



RADIO TEST REPORT

Test Report No. : 11232718H-A

Applicant : silex technology, Inc.
Type of Equipment : PCI Express Half mini card WLAN module
Model No. : SX-PCEAN2
FCC ID : N6C-SXPCEAN2
Test regulation : FCC Part 15 Subpart C: 2016
(Class II Permissive change)
* Radiated spurious emission test only
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)

Date of test: April 5 to September 15, 2016

Representative test engineer:

T. Shimada

Takumi Shimada

Engineer

Consumer Technology Division

Approved by:

T. Takayama

Tsubasa Takayama

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

13-EM-F0429

REVISION HISTORY

Original Test Report No.: 11232718H-A

[illegible]

CONTENTS	PAGE
SECTION 1: Customer information.....	4
SECTION 2: Equipment under test (E.U.T.).....	4
SECTION 3: Test specification, procedures & results.....	5
SECTION 4: Operation of E.U.T. during testing.....	8
SECTION 5: Radiated Spurious Emission	11
APPENDIX 1: Test data	13
Radiated Spurious Emission	13
APPENDIX 2: Test instruments	33
APPENDIX 3: Photographs of test setup	34
Radiated Spurious Emission	34
Worst Case Position	35

SECTION 1: Customer information

Company Name	:	silex technology, Inc.
Address	:	2-3-1 Hikaridai, Seika-cho, Kyoto 619-0237, Japan
Telephone Number	:	+81-774-98-3878
Facsimile Number	:	+81-774-98-3758
Contact Person	:	Toshiro Kometani

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

2.1 Identification of E.U.T.

Type of Equipment	:	PCI Express Half mini card WLAN module
Model No.	:	SX-PCEAN2
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 3.3 V
Receipt Date of Sample	:	March 15, 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: SX-PCEAN2 (referred to as the EUT in this report) is a PCI Express Half mini card WLAN module.

Radio Specification

Radio Type	:	Transceiver
Method of Frequency Generation	:	Synthesizer
Power Supply (inner)	:	DC 1.2 V
Clock frequency	:	40 MHz

Radio Specification

	IEEE802.11b	IEEE802.11g/n (20 M band)	IEEE802.11a/n (20 M band)	IEEE802.11n (40 M band)
Frequency of operation	2412 MHz-2462 MHz *1)	2412 MHz-2462 MHz *1)	5180 MHz-5240 MHz 5260 MHz-5320 MHz 5500 MHz-5700 MHz 5745 MHz-5825 MHz	2422 MHz-2452 MHz *1) 5190 MHz-5230 MHz 5270 MHz-5310 MHz 5510 MHz-5670 MHz 5755 MHz-5795 MHz
Type of modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (64QAM, 16QAM, QPSK, BPSK)	OFDM (64QAM, 16QAM, QPSK, BPSK)	
Channel spacing	5 MHz		20 MHz	2.4 GHz: 5 MHz 5 GHz: 40 MHz
Antenna type	Sleeve antenna: SANSEI ELECTRIC CO.,LTD.			
Antenna Gain	2.0 dBi@2.4GHz Band, 2.1 dBi@5GHz Band			
Antenna Connector type	U.FL Alternative connector			

*1) This test report applies to IEEE802.11b/g/n-20 (2412 MHz - 2462 MHz) and n-40(2422 MHz - 2452 MHz).

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

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
Spurious Emission Restricted Band Edges	FCC: KDB 558074 D01 DTS Meas Guidance v03r05	FCC: Section15.247(d)	0.2 dB 2390.00 MHz, AV, Vertical.	Complied	Radiated (above 30 MHz) *1)
	IC: RSS-Gen 6.13	IC: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10			
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 15.31 (e)

The RF Module has own regulator.

The RF Module is constantly provided voltage through own regulator regardless of input voltage (DC 1.2 V).
Therefore, this EUT complies with the requirement.

FCC Part 15.203/212 Antenna requirement

The EUT has a unique antenna connector (U.FL on the Module).
Therefore the equipment complies with the requirement of 15.203/212.

3.3 Addition to standard

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.

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

Polarity	Radiated emission (Below 1GHz)			
	(3 m*) (+/-)		(10 m*) (+/-)	
	30 MHz – 200 MHz	200 MHz – 1000 MHz	30 MHz – 200 MHz	200 MHz – 1000 MHz
Horizontal	5.0 dB	5.3 dB	5.0 dB	5.0 dB
Vertical	4.7 dB	5.9 dB	5.0 dB	5.1 dB

Radiated emission (Above 1GHz)				
(3 m*) (+/-)		(1 m*) (+/-)		(10 m*) (+/-)
1 GHz – 6 GHz	6 GHz – 18 GHz	10 GHz – 26.5 GHz	26.5 GHz – 40GHz	1 GHz - 18 GHz
5.2 dB	5.4 dB	5.5 dB	5.5 dB	5.4 dB

*Measurement distance

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	-	-

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)

Test operating mode was determined as follows according to “Section 1 of 6 802.11 a/b/g/n testing - Managing Complex Regulatory Approvals - ” of TCB Council Workshop October 2009.

Mode	Remarks*
IEEE 802.11b (11b)	11Mbps (Short GI), PN9
IEEE 802.11g (11g)	12Mbps, PN9
IEEE 802.11n MIMO 20 MHz BW (11n-20)	MCS 9 (Short GI), PN9
IEEE 802.11n MIMO 40 MHz BW (11n-40)	MCS 9 (Short GI), PN9
*The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)	
*The power value of the EUT was set for testing as follows (setting value might be different from product specification value);	
- Power Setting: Refer to the following table.	
- Software: Atheros Radio Test Tool (ART2-GUI) Version 2.28.6	
*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.	

[Power setting]

Operation	Rate	Frequency	Power Setting [dBm]
11b	11 Mbps(Short GI)	2412 MHz	13.5
		2437 MHz	15.0
		2462 MHz	11.5
11g	12 Mbps	2412 MHz	13.5
		2437 MHz	16.5
		2462 MHz	11.5
11n MIMO 20 MHz band	MCS 9 (Short GI)	2412 MHz	11.5
		2437 MHz	16.0
		2462 MHz	10.5
11n MIMO 40 MHz band	MCS 9 (Short GI)	2422 MHz	5.5
		2437 MHz	14.5
		2452 MHz	4.5

*The details of Operating mode(s)

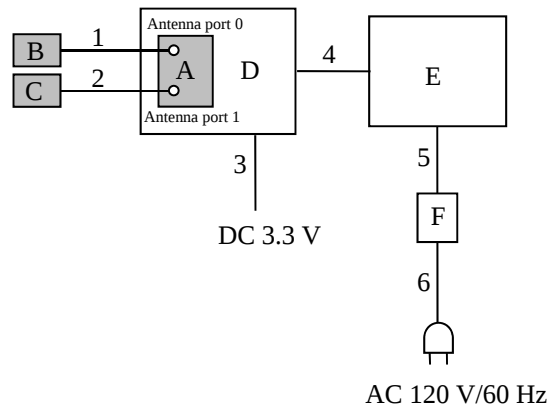
Test Item	Operating Mode	Tested Antenna port	Tested frequency
Radiated Spurious Emission (Below 1 GHz)	11n-20 Tx *1)	0+1	2437 MHz *1)
Radiated Spurious Emission (Above 1 GHz)	11b Tx	0	2412 MHz
	11n-20 Tx *2)	0+1	2437 MHz
			2462 MHz
	11g Tx *3)	0	2412 MHz
			2462 MHz
	11n-40 Tx	0+1	2422 MHz
			2437 MHz
			2452 MHz

*1) The operating mode and tested frequency were tested as a representative, because it had the highest power at antenna terminal test.

*2) Since 11g and 11n-20 have the same modulation method and no differences in transmitting specification, test was performed on the representative mode that had the highest peak output power.

*3) Only band-edge test was performed.

4.2 Configuration and peripherals



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

* The test was performed using a typical evaluation board (Jig board).

