	47.7	32.1	8.2	35.6	-	52.4	73.9	21.5	
Hori	7437.000	PK	43.4	36.1	9.2	35.6	-	53.1	-	-	Floor Noise
Hori	9916.000	PK	44.0	38.6	10.3	36.4	-	56.5	-	-	Floor Noise
Hori	12395.000	PK	44.8	39.8	-0.9	32.9	-	50.8	73.9	23.1	
Hori	2483.500	AV	40.9	26.9	5.8	36.1	2.6	40.1	53.9	13.8	*1)
Hori	4956.062	AV	47.0	32.1	8.2	35.6	-	51.7	53.9	2.2	Not Duty Cycle
Hori	4958.000	AV	36.6	32.1	8.2	35.6	2.6	43.9	53.9	10.0	
Hori	7437.000	AV	33.4	36.1	9.2	35.6	-	43.1	-	-	Floor Noise
Hori	9916.000	AV	34.0	38.6	10.3	36.4	-	46.5	-	-	Floor Noise
Hori	12395.000	AV	36.3	39.8	-0.9	32.9	2.6	44.9	53.9	9.0	
Vert	79.611	QP	54.7	6.6	8.1	38.8	-	30.6	40.0	9.4	
Vert	269.101	QP	41.3	18.7	10.3	38.9	-	31.4	46.0	14.6	
Vert	390.941	QP	40.3	17.4	11.2	38.6	-	30.3	46.0	15.7	
Vert	432.667	QP	39.0	17.8	11.5	38.5	-	29.8	46.0	16.2	
Vert	508.301	QP	36.1	18.2	12.0	38.2	-	28.1	46.0	17.9	
Vert	532.335	QP	37.5	18.5	12.2	38.1	-	30.1	46.0	15.9	
Vert	701.311	QP	35.5	20.4	13.2	38.2	-	30.9	46.0	15.1	
Vert	2483.500	PK	53.4	26.9	5.8	36.1	-	50.0	73.9	23.9	
Vert	4956.067	PK	51.5	32.1	8.2	35.6	-	56.2	73.9	17.7	
Vert	4958.000	PK	47.9	32.1	8.2	35.6	-	52.6	73.9	21.3	
Vert	7437.000	PK	43.6	36.1	9.2	35.6	-	53.3	-	-	Floor Noise
Vert	9916.000	PK	44.3	38.6	10.3	36.4	-	56.8	-	-	Floor Noise
Vert	12395.000	PK	51.7	39.8	-1.7	32.9	-	56.9	73.9	17.0	
Vert	2483.500	AV	41.1	26.9	5.8	36.1	2.6	40.3	53.9	13.6	*1)
Vert	4956.067	AV	48.3	32.1	8.2	35.6	-	53.0	53.9	0.9	Not Duty Cycle
Vert	4958.000	AV	37.2	32.1	8.2	35.6	2.6	44.5	53.9	9.4	
Vert	7437.000	AV	33.4	36.1	9.2	35.6	-	43.1	-	-	Floor Noise
Vert	9916.000	AV	34.2	38.6	10.3	36.4	-	46.7	-	-	Floor Noise
Vert	12395.000	AV	42.4	39.8	-0.9	32.9	2.6	51.0	53.9	2.9	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (4.5 m / 3.0 m) = 3.5 dB

Distance factor: 10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

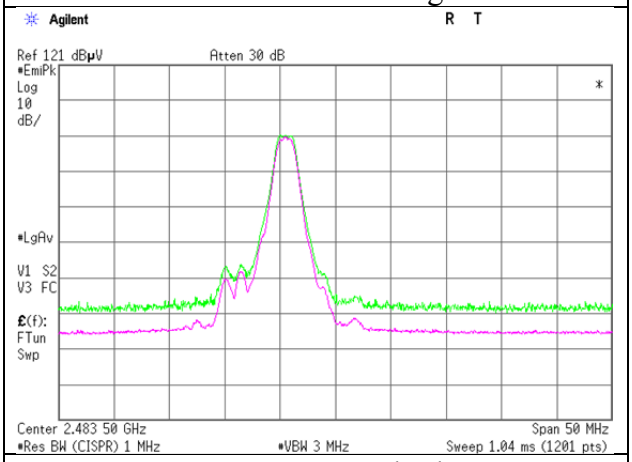
*1) Not Out of Band emission(Leakage Power)

Radiated Spurious Emission
(Chip Antenna)
(Reference Plot for band-edge)

Test place	Ise EMC Lab.No.1 Semi Anechoic Chamber
Report No.	11084189H
Date	January 18, 2016
Temperature / Humidity	22 deg. C / 41 % RH
Engineer	Shinichi Miyazono
	(1 GHz - 10 GHz)
Mode	Tx 2479 MHz

Horizontal

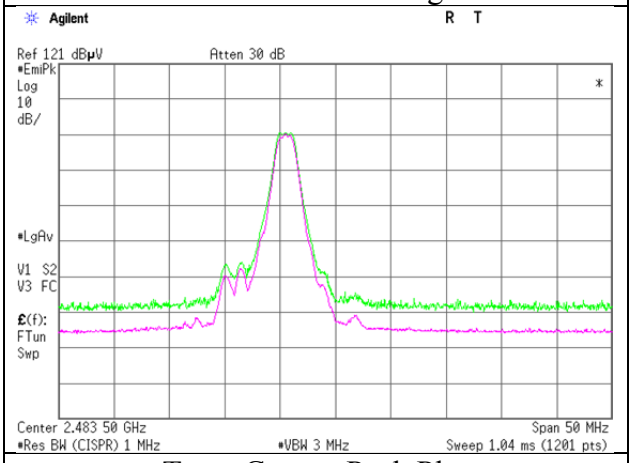
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission
(Patch antenna: PA2409S)

Test place	Ise EMC Lab.		
Report No.	11084189H		
Semi Anechoic Chamber	No.1	No.4	No.4
Date	January 19, 2016	January 20, 2016	January 20, 2016
Temperature / Humidity	22 deg. C / 30 % RH	22 deg. C / 30 % RH	22 deg. C / 30 % RH
Engineer	Shinichi Miyazono (30 MHz - 1000 MHz)	Shinichi Miyazono (1 GHz - 10 GHz)	Shinichi Miyazono (10 GHz - 26.5 GHz)
Mode	Tx 2402 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	52.996	QP	41.1	9.6	7.7	38.8	-	19.6	40.0	20.4	
Hori	271.442	QP	42.3	18.7	10.3	38.9	-	32.4	46.0	13.6	
Hori	390.940	QP	38.5	17.4	11.2	38.6	-	28.5	46.0	17.5	
Hori	432.005	QP	41.4	17.8	11.5	38.5	-	32.2	46.0	13.8	
Hori	508.280	QP	39.3	18.2	12.0	38.2	-	31.3	46.0	14.7	
Hori	532.311	QP	33.6	18.5	12.2	38.1	-	26.2	46.0	19.8	
Hori	701.367	QP	38.6	20.4	13.2	38.2	-	34.0	46.0	12.0	
Hori	2369.545	PK	55.0	27.9	6.6	32.1	-	57.4	73.9	16.5	
Hori	2390.000	PK	49.2	27.9	6.6	32.1	-	51.6	73.9	22.3	
Hori	4804.000	PK	48.2	32.8	9.0	31.3	-	58.7	73.9	15.2	
Hori	4806.042	PK	46.1	32.8	9.0	31.3	-	56.6	73.9	17.3	
Hori	7206.000	PK	42.0	36.8	10.2	32.6	-	56.4	-	-	Floor Noise
Hori	9608.000	PK	42.3	38.1	10.9	32.6	-	58.7	-	-	Floor Noise
Hori	12010.000	PK	41.9	39.9	-1.1	33.2	-	47.5	-	-	Floor Noise
Hori	2369.545	AV	40.4	27.9	6.6	32.1	2.6	45.4	53.9	8.5	
Hori	2390.000	AV	36.1	27.9	6.6	32.1	2.6	41.1	53.9	12.8	*1)
Hori	4804.000	AV	40.3	32.8	9.0	31.3	2.6	53.4	53.9	0.5	
Hori	4806.042	AV	41.0	32.8	9.0	31.3	-	51.5	53.9	2.4	Not Duty Cycle
Hori	7206.000	AV	33.1	36.8	10.2	32.6	-	47.5	-	-	Floor Noise
Hori	9608.000	AV	33.5	38.1	10.9	32.6	-	49.9	-	-	Floor Noise
Hori	12010.000	AV	33.9	39.9	-1.1	33.2	-	39.5	-	-	Floor Noise
Vert	53.387	QP	53.3	9.5	7.7	38.8	-	31.7	40.0	8.3	
Vert	271.443	QP	41.9	18.7	10.3	38.9	-	32.0	46.0	14.0	
Vert	390.948	QP	40.5	17.4	11.2	38.6	-	30.5	46.0	15.5	
Vert	432.971	QP	39.1	17.8	11.5	38.5	-	29.9	46.0	16.1	
Vert	508.255	QP	36.4	18.2	12.0	38.2	-	28.4	46.0	17.6	
Vert	532.422	QP	37.6	18.5	12.2	38.1	-	30.2	46.0	15.8	
Vert	701.356	QP	35.8	20.4	13.2	38.2	-	31.2	46.0	14.8	
Vert	2369.588	PK	53.5	27.9	6.6	32.1	-	55.9	73.9	18.0	
Vert	2390.000	PK	48.6	27.9	6.6	32.1	-	51.0	73.9	22.9	
Vert	4804.000	PK	48.6	32.8	9.0	31.3	-	59.1	73.9	14.8	
Vert	4806.058	PK	45.3	32.8	9.0	31.3	-	55.8	73.9	18.1	
Vert	7206.000	PK	41.9	36.8	10.2	32.6	-	56.3	-	-	Floor Noise
Vert	9608.000	PK	42.2	38.1	10.9	32.6	-	58.6	-	-	Floor Noise
Vert	12010.000	PK	42.0	39.9	-1.1	33.2	-	47.6	-	-	Floor Noise
Vert	2369.588	AV	40.0	27.9	6.6	32.1	2.6	45.0	53.9	8.9	
Vert	2390.000	AV	35.1	27.9	6.6	32.1	2.6	40.1	53.9	13.8	*1)
Vert	4804.000	AV	40.6	32.8	9.0	31.3	2.6	53.7	53.9	0.2	
Vert	4806.058	AV	40.1	32.8	9.0	31.3	-	50.6	53.9	3.3	Not Duty Cycle
Vert	7206.000	AV	33.1	36.8	10.2	32.6	-	47.5	-	-	Floor Noise
Vert	9608.000	AV	33.6	38.1	10.9	32.6	-	50.0	-	-	Floor Noise
Vert	12010.000	AV	33.9	39.9	-1.1	33.2	-	39.5	-	-	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (4.4 m / 3.0 m) = 3.3 dB

