



RADIO TEST REPORT

Test Report No. : 11006939H-A-R1

Applicant : **Audio-Technica Corp.**
Type of Equipment : **Boundary Transmitter**
Base Transmitter
Model No. : **ATW-T1006**
ATW-T1007
FCC ID : **JFZT1006T1007**
Test regulation : **FCC Part 15 Subpart C: 2015**
Test Result : **Complied**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
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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 11006939H-A. 11006939H-A is replaced with this report.

Date of test: October 20 and 21, 2015

Representative test engineer:

T. Noguchi
Takafumi Noguchi

Engineer

Consumer Technology Division

Approved by:

Takayuki Shimada
Takayuki Shimada

Engineer

Consumer Technology Division



NVLAP LAB CODE: 200572-0

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13-EM-F0429

REVISION HISTORY

Original Test Report No.: 11006939H-A

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CONTENTS	PAGE
SECTION 1: Customer information	4
SECTION 2: Equipment under test (E.U.T.)	4
SECTION 3: Test specification, procedures & results	5
SECTION 4: Operation of E.U.T. during testing.....	8
SECTION 5: Conducted Emission	10
SECTION 6: Radiated Spurious Emission	11
SECTION 7: Antenna Terminal Conducted Tests	12
APPENDIX 1: Test data	13
Conducted Emission	13
6dB Bandwidth	17
Maximum Peak Output Power.....	19
Average Output Power	20
Radiated Spurious Emission	21
Conducted Spurious Emission.....	33
Power Density.....	34
99%Occupied Bandwidth	36
APPENDIX 2: Test instruments	37
APPENDIX 3: Photographs of test setup.....	38
Conducted Emission	38
Radiated Spurious Emission	40

SECTION 1: Customer information

Company Name	: Audio-Technica Fukui Inc.*
Address	: 87-1 Totani Echizen-shi Fukui 915-0003 Japan
Telephone Number	: +81-778-25-6715
Facsimile Number	: +81-778-25-6705
Contact Person	: YASUSHI TAKASHIMA

***Remarks:**

Audio-Technica Fukui Inc. is on behalf of the applicant: Audio-Technica Corp.

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

2.1 Identification of E.U.T.

Type of Equipment	: Boundary Transmitter Base Transmitter
Model No.	: ATW-T1006 ATW-T1007
Serial No.	: Refer to Section 4, Clause 4.2
Rating	: DC 3.7 V (Battery) AC 100 -240 V (AC Adapter)
Receipt Date of Sample	: October 20, 2015
Country of Mass-production	: China
Condition of EUT	: Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	: No Modification by the test lab

2.2 Product description

Model No: ATW-T1006, referred to as the EUT in this report, is the Boundary Transmitter.
Model No: ATW-T1007, referred to as the EUT in this report, is the Base Transmitter.

General Specification

Clock frequency(ies) in the system	: 24MHz
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Radio Specification

Radio Type	: Transceiver
Frequency of Operation	: 2403 - 2481 MHz
Modulation	: GFSK, TDMA
Power Supply (inner)	: DC 2.0 V
Antenna type	: PIFA Antenna
Antenna Gain	: -1.60 dBi (Ant1), -1.70 dBi (Ant2)

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 C63.4-2009 7. AC powerline Conducted Emission measurements IC: RSS-Gen 8.8	FCC: Section 15.207 IC: RSS-Gen 8.8	QP 24.9 dB, 0.32075 MHz, N AV 19.1 dB, 0.32075 MHz, N	Complied	-
6dB Bandwidth	FCC: KDB 558074 D01 DTS Meas Guidance v03r03 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 v03r03 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 v03r03 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 v03r03 IC: RSS-Gen 6.13	FCC: Section 15.247(d) IC: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	7.0 dB 2483.500 MHz, AV, Horizontal	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 v03r03 12.2.7.

* In case any questions arise about test procedure, ANSI C63.4: 2009 is also referred.

FCC Part 15.31 (e)

This EUT provides stable voltage (DC 2.0 V) constantly to RF part regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

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

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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 $k = 2$.
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Test site (semi anechoic chamber)	Conducted emission Uncertainty (+/-)			
	No. 1	No. 2	No. 3	No. 4
150 kHz - 30 MHz	3.5 dB	3.5 dB	3.4 dB	3.5 dB

Test site (semi anechoic chamber)	Radiated emission Uncertainty (+/-)						
	Measurement distance: 3 m				1 m		0.5 m
	9 kHz - 30 MHz	30 MHz - 300 MHz	300 MHz - 1 GHz	1 GHz - 10 GHz	10 GHz - 18 GHz	18 GHz - 26.5 GHz	26.5 GHz - 40 GHz
No. 1	4.3 dB	5.1 dB	6.2 dB	5.5 dB	5.8 dB	5.8 dB	4.3 dB
No. 2	4.2 dB	5.1 dB	6.2 dB	5.4 dB	5.7 dB	5.9 dB	5.6 dB
No. 3	4.4 dB	5.1 dB	6.3 dB	5.2 dB	5.5 dB	5.8 dB	5.5 dB
No. 4	4.7 dB	5.3 dB	6.3 dB	5.3 dB	5.7 dB	5.9 dB	5.5 dB

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	
0.7 dB	1.5 dB	1.5 dB	1.7 dB	2.8 dB	2.8 dB	2.9 dB	2.6 dB

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 test report has enough margin, more than the site margin.

3.5 Test Location

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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

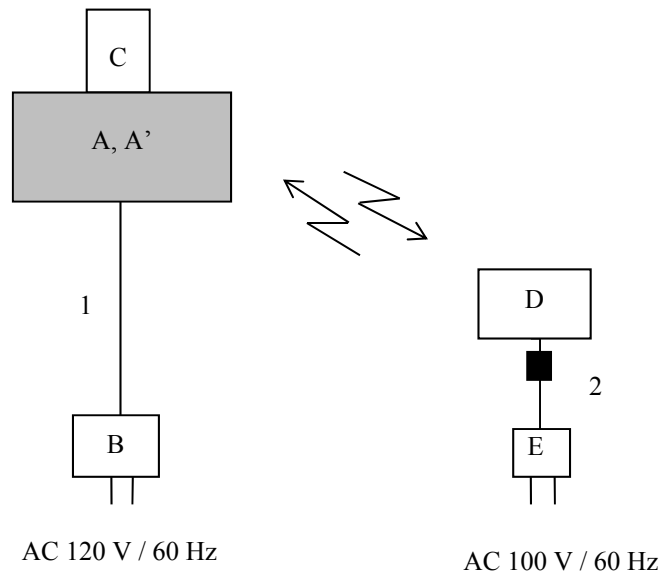
4.1 Operating Mode(s)

Mode	Remarks*
Transmitting (Tx) mode	
*Power of the EUT was set by the software as follows; -Power setting: 0045 -Hardware Version: TP -Software Version: V0017 *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.	

*The details of Operating mode(s)

Test Item	Operating Mode	Tested Antenna	Tested frequency
Maximum Peak Output Power	Tx	Antenna 1 Antenna 2	2403MHz 2441MHz 2481MHz
6dB Bandwidth, Power Density, 99% Occupied Bandwidth	Tx,	Antenna 1 *1)	2403MHz 2441MHz 2481MHz
Conducted Spurious Emission	Tx	Antenna 1 *1)	2403MHz *2)
Conducted Emission	Tx,	Antenna 1 *1)	2403MHz 2441MHz 2481MHz
Spurious Emission	Tx,	Antenna 1 *1)	2403MHz 2441MHz 2481MHz
*1) The antenna was tested as a worst condition, because it had the highest power at Maximum Peak Output power test. *2) The test was performed with the representative 2403 MHz.			

4.2 Configuration and peripherals



■ : Standard Ferrite Core

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

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Boundary Transmitter	ATW-T1006	TP1 No.3 *1) TP1 No.1 *2)	Audio-Technica Fukui Inc.	EUT
A'	Base Transmitter	ATW-T1007	TP1 No.2	Audio-Technica Fukui Inc.	EUT
B	AC Adapter	KSAS0050500055VUU	001	Ktec Power Supply Co.,LTD	-
C	Microphone	ES915 S	0739	Audio-Technica Fukui Inc.	*3)
D	Receiver	ATW-R1100	12420536	Audio-Technica Fukui Inc.	-
E	AC Adapter	KSAS0051200050VUD	-	Ktec Power Supply Co.,LTD	-

*1) Used for other tests except for Antenna Terminal Conducted test.

*2) Used for Antenna Terminal Conducted test.

*3) Used for A' (ATW-T1007) only.

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	USB Cable	1.5	Shielded	Shielded	-
2	DC Cable	1.5	Unshielded	Unshielded	-

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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 (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 v03r03".

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.

The height of the measuring antenna varied between 1 m 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 *a)		Spectrum Analyzer *a)
Detector	QP	PK	AV *1)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	Average Power Method: <u>12.2.5.2</u> 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 10 GHz), 1 m *2) (above 10 GHz)		3 m (below 10 GHz), 1 m *2) (above 10 GHz)

*1) Average Power Measurement was performed based on 6.0 & 12.2.5 of "KDB 558074 D01 DTS Meas Guidance v03r03"

*2) Distance Factor: $20 \times \log(3.0 \text{ m} / 1.0 \text{ m}) = 9.5 \text{ dB}$

The test was made on EUT at the normal use position.