Description of EUT

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	PCI Express Half Mini Card WLAN Module	SX-PCEAN2	M7000030	Silex	EUT
B	Antenna	ANTDC-081A0	001	SANSEI ELECTRIC CO.,LTD.	EUT
C	Antenna	ANTDC-081A0	002	SANSEI ELECTRIC CO.,LTD.	EUT
D	Jig board	-	-	-	-
E	Laptop PC	HP ProBook 6550 b	CNU1242 MQ0	HP	-
F	AC Adapter	Series PPP009L-E	CT: WBGST0A1R0PJ9u	HP	-
G	Regulated DC Power Supply	PW16-5ADP	171116437	TEXO	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Antenna Cable	0.15	Shielded	Shielded	-
2	Antenna Cable	0.15	Shielded	Shielded	-
3	DC Cable	2.7	Unshielded	Unshielded	-
4	Mini PCI Cable	0.3	Shielded	Shielded	-
5	DC Cable	1.8	Unshielded	Unshielded	-
6	AC Cable	1.8	Unshielded	Unshielded	-
7	AC Cable	1.8	Unshielded	Unshielded	-

SECTION 5: 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 1 GHz]

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 1 GHz]

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	Below 30 MHz	30 MHz to 200 MHz	200 MHz to 1 GHz	Above 1 GHz
Antenna Type	Loop	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 *4)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	Average Power Method: RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: 100 traces If duty cycle was less than 98%, a duty factor was added to the results.	RBW: 100 kHz VBW: 300kHz
Test Distance	3 m	4.45 m *1) (1 GHz – 10 GHz), 4.4 m *2) (1 GHz – 10 GHz), 1 m *3) (10 GHz – 26.5 GHz)		4.45 m *1) (1 GHz – 10 GHz), 4.4 m *2) (1 GHz – 10 GHz), 1 m *3) (10 GHz – 26.5 GHz)

*1) Distance Factor: $20 \times \log(4.45 \text{ m} / 3.0 \text{ m}) = 3.43 \text{ dB}$ (Ise EMC Lab. No.4 Semi Anechoic Chamber)

*2) Distance Factor: $20 \times \log(4.4 \text{ m} / 3.0 \text{ m}) = 3.3 \text{ dB}$ (Ise EMC Lab. No.3 Semi Anechoic Chamber)

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

*4) Average Power Measurement was performed based on 6. 0 & 12.2.5 of "KDB 558074 D01 DTS Meas Guidance v03r05"

[Antenna]

- The carrier level and noise levels were confirmed at each position of X0, X90, Y0, Y90, Z0, Z90, X, Y and Z axes of Antenna to see the position of maximum noise, and the test was made at the position that has the maximum noise.

[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.

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

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

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

APPENDIX 1: Test data

Radiated Spurious Emission

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber	
Report No.	11232718H	
Date	April 5, 2016	April 6, 2016
Temperature / Humidity	21 deg. C / 49 % RH	22 deg. C / 38 % RH
Engineer	Keisuke Kawamura	Masafumi Niwa
	(1 GHz-10 GHz)	(10 GHz-26.5 GHz)
Mode	Tx 11b 2412 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	2390.000	PK	53.1	27.9	6.7	32.1	-	55.6	73.9	18.3	
Hori	4824.000	PK	46.1	32.9	9.1	31.3	-	56.8	73.9	17.1	
Hori	7236.000	PK	41.2	36.8	10.3	32.6	-	55.7	73.9	18.2	Floor Noise
Hori	9648.000	PK	40.8	38.1	11.1	32.6	-	57.4	73.9	16.5	Floor Noise
Hori	2390.000	AV	43.7	27.9	6.7	32.1	0.2	46.4	53.9	7.5	*1)
Hori	4824.000	AV	36.9	32.9	9.1	31.3	0.2	47.8	53.9	6.1	
Hori	7236.000	AV	32.4	36.8	10.3	32.6	-	46.9	53.9	7.0	Floor Noise
Hori	9648.000	AV	31.0	38.1	11.1	32.6	-	47.6	53.9	6.3	Floor Noise
Vert	2390.000	PK	50.2	27.9	6.7	32.1	-	52.7	73.9	21.2	
Vert	4824.000	PK	49.8	32.9	9.1	31.3	-	60.5	73.9	13.4	
Vert	7236.000	PK	41.6	36.8	10.3	32.6	-	56.1	73.9	17.8	Floor Noise
Vert	9648.000	PK	40.8	38.1	11.1	32.6	-	57.4	73.9	16.5	Floor Noise
Vert	2390.000	AV	41.2	27.9	6.7	32.1	0.2	43.9	53.9	10.0	*1)
Vert	4824.000	AV	41.1	32.9	9.1	31.3	0.2	52.0	53.9	1.9	
Vert	7236.000	AV	32.4	36.8	10.3	32.6	-	46.9	53.9	7.0	Floor Noise
Vert	9648.000	AV	31.1	38.1	11.1	32.6	-	47.7	53.9	6.2	Floor Noise

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

*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 (4.45 m / 3.0 m) = 3.43 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	2412.000	PK	101.4	28.0	6.7	32.1	104.0	-	-	Carrier
Hori	2400.000	PK	49.1	28.0	6.7	32.1	51.7	84.0	32.3	
Hori	2464.021	PK	53.1	28.0	6.8	32.1	55.8	84.0	28.2	
Vert	2412.000	PK	101.1	28.0	6.7	32.1	103.7	-	-	Carrier
Vert	2400.000	PK	47.7	28.0	6.7	32.1	50.3	83.7	33.4	
Vert	2464.021	PK	52.3	28.0	6.8	32.1	55.0	83.7	28.7	

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

UL Japan, Inc.

Ise EMC Lab.

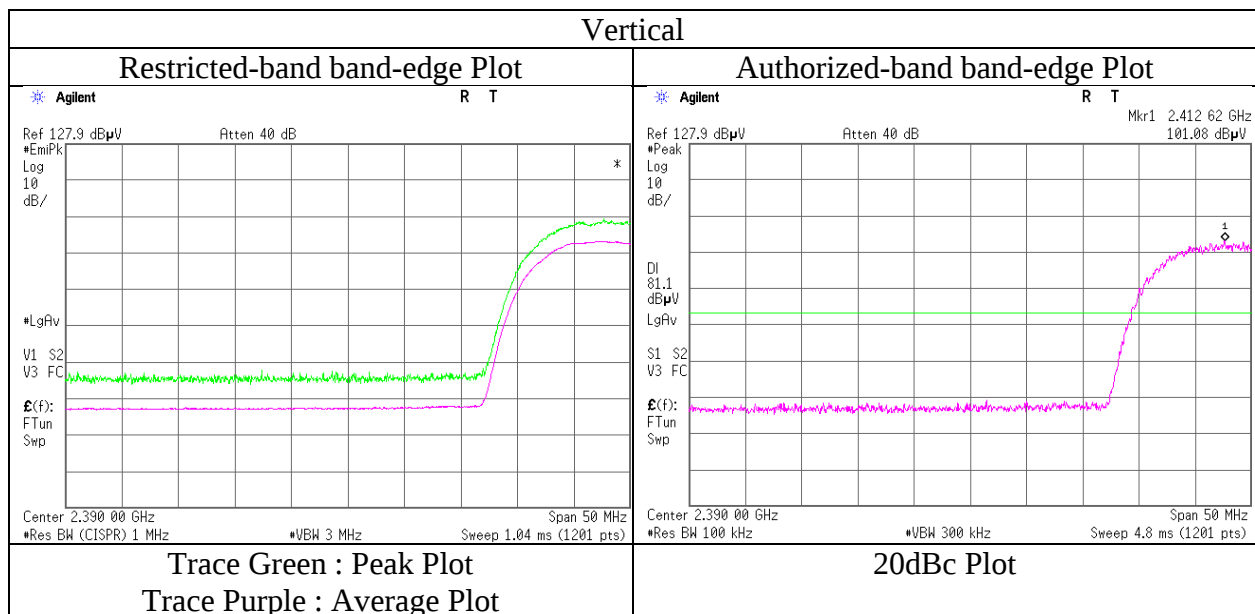
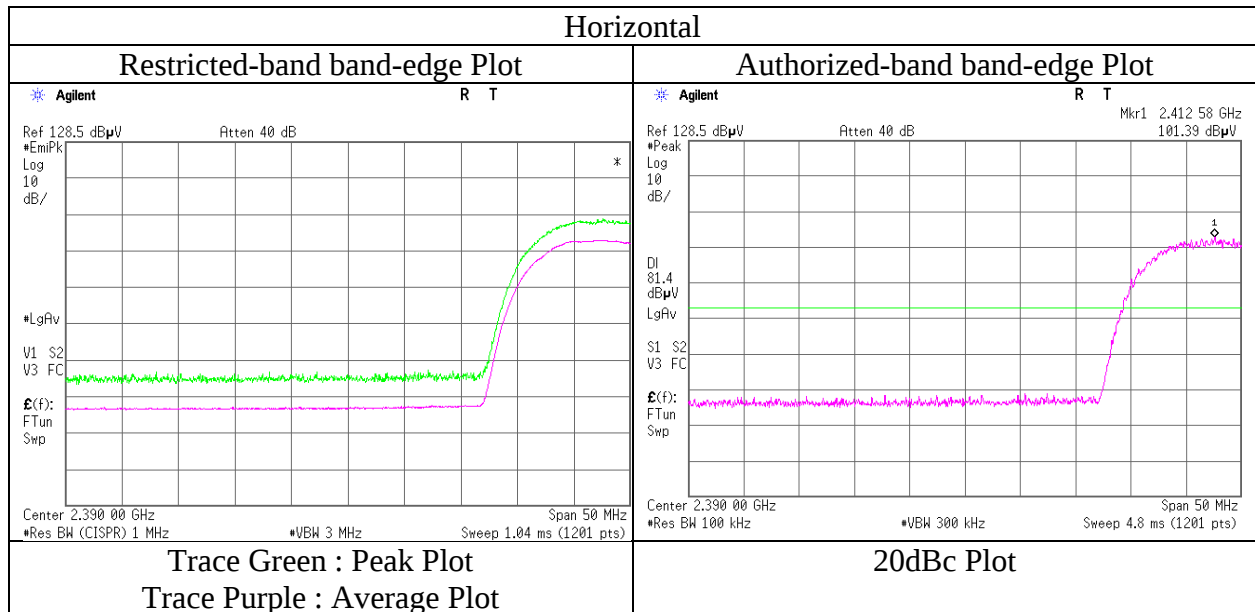
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11232718H
Date	April 5, 2016
Temperature / Humidity	21 deg. C / 49 % RH
Engineer	Keisuke Kawamura
	(1 GHz-10 GHz)
Mode	Tx 11b 2412 MHz