Distance factor: 10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

*1) Not Out of Band emission(Leakage Power)

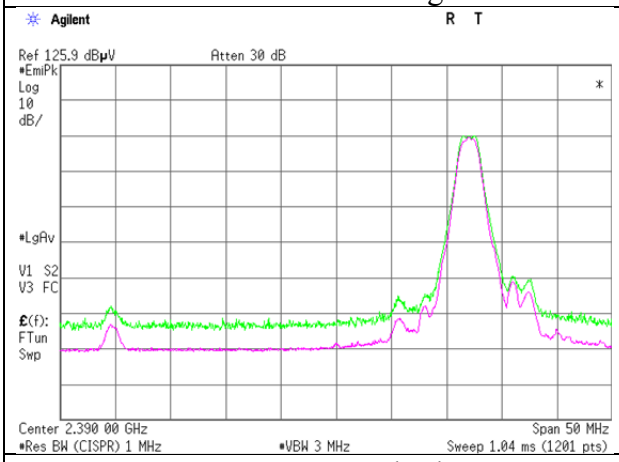
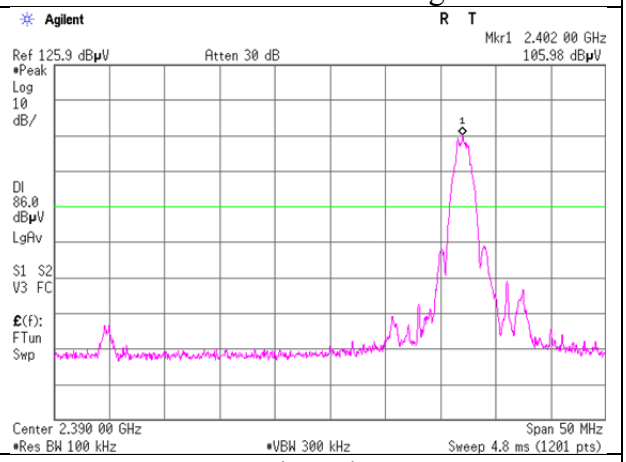
20dBc Data Sheet

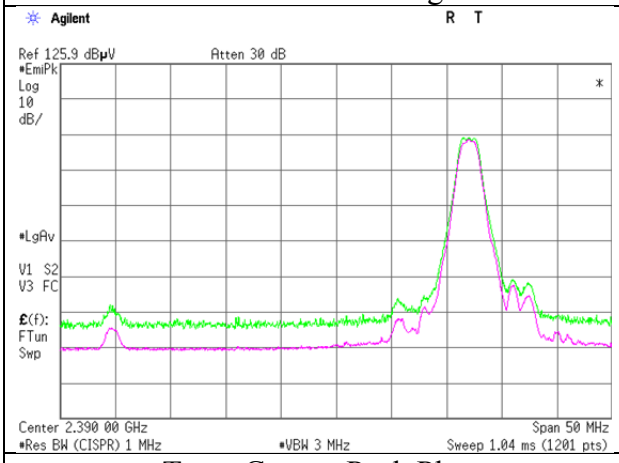
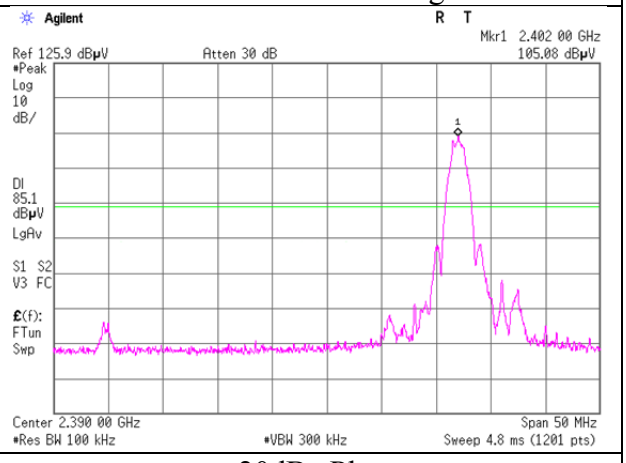
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	106.0	28.0	6.6	32.1	108.5	-	-	Carrier
Hori	2400.000	PK	74.2	28.0	6.6	32.1	76.7	88.5	11.8	
Vert	2402.000	PK	105.1	28.0	6.6	32.1	107.6	-	-	Carrier
Vert	2400.000	PK	73.8	28.0	6.6	32.1	76.3	87.6	11.3	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amprifier)

Radiated Spurious Emission
(Patch antenna: PA2409S)
(Reference Plot for band-edge)

Test place	Ise EMC Lab.No.4 Semi Anechoic Chamber
Report No.	11084189H
Date	January 20, 2016
Temperature / Humidity	22 deg. C / 30 % RH
Engineer	Shinichi Miyazono
	(1 GHz - 10 GHz)
Mode	Tx 2402 MHz

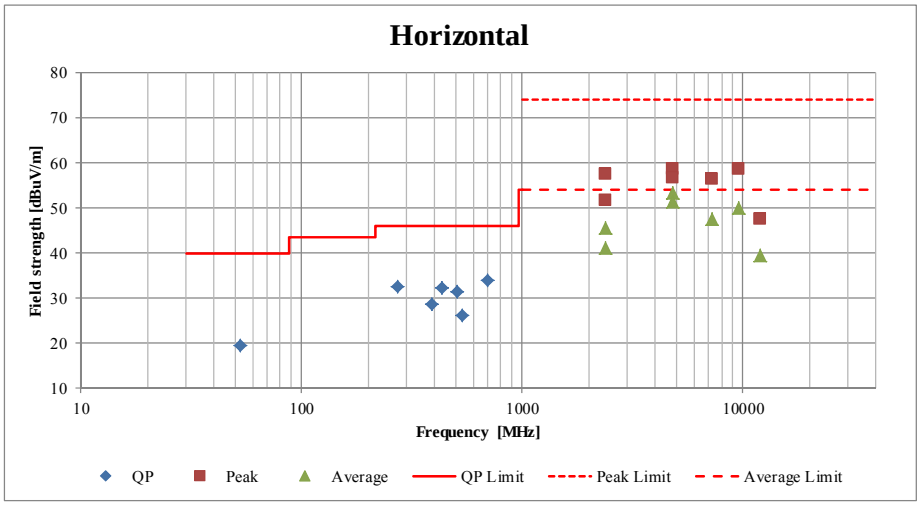
Horizontal	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

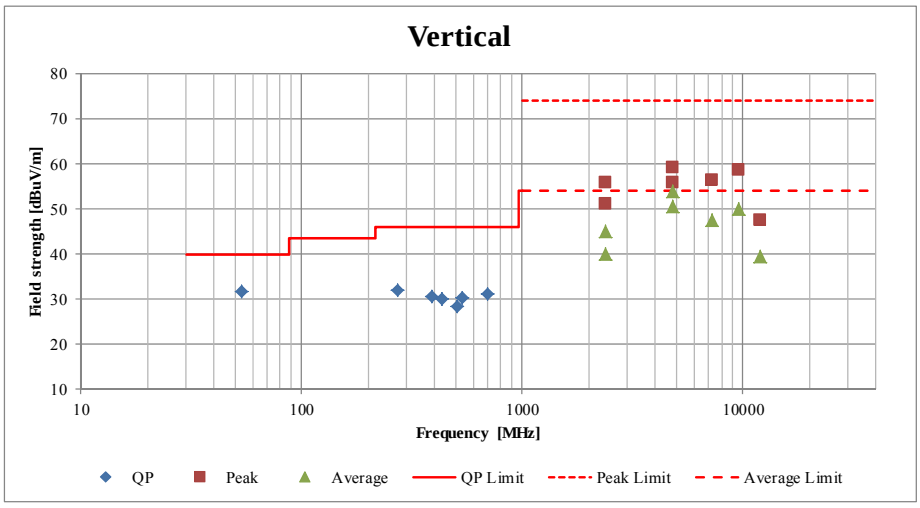
Vertical	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission
(Patch antenna: PA2409S)
(Plot data, Worst case)