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

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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	2 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 v03r03".
 *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 ATW-T1006

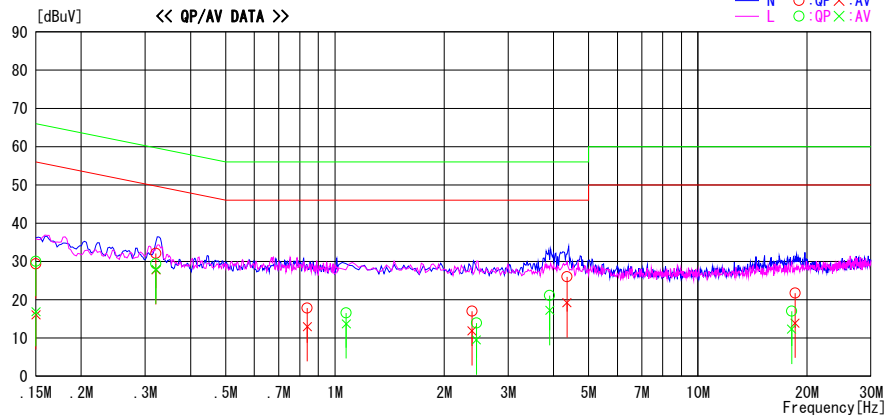
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Ise EMC Lab. No.2 Semi Anechoic Chamber
Date : 2015/10/21

Report No. : 11006939H
Temp./Humi. : 23deg. C / 51% RH
Engineer : Kazuya Yoshioka

Mode / Remarks : Tx 2403MHz Antenna 1

LIMIT : FCC15.207 QP
FCC15.207 AV



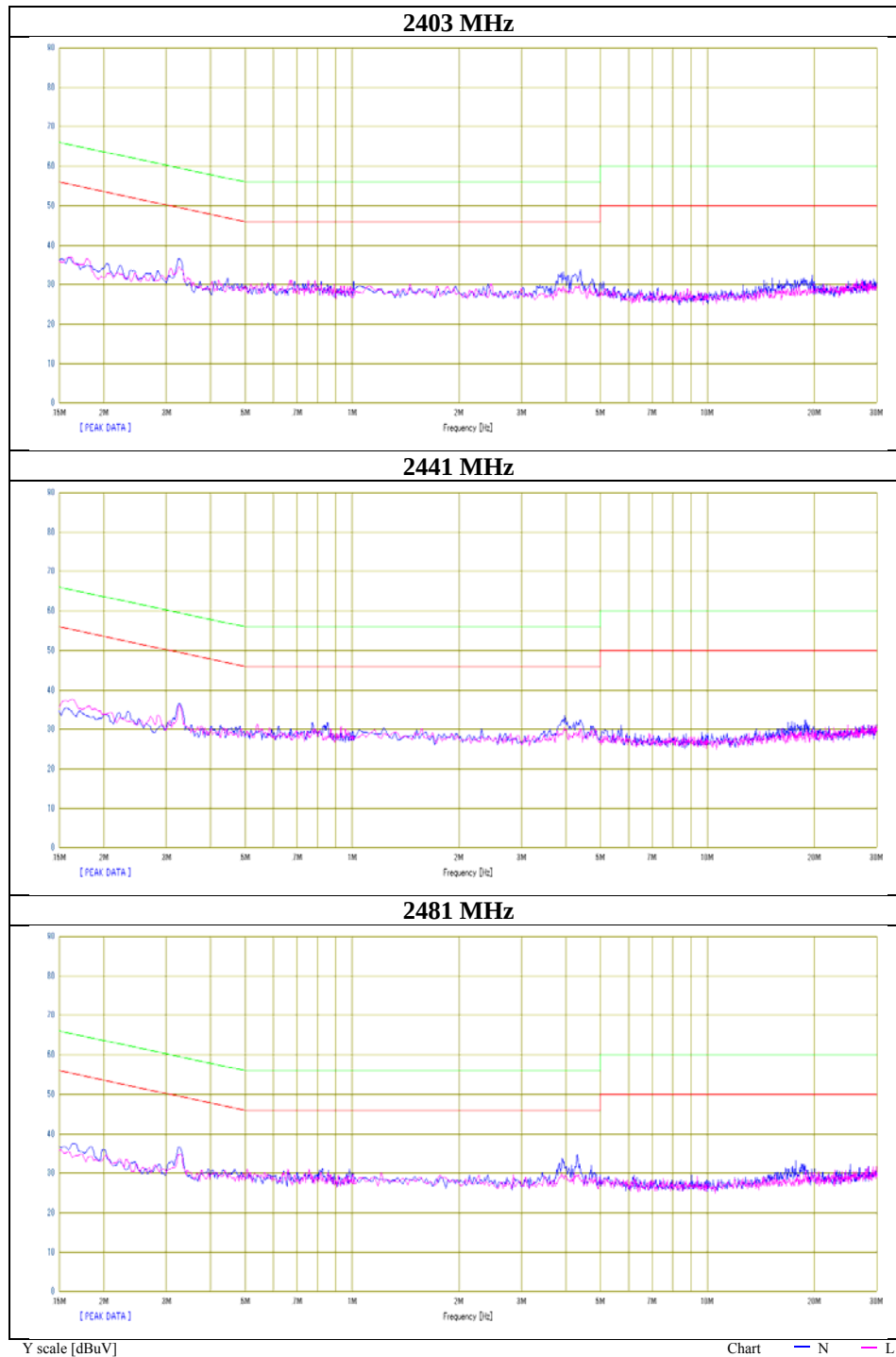
Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15000	16.1	2.8	13.3	29.4	16.1	66.0	56.0	36.6	39.9	N	
0.32125	18.8	14.5	13.3	32.1	27.8	59.7	49.7	27.6	21.9	N	
0.83879	4.4	-0.4	13.4	17.8	13.0	56.0	46.0	38.2	33.0	N	
2.38638	3.3	-1.8	13.7	17.0	11.9	56.0	46.0	39.0	34.1	N	
4.35552	12.0	5.2	14.0	26.0	19.2	56.0	46.0	30.0	26.8	N	
18.52690	5.3	-2.5	16.4	21.7	13.9	60.0	50.0	38.3	36.1	N	
0.15000	16.7	3.6	13.3	30.0	16.9	66.0	56.0	36.0	39.1	L	
0.32118	16.1	14.7	13.3	29.4	28.0	59.7	49.7	30.3	21.7	L	
1.07412	3.2	0.3	13.4	16.6	13.7	56.0	46.0	39.4	32.3	L	
2.45388	0.2	-4.2	13.7	13.9	9.5	56.0	46.0	42.1	36.5	L	
3.90380	7.1	3.2	14.0	21.1	17.2	56.0	46.0	34.9	28.8	L	
18.12039	0.6	-4.1	16.4	17.0	12.3	60.0	50.0	43.0	37.7	L	

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

Conducted Emission

ATW-T1006

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11006939H
Date	October 21, 2015
Temperature / Humidity	23 deg. C / 51 % RH
Engineer	Kazuya Yoshioka
Mode	Tx



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Conducted Emission ATW-T1007

DATA OF CONDUCTED EMISSION TEST

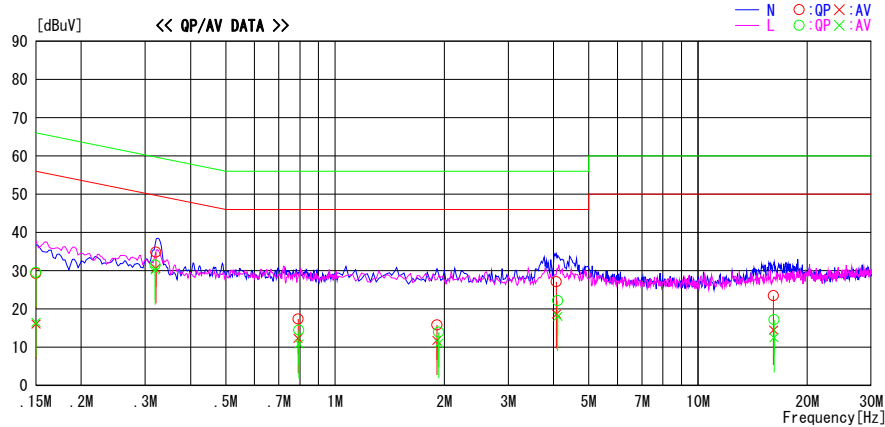
UL Japan, Inc. Ise EMC Lab. No. 2 Semi Anechoic Chamber
Date : 2015/10/21