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

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

Radiated Spurious Emission

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11232718H
Date	April 5, 2016 April 6, 2016
Temperature / Humidity	21 deg. C / 49 % RH 22 deg. C / 38 % RH
Engineer	Keisuke Kawamura Masafumi Niwa
	(1 GHz-10 GHz) (10 GHz-26.5 GHz)
Mode	Tx 11b 2437 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	4874.000	PK	47.5	33.1	9.1	31.3	-	58.4	73.9	15.5	
Hori	7311.000	PK	41.2	36.8	10.3	32.6	-	55.7	73.9	18.2	Floor Noise
Hori	9748.000	PK	40.8	38.2	11.1	32.7	-	57.4	73.9	16.5	Floor Noise
Hori	4874.000	AV	38.6	33.1	9.1	31.3	0.2	49.7	53.9	4.2	
Hori	7311.000	AV	32.4	36.8	10.3	32.6	-	46.9	53.9	7.0	Floor Noise
Hori	9748.000	AV	31.0	38.2	11.1	32.7	-	47.6	53.9	6.3	Floor Noise
Vert	4874.000	PK	49.4	33.1	9.1	31.3	-	60.3	73.9	13.6	
Vert	7311.000	PK	41.6	36.8	10.3	32.6	-	56.1	73.9	17.8	Floor Noise
Vert	9748.000	PK	41.0	38.2	11.1	32.7	-	57.6	73.9	16.3	Floor Noise
Vert	4874.000	AV	39.9	33.1	9.1	31.3	0.2	51.0	53.9	2.9	
Vert	7311.000	AV	32.4	36.8	10.3	32.6	-	46.9	53.9	7.0	Floor Noise
Vert	9748.000	AV	31.1	38.2	11.1	32.7	-	47.7	53.9	6.2	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 $20\log(4.45\text{m} / 3.0\text{m}) = 3.43\text{ dB}$
 10 GHz - 26.5 GHz $20\log(1.0\text{m} / 3.0\text{m}) = -9.5\text{ dB}$

Radiated Spurious Emission

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber	
Report No.	11232718H	
Date	April 5, 2016	April 6, 2016
Temperature / Humidity	21 deg. C / 49 % RH	22 deg. C / 38 % RH
Engineer	Keisuke Kawamura (1 GHz-10 GHz)	Masafumi Niwa (10 GHz-26.5 GHz)
Mode	Tx 11b 2462 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	2483.500	PK	48.8	28.1	6.8	32.1	-	51.6	73.9	22.3	
Hori	4924.000	PK	40.4	33.3	9.2	31.3	-	51.6	73.9	22.3	
Hori	7386.000	PK	41.2	36.8	10.3	32.6	-	55.7	73.9	18.2	Floor Noise
Hori	9848.000	PK	40.8	38.2	11.1	32.7	-	57.4	73.9	16.5	Floor Noise
Hori	2483.500	AV	40.3	28.1	6.8	32.1	0.2	43.3	53.9	10.6	*1)
Hori	4924.000	AV	30.9	33.3	9.2	31.3	0.2	42.3	53.9	11.6	
Hori	7386.000	AV	32.4	36.8	10.3	32.6	-	46.9	53.9	7.0	Floor Noise
Hori	9848.000	AV	31.0	38.2	11.1	32.7	-	47.6	53.9	6.3	Floor Noise
Vert	2483.500	PK	50.9	28.1	6.8	32.1	-	53.7	73.9	20.2	
Vert	4924.000	PK	44.9	33.3	9.2	31.3	-	56.1	73.9	17.8	
Vert	7386.000	PK	41.6	36.8	10.3	32.6	-	56.1	73.9	17.8	Floor Noise
Vert	9848.000	PK	41.0	38.2	11.1	32.7	-	57.6	73.9	16.3	Floor Noise
Vert	2483.500	AV	40.5	28.1	6.8	32.1	0.2	43.5	53.9	10.4	*1)
Vert	4924.000	AV	35.6	33.3	9.2	31.3	0.2	47.0	53.9	6.9	
Vert	7386.000	AV	32.4	36.8	10.3	32.6	-	46.9	53.9	7.0	Floor Noise
Vert	9848.000	AV	31.1	38.2	11.1	32.7	-	47.7	53.9	6.2	Floor Noise

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

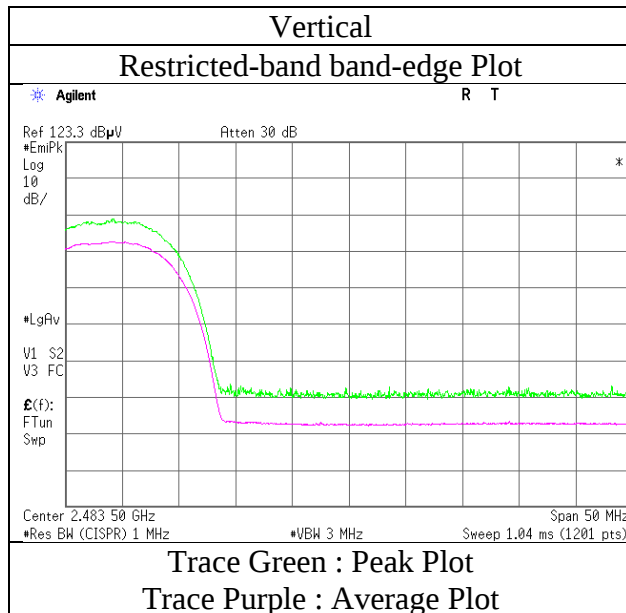
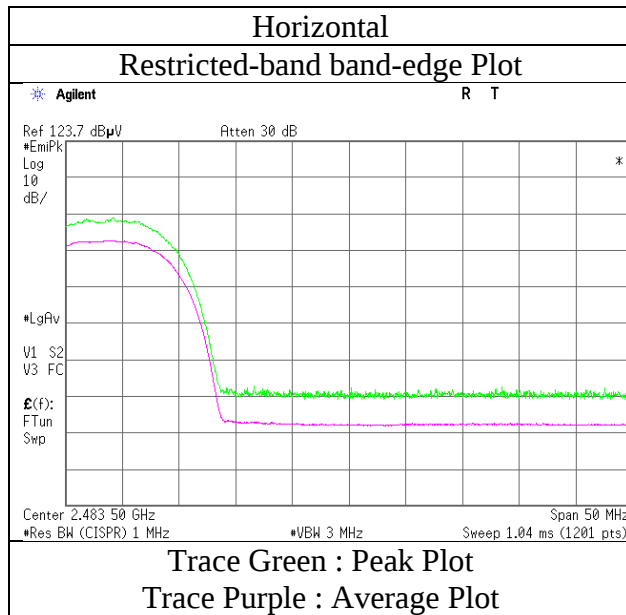
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz $20\log(4.45\text{m} / 3.0\text{m}) = 3.43\text{ dB}$
 10 GHz - 26.5 GHz $20\log(1.0\text{m} / 3.0\text{m}) = -9.5\text{ dB}$

