RADIO TEST REPORT

Test Report No. : 11197179H-A-R2

Applicant	:	**Murata Manufacturing Co., Ltd.**
Type of Equipment	:	**Communication Module**
Model No.	:	**LBBA0ZZ1EU**
FCC ID	:	**VPYLB1EU**
Test regulation	:	**FCC Part 15 Subpart C: 2016**
Test Result	:	**Complied**

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2. The results in this report apply only to the sample tested.
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4. The test results in this report are traceable to the national or international standards.
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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 11197179H-A-R1. 11197179H-A-R1 is replaced with this report.

Date of test: March 18 to May 13, 2016

Representative test engineer:
Yuta Moriya
Engineer
Consumer Technology Division

Approved by:
Takahiro Hatakeda
Leader
Consumer Technology Division

NVLAP LAB CODE: 200572-0

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REVISION HISTORY

Original Test Report No.: 11197179H-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	11197179H-A	May 24,2016	-	-
1	11197179H-A-R1	July 6, 2016	P9	Correction of configuration and peripherals.
2	11197179H-A-R2	July 7, 2016	P9	Correction of configuration and peripherals. Correction of cable length for No.3.

CONTENTS **PAGE**

SECTION 1: Customer information

Company Name	:	Murata Manufacturing Co., Ltd.
Address	:	1-10-1 Higashikotari, Nagaokakyo-shi, Kyoto 617-8555 Japan
Telephone Number	:	+81-75-955-6736
Facsimile Number	:	+81-75-955-6634
Contact Person	:	Motoo Hayashi

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

2.1 Identification of E.U.T.

Type of Equipment	:	Communication Module
Model No.	:	LBBA0ZZ1EU
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	LDO mode: Typ. VCC=3.6V(3.2-5.5V) Direct DC supply mode: Typ. VDDIN=2.8V(2.6-3.0V)
Receipt Date of Sample	:	March 15, 2016
Country of Mass-production	:	Japan
Condition of EUT	:	Engineering 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: LBBA0ZZ1EU (referred to as the EUT in this report) is a Communication Module.

General Specification

Clock frequency(ies) in the system	:	32.768 kHz, 16 MHz, 32 MHz

Radio Specification

Radio Type	:	Transceiver
Frequency of Operation	:	2405 MHz - 2475 MHz
Modulation	:	O-QPSK
Power Supply (radio part input)	:	LDO mode: 3.0 V Direct DC supply mode: 2.8V(2.6-3.0V)
Antenna type	:	Monopole Antenna
Antenna Gain	:	1.7 dBi with RF Cable
Operating temperature	:	-40 deg. C to +85 deg. C

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C FCC part 15 final revised on April 6, 2016.
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** 13.5 dB, 21.09790 MHz, N **AV** 9.3 dB, 21.09790 MHz, N	Complied	-
6dB Bandwidth	**FCC:** KDB 558074 D01 DTS Meas Guidance v03r05 **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 v03r05 **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 v03r05 **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 v03r05 **IC:** RSS-Gen 6.13	**FCC:** Section15.247(d) **IC:** RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	4.2 dB 2390.000 MHz, AV, Hori.	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 v03r05 12.2.7.

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

FCC Part 15.31 (e)

[LDO mode]
This EUT provides stable voltage (DC3.0V) constantly to RF Module regardless of input voltage.
Therefore, this EUT complies with the requirement.

[Direct DC supply mode]
The stable voltage (DC 2.8 V) was provided to the EUT during the all tests.
And maximum and minimum voltage were provided to the EUT during the output power measurement test.
Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

The EUT has a unique coupling/antenna connector (MMCX connector) and an external antenna connector, but it is installed by the professionals.
Therefore the equipment complies with the requirement of 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

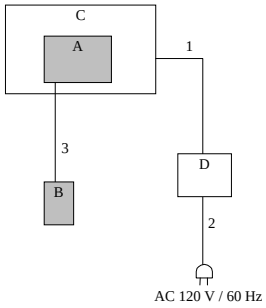
Refer to APPENDIX.

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

4.1 Operating Mode(s)

Mode	Tested frequency
Transmitting (Tx)	2405 MHz 2440 MHz 2475 MHz
*The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)	
*Power of the EUT was set by the software as follows; Power settings: 10 dBm Software: Type1EU Testtool DEBUG 1.01 *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. *Test was performed with Direct DC supply mode as representative because it had higher peak output power.	

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

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Communication Module	LBBA0ZZ1EU	1	Murata Manufacturing Co., Ltd.	EUT
B	Antenna	MEIWX-282XSAX X-2400	1	MAP electronics co., ltd.	EUT
C	PCB board	-	-	-	*1)
D	DC Power Supply	PMC35-ZA	02871	KIKUSUI	-

*1) The use of a board does not influence on the test result.

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Power Cable	0.70	Unshielded	Unshielded	-
2	AC Power Cable	2.00	Unshielded	Unshielded	-
3	Antenna Cable	0.17	Shielded	Shielded	-

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane.
The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT, 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.

For the tests on EUT with other peripherals
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 v03r05".

[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 200 MHz	200 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	3.95 m *1) (1 GHz – 10GHz), 1 m *2) (10 GHz – 26.5 GHz)		3.95 m *1) (1 GHz – 10GHz), 1 m *2) (10 GHz – 26.5 GHz)

*1) Distance Factor: 20 x log (3.95 m / 3.0 m) = 2.39 dB
*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 v03r05"

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

[Antenna]
- The carrier level and noise levels were confirmed at each position of X0, X90, Y0, Y90, and Z90 axes of 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	10 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 v03r05".
*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

DATA OF CONDUCTED EMISSION TEST

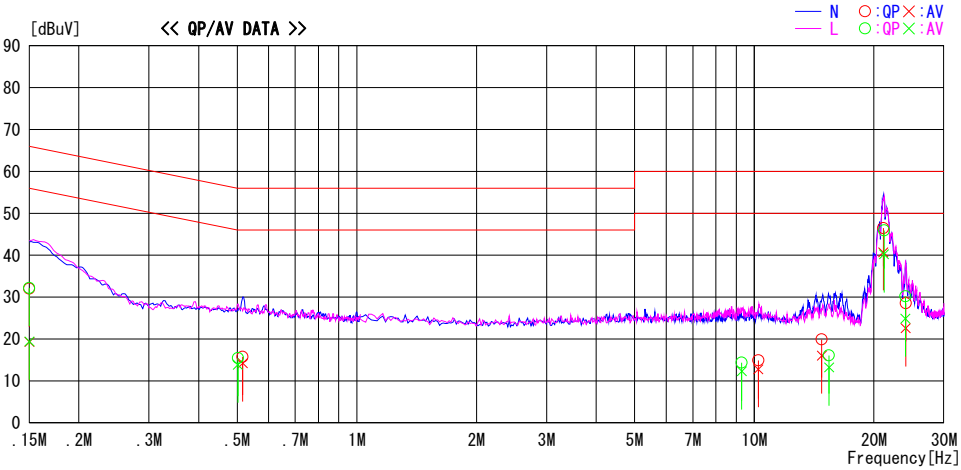
UL Japan, Inc. Ise EMC Lab. No.4 Semi Anechoic Chamber
Date : 2016/05/13