Report No. : 11006939H

Temp./Humi. : 23deg. C / 51% RH
Engineer : Kazuya Yoshioka

Mode / Remarks : Tx 2403MHz Antenna 1

LIMIT : FCC15.207 QP
FCC15.207 AV



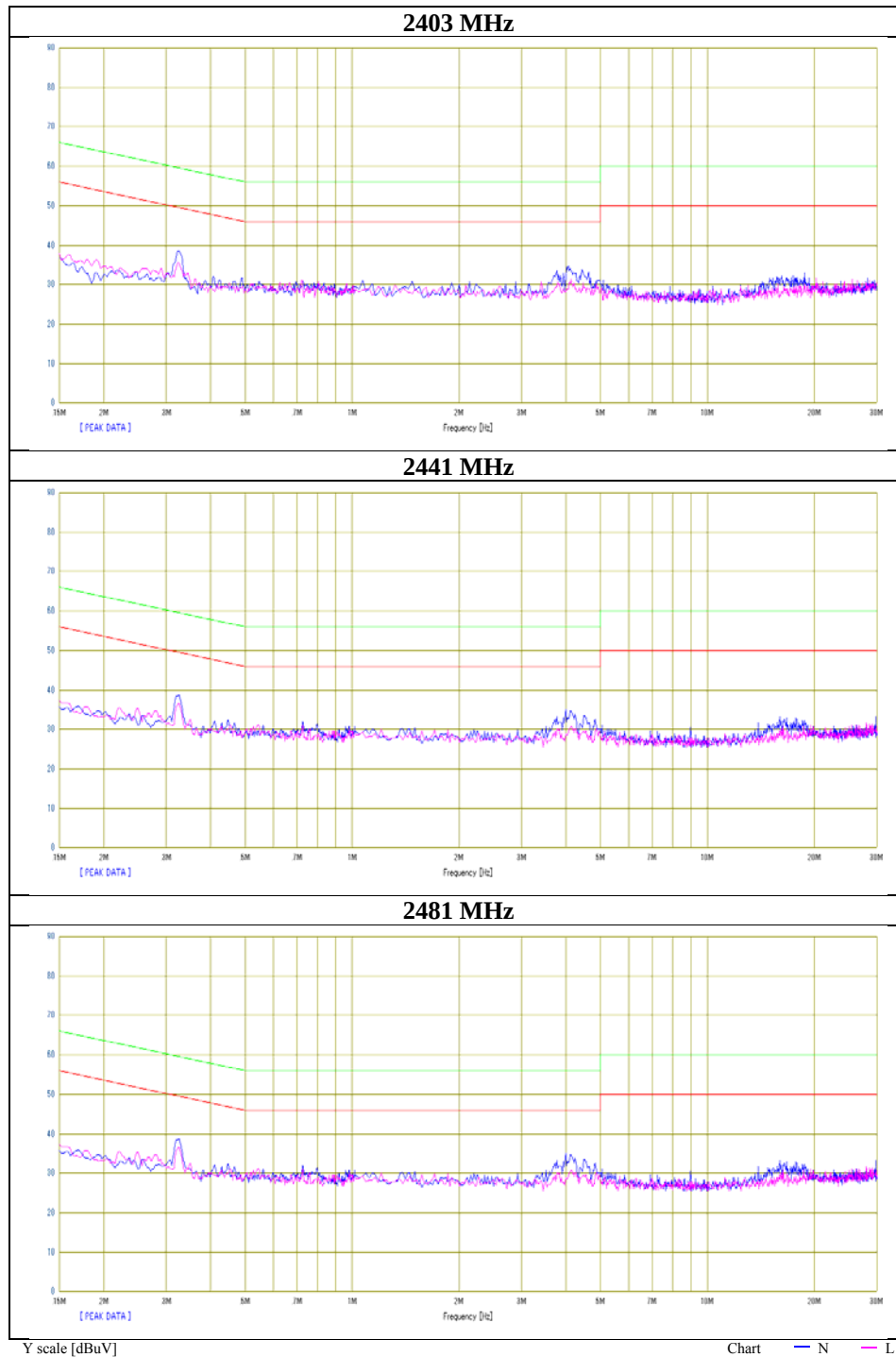
Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15000	16.0	2.8	13.3	29.3	16.1	66.0	56.0	36.7	39.9	N	
0.32075	21.5	17.3	13.3	34.8	30.6	59.7	49.7	24.9	19.1	N	
0.79162	4.0	-1.1	13.4	17.4	12.3	56.0	46.0	38.6	33.7	N	
1.90968	2.2	-1.8	13.6	15.8	11.8	56.0	46.0	40.2	34.2	N	
4.07131	13.1	4.7	14.0	27.1	18.7	56.0	46.0	28.9	27.3	N	
16.13764	7.5	-1.5	16.0	23.5	14.5	60.0	50.0	36.5	35.5	N	
0.15000	16.3	3.2	13.3	29.6	16.5	66.0	56.0	36.4	39.5	L	
0.31951	18.2	16.9	13.3	31.5	30.2	59.7	49.7	28.2	19.5	L	
0.79597	1.1	-2.5	13.4	14.5	10.9	56.0	46.0	41.5	35.1	L	
1.93235	0.3	-2.5	13.6	13.9	11.1	56.0	46.0	42.1	34.9	L	
4.10848	8.2	4.1	14.0	22.2	18.1	56.0	46.0	33.8	27.9	L	
16.19351	1.1	-3.6	16.1	17.2	12.5	60.0	50.0	42.8	37.5	L	

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

Conducted Emission

ATW-T1007

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11006939H
Date	October 21, 2015
Temperature / Humidity	23 deg. C / 51 % RH
Engineer	Kazuya Yoshioka
Mode	Tx



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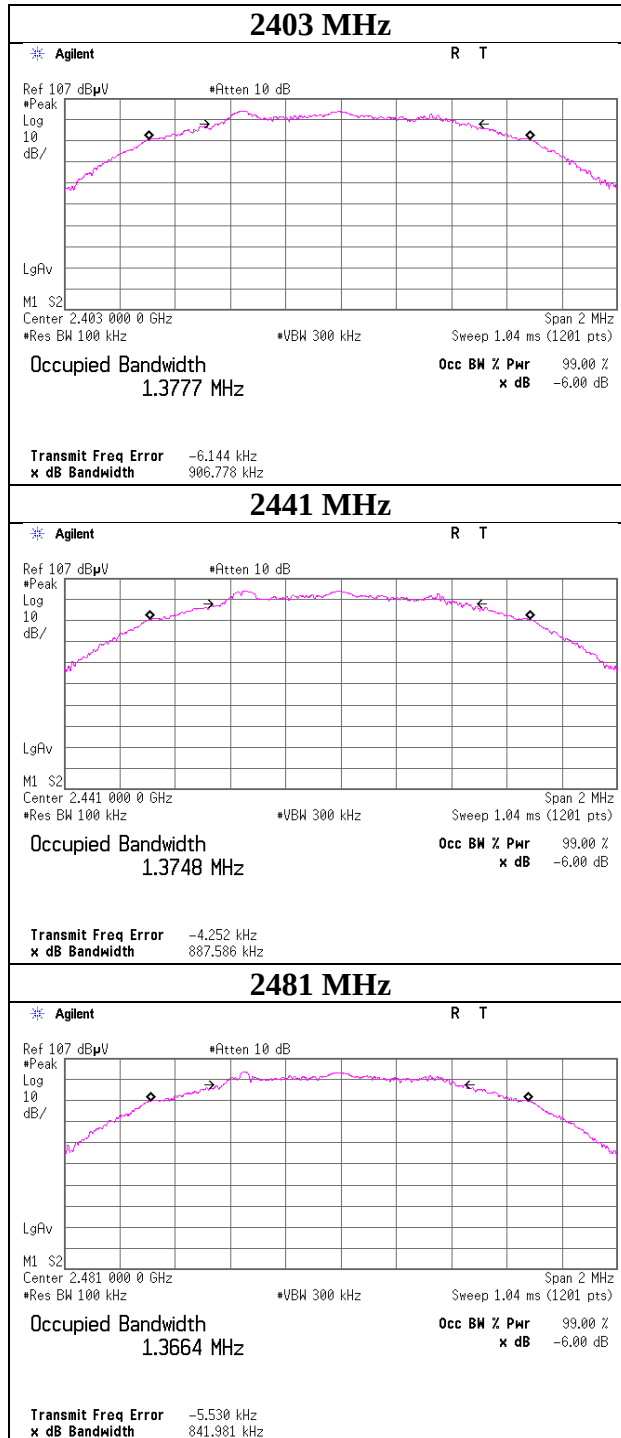
Facsimile : +81 596 24 8124

6dB Bandwidth

Test place Ise EMC Lab. No.7 Shielded Room
Report No. 11006939H
Date October 20, 2015
Temperature / Humidity 22 deg. C / 45 % RH
Engineer Takafumi Noguchi
Mode Tx

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2403	0.907	> 500
2441	0.888	> 500
2481	0.842	> 500

6dB Bandwidth



UL Japan, Inc.

Ise EMC Lab.

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Telephone : +81 596 24 8999

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Maximum Peak Output Power

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 11006939H
Date : October 20, 2015
Temperature / Humidity : 22 deg. C / 45 % RH
Engineer : Takafumi Noguchi
Mode : Tx

Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2403	-4.84	1.80	10.00	6.96	4.97	30.00	1000	23.04
2441	-4.96	1.81	10.00	6.85	4.84	30.00	1000	23.15
2481	-5.53	1.83	10.00	6.30	4.27	30.00	1000	23.70

Antenna 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2403	-5.49	1.80	10.00	6.31	4.28	30.00	1000	23.69
2441	-5.35	1.81	10.00	6.46	4.43	30.00	1000	23.54
2481	-5.54	1.83	10.00	6.29	4.26	30.00	1000	23.71

Sample Calculation:

Result = Reading + Cable Loss + Attenuator Loss

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

Average Output Power **(Reference data for RF Exposure)**

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	11006939H
Date	October 20, 2015
Temperature / Humidity	22 deg. C / 45 % RH
Engineer	Takafumi Noguchi
Mode	Tx

Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2403	-8.58	1.80	10.00	3.22	2.10	30.00	1000	26.78
2443	-8.69	1.81	10.00	3.12	2.05	30.00	1000	26.88
2481	-9.38	1.83	10.00	2.45	1.76	30.00	1000	27.55

Antenna 2

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2403	-9.31	1.80	10.00	2.49	1.77	30.00	1000	27.51
2443	-9.20	1.81	10.00	2.61	1.82	30.00	1000	27.39
2481	-9.40	1.83	10.00	2.43	1.75	30.00	1000	27.57

Sample Calculation:

Result = Reading + Cable Loss + Attenuator Loss

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

Radiated Spurious Emission ATW-T1006

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 11006939H
Date : October 20, 2015
Temperature / Humidity : 22 deg. C / 55 % RH
Engineer : Takumi Shimada
Mode : Tx 2403 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	50.000	QP	23.0	10.7	7.0	28.5	-	12.2	40.0	27.8	
Hori	100.000	QP	22.6	10.1	7.5	28.2	-	12.0	43.5	31.5	
Hori	200.000	QP	21.7	16.5	8.2	27.7	-	18.7	43.5	24.8	
Hori	400.000	QP	21.9	17.6	9.4	28.2	-	20.7	46.0	25.3	
Hori	500.000	QP	22.1	18.7	9.9	28.6	-	22.1	46.0	23.9	
Hori	700.000	QP	21.7	20.6	10.6	28.0	-	24.9	46.0	21.1	
Hori	2390.000	PK	46.0	29.3	3.1	35.0	-	43.4	73.9	30.5	
Hori	4806.000	PK	42.8	32.7	5.3	34.2	-	46.6	73.9	27.3	
Hori	7209.000	PK	42.2	36.8	6.6	34.1	-	51.5	73.9	22.4	Floor Noise
Hori	9612.000	PK	43.4	38.9	7.3	34.7	-	54.9	73.9	19.0	Floor Noise
Hori	2390.000	AV	37.0	29.3	3.1	35.0	5.2	39.6	53.9	14.3	*1)
Hori	4806.000	AV	34.6	32.7	5.3	34.2	5.2	43.6	53.9	10.3	
Hori	7209.000	AV	34.0	36.8	6.6	34.1	-	43.3	53.9	10.6	Floor Noise
Hori	9612.000	AV	35.1	38.9	7.3	34.7	-	46.6	53.9	7.3	Floor Noise
Vert	50.000	QP	31.3	10.7	7.0	28.5	-	20.5	40.0	19.5	
Vert	100.000	QP	22.4	10.1	7.5	28.2	-	11.8	43.5	31.7	
Vert	200.000	QP	21.8	16.5	8.2	27.7	-	18.8	43.5	24.7	
Vert	400.000	QP	21.9	17.6	9.4	28.2	-	20.7	46.0	25.3	
Vert	500.000	QP	22.1	18.7	9.9	28.6	-	22.1	46.0	23.9	
Vert	700.000	QP	21.7	20.6	10.6	28.0	-	24.9	46.0	21.1	
Vert	2390.000	PK	45.6	29.3	3.1	35.0	-	43.0	73.9	30.9	
Vert	4806.000	PK	43.9	32.7	5.3	34.2	-	47.7	73.9	26.2	
Vert	7209.000	PK	42.5	36.8	6.6	34.1	-	51.8	73.9	22.1	Floor Noise
Vert	9612.000	PK	43.8	38.9	7.3	34.7	-	55.3	73.9	18.6	Floor Noise
Vert	2390.000	AV	36.7	29.3	3.1	35.0	5.2	39.3	53.9	14.6	*1)
Vert	4806.000	AV	35.3	32.7	5.3	34.2	5.2	44.3	53.9	9.6	
Vert	7209.000	AV	34.1	36.8	6.6	34.1	-	43.4	53.9	10.5	Floor Noise
Vert	9612.000	AV	35.3	38.9	7.3	34.7	-	46.8	53.9	7.1	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 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: 10 GHz - 26.5 GHz 20log (3.0 m / 1.0 m) = 9.5 dB

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

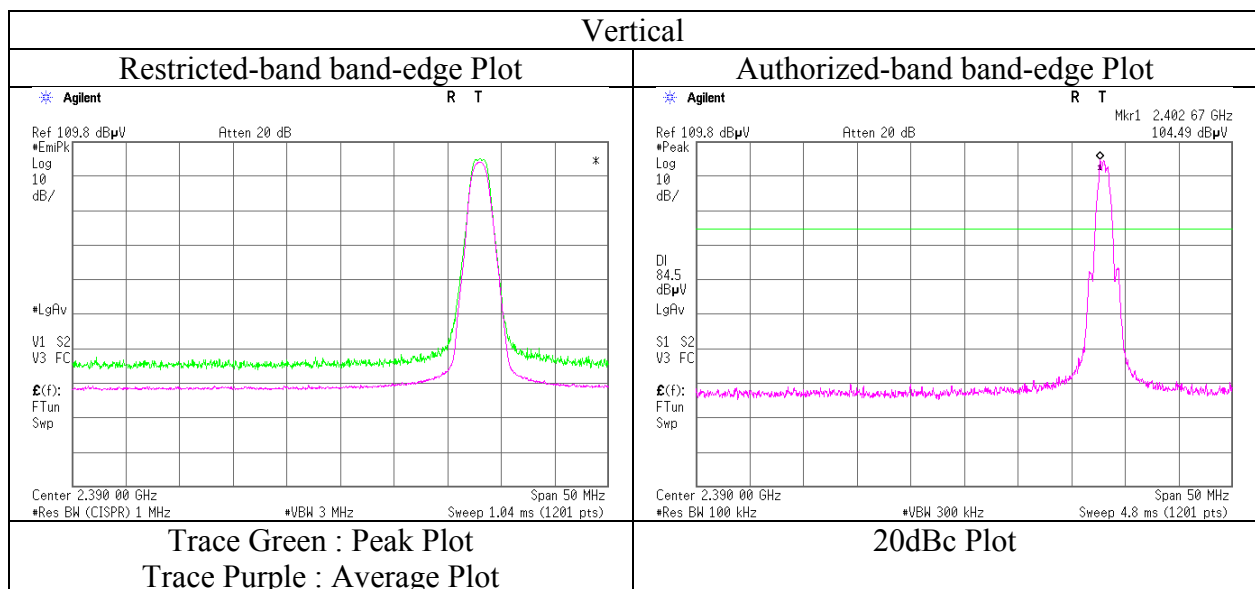
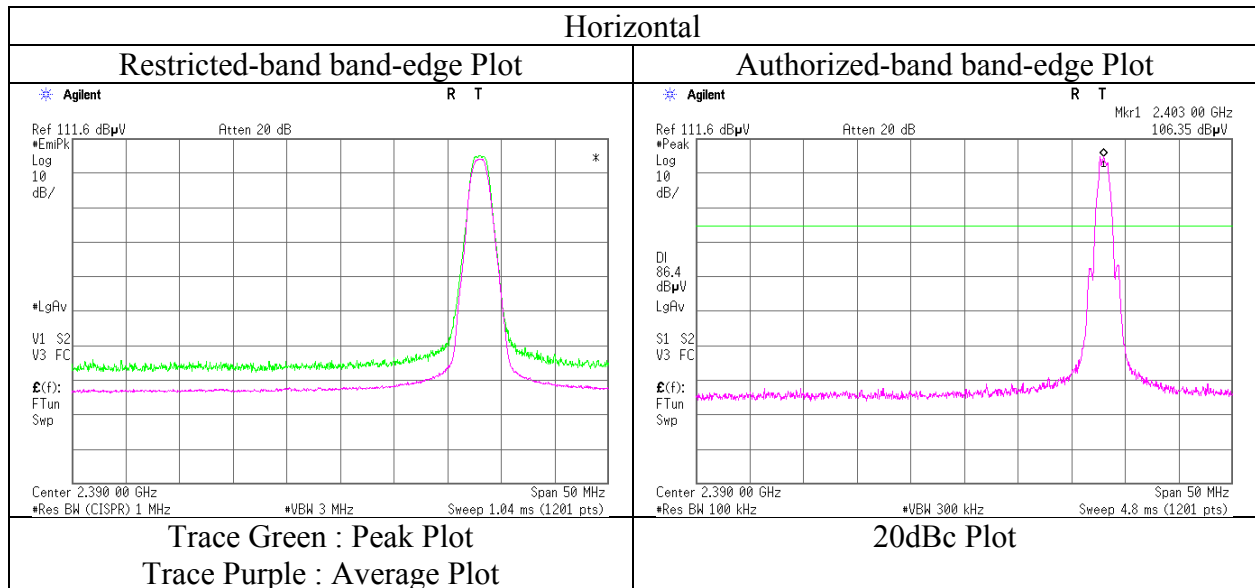
20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2403.000	PK	106.4	29.3	3.1	35.0	103.8	-	-	Carrier
Hori	2400.000	PK	43.7	29.3	3.1	35.0	41.1	83.8	42.7	
Vert	2403.000	PK	104.5	29.3	3.1	35.0	101.9	-	-	Carrier
Vert	2400.000	PK	43.4	29.3	3.1	35.0	40.8	81.9	41.1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

Radiated Spurious Emission (Reference Plot for band-edge) ATW-T1006

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11006939H
Date	October 20, 2015
Temperature / Humidity	22 deg. C / 55 % RH
Engineer	Takumi Shimada
Mode	Tx 2403 MHz



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

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Radiated Spurious Emission

ATW-T1006

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11006939H
Date	October 20, 2015
Temperature / Humidity	22 deg. C / 55 % RH
Engineer	Takumi Shimada
Mode	Tx 2441 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	50.000	QP	23.0	10.7	7.0	28.5	-	12.2	40.0	27.8	
Hori	100.000	QP	22.5	10.1	7.5	28.2	-	11.9	43.5	31.6	
Hori	200.000	QP	21.8	16.5	8.2	27.7	-	18.8	43.5	24.7	
Hori	400.000	QP	21.9	17.6	9.4	28.2	-	20.7	46.0	25.3	
Hori	500.000	QP	22.1	18.7	9.9	28.6	-	22.1	46.0	23.9	
Hori	700.000	QP	21.7	20.6	10.6	28.0	-	24.9	46.0	21.1	
Hori	4882.000	PK	43.4	32.8	5.3	34.2	-	47.3	73.9	26.6	
Hori	7323.000	PK	43.0	36.8	6.7	34.1	-	52.4	73.9	21.5	Floor Noise
Hori	9764.000	PK	43.8	39.0	7.3	34.7	-	55.4	73.9	18.5	Floor Noise
Hori	4882.000	AV	35.4	32.8	5.3	34.2	5.2	44.5	53.9	9.4	
Hori	7323.000	AV	34.4	36.8	6.7	34.1	-	43.8	53.9	10.1	Floor Noise
Hori	9764.000	AV	35.4	39.0	7.3	34.7	-	47.0	53.9	6.9	Floor Noise
Vert	50.000	QP	31.3	10.7	7.0	28.5	-	20.5	40.0	19.5	
Vert	100.000	QP	22.4	10.1	7.5	28.2	-	11.8	43.5	31.7	
Vert	200.000	QP	21.8	16.5	8.2	27.7	-	18.8	43.5	24.7	
Vert	400.000	QP	21.8	17.6	9.4	28.2	-	20.6	46.0	25.4	
Vert	500.000	QP	22.1	18.7	9.9	28.6	-	22.1	46.0	23.9	
Vert	700.000	QP	21.6	20.6	10.6	28.0	-	24.8	46.0	21.2	
Vert	4882.000	PK	44.5	32.8	5.3	34.2	-	48.4	73.9	25.5	
Vert	7323.000	PK	43.0	36.8	6.7	34.1	-	52.4	73.9	21.5	Floor Noise
Vert	9764.000	PK	44.0	39.0	7.3	34.7	-	55.6	73.9	18.3	Floor Noise
Vert	4882.000	AV	35.8	32.8	5.3	34.2	5.2	44.9	53.9	9.0	
Vert	7323.000	AV	35.0	36.8	6.7	34.1	-	44.4	53.9	9.5	Floor Noise
Vert	9764.000	AV	35.4	39.0	7.3	34.7	-	47.0	53.9	6.9	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 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: 10 GHz - 26.5 GHz 20log (3.0 m / 1.0 m) = 9.5 dB