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

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11232718H
Date	April 5, 2016
Temperature / Humidity	21 deg. C / 49 % RH
Engineer	Keisuke Kawamura
Mode	Tx 11b 2462 MHz



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

Radiated Spurious Emission

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11232718H
Date	September 15, 2016
Temperature / Humidity	24 deg. C / 64 % RH
Engineer	Takumi Shimada
	(1 GHz-10 GHz)
Mode	Tx 11g 2412 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	2390.000	PK	54.7	26.7	6.6	32.7	-	55.3	73.9	18.6	
Hori	2390.000	AV	41.4	26.7	6.6	32.7	0.3	42.3	53.9	11.6	*1)
Vert	2390.000	PK	56.0	26.7	6.6	32.7	-	56.6	73.9	17.3	
Vert	2390.000	AV	43.2	26.7	6.6	32.7	0.3	44.1	53.9	9.8	*1)

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

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

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

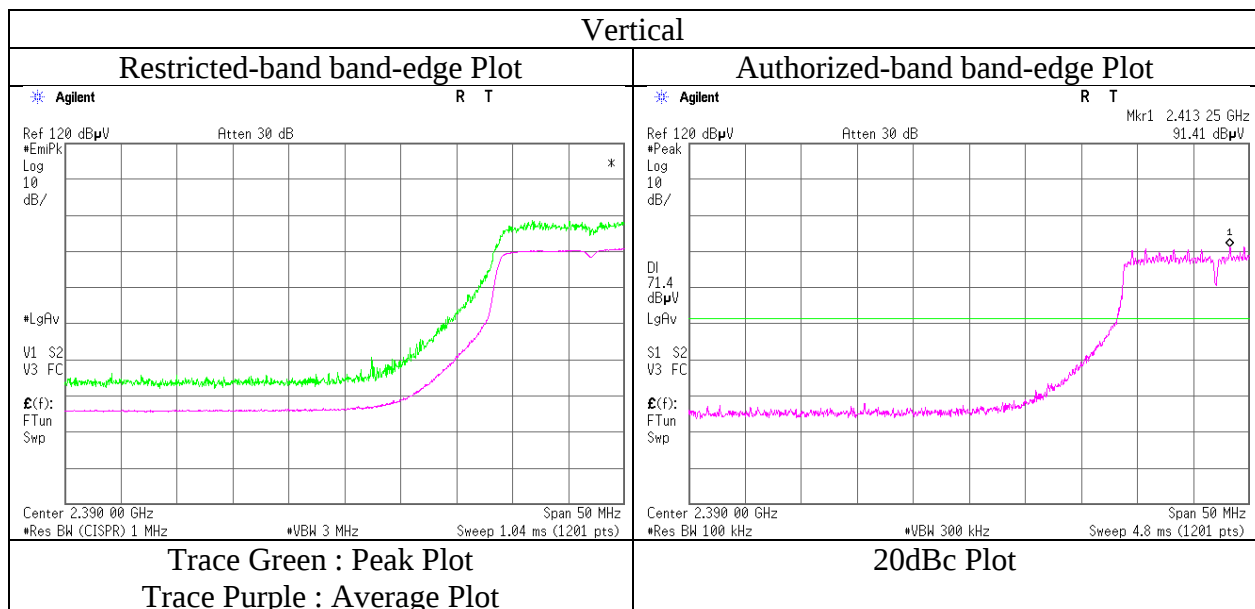
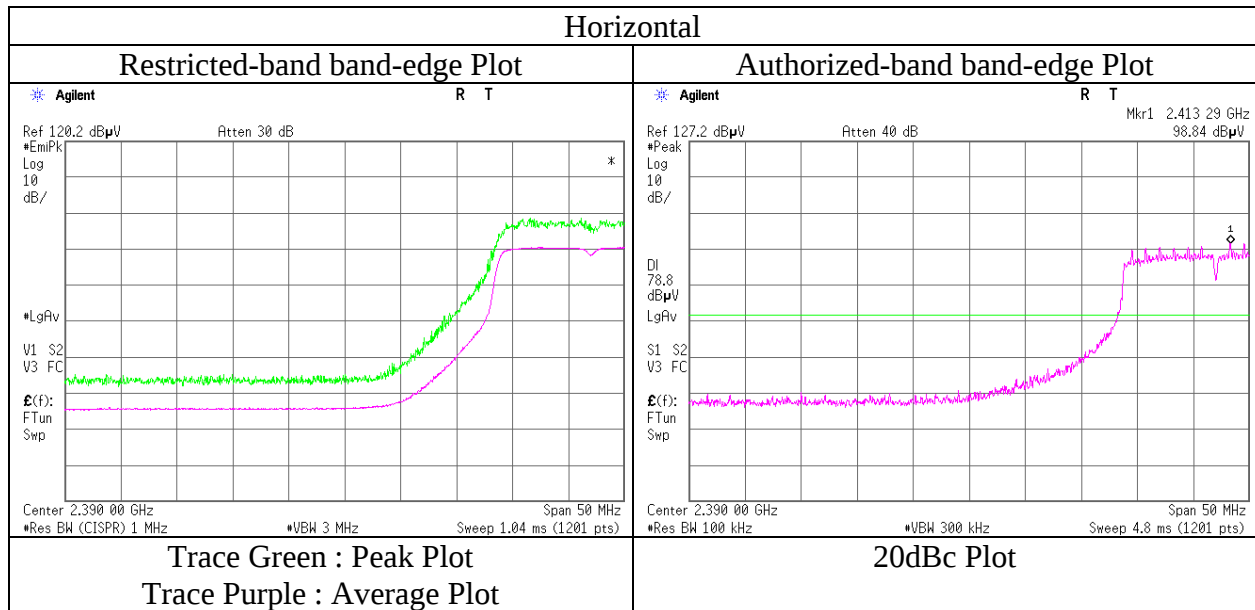
20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	98.8	26.7	6.6	32.7	99.4	-	-	Carrier
Hori	2400.000	PK	64.4	26.7	6.6	32.7	65.0	79.4	14.4	
Vert	2412.000	PK	91.4	26.7	6.6	32.7	92.0	-	-	Carrier
Vert	2400.000	PK	60.0	26.7	6.6	32.7	60.6	72.0	11.4	

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

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11232718H
Date	September 15, 2016
Temperature / Humidity	24 deg. C / 64 % RH
Engineer	Takumi Shimada (1 GHz-10 GHz)
Mode	Tx 11g 2412 MHz



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

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

Radiated Spurious Emission

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11232718H
Date	April 5, 2016
Temperature / Humidity	21 deg. C / 49 % RH
Engineer	Keisuke Kawamura (1 GHz-10 GHz)
Mode	Tx 11g 2462 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	2483.500	PK	55.9	28.1	6.8	32.1	-	58.7	73.9	15.2	
Hori	2483.500	AV	43.0	28.1	6.8	32.1	0.3	46.1	53.9	7.8	*1)
Vert	2483.500	PK	57.3	28.1	6.8	32.1	-	60.1	73.9	13.8	
Vert	2483.500	AV	44.3	28.1	6.8	32.1	0.3	47.4	53.9	6.5	*1)