Report No. : 11197179H

Temp./Humi. : 24deg. C / 48% RH
Engineer : Satofumi Matsuyama

Mode / Remarks : Tx 2440 MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



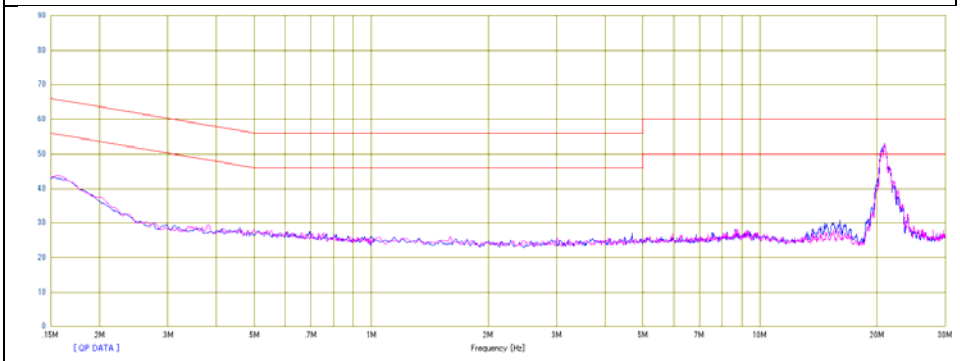
Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV	Factor	QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.15000	18.6	5.9	13.4	32.0	19.3	66.0	56.0	34.0	36.7	N	
0.51613	2.3	0.8	13.4	15.7	14.2	56.0	46.0	40.3	31.8	N	
10.23126	0.8	-1.3	14.1	14.9	12.8	60.0	50.0	45.1	37.2	N	
14.78433	5.6	1.8	14.3	19.9	16.1	60.0	50.0	40.1	33.9	N	
21.09790	31.8	26.0	14.7	46.5	40.7	60.0	50.0	13.5	9.3	N	
24.03725	13.8	7.8	14.8	28.6	22.6	60.0	50.0	31.4	27.4	N	
0.15000	18.8	6.0	13.4	32.2	19.4	66.0	56.0	33.8	36.6	L	
0.50219	2.1	0.5	13.4	15.5	13.9	56.0	46.0	40.5	32.1	L	
9.29594	0.3	-1.8	14.1	14.4	12.3	60.0	50.0	45.6	37.7	L	
15.41451	1.7	-1.2	14.4	16.1	13.2	60.0	50.0	43.9	36.8	L	
21.20046	31.2	25.5	14.7	45.9	40.2	60.0	50.0	14.1	9.8	L	
23.98618	15.4	10.1	14.8	30.2	24.9	60.0	50.0	29.8	25.1	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.

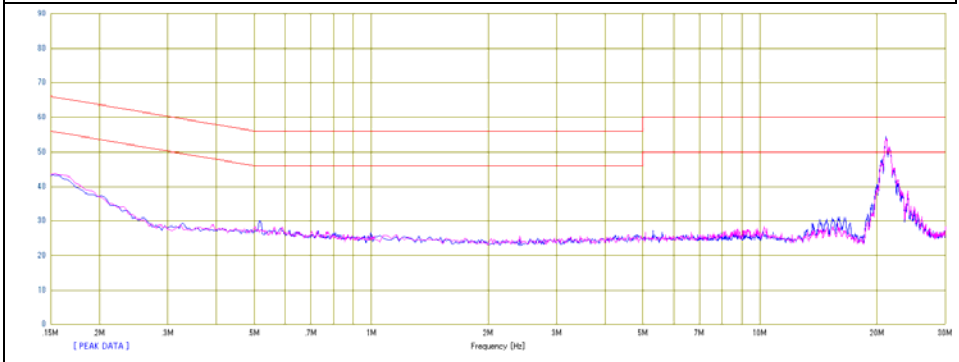
Conducted Emission

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11197179H
Date	May 13, 2016
Temperature / Humidity	24 deg. C / 48 % RH
Engineer	Satofumi Matsuyama
Mode	Tx

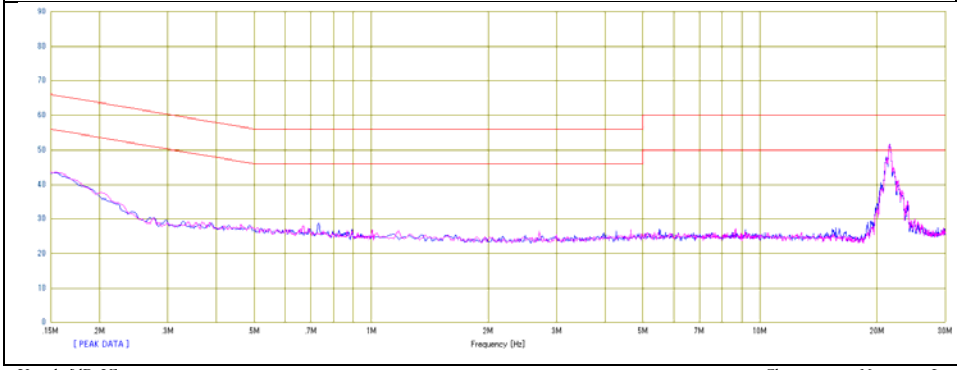
2405 MHz



2440 MHz



2475 MHz



Y scale [dBuV] Chart N L

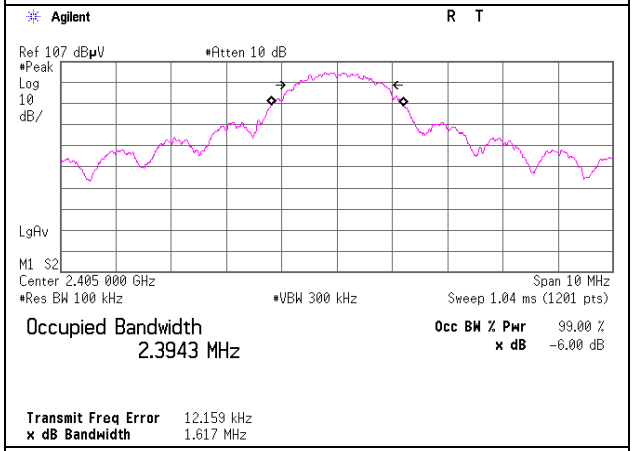
6dB Bandwidth

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11197179H
Date	May 12, 2016
Temperature / Humidity	25 deg. C / 32% RH
Engineer	Yuta Moriya
Mode	Tx

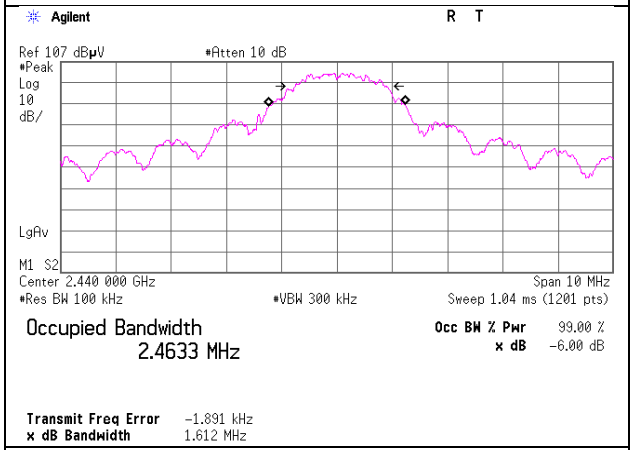
Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2405	1.617	> 500
2440	1.612	> 500
2475	1.618	> 500