Test place	Ise EMC Lab.		
Report No.	11084189H		
Semi Anechoic Chamber	No.1	No.4	No.4
Date	January 19, 2016	January 20, 2016	January 20, 2016
Temperature / Humidity	22 deg. C / 30 % RH	22 deg. C / 30 % RH	22 deg. C / 30 % RH
Engineer	Shinichi Miyazono	Shinichi Miyazono	Shinichi Miyazono
	(30 MHz - 1000 MHz)	(1 GHz - 10 GHz)	(10 GHz - 26.5 GHz)
Mode	Tx 2402 MHz		





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

Radiated Spurious Emission
(Patch antenna: PA2409S)

Test place	Ise EMC Lab.		
Report No.	11084189H		
Semi Anechoic Chamber	No.1	No.4	No.4
Date	January 19, 2016	January 20, 2016	January 20, 2016
Temperature / Humidity	22 deg. C / 30 % RH	22 deg. C / 30 % RH	22 deg. C / 30 % RH
Engineer	Shinichi Miyazono	Shinichi Miyazono	Shinichi Miyazono
	(30 MHz - 1000 MHz)	(1 GHz - 10 GHz)	(10 GHz - 26.5 GHz)
Mode	Tx 2440 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	52.990	QP	41.2	9.7	7.7	38.8	-	19.8	40.0	20.2	
Hori	271.411	QP	42.1	18.7	10.3	38.9	-	32.2	46.0	13.8	
Hori	390.951	QP	38.4	17.4	11.2	38.6	-	28.4	46.0	17.6	
Hori	432.012	QP	41.5	17.8	11.5	38.5	-	32.3	46.0	13.7	
Hori	508.265	QP	39.5	18.2	12.0	38.2	-	31.5	46.0	14.5	
Hori	532.402	QP	33.4	18.5	12.2	38.1	-	26.0	46.0	20.0	
Hori	701.337	QP	38.5	20.4	13.2	38.2	-	33.9	46.0	12.1	
Hori	4880.000	PK	47.3	33.1	9.1	31.3	-	58.2	73.9	15.7	
Hori	4882.042	PK	44.2	33.1	9.1	31.3	-	55.1	73.9	18.8	
Hori	7320.000	PK	42.1	36.8	10.2	32.6	-	56.5	-	-	Floor Noise
Hori	9760.000	PK	42.4	38.2	11.0	32.7	-	58.9	-	-	Floor Noise
Hori	12200.000	PK	42.1	39.9	-1.0	33.0	-	48.0	-	-	Floor Noise
Hori	4880.000	AV	39.9	33.1	9.1	31.3	2.6	53.4	53.9	0.5	
Hori	4882.042	AV	41.0	33.1	9.1	31.3	-	51.9	53.9	2.0	Not Duty Cycle
Hori	7320.000	AV	33.2	36.8	10.2	32.6	-	47.6	-	-	Floor Noise
Hori	9760.000	AV	33.6	38.2	11.0	32.7	-	50.1	-	-	Floor Noise
Hori	12200.000	AV	33.8	39.9	-1.0	33.0	-	39.7	-	-	Floor Noise
Vert	53.390	QP	53.4	9.5	7.7	38.8	-	31.8	40.0	8.2	
Vert	271.423	QP	41.8	18.7	10.3	38.9	-	31.9	46.0	14.1	
Vert	390.946	QP	40.4	17.4	11.2	38.6	-	30.4	46.0	15.6	
Vert	432.857	QP	39.2	17.8	11.5	38.5	-	30.0	46.0	16.0	
Vert	508.249	QP	36.5	18.2	12.0	38.2	-	28.5	46.0	17.5	
Vert	532.419	QP	37.5	18.5	12.2	38.1	-	30.1	46.0	15.9	
Vert	701.341	QP	35.9	20.4	13.2	38.2	-	31.3	46.0	14.7	
Vert	4880.000	PK	48.0	33.1	9.1	31.3	-	58.9	73.9	15.0	
Vert	4882.092	PK	43.5	33.1	9.1	31.3	-	54.4	73.9	19.5	
Vert	7320.000	PK	42.0	36.8	10.2	32.6	-	56.4	-	-	Floor Noise
Vert	9760.000	PK	42.3	38.2	11.0	32.7	-	58.8	-	-	Floor Noise
Vert	12200.000	PK	42.3	39.9	-1.0	33.0	-	48.2	-	-	Floor Noise
Vert	4880.000	AV	40.2	33.1	9.1	31.3	2.6	53.7	53.9	0.2	
Vert	4882.092	AV	38.8	33.1	9.1	31.3	-	49.7	53.9	4.2	Not Duty Cycle
Vert	7320.000	AV	33.0	36.8	10.2	32.6	-	47.4	-	-	Floor Noise
Vert	9760.000	AV	33.5	38.2	11.0	32.7	-	50.0	-	-	Floor Noise
Vert	12200.000	AV	33.9	39.9	-1.0	33.0	-	39.8	-	-	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (4.4 m / 3.0 m) = 3.3 dB

Distance factor: 10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

*1) Not Out of Band emission(Leakage Power)

Radiated Spurious Emission
(Patch antenna: PA2409S)

Test place	Ise EMC Lab.			
Report No.	11084189H			
Semi Anechoic Chamber	No.1	No.1	No.4	No.4
Date	January 18, 2016	January 19, 2016	January 20, 2016	January 20, 2016
Temperature / Humidity	22 deg. C / 30 % RH	22 deg. C / 30 % RH	22 deg. C / 30 % RH	22 deg. C / 30 % RH
Engineer	Shinichi Miyazono	Shinichi Miyazono	Shinichi Miyazono	Shinichi Miyazono
	(1 GHz - 10 GHz)	(30 MHz - 1000 MHz)	(1 GHz - 10 GHz)	(10 GHz - 26.5 GHz)
Mode	Tx 2479 MHz			

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	52.991	QP	41.2	9.7	7.7	38.8	-	19.8	40.0	20.2	
Hori	269.433	QP	41.9	18.7	10.3	38.9	-	32.0	46.0	14.0	
Hori	390.951	QP	38.3	17.4	11.2	38.6	-	28.3	46.0	17.7	
Hori	431.998	QP	41.2	17.8	11.5	38.5	-	32.0	46.0	14.0	
Hori	508.266	QP	39.2	18.2	12.0	38.2	-	31.2	46.0	14.8	
Hori	532.301	QP	33.3	18.5	12.2	38.1	-	25.9	46.0	20.1	
Hori	701.350	QP	38.5	20.4	13.2	38.2	-	33.9	46.0	12.1	
Hori	2483.500	PK	61.2	26.9	5.6	36.1	-	57.6	73.9	16.3	
Hori	4956.072	PK	51.0	32.1	8.0	35.6	-	55.5	73.9	18.4	
Hori	4958.000	PK	52.0	32.1	8.0	35.6	-	56.5	73.9	17.4	
Hori	7437.000	PK	43.9	36.1	9.0	35.6	-	53.4	-	-	Floor Noise
Hori	9916.000	PK	45.3	38.6	10.1	36.4	-	57.6	-	-	Floor Noise
Hori	12395.000	PK	42.6	39.8	-0.9	32.9	-	48.6	-	-	Floor Noise
Hori	2483.500	AV	52.7	26.9	5.6	36.1	2.6	51.7	53.9	2.2	*1)
Hori	4956.072	AV	46.7	32.1	8.0	35.6	-	51.2	53.9	2.7	Not Duty Cycle
Hori	4958.000	AV	41.0	32.1	8.0	35.6	2.6	48.1	53.9	5.8	
Hori	7437.000	AV	33.3	36.1	9.0	35.6	-	42.8	-	-	Floor Noise
Hori	9916.000	AV	33.7	38.6	10.1	36.4	-	46.0	-	-	Floor Noise
Hori	12395.000	AV	33.8	39.8	-0.9	32.9	-	39.8	-	-	Floor Noise
Vert	53.390	QP	53.1	9.5	7.7	38.8	-	31.5	40.0	8.5	
Vert	271.449	QP	41.8	18.7	10.3	38.9	-	31.9	46.0	14.1	
Vert	390.953	QP	40.3	17.4	11.2	38.6	-	30.3	46.0	15.7	
Vert	432.776	QP	39.0	17.8	11.5	38.5	-	29.8	46.0	16.2	
Vert	508.249	QP	36.5	18.2	12.0	38.2	-	28.5	46.0	17.5	
Vert	532.389	QP	37.5	18.5	12.2	38.1	-	30.1	46.0	15.9	
Vert	701.331	QP	35.6	20.4	13.2	38.2	-	31.0	46.0	15.0	
Vert	2483.500	PK	61.1	26.9	5.6	36.1	-	57.5	73.9	16.4	
Vert	4956.047	PK	51.6	32.1	8.0	35.6	-	56.1	73.9	17.8	
Vert	4958.000	PK	49.3	32.1	8.0	35.6	-	53.8	73.9	20.1	
Vert	7437.000	PK	43.2	36.1	9.0	35.6	-	52.7	-	-	Floor Noise
Vert	9916.000	PK	43.8	38.6	10.1	36.4	-	56.1	-	-	Floor Noise
Vert	12395.000	PK	42.6	39.8	-0.9	32.9	-	48.6	-	-	Floor Noise
Vert	2483.500	AV	45.6	26.9	5.6	36.1	2.6	44.6	53.9	9.3	*1)
Vert	4956.047	AV	48.5	32.1	8.0	35.6	-	53.0	53.9	0.9	Not Duty Cycle
Vert	4958.000	AV	38.0	32.1	8.0	35.6	2.6	45.1	53.9	8.8	
Vert	7437.000	AV	33.3	36.1	9.0	35.6	-	42.8	-	-	Floor Noise
Vert	9916.000	AV	34.1	38.6	10.1	36.4	-	46.4	-	-	Floor Noise
Vert	12395.000	AV	33.9	39.8	-0.9	32.9	-	39.9	-	-	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (4.4 m / 3.0 m) = 3.3 dB