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

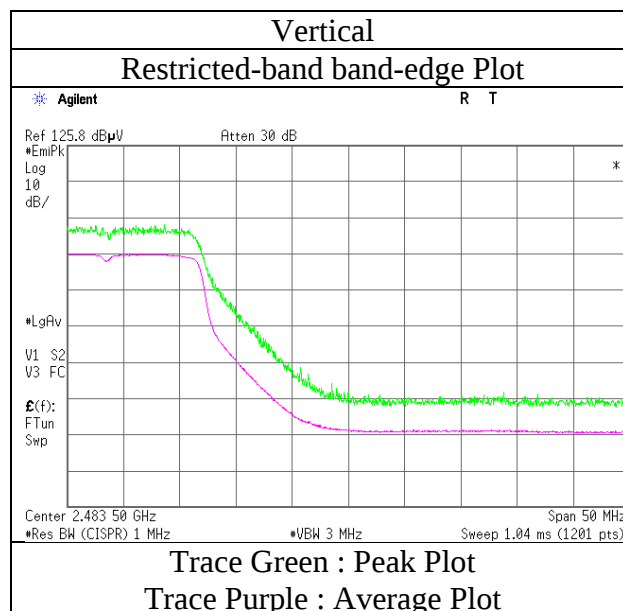
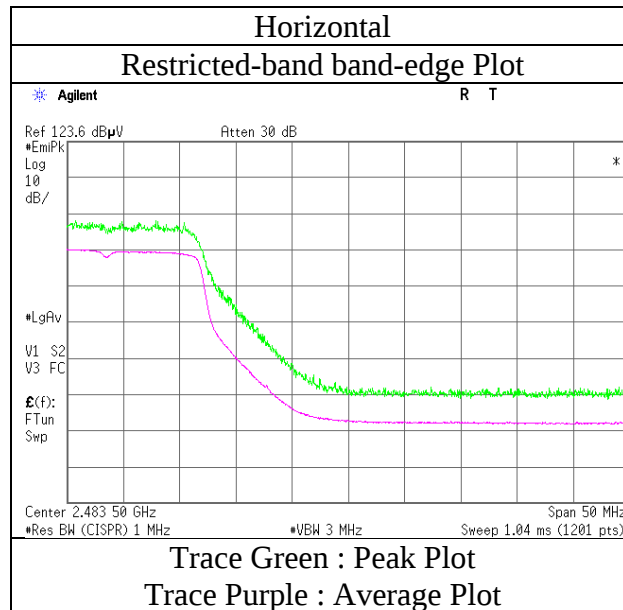
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz $20\log(4.45\text{m} / 3.0\text{m}) = 3.43\text{ dB}$

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

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11232718H
Date	April 5, 2016
Temperature / Humidity	21 deg. C / 49 % RH
Engineer	Keisuke Kawamura
	(1 GHz-10 GHz)
Mode	Tx 11g 2462 MHz



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

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

Radiated Spurious Emission

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11232718H
Date	April 5, 2016 April 6, 2016
Temperature / Humidity	23 deg. C / 60 % RH 22 deg. C / 38 % RH
Engineer	Masafumi Niwa Masafumi Niwa
	(1 GHz-10 GHz) (10 GHz-26.5 GHz)
Mode	Tx 11n-20 2412 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	2390.000	PK	62.9	27.9	6.7	32.1	-	65.4	73.9	8.5	
Hori	2483.500	PK	52.5	28.1	6.8	32.1	-	55.3	73.9	18.6	
Hori	4824.000	PK	41.7	32.9	9.1	31.3	-	52.4	73.9	21.5	Floor Noise
Hori	7236.000	PK	40.4	36.8	10.3	32.6	-	54.9	73.9	19.0	Floor Noise
Hori	9648.000	PK	41.2	38.1	11.1	32.6	-	57.8	73.9	16.1	Floor Noise
Hori	2390.000	AV	49.0	27.9	6.7	32.1	0.6	52.1	53.9	1.8	*1)
Hori	2483.500	AV	42.6	28.1	6.8	32.1	0.6	46.0	53.9	7.9	*1)
Hori	4824.000	AV	32.1	32.9	9.1	31.3	-	42.8	53.9	11.1	Floor Noise
Hori	7236.000	AV	32.6	36.8	10.3	32.6	-	47.1	53.9	6.8	Floor Noise
Hori	9648.000	AV	31.2	38.1	11.1	32.6	-	47.8	53.9	6.1	Floor Noise
Vert	2390.000	PK	67.6	27.9	6.7	32.1	-	70.1	73.9	3.8	
Vert	2483.500	PK	53.2	28.1	6.8	32.1	-	56.0	73.9	17.9	
Vert	4824.000	PK	42.0	32.9	9.1	31.3	-	52.7	73.9	21.2	Floor Noise
Vert	7236.000	PK	41.1	36.8	10.3	32.6	-	55.6	73.9	18.3	Floor Noise
Vert	9648.000	PK	41.1	38.1	11.1	32.6	-	57.7	73.9	16.2	Floor Noise
Vert	2390.000	AV	50.6	27.9	6.7	32.1	0.6	53.7	53.9	0.2	*1)
Vert	2483.500	AV	43.9	28.1	6.8	32.1	0.6	47.3	53.9	6.6	*1)
Vert	4824.000	AV	32.8	32.9	9.1	31.3	-	43.5	53.9	10.4	Floor Noise
Vert	7236.000	AV	32.8	36.8	10.3	32.6	-	47.3	53.9	6.6	Floor Noise
Vert	9648.000	AV	31.3	38.1	11.1	32.6	-	47.9	53.9	6.0	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 (4.45m / 3.0 m) = -3.43 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	2412.000	PK	103.5	28.0	6.7	32.1	106.1	-	-	Carrier
Hori	2400.000	PK	69.3	28.0	6.7	32.1	71.9	86.1	14.2	
Vert	2412.000	PK	101.1	28.0	6.7	32.1	103.7	-	-	Carrier
Vert	2400.000	PK	68.5	28.0	6.7	32.1	71.1	83.7	12.6	

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

UL Japan, Inc.