6dB Bandwidth

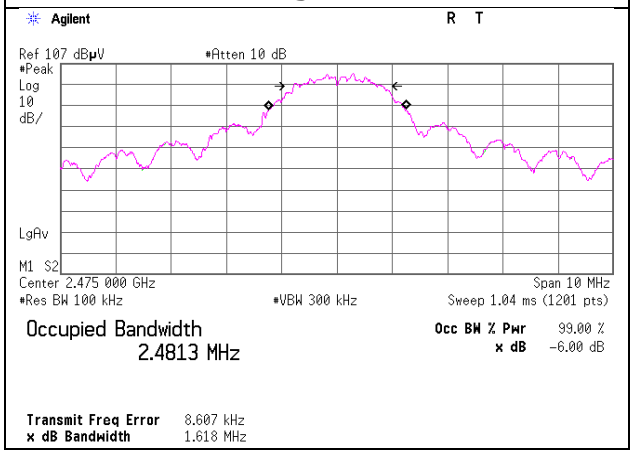
2405 MHz



2440 MHz



2475 MHz



Maximum Peak Output Power

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11197179H
Date	May 12, 2016
Temperature / Humidity	25 deg. C / 32% RH
Engineer	Yuta Moriya
Mode	Tx

Direct DC supply mode(DC 2.8V)

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2405	-1.87	1.51	10.09	9.73	9.40	30.00	1000	20.27
2440	-1.82	1.52	10.09	9.79	9.53	30.00	1000	20.21
2475	-2.26	1.53	10.09	9.36	8.63	30.00	1000	20.64

Direct DC supply mode(DC 2.6V)

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2405	-1.87	1.51	10.09	9.73	9.40	30.00	1000	20.27
2440	-1.83	1.52	10.09	9.78	9.51	30.00	1000	20.22
2475	-2.28	1.53	10.09	9.34	8.59	30.00	1000	20.66

Direct DC supply mode(DC 3.0V)

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2405	-1.88	1.51	10.09	9.72	9.38	30.00	1000	20.28
2440	-1.83	1.52	10.09	9.78	9.51	30.00	1000	20.22
2475	-2.27	1.53	10.09	9.35	8.61	30.00	1000	20.65

LDO mode

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2405	-1.88	1.51	10.09	9.72	9.38	30.00	1000	20.28

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

Average Output Power
(Reference data for RF Exposure)

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	11197179H
Date	May 12, 2016
Temperature / Humidity	25 deg. C / 32% RH
Engineer	Yuta Moriya
Mode	Tx

Direct DC supply mode(DC 2.8V)

Freq.	Reading	Cable Loss	Atten. Loss	Result	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
2405	-6.24	1.51	10.09	5.36	3.44
2440	-6.26	1.52	10.09	5.35	3.43
2475	-6.86	1.53	10.03	4.70	2.95

Direct DC supply mode(DC 2.6V)

Freq.	Reading	Cable Loss	Atten. Loss	Result	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
2405	-6.24	1.51	10.09	5.36	3.44
2440	-6.27	1.52	10.09	5.34	3.42
2475	-6.88	1.53	10.03	4.68	2.94

Direct DC supply mode(DC 3.0V)

Freq.	Reading	Cable Loss	Atten. Loss	Result	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
2405	-6.25	1.51	10.09	5.35	3.43
2440	-6.26	1.52	10.09	5.35	3.43
2475	-6.87	1.53	10.03	4.69	2.94

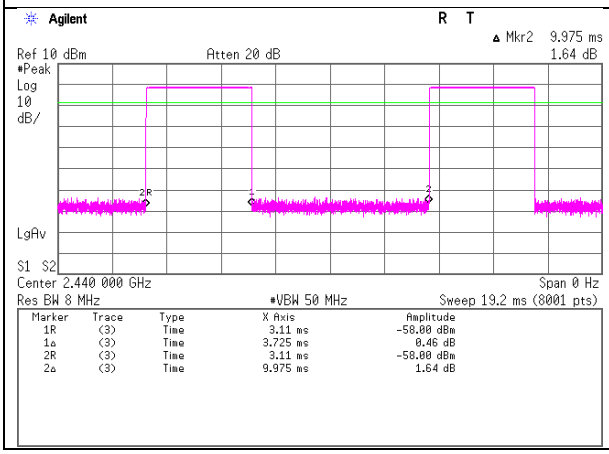
Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

*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.	11197179H
Date	May 12, 2016
Temperature / Humidity	25 deg. C / 32% RH
Engineer	Yuta Moriya
Mode	Tx

Tx on / (Tx on + Tx off) =	**0.373**
Tx on / (Tx on + Tx off) * 100 =	**37.3 %**
Duty factor = 10 * log (9.975 / 3.725) =	**4.28 dB**



Radiated Spurious Emission

Test place	Ise EMC Lab. No.1 and 3 Semi Anechoic Chamber	
Report No.	11197179H	
Date	May 13, 2016	March 26, 2016
Temperature / Humidity	22 deg. C / 58 % RH	22 deg. C / 38 % RH
Engineer	Satofumi Matsuyama (Above 1GHz)	Ken Fujita (Below 1GHz)
Mode	Tx 2405 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	30.000	QP	26.5	16.8	7.0	32.3	-	18.0	40.0	22.0	
Hori	35.850	QP	23.5	15.4	7.1	32.3	-	13.7	40.0	26.3	
Hori	42.150	QP	23.4	13.1	7.2	32.2	-	11.5	40.0	28.5	
Hori	54.300	QP	23.6	8.8	7.4	32.1	-	7.7	40.0	32.3	
Hori	449.332	QP	24.3	17.7	10.9	32.1	-	20.8	46.0	25.2	
Hori	850.671	QP	24.4	22.2	13.1	31.3	-	28.4	46.0	17.6	
Hori	2390.000	PK	70.4	26.8	5.6	36.3	-	66.5	73.9	7.4	
Hori	4810.000	PK	47.1	31.8	7.9	35.6	-	51.2	73.9	22.7	
Hori	7215.000	PK	44.1	36.1	9.1	35.8	-	53.5	73.9	20.4	Floor Noise
Hori	9620.000	PK	45.0	38.6	9.9	36.2	-	57.3	73.9	16.6	Floor Noise
Hori	2390.000	AV	49.3	26.8	5.6	36.3	4.3	49.7	53.9	4.2	*1)
Hori	4810.000	AV	35.1	31.8	7.9	35.6	4.3	43.5	53.9	10.4	
Hori	7215.000	AV	33.1	36.1	9.1	35.8	-	42.5	53.9	11.4	Floor Noise
Hori	9620.000	AV	33.3	38.6	9.9	36.2	-	45.6	53.9	8.3	Floor Noise
Vert	30.000	QP	33.5	16.8	7.0	32.3	-	25.0	40.0	15.0	
Vert	35.428	QP	36.5	15.5	7.1	32.3	-	26.8	40.0	13.2	
Vert	42.150	QP	31.5	13.1	7.2	32.2	-	19.6	40.0	20.4	
Vert	53.081	QP	32.6	9.2	7.4	32.2	-	17.0	40.0	23.0	
Vert	453.999	QP	24.7	17.7	11.0	32.1	-	21.3	46.0	24.7	
Vert	850.671	QP	24.6	22.2	13.1	31.3	-	28.6	46.0	17.4	
Vert	2390.000	PK	67.7	26.8	5.6	36.3	-	63.8	73.9	10.1	
Vert	4810.000	PK	51.8	31.8	7.9	35.6	-	55.9	73.9	18.0	
Vert	7215.000	PK	44.9	36.1	9.1	35.8	-	54.3	73.9	19.6	Floor Noise
Vert	9620.000	PK	44.6	38.6	9.9	36.2	-	56.9	73.9	17.0	Floor Noise
Vert	2390.000	AV	47.2	26.8	5.6	36.3	4.3	47.6	53.9	6.3	*1)
Vert	4810.000	AV	36.5	31.8	7.9	35.6	4.3	44.9	53.9	9.0	
Vert	7215.000	AV	33.1	36.1	9.1	35.8	-	42.5	53.9	11.4	Floor Noise
Vert	9620.000	AV	33.5	38.6	9.9	36.2	-	45.8	53.9	8.1	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).