Distance factor: 10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

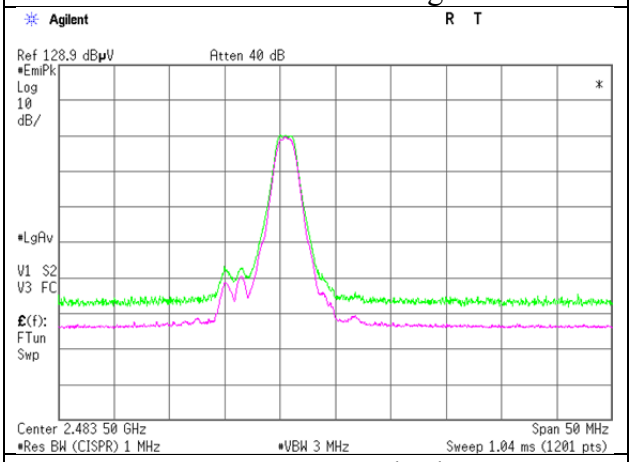
*1) Not Out of Band emission(Leakage Power)

Radiated Spurious Emission
(Patch antenna: PA2409S)
(Reference Plot for band-edge)

Test place	Ise EMC Lab.No.1 Semi Anechoic Chamber
Report No.	11084189H
Date	January 18, 2016
Temperature / Humidity	22 deg. C / 41 % RH
Engineer	Shinichi Miyazono
	(1 GHz - 10 GHz)
Mode	Tx 2479 MHz

Horizontal

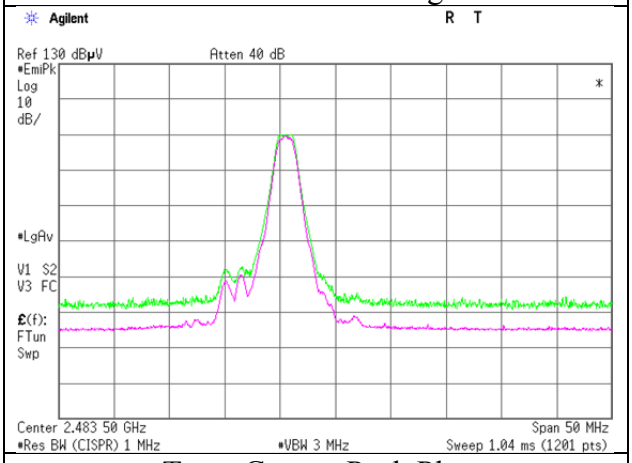
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission
(Patch antenna: PAT209S-24)

Test place	Ise EMC Lab.		
Report No.	11084189H		
Semi Anechoic Chamber	No.1	No.4	No.4
Date	January 19, 2016	January 20, 2016	January 20, 2016
Temperature / Humidity	22 deg. C / 30 % RH	22 deg. C / 30 % RH	22 deg. C / 30 % RH
Engineer	Shinichi Miyazono (30 MHz - 1000 MHz)	Shinichi Miyazono (1 GHz - 10 GHz)	Shinichi Miyazono (10 GHz - 26.5 GHz)
Mode	Tx 2402 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	52.978	QP	41.4	9.7	7.7	38.8	-	20.0	40.0	20.0	
Hori	269.401	QP	42.0	18.7	10.3	38.9	-	32.1	46.0	13.9	
Hori	390.947	QP	38.6	17.4	11.2	38.6	-	28.6	46.0	17.4	
Hori	431.989	QP	41.4	17.8	11.5	38.5	-	32.2	46.0	13.8	
Hori	508.263	QP	39.1	18.2	12.0	38.2	-	31.1	46.0	14.9	
Hori	532.351	QP	33.5	18.5	12.2	38.1	-	26.1	46.0	19.9	
Hori	701.344	QP	38.7	20.4	13.2	38.2	-	34.1	46.0	11.9	
Hori	2369.510	PK	53.6	27.9	6.6	32.1	-	56.0	73.9	17.9	
Hori	2390.000	PK	51.1	27.9	6.6	32.1	-	53.5	73.9	20.4	
Hori	4804.000	PK	45.5	32.8	9.0	31.3	-	56.0	73.9	17.9	
Hori	4806.075	PK	45.1	32.8	9.0	31.3	-	55.6	73.9	18.3	
Hori	7206.000	PK	42.1	36.8	10.2	32.6	-	56.5	-	-	Floor Noise
Hori	9608.000	PK	42.5	38.1	10.9	32.6	-	58.9	-	-	Floor Noise
Hori	12010.000	PK	41.5	39.9	-1.1	33.2	-	47.1	-	-	Floor Noise
Hori	2369.510	AV	40.4	27.9	6.6	32.1	2.6	45.4	53.9	8.5	
Hori	2390.000	AV	36.6	27.9	6.6	32.1	2.6	41.6	53.9	12.3	*1)
Hori	4804.000	AV	39.1	32.8	9.0	31.3	2.6	52.2	53.9	1.7	
Hori	4806.075	AV	40.8	32.8	9.0	31.3	-	51.3	53.9	2.6	Not Duty Cycle
Hori	7206.000	AV	33.0	36.8	10.2	32.6	-	47.4	-	-	Floor Noise
Hori	9608.000	AV	33.4	38.1	10.9	32.6	-	49.8	-	-	Floor Noise
Hori	12010.000	AV	34.3	39.9	-1.1	33.2	-	39.9	-	-	Floor Noise
Vert	53.291	QP	53.3	9.5	7.7	38.8	-	31.7	40.0	8.3	
Vert	271.457	QP	41.8	18.7	10.3	38.9	-	31.9	46.0	14.1	
Vert	390.958	QP	40.4	17.4	11.2	38.6	-	30.4	46.0	15.6	
Vert	432.785	QP	39.1	17.8	11.5	38.5	-	29.9	46.0	16.1	
Vert	508.261	QP	36.4	18.2	12.0	38.2	-	28.4	46.0	17.6	
Vert	532.369	QP	37.6	18.5	12.2	38.1	-	30.2	46.0	15.8	
Vert	701.351	QP	35.8	20.4	13.2	38.2	-	31.2	46.0	14.8	
Vert	2369.520	PK	54.0	27.9	6.6	32.1	-	56.4	73.9	17.5	
Vert	2390.000	PK	50.1	27.9	6.6	32.1	-	52.5	73.9	21.4	
Vert	4804.000	PK	47.5	32.8	9.0	31.3	-	58.0	73.9	15.9	
Vert	4806.050	PK	45.2	32.8	9.0	31.3	-	55.7	73.9	18.2	
Vert	7206.000	PK	42.0	36.8	10.2	32.6	-	56.4	-	-	Floor Noise
Vert	9608.000	PK	42.4	38.1	10.9	32.6	-	58.8	-	-	Floor Noise
Vert	12010.000	PK	47.0	39.9	-1.1	33.2	-	52.6	-	-	Floor Noise
Vert	2369.520	AV	40.9	27.9	6.6	32.1	2.6	45.9	53.9	8.0	
Vert	2390.000	AV	37.1	27.9	6.6	32.1	2.6	42.1	53.9	11.8	*1)
Vert	4804.000	AV	40.4	32.8	9.0	31.3	2.6	53.5	53.9	0.4	
Vert	4806.050	AV	39.8	32.8	9.0	31.3	-	50.3	53.9	3.6	Not Duty Cycle
Vert	7206.000	AV	33.2	36.8	10.2	32.6	-	47.6	-	-	Floor Noise
Vert	9608.000	AV	33.5	38.1	10.9	32.6	-	49.9	-	-	Floor Noise
Vert	12010.000	AV	38.7	39.9	-1.1	33.2	-	44.3	-	-	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (4.4 m / 3.0 m) = 3.3 dB

Distance factor: 10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

*1) Not Out of Band emission(Leakage Power)