Ise EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

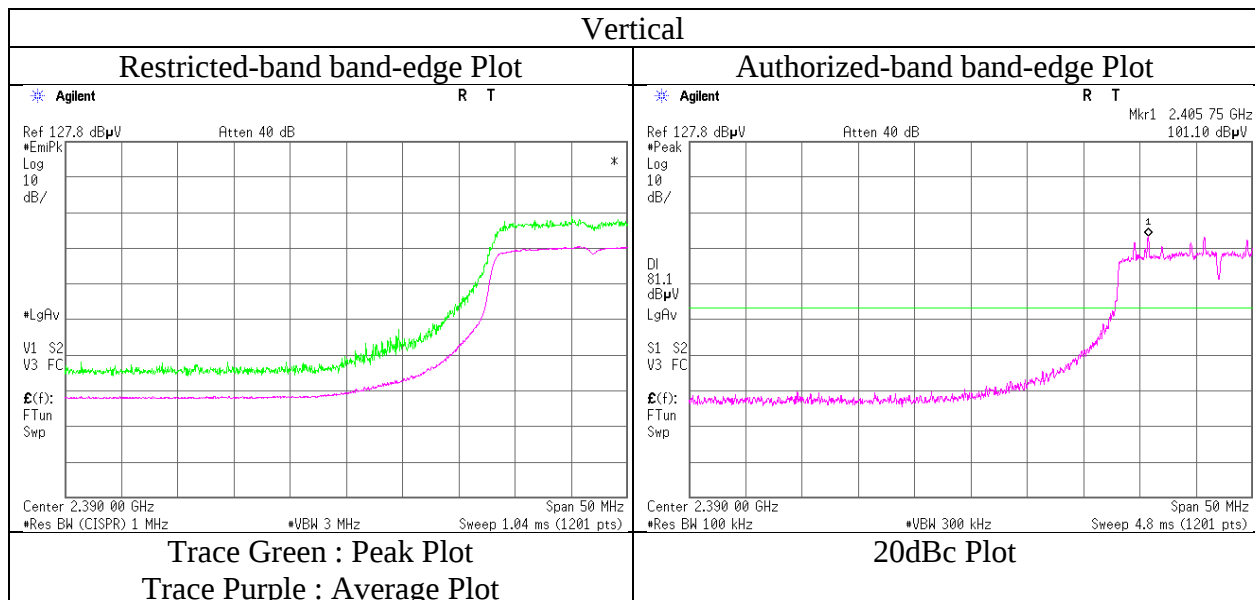
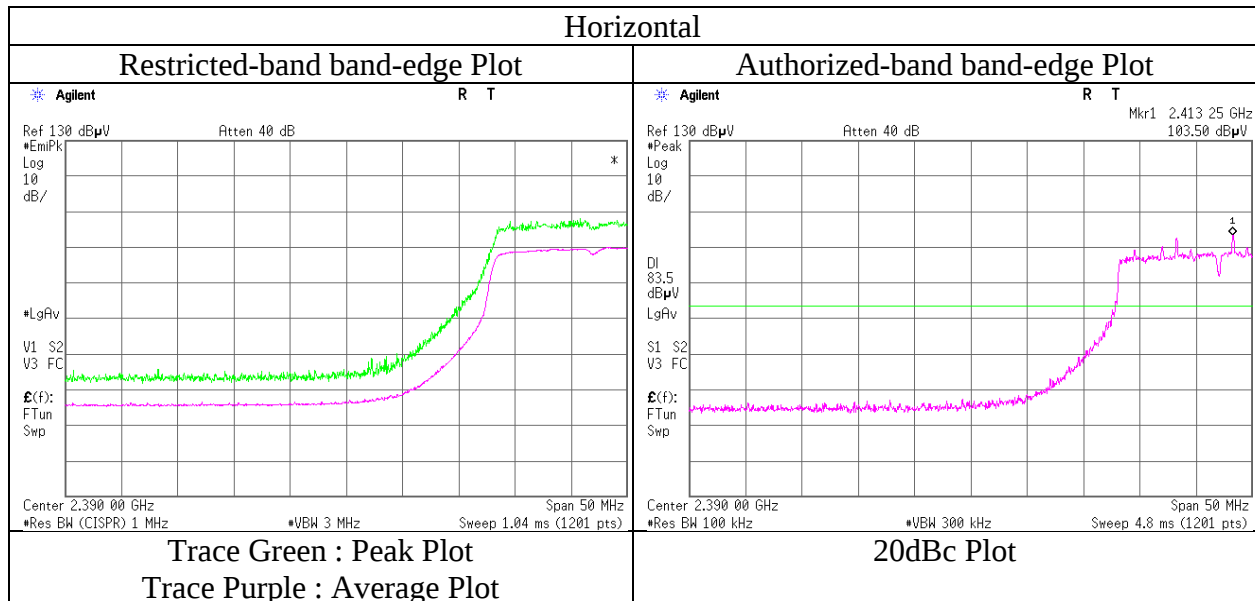
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Ise EMC Lab. No. 4 Semi Anechoic Chamber
Report No.	11232718H
Date	April 5, 2016
Temperature / Humidity	23 deg. C / 60 % RH
Engineer	Masafumi Niwa
Mode	Tx 11n-20 2412 MHz

April 6, 2016
22 deg. C / 38 % RH
Masafumi Niwa
(10 GHz-26.5 GHz)



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

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

Radiated Spurious Emission

Test place : Ise EMC Lab. No. 4 Semi Anechoic Chamber
Report No. : 11232718H
Date : April 5, 2016 April 6, 2016 April 8, 2016
Temperature / Humidity : 23 deg. C / 60 % RH 22 deg. C / 38 % RH 21 deg. C / 51 % RH
Engineer : Masafumi Niwa Masafumi Niwa Masafumi Niwa
(1 GHz-10 GHz) (10 GHz-26.5 GHz) (30 MHz-1000 MHz)
Mode : Tx 11n-20 2437 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dBm]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	99.741	QP	46.2	9.7	8.1	32.1	-	31.9	43.5	11.6	
Hori	120.001	QP	43.3	12.4	8.3	32.0	-	32.0	43.5	11.5	
Hori	177.491	QP	35.3	16.0	8.9	32.0	-	28.2	43.5	15.3	
Hori	497.812	QP	36.4	17.5	11.2	32.2	-	32.9	46.0	13.1	
Hori	699.572	QP	37.3	19.8	12.3	32.2	-	37.2	46.0	8.8	
Hori	836.231	QP	38.4	21.1	13.0	31.4	-	41.1	46.0	4.9	
Hori	2390.000	PK	55.3	27.9	6.7	32.1	-	57.8	73.9	16.1	
Hori	2483.500	PK	56.6	28.1	6.8	32.1	-	59.4	73.9	14.5	
Hori	4874.000	PK	46.8	33.1	9.1	31.3	-	57.7	73.9	16.2	
Hori	7311.000	PK	43.5	36.8	10.3	32.6	-	58.0	73.9	15.9	
Hori	9748.000	PK	40.1	38.2	11.1	32.7	-	56.7	73.9	17.2	Floor Noise
Hori	2390.000	AV	45.9	27.9	6.7	32.1	0.6	49.0	53.9	4.9	*1)
Hori	2483.500	AV	48.2	28.1	6.8	32.1	0.6	51.6	53.9	2.3	*1)
Hori	4874.000	AV	35.0	33.1	9.1	31.3	0.6	46.5	53.9	7.4	
Hori	7311.000	AV	34.6	36.8	10.3	32.6	0.6	49.7	53.9	4.2	
Hori	9748.000	AV	31.2	38.2	11.1	32.7	-	47.8	53.9	6.1	Floor Noise
Vert	40.321	QP	33.1	13.8	7.3	32.1	-	22.1	40.0	17.9	
Vert	99.623	QP	46.4	9.7	8.1	32.1	-	32.1	43.5	11.4	
Vert	119.993	QP	39.2	12.4	8.3	32.0	-	27.9	43.5	15.6	
Vert	499.141	QP	40.4	17.5	11.2	32.2	-	36.9	46.0	9.1	
Vert	696.221	QP	36.5	19.8	12.3	32.2	-	36.4	46.0	9.6	
Vert	949.982	QP	29.5	22.1	13.5	30.9	-	34.2	46.0	11.8	
Vert	2390.000	PK	57.6	27.9	6.7	32.1	-	60.1	73.9	13.8	
Vert	2483.500	PK	59.0	28.1	6.8	32.1	-	61.8	73.9	12.1	
Vert	4874.000	PK	47.5	33.1	9.1	31.3	-	58.4	73.9	15.5	
Vert	7311.000	PK	44.8	36.8	10.3	32.6	-	59.3	73.9	14.6	
Vert	9748.000	PK	40.3	38.2	11.1	32.7	-	56.9	73.9	17.0	Floor Noise
Vert	2390.000	AV	47.3	27.9	6.7	32.1	0.6	50.4	53.9	3.5	*1)
Vert	2483.500	AV	49.1	28.1	6.8	32.1	0.6	52.5	53.9	1.4	*1)
Vert	4874.000	AV	37.1	33.1	9.1	31.3	0.6	48.6	53.9	5.3	
Vert	7311.000	AV	36.5	36.8	10.3	32.6	0.6	51.6	53.9	2.3	
Vert	9748.000	AV	31.3	38.2	11.1	32.7	-	47.9	53.9	6.0	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 (4.45m / 3.0 m) = -3.43 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 [dBm]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2437.000	PK	107.7	28.0	6.8	32.1	110.4	-	-	Carrier
Hori	2400.000	PK	50.9	28.0	6.7	32.1	53.5	90.4	36.9	
Vert	2437.000	PK	106.7	28.0	6.8	32.1	109.4	-	-	Carrier
Vert	2400.000	PK	53.5	28.0	6.7	32.1	56.1	89.4	33.3	