*The 10th harmonic was not seen so the result was its base noise level.

Distance factor: 1 GHz - 10 GHz 20log (3.95 m / 3.0 m) = 2.39 dB
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	2405.000	PK	107.8	26.8	5.6	36.3	103.9	-	-	Carrier
Hori	2400.000	PK	66.6	26.8	5.6	36.3	62.7	83.9	21.2	
Vert	2405.000	PK	105.9	26.8	5.6	36.3	102.0	-	-	Carrier
Vert	2400.000	PK	64.2	26.8	5.6	36.3	60.3	82.0	21.7	

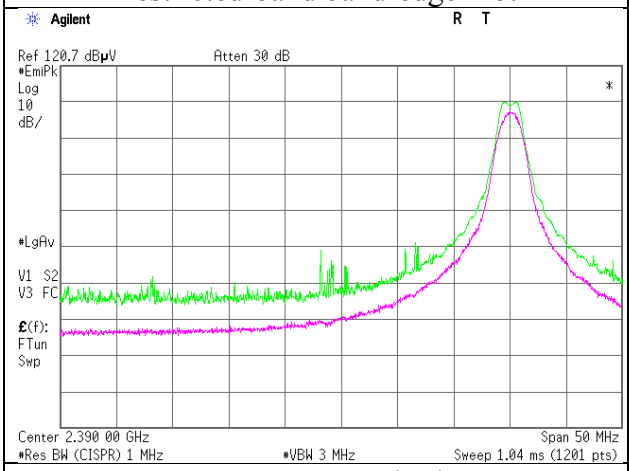
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amprifier)

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No.	11197179H
Date	May 13, 2016
Temperature / Humidity	22 deg. C / 58 % RH
Engineer	Satofumi Matsuyama
Mode	Tx 2405 MHz

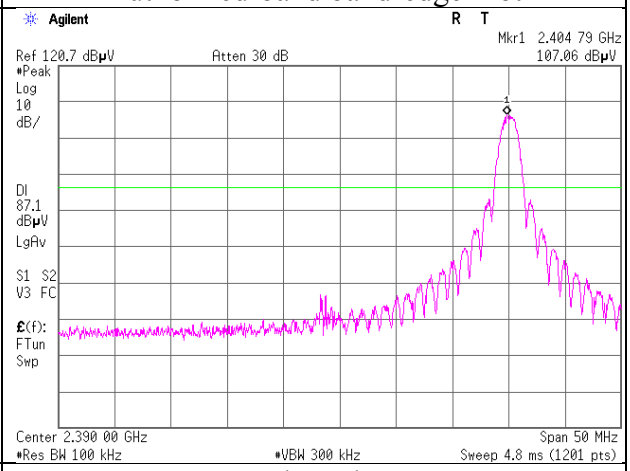
Horizontal

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

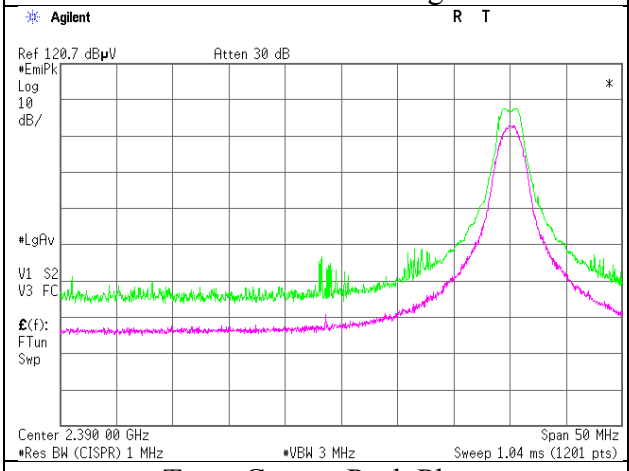
Authorized-band band-edge Plot



20dBc Plot

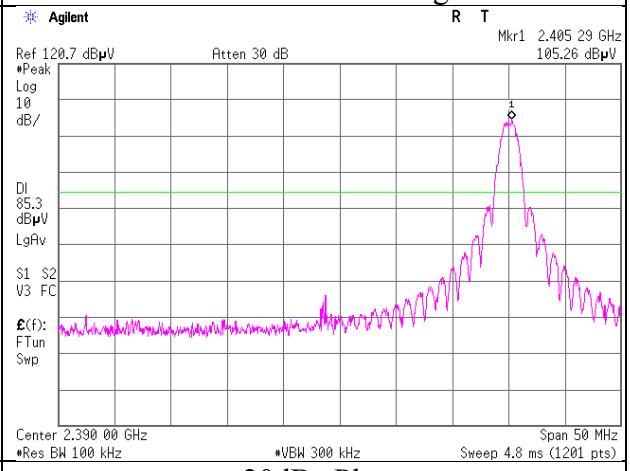
Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Authorized-band band-edge Plot



20dBc Plot

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

Radiated Spurious Emission

Test place	Ise EMC Lab. No.1 and 3 Semi Anechoic Chamber	
Report No.	11197179H	
Date	May 13, 2016	March 26, 2016
Temperature / Humidity	22 deg. C / 58 % RH	22 deg. C / 38 % RH
Engineer	Satofumi Matsuyama (Above 1GHz)	Ken Fujita (Below 1GHz)
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	30.000	QP	26.7	16.8	7.0	32.3	-	18.2	40.0	21.8	
Hori	35.776	QP	24.3	15.4	7.1	32.3	-	14.5	40.0	25.5	
Hori	42.132	QP	23.0	13.1	7.2	32.2	-	11.1	40.0	28.9	
Hori	54.223	QP	23.5	8.8	7.4	32.1	-	7.6	40.0	32.4	
Hori	463.332	QP	24.3	17.8	11.0	32.1	-	21.0	46.0	25.0	
Hori	875.171	QP	23.8	22.2	13.2	31.1	-	28.1	46.0	17.9	
Hori	4880.000	PK	47.0	32.0	7.9	35.5	-	51.4	73.9	22.5	
Hori	7320.000	PK	43.3	36.1	9.1	35.8	-	52.7	73.9	21.2	Floor Noise
Hori	9760.000	PK	45.1	38.6	10.0	36.3	-	57.4	73.9	16.5	Floor Noise
Hori	4880.000	AV	35.3	32.0	7.9	35.5	4.3	44.0	53.9	9.9	
Hori	7320.000	AV	33.2	36.1	9.1	35.8	-	42.6	53.9	11.3	Floor Noise
Hori	9760.000	AV	33.5	38.6	10.0	36.3	-	45.8	53.9	8.1	Floor Noise
Vert	30.000	QP	33.2	16.8	7.0	32.3	-	24.7	40.0	15.3	
Vert	42.134	QP	31.2	13.1	7.2	32.2	-	19.3	40.0	20.7	
Vert	53.082	QP	32.9	9.2	7.4	32.2	-	17.3	40.0	22.7	
Vert	462.165	QP	24.4	17.8	11.0	32.1	-	21.1	46.0	24.9	
Vert	872.838	QP	24.5	22.2	13.1	31.2	-	28.6	46.0	17.4	
Vert	4880.000	PK	49.9	32.0	7.9	35.5	-	54.3	73.9	19.6	
Vert	7320.000	PK	44.9	36.1	9.1	35.8	-	54.3	73.9	19.6	Floor Noise
Vert	9760.000	PK	44.4	38.6	10.0	36.3	-	56.7	73.9	17.2	Floor Noise
Vert	4880.000	AV	39.3	32.0	7.9	35.5	4.3	48.0	53.9	5.9	
Vert	7320.000	AV	33.5	36.1	9.1	35.8	-	42.9	53.9	11.0	Floor Noise
Vert	9760.000	AV	33.1	38.6	10.0	36.3	-	45.4	53.9	8.5	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).