Radiated Spurious Emission

ATW-T1006

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11006939H
Date	October 20, 2015
Temperature / Humidity	22 deg. C / 55 % RH
Engineer	Takumi Shimada
Mode	Tx 2481 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	50.000	QP	23.1	10.7	7.0	28.5	-	12.3	40.0	27.7	
Hori	100.000	QP	22.4	10.1	7.5	28.2	-	11.8	43.5	31.7	
Hori	200.000	QP	21.8	16.5	8.2	27.7	-	18.8	43.5	24.7	
Hori	400.000	QP	21.8	17.6	9.4	28.2	-	20.6	46.0	25.4	
Hori	500.000	QP	22.2	18.7	9.9	28.6	-	22.2	46.0	23.8	
Hori	700.000	QP	21.7	20.6	10.6	28.0	-	24.9	46.0	21.1	
Hori	2483.500	PK	59.3	29.3	3.2	34.9	-	56.9	73.9	17.0	
Hori	4962.000	PK	42.8	33.0	5.3	34.3	-	46.8	73.9	27.1	
Hori	7443.000	PK	42.6	36.8	6.6	34.2	-	51.8	73.9	22.1	Floor Noise
Hori	9924.000	PK	43.5	39.0	7.3	34.7	-	55.1	73.9	18.8	Floor Noise
Hori	2483.500	AV	44.1	29.3	3.2	34.9	5.2	46.9	53.9	7.0	*1)
Hori	4962.000	AV	35.0	33.0	5.3	34.3	5.2	44.2	53.9	9.7	
Hori	7443.000	AV	34.6	36.8	6.6	34.2	-	43.8	53.9	10.1	Floor Noise
Hori	9924.000	AV	34.9	39.0	7.3	34.7	-	46.5	53.9	7.4	Floor Noise
Vert	50.000	QP	31.3	10.7	7.0	28.5	-	20.5	40.0	19.5	
Vert	100.000	QP	22.5	10.1	7.5	28.2	-	11.9	43.5	31.6	
Vert	200.000	QP	21.7	16.5	8.2	27.7	-	18.7	43.5	24.8	
Vert	400.000	QP	21.8	17.6	9.4	28.2	-	20.6	46.0	25.4	
Vert	500.000	QP	22.1	18.7	9.9	28.6	-	22.1	46.0	23.9	
Vert	700.000	QP	21.7	20.6	10.6	28.0	-	24.9	46.0	21.1	
Vert	2483.500	PK	56.2	29.3	3.2	34.9	-	53.8	73.9	20.1	
Vert	4962.000	PK	43.8	33.0	5.3	34.3	-	47.8	73.9	26.1	
Vert	7443.000	PK	42.8	36.8	6.6	34.2	-	52.0	73.9	21.9	Floor Noise
Vert	9924.000	PK	43.4	39.0	7.3	34.7	-	55.0	73.9	18.9	Floor Noise
Vert	2483.500	AV	41.1	29.3	3.2	34.9	5.2	43.9	53.9	10.0	*1)
Vert	4962.000	AV	35.5	33.0	5.3	34.3	5.2	44.7	53.9	9.2	
Vert	7443.000	AV	35.0	36.8	6.6	34.2	-	44.2	53.9	9.7	Floor Noise
Vert	9924.000	AV	35.1	39.0	7.3	34.7	-	46.7	53.9	7.2	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier) + Duty factor

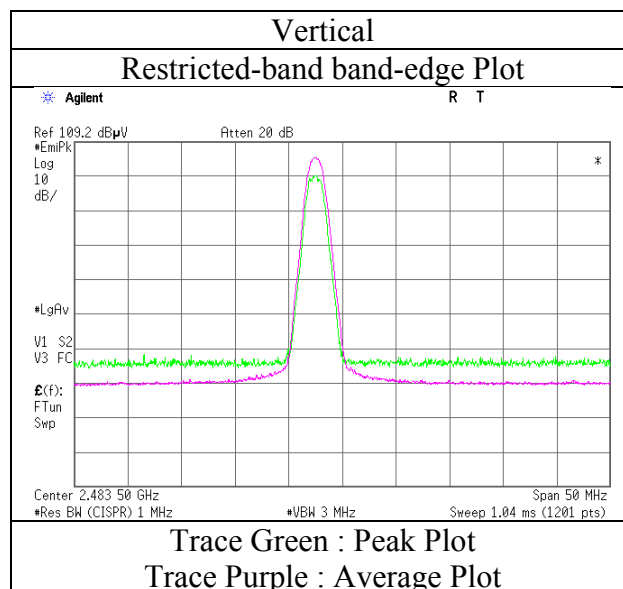
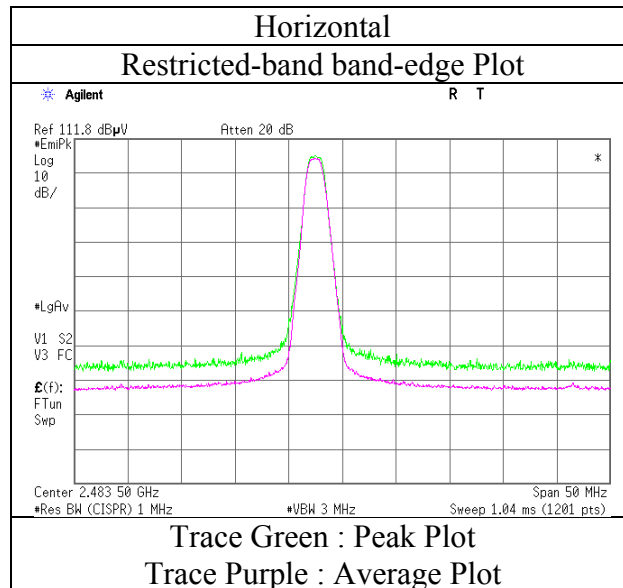
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

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

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

Radiated Spurious Emission
(Reference Plot for band-edge)
ATW-T1006

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11006939H
Date	October 20, 2015
Temperature / Humidity	22 deg. C / 55 % RH
Engineer	Takumi Shimada
Mode	Tx 2481 MHz



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

Radiated Spurious Emission

ATW-T1007

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11006939H
Date	October 20, 2015
Temperature / Humidity	22 deg. C / 55 % RH
Engineer	Takumi Shimada
Mode	Tx 2403 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	47.530	QP	23.2	11.5	7.0	28.5	-	13.2	40.0	26.8	
Hori	135.167	QP	25.9	14.0	7.7	28.0	-	19.6	43.5	23.9	
Hori	172.037	QP	24.4	16.0	8.0	27.8	-	20.6	43.5	22.9	
Hori	184.318	QP	26.1	16.4	8.1	27.8	-	22.8	43.5	20.7	
Hori	208.901	QP	29.8	16.6	8.2	27.6	-	27.0	43.5	16.5	
Hori	380.917	QP	28.8	17.0	9.3	28.0	-	27.1	46.0	18.9	
Hori	2390.000	PK	44.8	29.3	3.1	35.0	-	42.2	73.9	31.7	
Hori	4806.000	PK	42.6	32.7	5.3	34.2	-	46.4	73.9	27.5	Floor Noise
Hori	7209.000	PK	42.7	36.8	6.6	34.1	-	52.0	73.9	21.9	Floor Noise
Hori	9612.000	PK	43.2	38.9	7.3	34.7	-	54.7	73.9	19.2	Floor Noise
Hori	2390.000	AV	33.6	29.3	3.1	35.0	5.2	36.2	53.9	17.7	*1)
Hori	4806.000	AV	33.9	32.7	5.3	34.2	-	37.7	53.9	16.2	Floor Noise
Hori	7209.000	AV	33.8	36.8	6.6	34.1	-	43.1	53.9	10.8	Floor Noise
Hori	9612.000	AV	35.3	38.9	7.3	34.7	-	46.8	53.9	7.1	Floor Noise
Vert	47.530	QP	36.8	11.5	7.0	28.5	-	26.8	40.0	13.2	
Vert	135.167	QP	32.5	14.0	7.7	28.0	-	26.2	43.5	17.3	
Vert	172.037	QP	28.4	16.0	8.0	27.8	-	24.6	43.5	18.9	
Vert	184.318	QP	29.5	16.4	8.1	27.8	-	26.2	43.5	17.3	
Vert	208.901	QP	32.9	16.6	8.2	27.6	-	30.1	43.5	13.4	
Vert	380.917	QP	37.1	17.0	9.3	28.0	-	35.4	46.0	10.6	
Vert	2390.000	PK	43.9	29.3	3.1	35.0	-	41.3	73.9	32.6	
Vert	4806.000	PK	42.4	32.7	5.3	34.2	-	46.2	73.9	27.7	Floor Noise
Vert	7209.000	PK	42.6	36.8	6.6	34.1	-	51.9	73.9	22.0	Floor Noise
Vert	9612.000	PK	43.3	38.9	7.3	34.7	-	54.8	73.9	19.1	Floor Noise
Vert	2390.000	AV	35.8	29.3	3.1	35.0	5.2	38.4	53.9	15.5	*1)
Vert	4806.000	AV	33.7	32.7	5.3	34.2	-	37.5	53.9	16.4	Floor Noise
Vert	7209.000	AV	34.1	36.8	6.6	34.1	-	43.4	53.9	10.5	Floor Noise
Vert	9612.000	AV	35.0	38.9	7.3	34.7	-	46.5	53.9	7.4	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 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: 10 GHz - 26.5 GHz 20log (3.0 m / 1.0 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	2403.000	PK	101.5	29.3	3.1	35.0	98.9	-	-	Carrier
Hori	2400.000	PK	41.3	29.3	3.1	35.0	38.7	78.9	40.2	
Vert	2403.000	PK	98.5	29.3	3.1	35.0	95.9	-	-	Carrier
Vert	2400.000	PK	38.2	29.3	3.1	35.0	35.6	75.9	40.3	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

UL Japan, Inc.