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

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

Radiated Spurious Emission

Test place	Ise EMC Lab. No. 4 Semi Anechoic Chamber	
Report No.	11232718H	
Date	April 5, 2016	April 6, 2016
Temperature / Humidity	23 deg. C / 60 % RH	22 deg. C / 38 % RH
Engineer	Masafumi Niwa	Masafumi Niwa
	(1 GHz-10 GHz)	(10 GHz-26.5 GHz)
Mode	Tx 11n-20 2462 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	2390.000	PK	51.9	27.9	6.7	32.1	-	54.4	73.9	19.5	
Hori	2483.500	PK	57.4	28.1	6.8	32.1	-	60.2	73.9	13.7	
Hori	4924.000	PK	41.2	33.3	9.2	31.3	-	52.4	73.9	21.5	Floor Noise
Hori	7386.000	PK	41.7	36.8	10.3	32.6	-	56.2	73.9	17.7	Floor Noise
Hori	9848.000	PK	41.3	38.2	11.1	32.7	-	57.9	73.9	16.0	Floor Noise
Hori	2390.000	AV	42.8	27.9	6.7	32.1	0.6	45.9	53.9	8.0	*1)
Hori	2483.500	AV	47.4	28.1	6.8	32.1	0.6	50.8	53.9	3.1	*1)
Hori	4924.000	AV	31.8	33.3	9.2	31.3	-	43.0	53.9	10.9	Floor Noise
Hori	7386.000	AV	32.9	36.8	10.3	32.6	-	47.4	53.9	6.5	Floor Noise
Hori	9848.000	AV	31.3	38.2	11.1	32.7	-	47.9	53.9	6.0	Floor Noise
Vert	2390.000	PK	52.3	27.9	6.7	32.1	-	54.8	73.9	19.1	
Vert	2483.500	PK	55.7	28.1	6.8	32.1	-	58.5	73.9	15.4	
Vert	4924.000	PK	41.7	33.3	9.2	31.3	-	52.9	73.9	21.0	Floor Noise
Vert	7386.000	PK	41.4	36.8	10.3	32.6	-	55.9	73.9	18.0	Floor Noise
Vert	9848.000	PK	40.4	38.2	11.1	32.7	-	57.0	73.9	16.9	Floor Noise
Vert	2390.000	AV	43.6	27.9	6.7	32.1	0.6	46.7	53.9	7.2	*1)
Vert	2483.500	AV	46.0	28.1	6.8	32.1	0.6	49.4	53.9	4.5	*1)
Vert	4924.000	AV	32.6	33.3	9.2	31.3	-	43.8	53.9	10.1	Floor Noise
Vert	7386.000	AV	33.0	36.8	10.3	32.6	-	47.5	53.9	6.4	Floor Noise
Vert	9848.000	AV	31.2	38.2	11.1	32.7	-	47.8	53.9	6.1	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).

Distance factor: 1 GHz - 10 GHz $20\log(4.45\text{m} / 3.0\text{m}) = -3.43\text{ dB}$
 10 GHz - 26.5 GHz $20\log(1.0\text{m} / 3.0\text{m}) = -9.5\text{ dB}$

*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	2462.000	PK	101.8	28.0	6.8	32.1	104.5	-	-	Carrier
Hori	2400.000	PK	47.2	28.0	6.7	32.1	49.8	84.5	34.7	
Vert	2462.000	PK	100.1	28.0	6.8	32.1	102.8	-	-	Carrier
Vert	2400.000	PK	48.6	28.0	6.7	32.1	51.2	82.8	31.6	

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

UL Japan, Inc.

Ise EMC Lab.

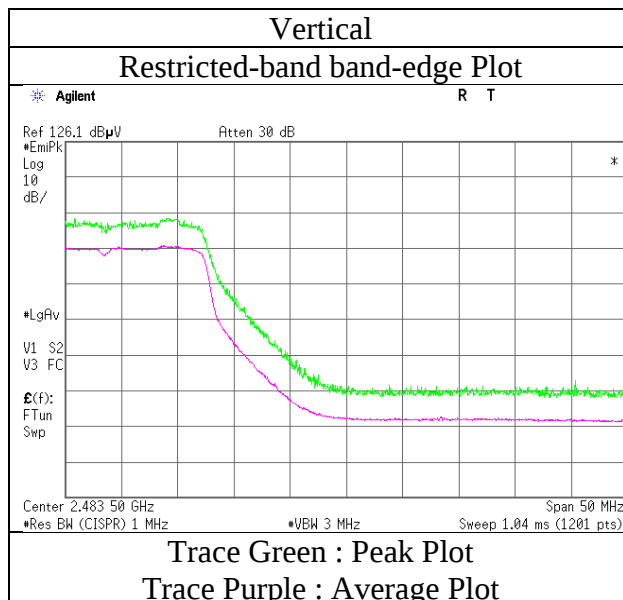
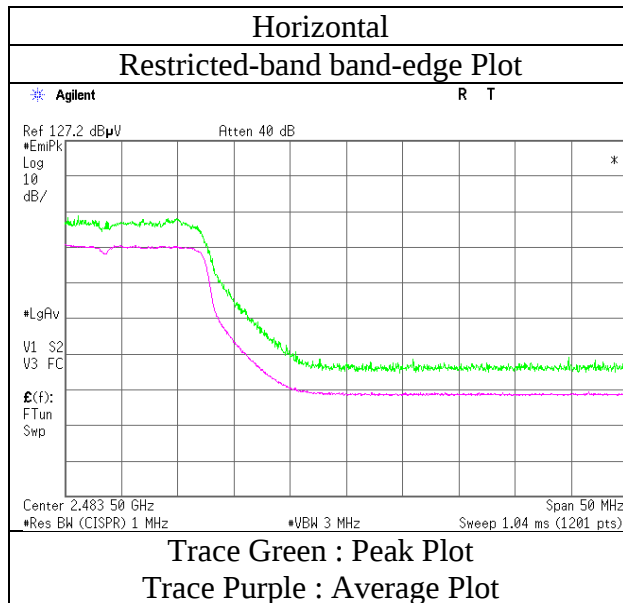
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission (Reference Plot for band-edge)