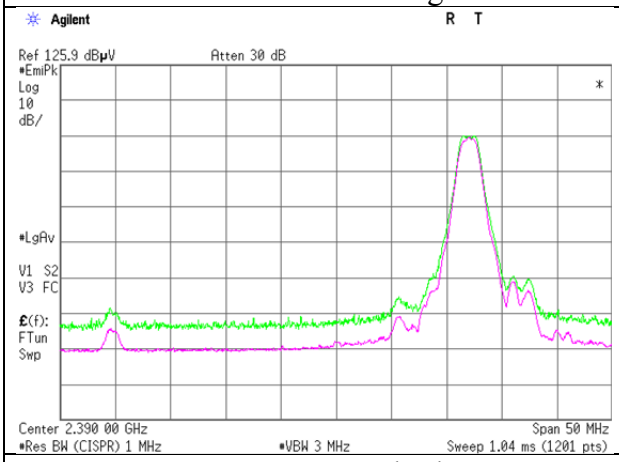
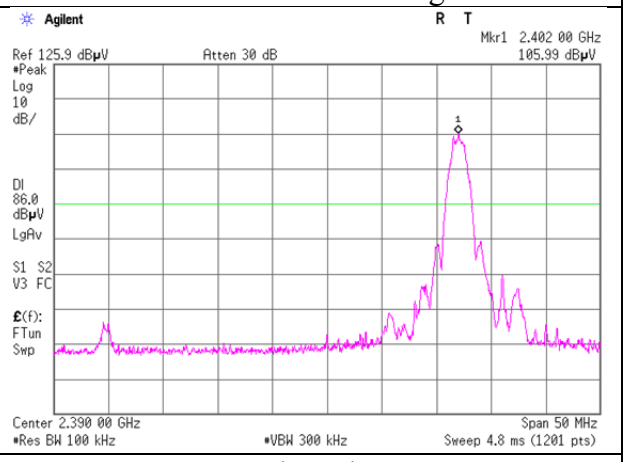
20dBc Data Sheet

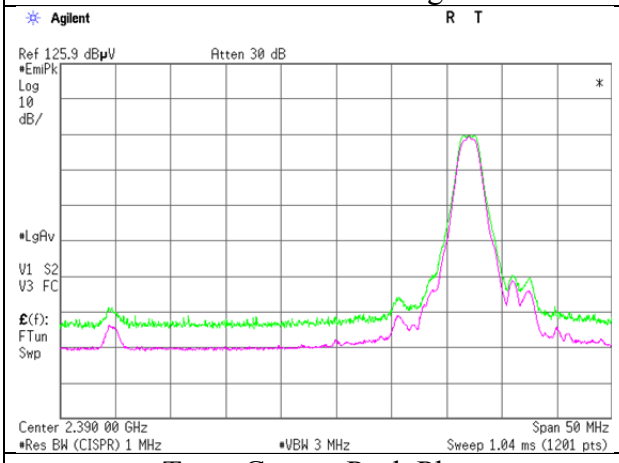
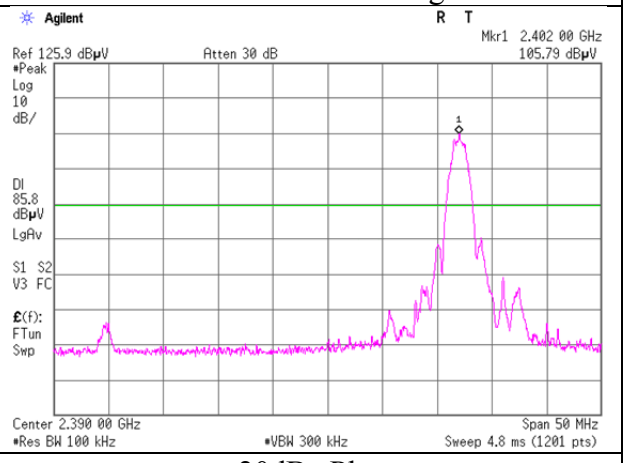
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	106.0	28.0	6.6	32.1	108.5	-	-	Carrier
Hori	2400.000	PK	75.0	28.0	6.6	32.1	77.5	88.5	11.0	
Vert	2402.000	PK	105.8	28.0	6.6	32.1	108.3	-	-	Carrier
Vert	2400.000	PK	75.0	28.0	6.6	32.1	77.5	88.3	10.8	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amprifier)

Radiated Spurious Emission
(Patch antenna: PAT209S-24)
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11084189H
Date	January 20, 2016
Temperature / Humidity	22 deg. C / 30 % RH
Engineer	Shinichi Miyazono
	(1 GHz - 10 GHz)
Mode	Tx 2402 MHz

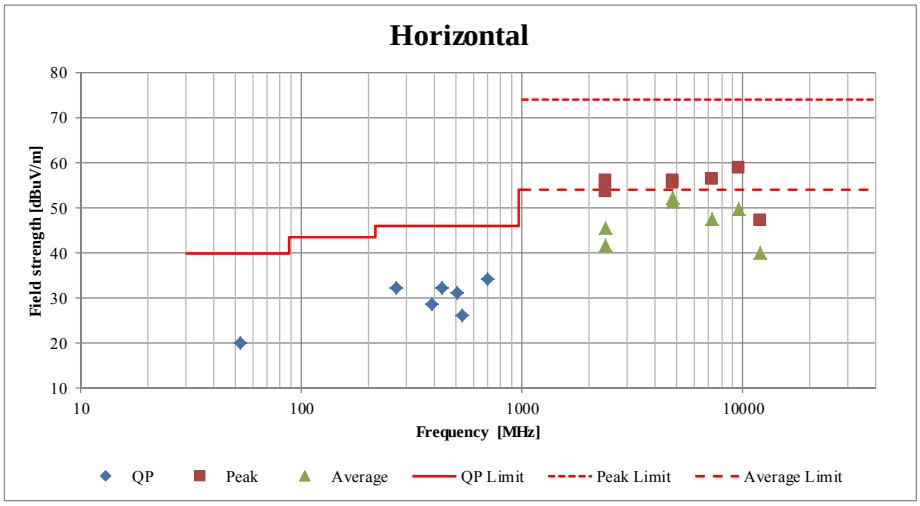
Horizontal	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

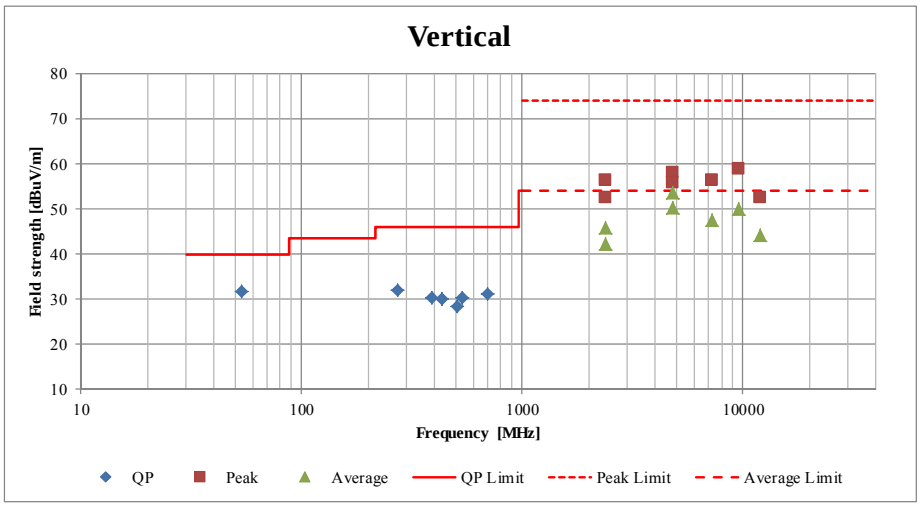
Vertical	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission
(Patch antenna: PAT209S-24)
(Plot data, Worst case)

Test place	Ise EMC Lab.		
Report No.	11084189H		
Semi Anechoic Chamber	No.1	No.4	No.4
Date	January 19, 2016	January 20, 2016	January 20, 2016
Temperature / Humidity	22 deg. C / 30 % RH	22 deg. C / 30 % RH	22 deg. C / 30 % RH
Engineer	Shinichi Miyazono	Shinichi Miyazono	Shinichi Miyazono
	(30 MHz - 1000 MHz)	(1 GHz - 10 GHz)	(10 GHz - 26.5 GHz)
Mode	Tx 2402 MHz		





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

Radiated Spurious Emission
(Patch antenna: PAT209S-24)