Ise EMC Lab.

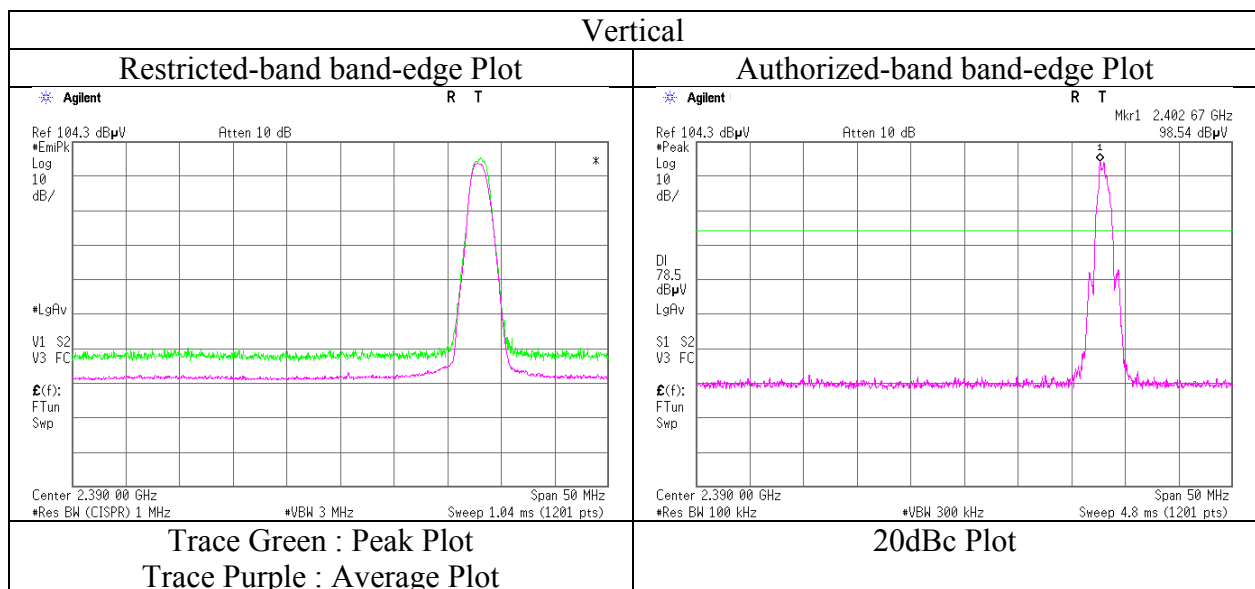
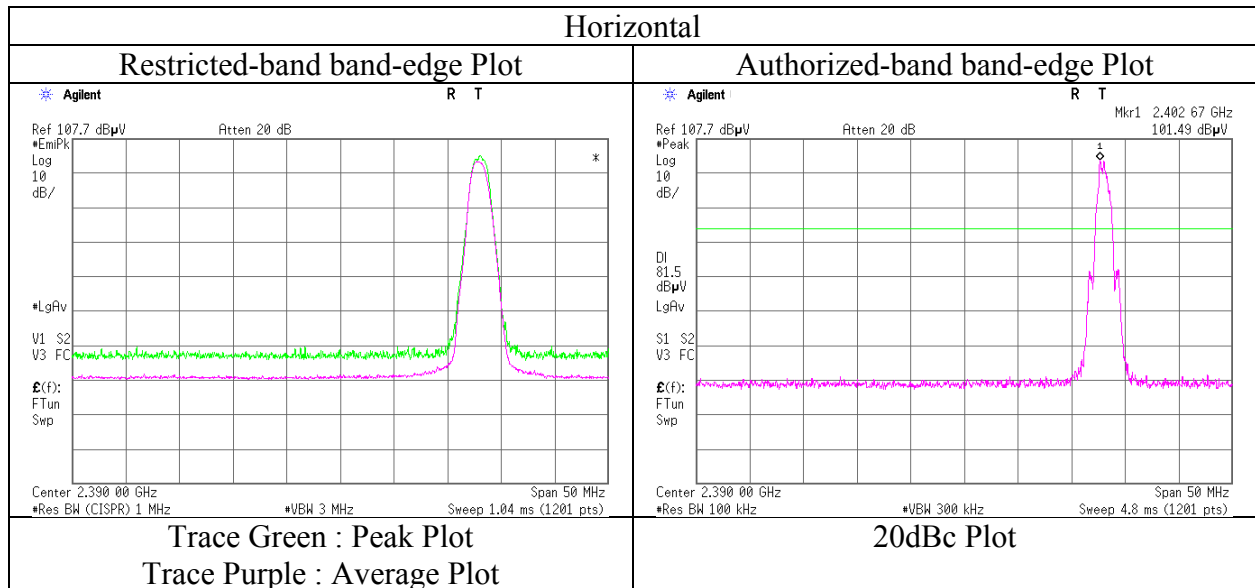
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Radiated Spurious Emission (Reference Plot for band-edge) ATW-T1007

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11006939H
Date	October 20, 2015
Temperature / Humidity	22 deg. C / 55 % RH
Engineer	Takumi Shimada
Mode	Tx 2403 MHz



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

Radiated Spurious Emission

ATW-T1007

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11006939H
Date	October 20, 2015
Temperature / Humidity	22 deg. C / 55 % RH
Engineer	Takumi Shimada
Mode	Tx 2441 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	47.523	QP	23.3	11.5	7.0	28.5	-	13.3	40.0	26.7	
Hori	135.164	QP	26.1	14.0	7.7	28.0	-	19.8	43.5	23.7	
Hori	172.018	QP	24.1	16.0	8.0	27.8	-	20.3	43.5	23.2	
Hori	184.312	QP	26.2	16.4	8.1	27.8	-	22.9	43.5	20.6	
Hori	208.906	QP	29.6	16.6	8.2	27.6	-	26.8	43.5	16.7	
Hori	380.924	QP	28.7	17.0	9.3	28.0	-	27.0	46.0	19.0	
Hori	4882.000	PK	42.1	32.8	5.3	34.2	-	46.0	73.9	27.9	Floor Noise
Hori	7323.000	PK	43.2	36.8	6.7	34.1	-	52.6	73.9	21.3	Floor Noise
Hori	9764.000	PK	43.5	39.0	7.3	34.7	-	55.1	73.9	18.8	Floor Noise
Hori	4882.000	AV	34.1	32.8	5.3	34.2	-	38.0	53.9	15.9	Floor Noise
Hori	7323.000	AV	34.6	36.8	6.7	34.1	-	44.0	53.9	9.9	Floor Noise
Hori	9764.000	AV	35.5	39.0	7.3	34.7	-	47.1	53.9	6.8	Floor Noise
Vert	47.523	QP	36.2	11.5	7.0	28.5	-	26.2	40.0	13.8	
Vert	135.164	QP	32.8	14.0	7.7	28.0	-	26.5	43.5	17.0	
Vert	172.018	QP	28.7	16.0	8.0	27.8	-	24.9	43.5	18.6	
Vert	184.312	QP	29.3	16.4	8.1	27.8	-	26.0	43.5	17.5	
Vert	208.906	QP	33.0	16.6	8.2	27.6	-	30.2	43.5	13.3	
Vert	380.924	QP	37.3	17.0	9.3	28.0	-	35.6	46.0	10.4	
Vert	4882.000	PK	42.4	32.8	5.3	34.2	-	46.3	73.9	27.6	Floor Noise
Vert	7323.000	PK	43.3	36.8	6.7	34.1	-	52.7	73.9	21.2	Floor Noise
Vert	9764.000	PK	43.1	39.0	7.3	34.7	-	54.7	73.9	19.2	Floor Noise
Vert	4882.000	AV	34.2	32.8	5.3	34.2	-	38.1	53.9	15.8	Floor Noise
Vert	7323.000	AV	34.7	36.8	6.7	34.1	-	44.1	53.9	9.8	Floor Noise
Vert	9764.000	AV	35.5	39.0	7.3	34.7	-	47.1	53.9	6.8	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier)