*The 10th harmonic was not seen so the result was its base noise level.

Distance factor: 1 GHz - 10 GHz 20log (3.95 m / 3.0 m) = 2.39 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission

Test place	Ise EMC Lab. No.1 and 2 Semi Anechoic Chamber
Report No.	11197179H
Date	May 12, 2016
Temperature / Humidity	24 deg. C / 52 % RH
Engineer	Satofumi Matsuyama
Mode	Tx 2475 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	35.689	QP	23.2	15.5	6.8	28.5	-	16.9	40.0	23.1	
Hori	43.122	QP	23.1	12.8	6.9	28.5	-	14.2	40.0	25.8	
Hori	52.910	QP	23.1	9.4	7.0	28.5	-	10.9	40.0	29.1	
Hori	451.665	QP	22.2	17.5	9.5	28.4	-	20.7	46.0	25.3	
Hori	860.004	QP	21.6	22.1	11.0	27.5	-	27.1	46.0	18.9	
Hori	2483.500	PK	67.8	26.9	5.6	36.3	-	63.9	73.9	10.0	
Hori	4950.000	PK	44.8	32.1	7.8	35.5	-	49.1	73.9	24.8	
Hori	7425.000	PK	44.1	36.1	9.0	35.8	-	53.3	73.9	20.6	Floor Noise
Hori	9900.000	PK	44.3	38.6	10.0	36.3	-	56.5	73.9	17.4	Floor Noise
Hori	2483.500	AV	42.1	26.9	5.6	36.3	4.3	42.5	53.9	11.4	*1)
Hori	4950.000	AV	32.5	32.1	7.8	35.5	4.3	41.1	53.9	12.8	
Hori	7425.000	AV	33.2	36.1	9.0	35.8	-	42.4	53.9	11.5	Floor Noise
Hori	9900.000	AV	33.3	38.6	10.0	36.3	-	45.5	53.9	8.4	Floor Noise
Vert	30.000	QP	23.4	17.0	6.7	28.5	-	18.5	40.0	21.5	
Vert	35.364	QP	23.8	15.6	6.8	28.5	-	17.6	40.0	22.4	
Vert	43.273	QP	23.2	12.7	6.9	28.5	-	14.2	40.0	25.8	
Vert	53.228	QP	23.2	9.3	7.0	28.5	-	10.9	40.0	29.1	
Vert	450.499	QP	22.3	17.5	9.5	28.4	-	20.8	46.0	25.2	
Vert	2483.500	PK	68.9	26.9	5.6	36.3	-	65.0	73.9	8.9	
Vert	4950.000	PK	47.3	32.1	7.8	35.5	-	51.6	73.9	22.3	
Vert	7425.000	PK	45.6	36.1	9.0	35.8	-	54.8	73.9	19.1	Floor Noise
Vert	9900.000	PK	44.2	38.6	10.0	36.3	-	56.4	73.9	17.5	Floor Noise
Vert	2483.500	AV	42.2	26.9	5.6	36.3	4.3	42.6	53.9	11.3	*1)
Vert	4950.000	AV	35.7	32.1	7.8	35.5	4.3	44.3	53.9	9.6	
Vert	7425.000	AV	33.2	36.1	9.0	35.8	-	42.4	53.9	11.5	Floor Noise
Vert	9900.000	AV	33.2	38.6	10.0	36.3	-	45.5	53.9	8.4	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).

*The 10th harmonic was not seen so the result was its base noise level.

Distance factor: 1 GHz - 10 GHz 20log (3.95 m / 3.0 m) = 2.39 dB

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

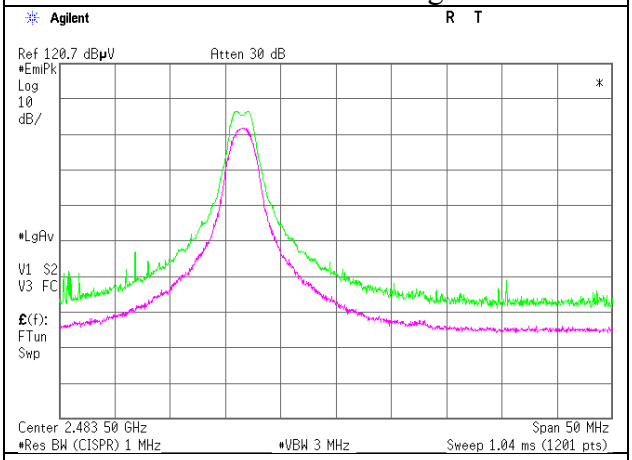
*1) Not Out of Band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No.	11197179H
Date	May 12, 2016
Temperature / Humidity	24 deg. C / 52 % RH
Engineer	Satofumi Matsuyama (1 GHz – 10 GHz)
Mode	Tx 2475MHz

Horizontal

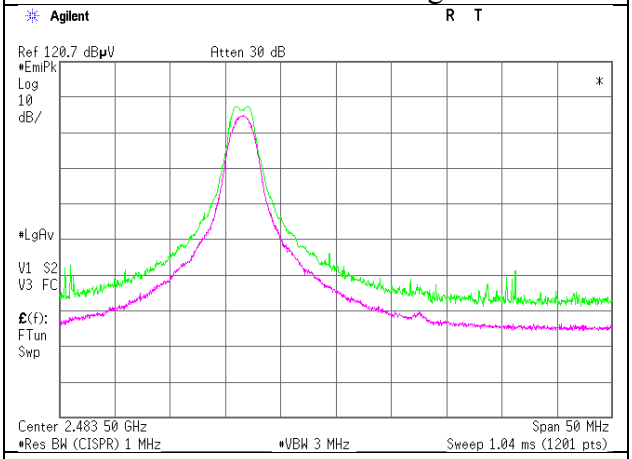
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot

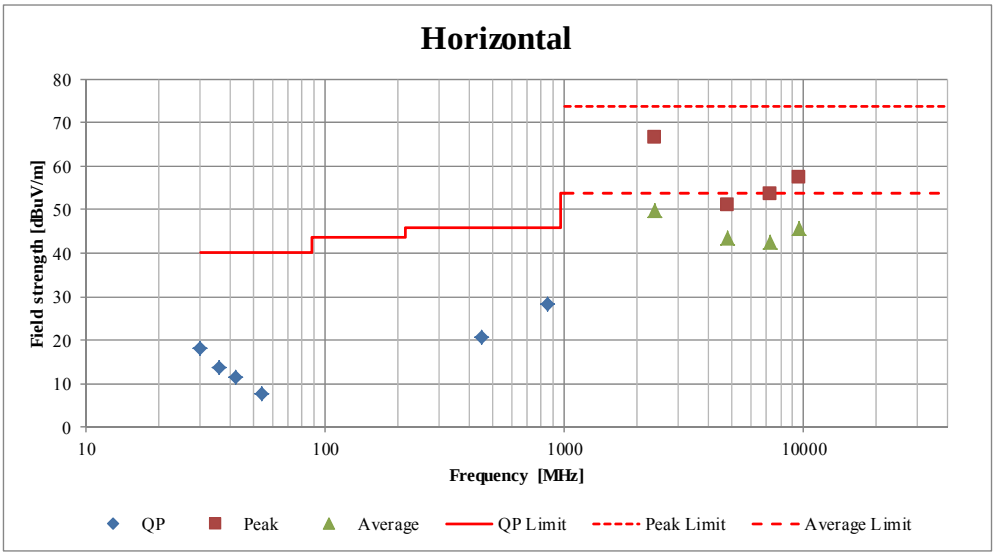


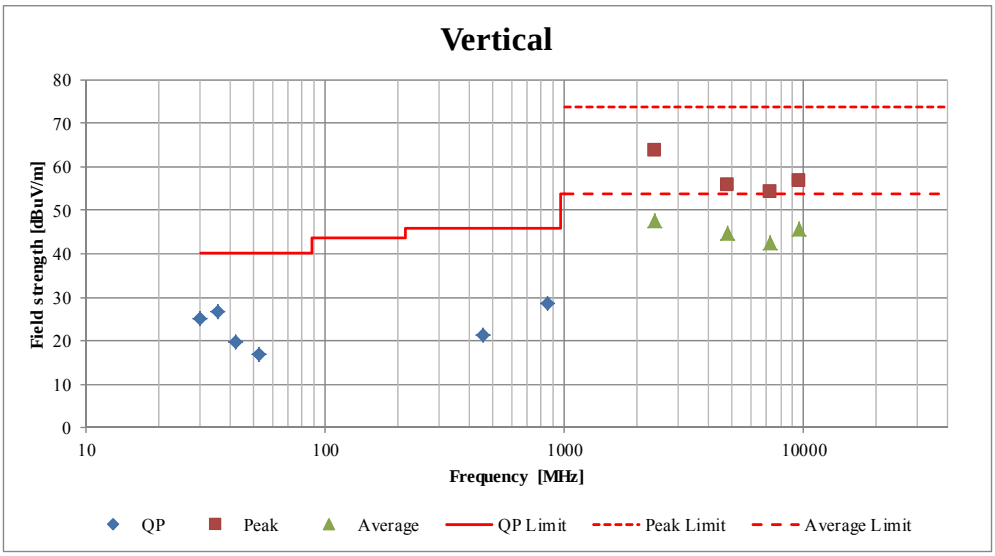
Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission
(Plot data, Worst case)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	11197179H	
Date	May 13, 2016	March 26, 2016
Temperature / Humidity	22 deg. C / 58 % RH	22 deg. C / 38 % RH
Engineer	Satofumi Matsuyama (Above 1GHz)	Ken Fujita (Below 1GHz)
Mode	Tx 2405 MHz	



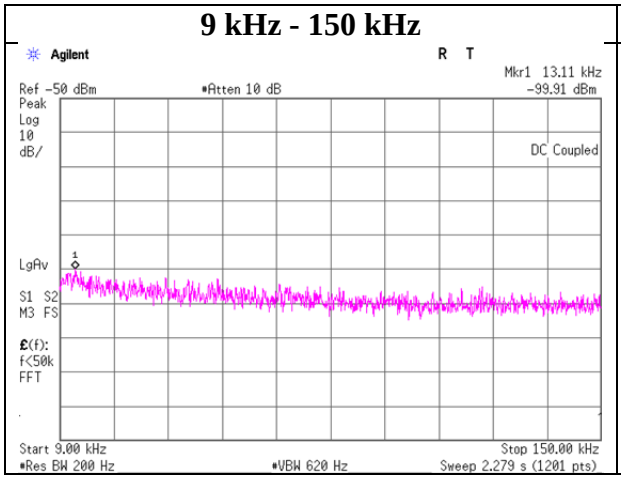


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

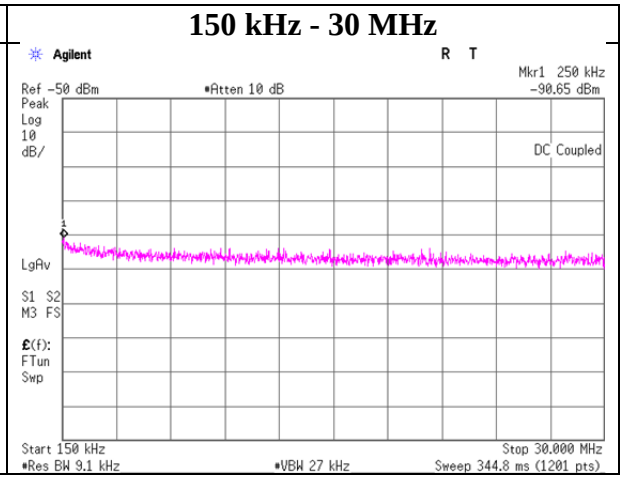
Conducted Spurious Emission

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	11197179H
Date	March 18, 2016
Temperature / Humidity	25 deg. C / 43% RH
Engineer	Shinichi Miyazono
Mode	Tx 2405 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



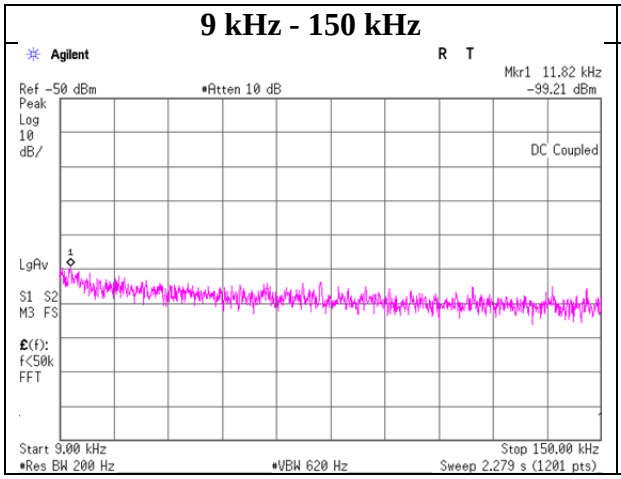
Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenator Loss [dB]	Antenna Gain [dBi]	N (Number of Output	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
13.11	-99.9	0.50	9.8	2.0	1	-87.6	300	6.0	-26.3	45.2	71.5	
250.00	-90.7	0.51	9.9	2.0	1	-78.3	300	6.0	-17.0	19.6	36.6	

E = EIRP - 20 log (D) + Ground bounce + 104.8 [dBuV/m]
EIRP = Reading + Cable Loss + Attenator Loss + Antenna Gain + 10 * log (N)