Test place	Ise EMC Lab.		
Report No.	11084189H		
Semi Anechoic Chamber	No.1	No.4	No.4
Date	January 19, 2016	January 20, 2016	January 20, 2016
Temperature / Humidity	22 deg. C / 30 % RH	22 deg. C / 30 % RH	22 deg. C / 30 % RH
Engineer	Shinichi Miyazono	Shinichi Miyazono	Shinichi Miyazono
	(30 MHz - 1000 MHz)	(1 GHz - 10 GHz)	(10 GHz - 26.5 GHz)
Mode	Tx 2440 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	52.988	QP	41.0	9.7	7.7	38.8	-	19.6	40.0	20.4	
Hori	269.422	QP	41.8	18.7	10.3	38.9	-	31.9	46.0	14.1	
Hori	390.951	QP	38.5	17.4	11.2	38.6	-	28.5	46.0	17.5	
Hori	431.995	QP	41.1	17.8	11.5	38.5	-	31.9	46.0	14.1	
Hori	508.260	QP	39.0	18.2	12.0	38.2	-	31.0	46.0	15.0	
Hori	532.349	QP	33.4	18.5	12.2	38.1	-	26.0	46.0	20.0	
Hori	701.340	QP	38.5	20.4	13.2	38.2	-	33.9	46.0	12.1	
Hori	4880.000	PK	48.3	33.1	9.1	31.3	-	59.2	73.9	14.7	
Hori	4882.067	PK	45.8	33.1	9.1	31.3	-	56.7	73.9	17.2	
Hori	7320.000	PK	42.1	36.8	10.2	32.6	-	56.5	-	-	Floor Noise
Hori	9760.000	PK	42.5	38.2	11.0	32.7	-	59.0	-	-	Floor Noise
Hori	12200.000	PK	42.0	39.9	-1.0	33.0	-	47.9	-	-	Floor Noise
Hori	4880.000	AV	40.2	33.1	9.1	31.3	2.6	53.7	53.9	0.2	
Hori	4882.067	AV	41.7	33.1	9.1	31.3	-	52.6	53.9	1.3	Not Duty Cycle
Hori	7320.000	AV	33.1	36.8	10.2	32.6	-	47.5	-	-	Floor Noise
Hori	9760.000	AV	33.5	38.2	11.0	32.7	-	50.0	-	-	Floor Noise
Hori	12200.000	AV	33.9	39.9	-1.0	33.0	-	39.8	-	-	Floor Noise
Vert	53.290	QP	53.1	9.6	7.7	38.8	-	31.6	40.0	8.4	
Vert	271.439	QP	41.6	18.7	10.3	38.9	-	31.7	46.0	14.3	
Vert	390.962	QP	40.1	17.4	11.2	38.6	-	30.1	46.0	15.9	
Vert	432.811	QP	39.0	17.8	11.5	38.5	-	29.8	46.0	16.2	
Vert	508.265	QP	36.5	18.2	12.0	38.2	-	28.5	46.0	17.5	
Vert	532.371	QP	37.5	18.5	12.2	38.1	-	30.1	46.0	15.9	
Vert	701.350	QP	35.6	20.4	13.2	38.2	-	31.0	46.0	15.0	
Vert	4880.000	PK	48.9	33.1	9.1	31.3	-	59.8	73.9	14.1	
Vert	4882.067	PK	43.6	33.1	9.1	31.3	-	54.5	73.9	19.4	
Vert	7320.000	PK	42.0	36.8	10.2	32.6	-	56.4	-	-	Floor Noise
Vert	9760.000	PK	42.5	38.2	11.0	32.7	-	59.0	-	-	Floor Noise
Vert	12200.000	PK	42.1	39.9	-1.0	33.0	-	48.0	-	-	Floor Noise
Vert	4880.000	AV	40.2	33.1	9.1	31.3	2.6	53.7	53.9	0.2	
Vert	4882.067	AV	38.9	33.1	9.1	31.3	-	49.8	53.9	4.1	Not Duty Cycle
Vert	7320.000	AV	33.0	36.8	10.2	32.6	-	47.4	-	-	Floor Noise
Vert	9760.000	AV	33.5	38.2	11.0	32.7	-	50.0	-	-	Floor Noise
Vert	12200.000	AV	33.8	39.9	-1.0	33.0	-	39.7	-	-	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (4.4 m / 3.0 m) = 3.3 dB

Distance factor: 10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

*1) Not Out of Band emission(Leakage Power)

Radiated Spurious Emission
(Patch antenna: PAT209S-24)

Test place	Ise EMC Lab.			
Report No.	11084189H			
Semi Anechoic Chamber	No.1	No.1	No.4	No.4
Date	January 18, 2016	January 19, 2016	January 20, 2016	January 20, 2016
Temperature / Humidity	22 deg. C / 30 % RH	22 deg. C / 30 % RH	22 deg. C / 30 % RH	22 deg. C / 30 % RH
Engineer	Shinichi Miyazono	Shinichi Miyazono	Shinichi Miyazono	Shinichi Miyazono
	(1 GHz - 10 GHz)	(30 MHz - 1000 MHz)	(1 GHz - 10 GHz)	(10 GHz - 26.5 GHz)
Mode	Tx 2479 MHz			

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	52.991	QP	41.2	9.7	7.7	38.8	-	19.8	40.0	20.2	
Hori	269.453	QP	41.9	18.7	10.3	38.9	-	32.0	46.0	14.0	
Hori	390.931	QP	38.5	17.4	11.2	38.6	-	28.5	46.0	17.5	
Hori	431.991	QP	41.2	17.8	11.5	38.5	-	32.0	46.0	14.0	
Hori	508.276	QP	39.0	18.2	12.0	38.2	-	31.0	46.0	15.0	
Hori	532.338	QP	33.4	18.5	12.2	38.1	-	26.0	46.0	20.0	
Hori	701.362	QP	38.5	20.4	13.2	38.2	-	33.9	46.0	12.1	
Hori	2483.500	PK	53.1	26.9	5.8	36.1	-	49.7	73.9	24.2	
Hori	4956.062	PK	50.3	32.1	8.2	35.6	-	55.0	73.9	18.9	
Hori	4958.000	PK	47.7	32.1	8.2	35.6	-	52.4	73.9	21.5	
Hori	7437.000	PK	43.4	36.1	9.2	35.6	-	53.1	-	-	Floor Noise
Hori	9916.000	PK	44.0	38.6	10.3	36.4	-	56.5	-	-	Floor Noise
Hori	12395.000	PK	42.2	39.8	-0.9	32.9	-	48.2	-	-	Floor Noise
Hori	2483.500	AV	40.9	26.9	5.8	36.1	2.6	40.1	53.9	13.8	*1)
Hori	4956.062	AV	47.0	32.1	8.2	35.6	-	51.7	53.9	2.2	Not Duty Cycle
Hori	4958.000	AV	36.6	32.1	8.2	35.6	2.6	43.9	53.9	10.0	
Hori	7437.000	AV	33.4	36.1	9.2	35.6	-	43.1	-	-	Floor Noise
Hori	9916.000	AV	34.0	38.6	10.3	36.4	-	46.5	-	-	Floor Noise
Hori	12395.000	AV	33.9	39.8	-0.9	32.9	-	39.9	-	-	Floor Noise
Vert	53.312	QP	53.4	9.5	7.7	38.8	-	31.8	40.0	8.2	
Vert	271.463	QP	41.9	18.7	10.3	38.9	-	32.0	46.0	14.0	
Vert	390.942	QP	40.3	17.4	11.2	38.6	-	30.3	46.0	15.7	
Vert	432.778	QP	39.1	17.8	11.5	38.5	-	29.9	46.0	16.1	
Vert	508.254	QP	36.5	18.2	12.0	38.2	-	28.5	46.0	17.5	
Vert	532.351	QP	37.5	18.5	12.2	38.1	-	30.1	46.0	15.9	
Vert	701.378	QP	35.7	20.4	13.2	38.2	-	31.1	46.0	14.9	
Vert	2483.500	PK	53.4	26.9	5.8	36.1	-	50.0	73.9	23.9	
Vert	4956.067	PK	51.5	32.1	8.2	35.6	-	56.2	73.9	17.7	
Vert	4958.000	PK	47.9	32.1	8.2	35.6	-	52.6	73.9	21.3	
Vert	7437.000	PK	43.6	36.1	9.2	35.6	-	53.3	-	-	Floor Noise
Vert	9916.000	PK	44.3	38.6	10.3	36.4	-	56.8	-	-	Floor Noise
Vert	12395.000	PK	42.3	39.8	-0.9	32.9	-	48.3	-	-	Floor Noise
Vert	2483.500	AV	41.1	26.9	5.8	36.1	2.6	40.3	53.9	13.6	*1)
Vert	4956.067	AV	48.3	32.1	8.2	35.6	-	53.0	53.9	0.9	Not Duty Cycle
Vert	4958.000	AV	37.2	32.1	8.2	35.6	2.6	44.5	53.9	9.4	
Vert	7437.000	AV	33.4	36.1	9.2	35.6	-	43.1	-	-	Floor Noise
Vert	9916.000	AV	34.2	38.6	10.3	36.4	-	46.7	-	-	Floor Noise
Vert	12395.000	AV	34.0	39.8	-0.9	32.9	-	40.0	-	-	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (4.4 m / 3.0 m) = 3.3 dB

Distance factor: 10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

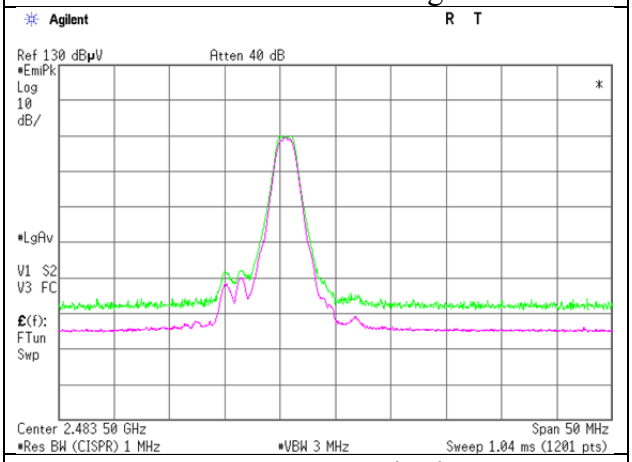
*1) Not Out of Band emission(Leakage Power)