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

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

Radiated Spurious Emission

ATW-T1007

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11006939H
Date	October 20, 2015
Temperature / Humidity	22 deg. C / 55 % RH
Engineer	Takumi Shimada
Mode	Tx 2481 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	47.509	QP	23.4	11.5	7.0	28.5	-	13.4	40.0	26.6	
Hori	135.152	QP	26.2	14.0	7.7	28.0	-	19.9	43.5	23.6	
Hori	172.027	QP	24.2	16.0	8.0	27.8	-	20.4	43.5	23.1	
Hori	184.309	QP	26.2	16.4	8.1	27.8	-	22.9	43.5	20.6	
Hori	208.911	QP	29.5	16.6	8.2	27.6	-	26.7	43.5	16.8	
Hori	380.929	QP	28.4	17.0	9.3	28.0	-	26.7	46.0	19.3	
Hori	2483.500	PK	53.8	29.3	3.2	34.9	-	51.4	73.9	22.5	
Hori	4962.000	PK	41.8	33.0	5.3	34.3	-	45.8	73.9	28.1	Floor Noise
Hori	7443.000	PK	43.1	36.8	6.6	34.2	-	52.3	73.9	21.6	Floor Noise
Hori	9924.000	PK	43.8	39.0	7.3	34.7	-	55.4	73.9	18.5	Floor Noise
Hori	2483.500	AV	42.1	29.3	3.2	34.9	5.2	44.9	53.9	9.0	*1)
Hori	4962.000	AV	33.5	33.0	5.3	34.3	-	37.5	53.9	16.4	Floor Noise
Hori	7443.000	AV	34.7	36.8	6.6	34.2	-	43.9	53.9	10.0	Floor Noise
Hori	9924.000	AV	35.0	39.0	7.3	34.7	-	46.6	53.9	7.3	Floor Noise
Vert	47.509	QP	36.4	11.5	7.0	28.5	-	26.4	40.0	13.6	
Vert	135.152	QP	33.0	14.0	7.7	28.0	-	26.7	43.5	16.8	
Vert	172.027	QP	28.9	16.0	8.0	27.8	-	25.1	43.5	18.4	
Vert	184.309	QP	29.4	16.4	8.1	27.8	-	26.1	43.5	17.4	
Vert	208.911	QP	33.2	16.6	8.2	27.6	-	30.4	43.5	13.1	
Vert	380.929	QP	37.1	17.0	9.3	28.0	-	35.4	46.0	10.6	
Vert	2483.500	PK	53.5	29.3	3.2	34.9	-	51.1	73.9	22.8	
Vert	4962.000	PK	42.4	33.0	5.3	34.3	-	46.4	73.9	27.5	Floor Noise
Vert	7443.000	PK	43.7	36.8	6.6	34.2	-	52.9	73.9	21.0	Floor Noise
Vert	9924.000	PK	43.4	39.0	7.3	34.7	-	55.0	73.9	18.9	Floor Noise
Vert	2483.500	AV	42.5	29.3	3.2	34.9	5.2	45.3	53.9	8.6	*1)
Vert	4962.000	AV	33.8	33.0	5.3	34.3	-	37.8	53.9	16.1	Floor Noise
Vert	7443.000	AV	34.7	36.8	6.6	34.2	-	43.9	53.9	10.0	Floor Noise
Vert	9924.000	AV	35.0	39.0	7.3	34.7	-	46.6	53.9	7.3	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier) + Duty factor

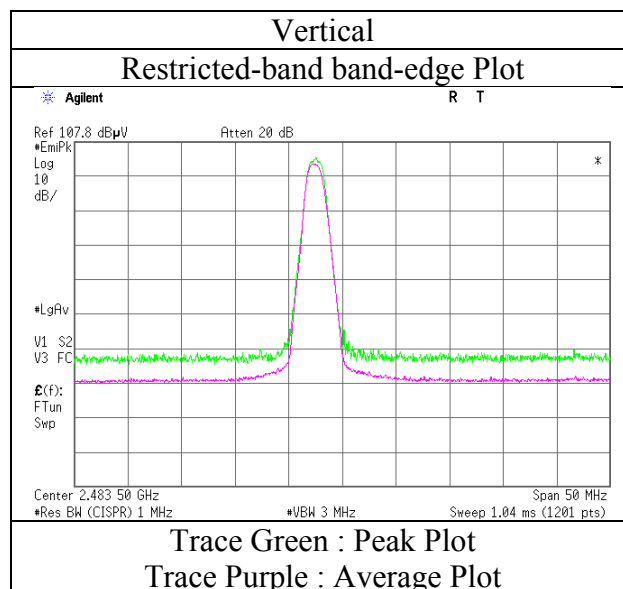
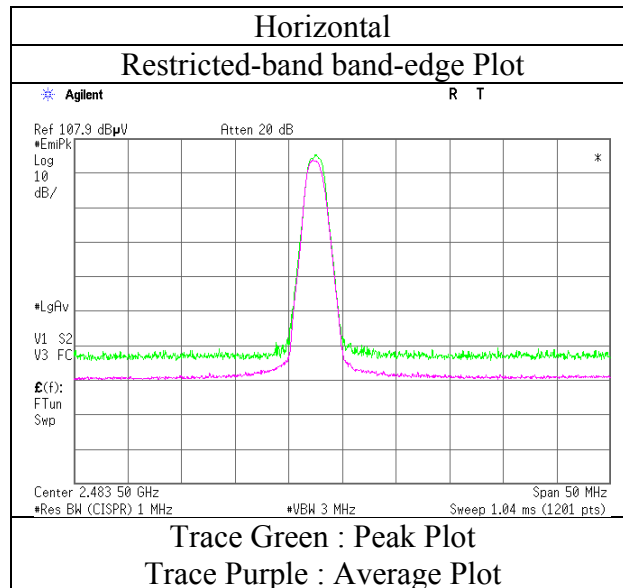
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

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

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

Radiated Spurious Emission (Reference Plot for band-edge) ATW-T1007

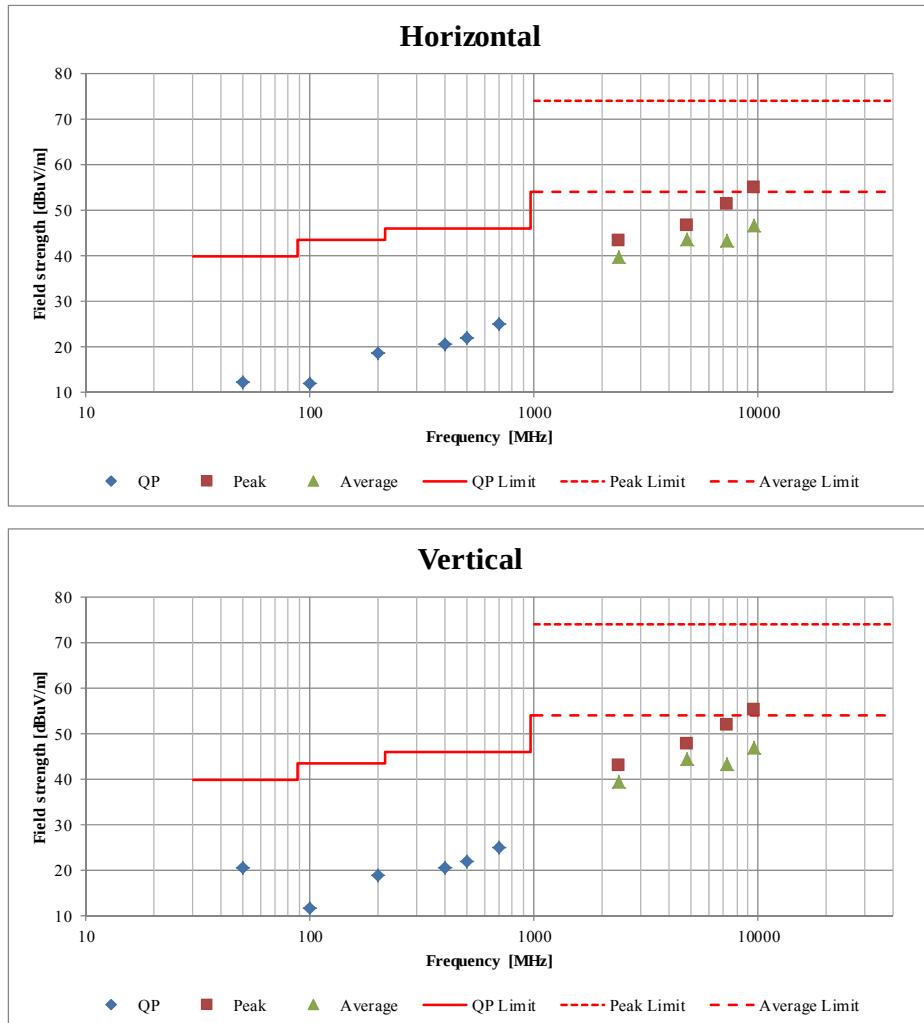
Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11006939H
Date	October 20, 2015
Temperature / Humidity	22 deg. C / 55 % RH
Engineer	Takumi Shimada
Mode	Tx 2481 MHz



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

Radiated Spurious Emission **(Plot data, Worst case)**

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 11006939H
Date : October 20, 2015
Temperature / Humidity : 22 deg. C / 55 % RH
Engineer : Takumi Shimada
Mode : Tx 2403 MHz

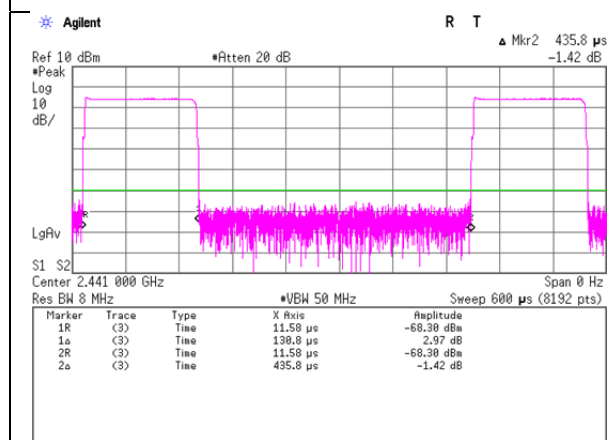


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

Burst rate confirmation

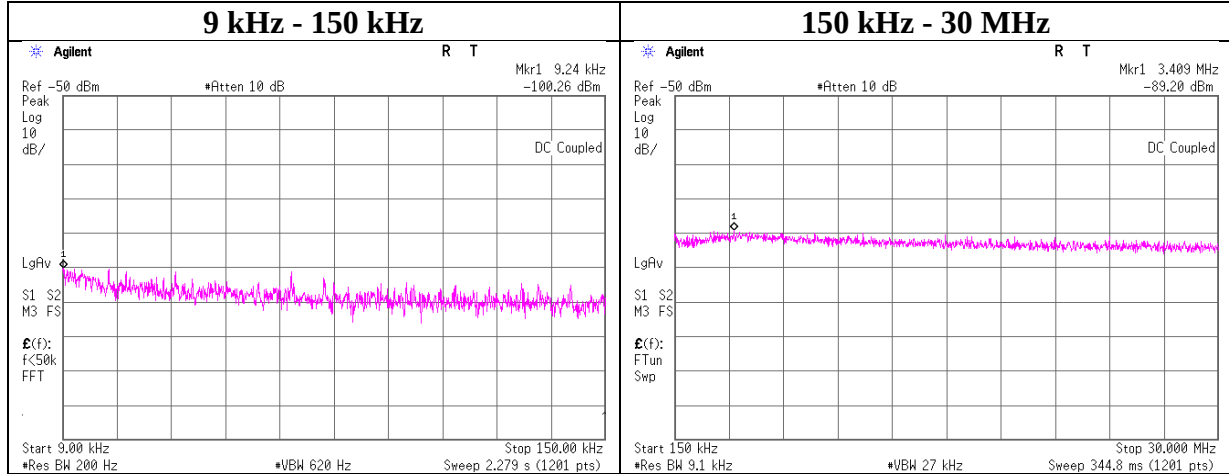
Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	11006939H
Date	October 20, 2015
Temperature/ Humidity	22 deg. C / 45 % RH
Engineer	Takafumi Noguchi
Mode	Tx