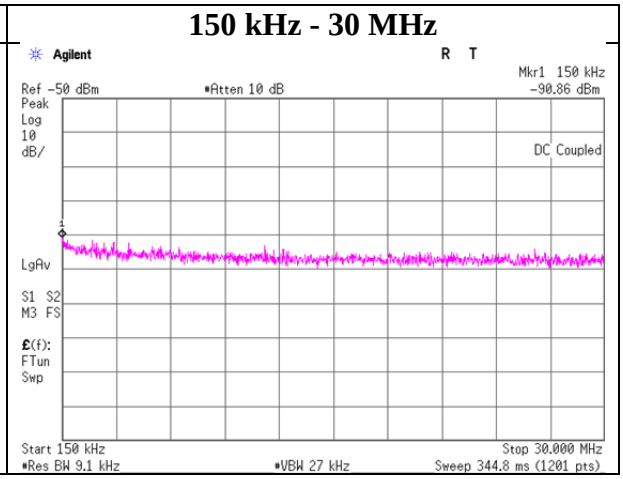
Conducted Spurious Emission

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	11197179H
Date	March 18, 2016
Temperature / Humidity	25 deg. C / 43% RH
Engineer	Shinichi Miyazono
Mode	Tx 2440MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



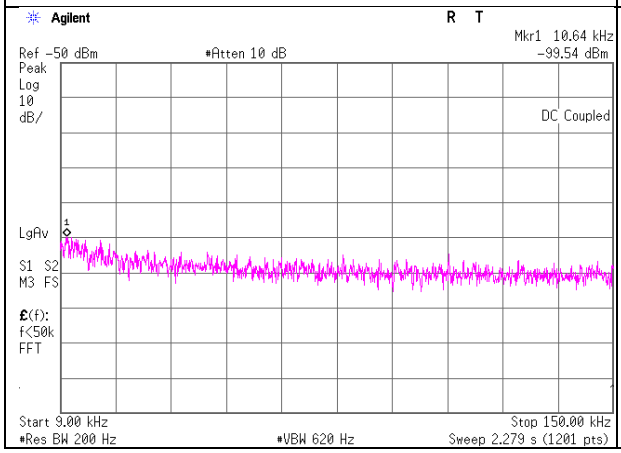
Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenator Loss [dB]	Antenna Gain [dBi]	N (Number of Output	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
11.82	-99.2	0.50	9.8	2.0	1	-86.9	300	6.0	-25.6	46.1	71.7	
150.00	-90.9	0.50	9.8	2.0	1	-78.5	300	6.0	-17.3	24.0	41.3	

E = EIRP - 20 log (D) + Ground bounce + 104.8 [dBuV/m]
EIRP = Reading + Cable Loss + Attenator Loss + Antenna Gain + 10 * log (N)

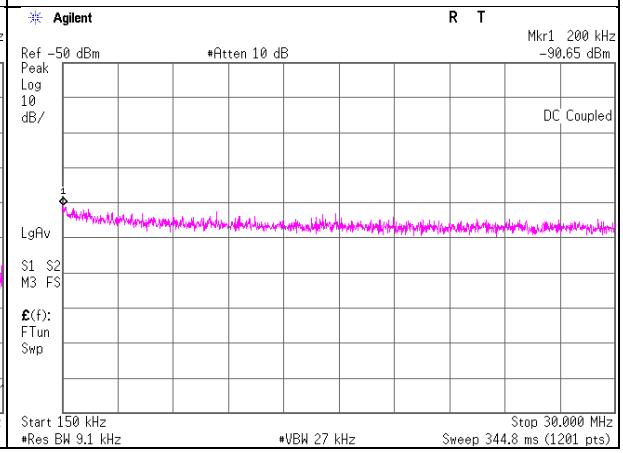
Conducted Spurious Emission

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11197179H
Date	May 12, 2016
Temperature / Humidity	25 deg. C / 32% RH
Engineer	Yuta Moriya
Mode	Tx 2475 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
10.64	-99.5	0.50	9.8	2.0	1	-87.2	300	6.0	-26.0	47.0	73.0	
200.00	-90.7	0.51	9.8	2.0	1	-78.3	300	6.0	-17.1	21.5	38.6	

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.11 Measurement Room
Report No.	11197179H
Date	May 12, 2016
Temperature / Humidity	25 deg. C / 32% RH
Engineer	Yuta Moriya
Mode	Tx

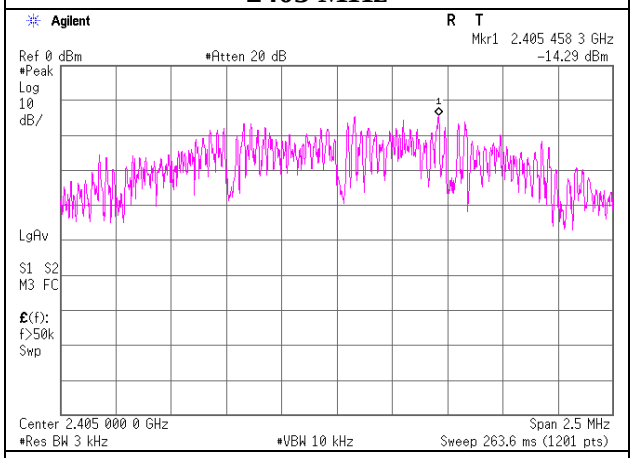
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2405.00	-14.29	1.51	10.09	-2.69	8.00	10.69
2440.00	-14.60	1.52	10.09	-2.99	8.00	10.99
2475.00	-15.69	1.53	10.09	-4.07	8.00	12.07

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

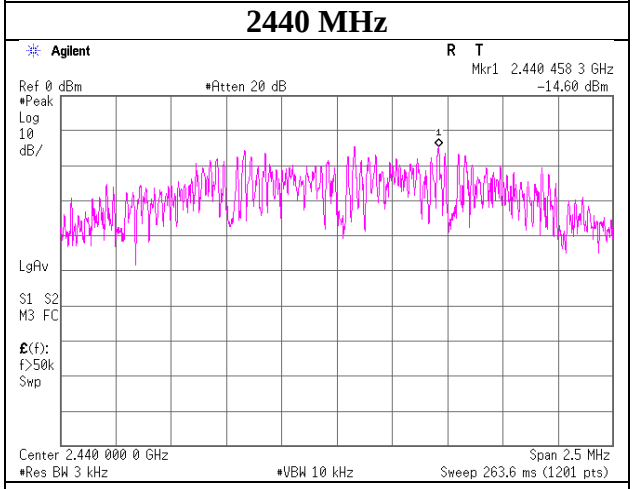
*The equipment and cables were not used for factor 0 dB of the data sheets.