Radiated Spurious Emission
(Patch antenna: PAT209S-24)
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No.	11084189H
Date	January 18, 2016
Temperature / Humidity	22 deg. C / 41 % RH
Engineer	Shinichi Miyazono
	(1 GHz - 10 GHz)
Mode	Tx 2479 MHz

Horizontal

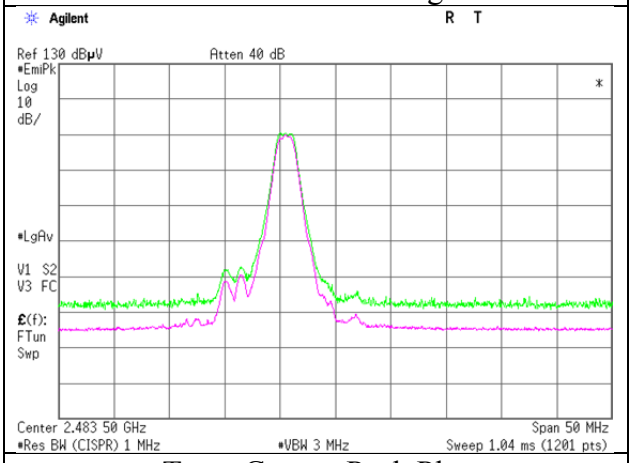
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



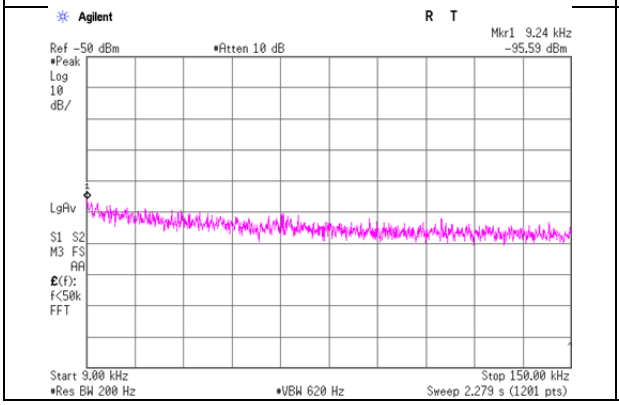
Trace Green : Peak Plot
Trace Purple : Average Plot

* Final result of restricted band edge was shown in tabular data.

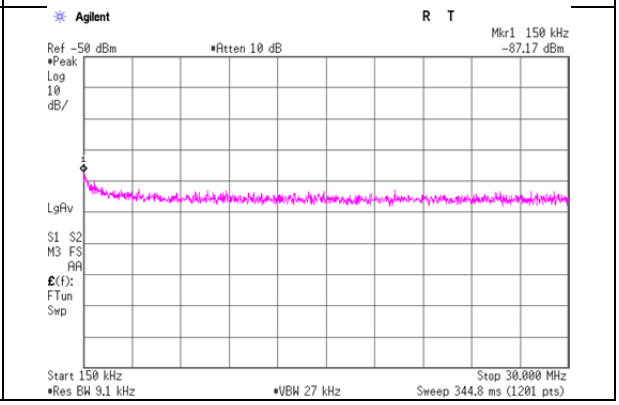
Conducted Spurious Emission

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	11084189H
Date	January 20, 2016
Temperature / Humidity	23 deg. C / 39 % RH
Engineer	Koji Yamamoto
Mode	Tx 2402 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenator Loss [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
9.24	-95.6	0.00	9.8	8.1	1	-77.7	300	6.0	-16.4	48.2	64.6	
150.00	-87.2	0.00	9.8	8.1	1	-69.2	300	6.0	-8.0	24.0	32.0	

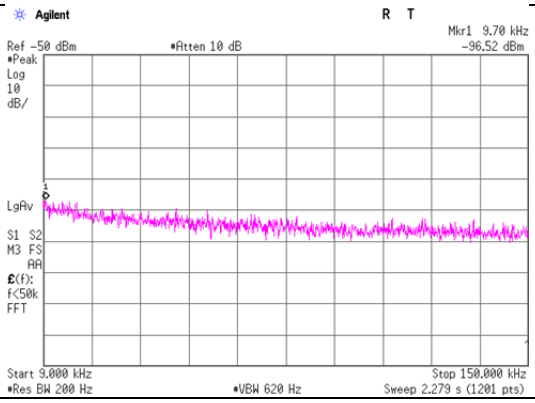
E = EIRP - 20 log (D) + Ground bounce + 104.8 [dBuV/m]

EIRP = Reading + Cable Loss + Attenator Loss + Antenna Gain + 10 * log (N)

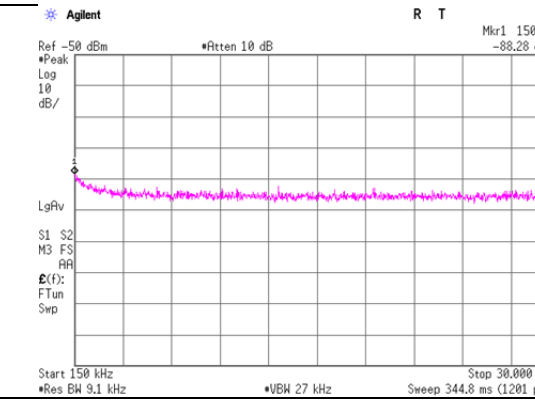
Conducted Spurious Emission

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	11084189H
Date	January 20, 2016
Temperature / Humidity	23 deg. C / 39 % RH
Engineer	Koji Yamamoto
Mode	Tx 2440 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenator Loss [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
9.70	-96.5	0.00	9.8	8.1	1	-78.6	300	6.0	-17.3	47.8	65.1	
150.00	-88.3	0.00	9.8	8.1	1	-70.4	300	6.0	-9.1	24.0	33.1	

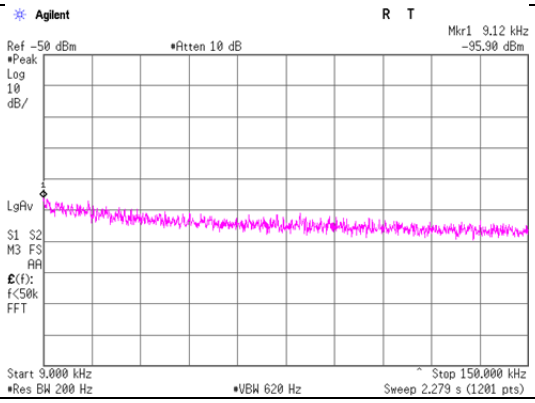
E = EIRP - 20 log (D) + Ground bounce + 104.8 [dBuV/m]

EIRP = Reading + Cable Loss + Attenator Loss + Antenna Gain + 10 * log (N)

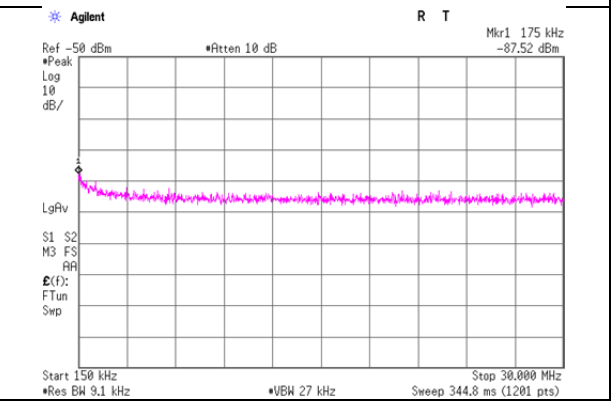
Conducted Spurious Emission

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	11084189H
Date	January 20, 2016
Temperature / Humidity	23 deg. C / 39 % RH
Engineer	Koji Yamamoto
Mode	Tx 2479 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenator Loss [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
9.12	-95.9	0.00	9.8	8.1	1	-78.0	300	6.0	-16.7	48.4	65.1	
175.00	-87.5	0.00	9.8	8.1	1	-69.6	300	6.0	-8.3	22.7	31.0	

E = EIRP - 20 log (D) + Ground bounce + 104.8 [dBuV/m]

EIRP = Reading + Cable Loss + Attenator Loss + Antenna Gain + 10 * log (N)

Power Density

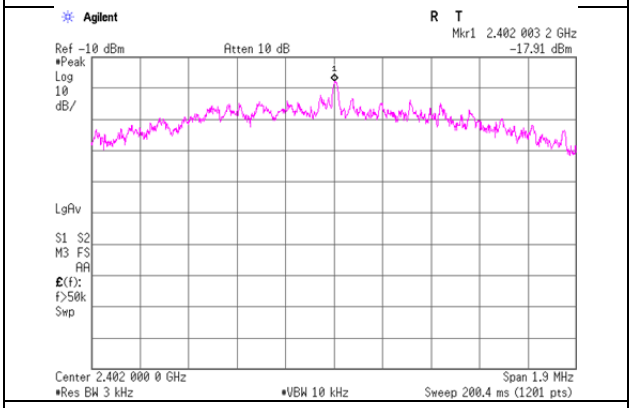
Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	11084189H
Date	January 20, 2016
Temperature / Humidity	23 deg. C / 39 % RH
Engineer	Koji Yamamoto
Mode	Tx

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2402.00	-17.91	0.87	10.06	-6.98	8.00	14.98
2440.00	-17.94	0.87	10.06	-7.01	8.00	15.01
2479.00	-18.19	0.88	10.06	-7.25	8.00	15.25