Tx on / (Tx on + Tx off) = 0.300
Tx on / (Tx on + Tx off) * 100 = 30.0 %
Duty factor = 10 * log (435.8 / 130.8) = 5.23 dB



Conducted Spurious Emission

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	11006939H
Date	October 20, 2015
Temperature / Humidity	22 deg. C / 45 % RH
Engineer	Takafumi Noguchi
Mode	Tx 2403 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator 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	-100.3	0.01	10.0	2.0	1	-88.3	300	6.0	-27.0	48.2	75.2	
3409.00	-89.2	2.25	10.0	2.0	1	-74.9	30	6.0	6.3	29.5	23.2	

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

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

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Power Density

Test place Ise EMC Lab. No.7 Shielded Room
Report No. 11006939H
Date October 20, 2015
Temperature / Humidity 22 deg. C / 45 % RH
Engineer Takafumi Noguchi
Mode Tx

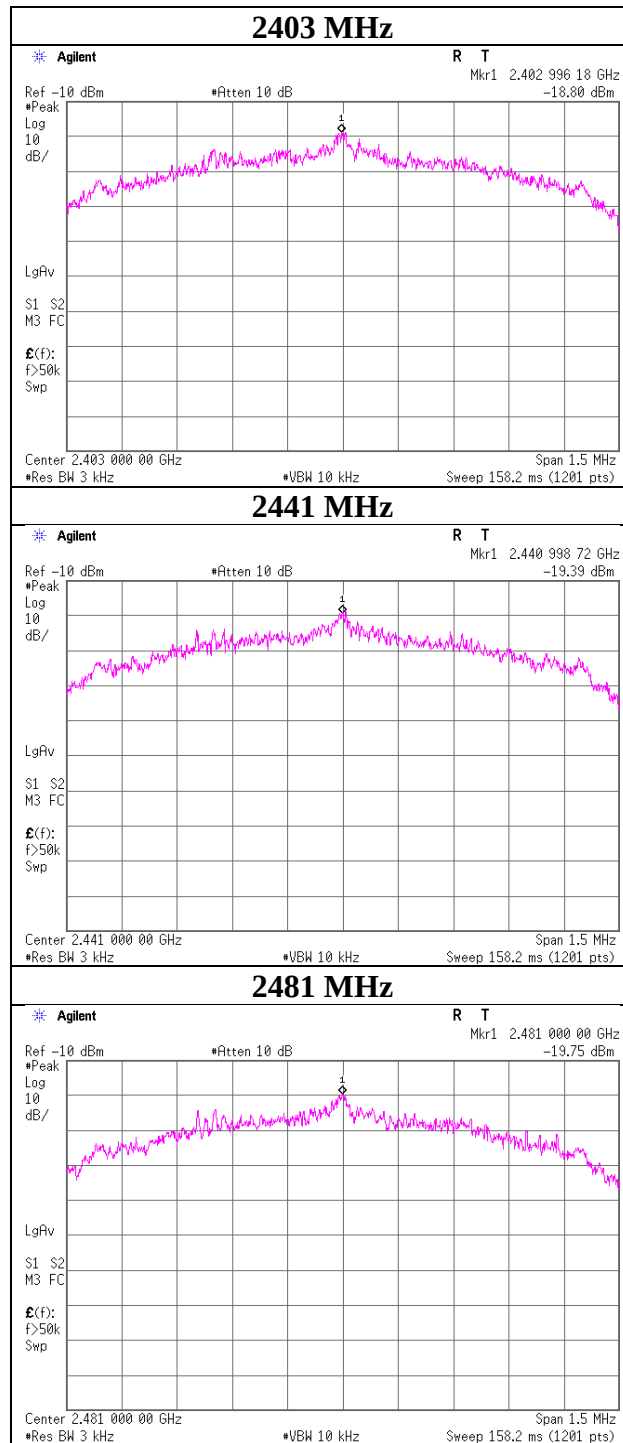
Tx

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2403.00	-18.80	1.80	10.00	-7.00	8.00	15.00
2441.00	-19.39	1.81	10.00	-7.58	8.00	15.58
2481.00	-19.75	1.83	10.00	-7.92	8.00	15.92

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

Power Density



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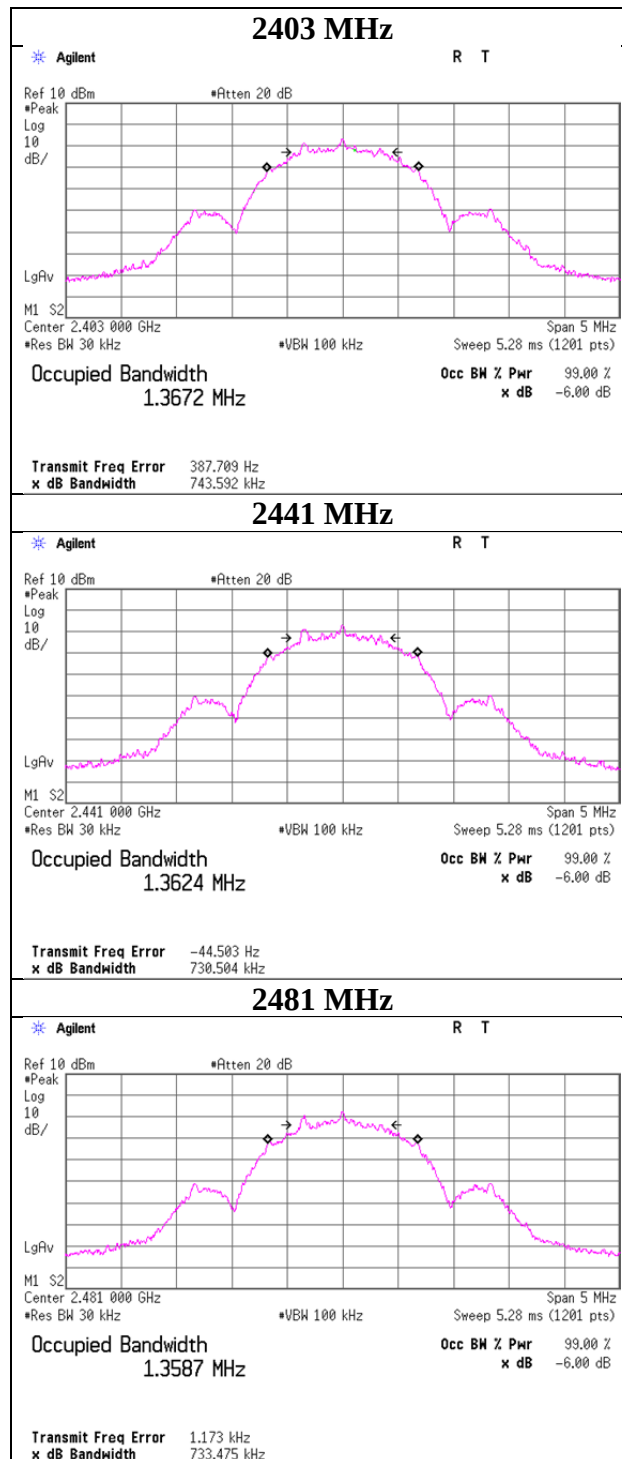
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99%Occupied Bandwidth

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	11006939H
Date	October 20, 2015
Temperature / Humidity	22 deg. C / 45 % RH
Engineer	Takafumi Noguchi
Mode	Tx



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APPENDIX 2: Test instruments

Test equipment

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	RE/CE	2015/07/01 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE/CE	2015/01/13 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MSA-13	Spectrum Analyzer	Agilent	E4440A	MY46185823	RE/CE	2015/06/02 * 12
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2015/02/05 * 12
MCC-168	Microwave Cable	Junkosha	MWX221	1408S016(1m) / 1409S492(5m)	RE	2015/09/24 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2015/01/28 * 12
MMM-01	Digital Tester	Fluke	FLUKE 26-3	78030611	RE/CE	2015/08/19 * 12
MHF-25	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	RE	2015/09/16 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE/CE	2015/06/08 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2014/10/18 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2014/10/18 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2015/02/06 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2014/11/11 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2015/09/04 * 12
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	CE	2014/11/12 * 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	2015/01/29 * 12
MAT-57	Attenuator(10dB)	Suhner	6810.19.A	-	AT	2015/01/08 * 12
MCC-171	Microwave Cable	Junkosha	MWX221	1409S494	AT	2015/03/04 * 12
MCC-102	Microwave Cable	Hirose Electric	U.FL-2LP-066J1-A (200)	-	AT	2015/06/08 * 12
MCC-105	Microwave Cable	Hirose Electric	U.FL-2LP-066J1-A (200)	-	AT	2015/06/08 * 12
MSA-16	Spectrum Analyzer	Agilent	E4440A	MY46186390	AT	2015/02/16 * 12
MPM-13	Power Meter	Anritsu	ML2495A	0824014	AT	2014/11/11 * 12
MPSE-18	Power sensor	Anritsu	MA2411B	0738174	AT	2014/11/11 * 12
MTA-47	Terminator	Pasternack Enterprises	PE6071	8376	AT	Pre Check
MOS-34	Thermo-Hygrometer	Custom	CTH-201	3401	AT	2015/01/13 * 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

UL Japan, Inc.

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