Power Density

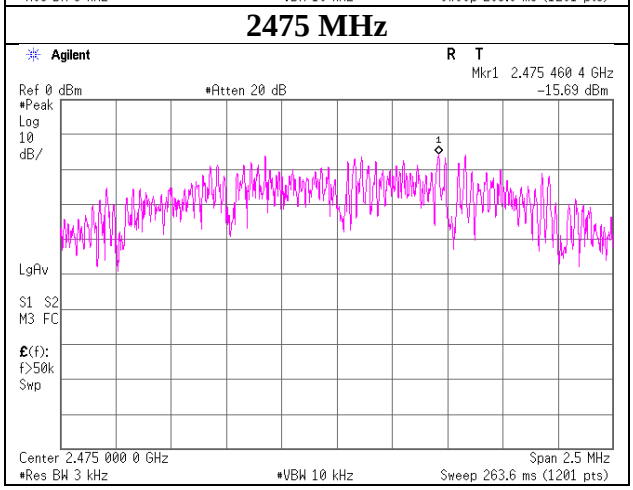
2405 MHz



2440 MHz



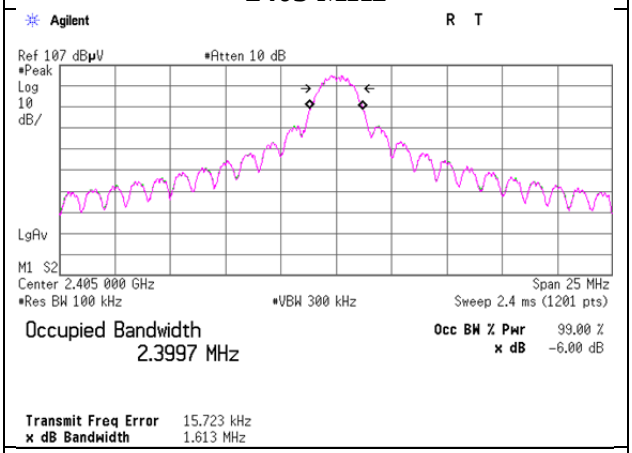
2475 MHz



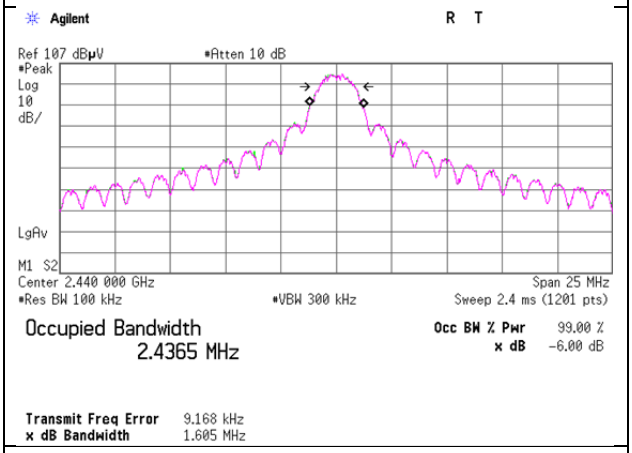
99% Occupied Bandwidth

Test place	Ise EMC Lab. No.6 and 11 Measurement Room	
Report No.	11197179H	
Date	March 18, 2016	May 12, 2016
Temperature / Humidity	25 deg. C / 43% RH	25 deg. C / 32% RH
Engineer	Shinichi Miyazono	Yuta Moriya
Mode	Tx	

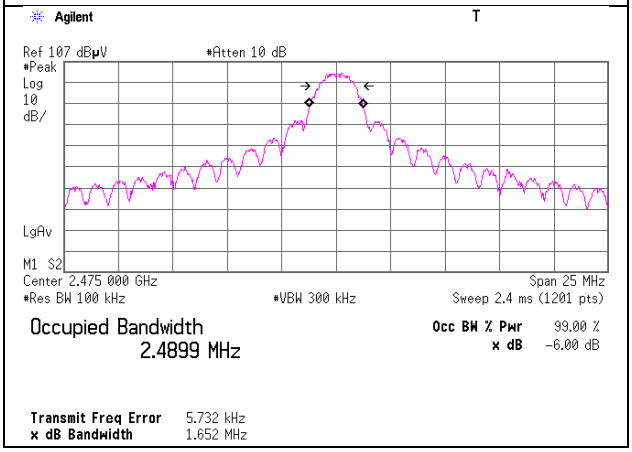
2405 MHz



2440 MHz



2475 MHz



APPENDIX 2: Test instruments

Test equipment (1/2)

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
MSA-13	Spectrum Analyzer	Agilent	E4440A	MY46185823	AT	2015/06/02 * 12
MAT-56	Attenuator(10dB)	Suhner	6810.19.A	-	AT	2016/01/18 * 12
MCC-172	Microwave Cable	Junkosha	MWX221	1409S495	AT	2016/03/11 * 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
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2015/07/01 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2016/01/21 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MSA-14	Spectrum Analyzer	Agilent	E4440A	MY48250080	RE	2015/10/07 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2015/10/11 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2015/10/11 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2015/10/11 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2016/02/08 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2015/11/10 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2015/09/04 * 12
MMM-01	Digital Tester	Fluke	FLUKE 26-3	78030611	RE	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	2016/01/21 * 12
MJM-25	Measure	KOMELON	KMC-36	-	RE	-
MHA-05	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	253	RE	2015/05/18 * 12
MHA-01	Horn Antenna 18-26.5GHz	EMCO	3160-09	1266	RE	2015/06/06 * 12
MPA-01	Pre Amplifier	Agilent	8449B	3008A01671	RE	2016/02/26 * 12
MCC-165	Microwave Cable	Junkosha	MWX221	1203S213(1m) / 1311S166(5m)	RE	2015/11/10 * 12
MMM-03	Digital Tester	Fluke	FLUKE 26-3	78030621	RE	2015/08/19 * 12
MHF-25	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	RE	2015/09/16 * 12
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	CE	2015/10/02 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	1501	CE	2016/01/21 * 12
MJM-26	Measure	KOMELON	KMC-36	-	CE	-
MTR-10	EMI Test Receiver	Rohde & Schwarz	ESR26	101408	CE	2016/01/29 * 12
MLS-23	LISN(AMN)	Schwarzbeck	NSLK8127	8127-729	CE(EUT)	2015/07/10 * 12
MAT-67	Attenuator	JFW Industries, Inc.	50FP-013H2 N	-	CE	2016/01/14 * 12
MCC-113	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SFM 141(5m)/421-010(1 m)/sucoform141-PE (1m)/RFM-E121(S witcher)	-/04178	CE	2015/07/02 * 12
MMM-10	DIGITAL HiTESTER	Hioki	3805	051201148	CE	2016/01/18 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2015/05/18 * 12
MCC-167	Microwave Cable	Junkosha	MWX221	1404S374(1m) / 1405S074(5m)	RE	2015/05/21 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2016/03/24 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2015/05/19 * 12

Test equipment (2/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MSA-16	Spectrum Analyzer	Agilent	E4440A	MY46186390	AT	2016/02/08 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-201	1401	AT	2016/01/21 * 12
MMM-12	DIGITAL HiTESTER	Hioki	3805	060500120	AT	2016/02/23 * 12
MSA-15	Spectrum Analyzer	Agilent	E4440A	MY46187105	AT	2015/11/11 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2016/03/18 * 12
MCC-138	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37953/2	AT	2015/10/08 * 12
MCC-38	Coaxial Cable	UL Japan	-	-	AT	2015/12/07 * 12
MAT-10	Attenuator(10dB)	Weinschel Corp	2	BL1173	AT	2015/11/10 * 12
MPM-08	Power Meter	Anritsu	ML2495A	6K00003338	AT	2015/10/08 * 12
MPSE-11	Power sensor	Anritsu	MA2411B	011737	AT	2015/10/08 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2015/10/01 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	1301	RE	2016/01/21 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE	-
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE	2015/05/18 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2015/09/02 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2015/10/11 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2015/10/11 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2015/07/13 * 12
MAT-70	Attenuator(6dB)	Agilent	8491A-006	MY52460153	RE	2015/04/08 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2016/03/24 * 12
MMM-08	DIGITAL HiTESTER	Hioki	3805	051201197	RE	2016/01/13 * 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