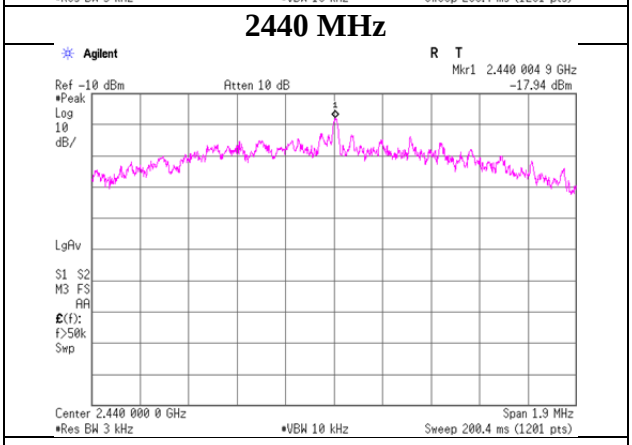
Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

Power Density

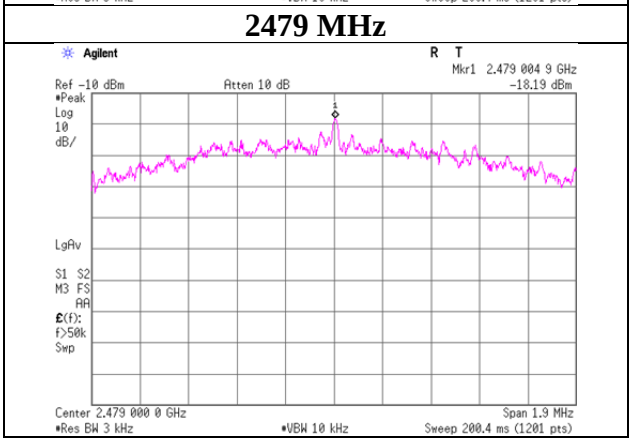
2402 MHz



2440 MHz



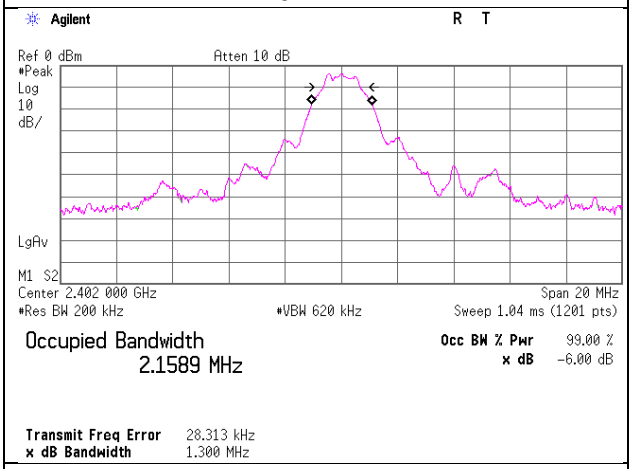
2479 MHz



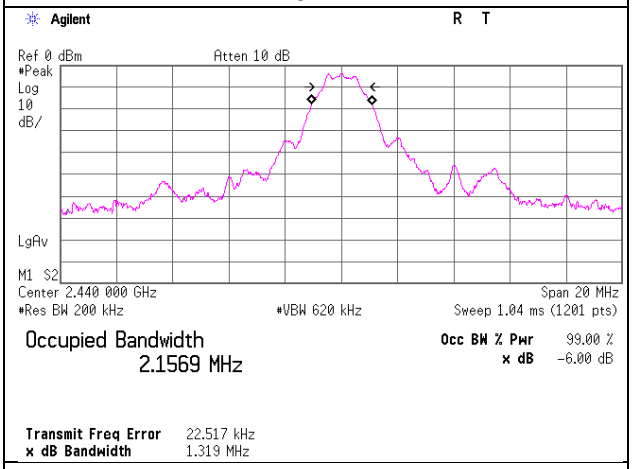
99%Occupied Bandwidth

Test place	Ise EMC Lab. No.11 and 6 Measurement Room	
Report No.	11084189H	
Date	December 21, 2015	January 20, 2016
Temperature / Humidity	21 deg. C / 32 % RH	23 deg. C / 39 % RH
Engineer	Shinya Watanabe	Koji Yamamoto
Mode	Tx	

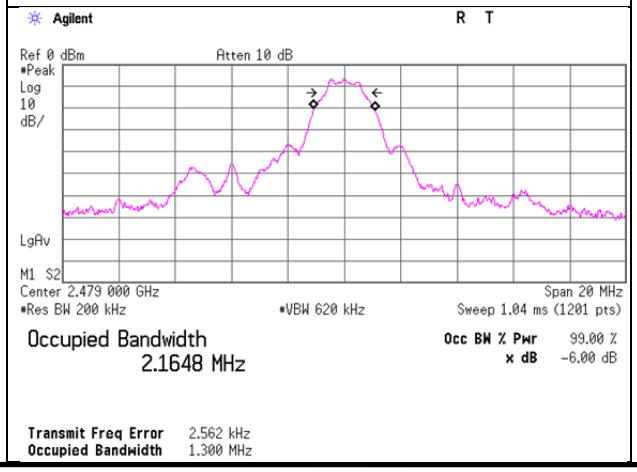
2402 MHz



2440 MHz



2479 MHz



APPENDIX 2: Test instruments

Test equipment (1/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	CE	2015/07/01 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	CE	2015/01/13 * 12
MJM-14	Measure	KOMELON	KMC-36	-	CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	CE/RE	
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	CE	2015/11/06 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	CE	2015/10/11 * 12
MLS-23	LISN(AMN)	Schwarzbeck	NSLK8127	8127-729	CE(EUT)	2015/07/10 * 12
MCC-13	Coaxial Cable	Fujikura	3D-2W(12m)/5D-2W(5m)/5D-2W(0.8m)/5D-2W(1m)	-	CE	2015/02/06 * 12
MAT-65	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2016/01/14 * 12
MMM-01	Digital Tester	Fluke	FLUKE 26-3	78030611	CE	2015/08/19 * 12
MAEC-01	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	RE	2015/09/19 * 12
MOS-27	Thermo-Hygrometer	CUSTOM	CTH-201	A08Q26	RE	2015/01/13 * 12
MJM-25	Measure	KOMELON	KMC-36	-	RE	-
MTR-09	EMI Test Receiver	Rohde & Schwarz	ESU26	100412	RE	2015/06/08 * 12
KBA-05	Biconical Antenna	Schwarzbeck	BBA9106	2513	RE	2015/11/02 * 12
KLA-04	Logperiodic Antenna	Schwarzbeck	USLP9143	361	RE	2015/11/03 * 12
MAT-08	Attenuator(6dB)	Weinschel Corp	2	BK7971	RE	2015/11/10 * 12
MCC-02	Coaxial Cable	Suhner/storm/Agilent/TSJ	-	-	RE	2015/09/29 * 12
MPA-19	Pre Amplifier	MITEQ	MLA-10K01-B01-35	1237616	RE	2015/02/03 * 12
MMM-03	Digital Tester	Fluke	FLUKE 26-3	78030621	RE	2015/08/19 * 12
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2015/10/02 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	1501	RE	2015/01/13 * 12
MJM-26	Measure	KOMELON	KMC-36	-	RE	-
MRENT-126	Spectrum Analyzer	KEYSIGHT	E4440A	MY46185516	RE	2015/07/31 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2015/08/10 * 12
MCC-141	Microwave Cable	Junkosha	MWX221	1305S002R(1m) / 1405S146(5m)	RE	2015/06/22 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	00650	RE	2015/10/01 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2015/06/06 * 12
MSA-16	Spectrum Analyzer	Agilent	E4440A	MY46186390	AT/RE	2015/02/16 * 12

Test equipment (2/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2015/12/08 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-201	1401	AT	2015/01/13 * 12
MAT-91	Attenuator	Weinschel Associates	WA56-10	56100307	AT	2015/06/01 * 12
MAT-20	Attenuator(10dB)(above1 GHz)	HIROSE ELECTRIC CO.,LTD.	AT-110	-	AT	2016/01/08 * 12
MAT-10	Attenuator(10dB)	Weinschel Corp	2	BL1173	AT	2015/11/10 * 12
MSA-14	Spectrum Analyzer	Agilent	E4440A	MY48250080	AT	2015/10/07 * 12
MCC-171	Microwave Cable	Junkosha	MWX221	1409S494	AT	2015/03/04 * 12
MCC-38	Coaxial Cable	UL Japan	-	-	AT	2015/12/07 * 12
MPM-09	Power Meter	Anritsu	ML2495A	6K00003348	AT	2015/10/19 * 12
MPSE-12	Power sensor	Anritsu	MA2411B	011598	AT	2015/10/19 * 12
MMM-12	DIGITAL HiTESTER	Hioki	3805	060500120	AT	2015/02/05 * 12
MPM-01	Power Meter	Agilent	E4417A	GB41290639	AT	2015/04/22 * 12
MPSE-03	Power sensor	Agilent	E9327A	US40440576	AT	2015/04/24 * 12
MCC-137	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37954/2	AT	2015/10/08 * 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 test**
RE: Radiated Emission test
AT: Antenna Terminal Conducted test