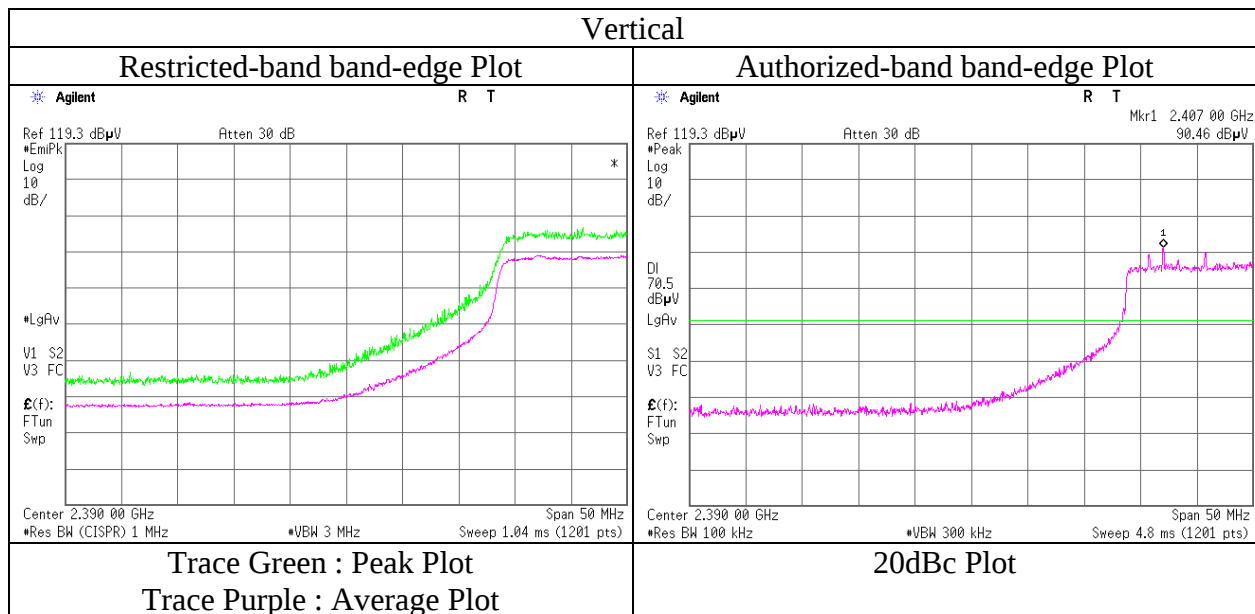
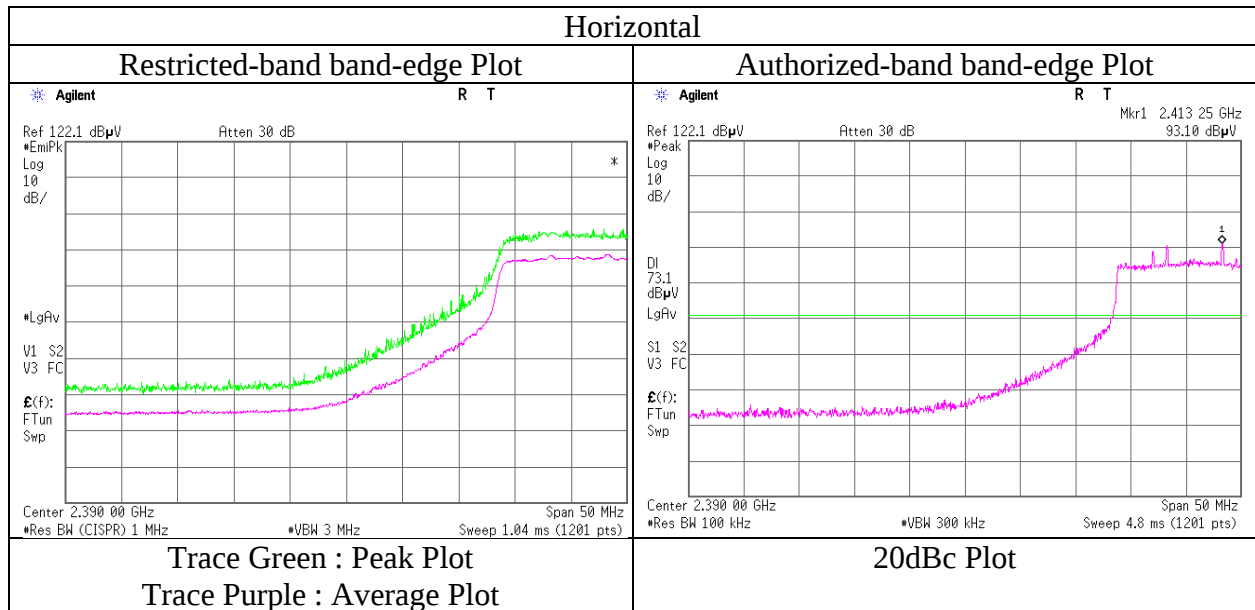
Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11232718H
Date	April 5, 2016
Temperature / Humidity	23 deg. C / 60 % RH
Engineer	Masafumi Niwa
	(1 GHz-10 GHz)
Mode	Tx 11n-20 2462 MHz



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

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11232718H
Date	April 5, 2016
Temperature / Humidity	21 deg. C / 49 % RH
Engineer	Keisuke Kawamura (1 GHz-10 GHz)
Mode	Tx 11n-40 2422 MHz



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

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

Radiated Spurious Emission

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11232718H
Date	April 5, 2016 April 6, 2016
Temperature / Humidity	21 deg. C / 49 % RH 22 deg. C / 38 % RH
Engineer	Keisuke Kawamura Masafumi Niwa
	(1 GHz-10 GHz) (10 GHz-26.5 GHz)
Mode	Tx 11n-40 2437 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	2288.023	PK	50.7	27.8	6.7	32.2	-	53.0	73.9	20.9	
Hori	4874.000	PK	46.8	33.1	9.1	31.3	-	57.7	73.9	16.2	
Hori	7311.000	PK	41.2	36.8	10.3	32.6	-	55.7	73.9	18.2	Floor Noise
Hori	9748.000	PK	40.8	38.2	11.1	32.7	-	57.4	73.9	16.5	Floor Noise
Hori	2288.023	AV	43.9	27.8	6.7	32.2	0.8	47.0	53.9	6.9	
Hori	4874.000	AV	35.4	33.1	9.1	31.3	0.8	47.1	53.9	6.8	*1)
Hori	7311.000	AV	32.4	36.8	10.3	32.6	-	46.9	53.9	7.0	Floor Noise
Hori	9748.000	AV	30.9	38.2	11.1	32.7	-	47.5	53.9	6.4	Floor Noise
Vert	2288.023	PK	51.0	27.8	6.7	32.2	-	53.3	73.9	20.6	
Vert	4874.000	PK	45.3	33.1	9.1	31.3	-	56.2	73.9	17.7	
Vert	7311.000	PK	41.6	36.8	10.3	32.6	-	56.1	73.9	17.8	Floor Noise
Vert	9748.000	PK	41.0	38.2	11.1	32.7	-	57.6	73.9	16.3	Floor Noise
Vert	2288.023	AV	44.2	27.8	6.7	32.2	0.8	47.3	53.9	6.6	
Vert	4874.000	AV	35.3	33.1	9.1	31.3	0.8	47.0	53.9	6.9	*1)
Vert	7311.000	AV	32.4	36.8	10.3	32.6	-	46.9	53.9	7.0	Floor Noise
Vert	9748.000	AV	31.1	38.2	11.1	32.7	-	47.7	53.9	6.2	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 (4.45m / 3.0 m) = 3.43 dB
 10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

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

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

Radiated Spurious Emission

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber	
Report No.	11232718H	
Date	April 5, 2016	April 6, 2016
Temperature / Humidity	21 deg. C / 49 % RH	22 deg. C / 38 % RH
Engineer	Keisuke Kawamura (1 GHz-10 GHz)	Masafumi Niwa (10 GHz-26.5 GHz)
Mode	Tx 11n-40 2452 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	2288.023	PK	49.5	27.8	6.7	32.2	-	51.8	73.9	22.1	
Hori	2483.500	PK	59.2	28.1	6.8	32.1	-	62.0	73.9	11.9	
Hori	4904.000	PK	40.4	33.2	9.2	31.3	-	51.5	73.9	22.4	Floor Noise
Hori	7356.000	PK	41.2	36.8	10.3	32.6	-	55.7	73.9	18.2	Floor Noise
Hori	9808.000	PK	40.8	38.2	11.1	32.7	-	57.4	73.9	16.5	Floor Noise
Hori	2288.023	AV	42.7	27.8	6.7	32.2	0.8	45.8	53.9	8.1	
Hori	2483.500	AV	47.6	28.1	6.8	32.1	0.8	51.2	53.9	2.7	*1)
Hori	4904.000	AV	30.9	33.2	9.2	31.3	-	42.0	53.9	11.9	Floor Noise
Hori	7356.000	AV	32.4	36.8	10.3	32.6	-	46.9	53.9	7.0	Floor Noise
Hori	9808.000	AV	30.9	38.2	11.1	32.7	-	47.5	53.9	6.4	Floor Noise
Vert	2288.023	PK	48.8	27.8	6.7	32.2	-	51.1	73.9	22.8	
Vert	2483.500	PK	58.7	28.1	6.8	32.1	-	61.5	73.9	12.4	
Vert	4904.000	PK	39.5	33.2	9.2	31.3	-	50.6	73.9	23.3	Floor Noise
Vert	7356.000	PK	41.6	36.8	10.3	32.6	-	56.1	73.9	17.8	Floor Noise
Vert	9808.000	PK	41.0	38.2	11.1	32.7	-	57.6	73.9	16.3	Floor Noise
Vert	2288.023	AV	42.0	27.8	6.7	32.2	0.8	45.1	53.9	8.8	
Vert	2483.500	AV	47.6	28.1	6.8	32.1	0.8	51.2	53.9	2.7	*1)
Vert	4904.000	AV	31.0	33.2	9.2	31.3	-	42.1	53.9	11.8	Floor Noise
Vert	7356.000	AV	32.4	36.8	10.3	32.6	-	46.9	53.9	7.0	Floor Noise
Vert	9808.000	AV	31.1	38.2	11.1	32.7	-	47.7	53.9	6.2	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 (4.45m / 3.0 m) = 3.43 dB
 10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

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

UL Japan, Inc.

Ise EMC Lab.

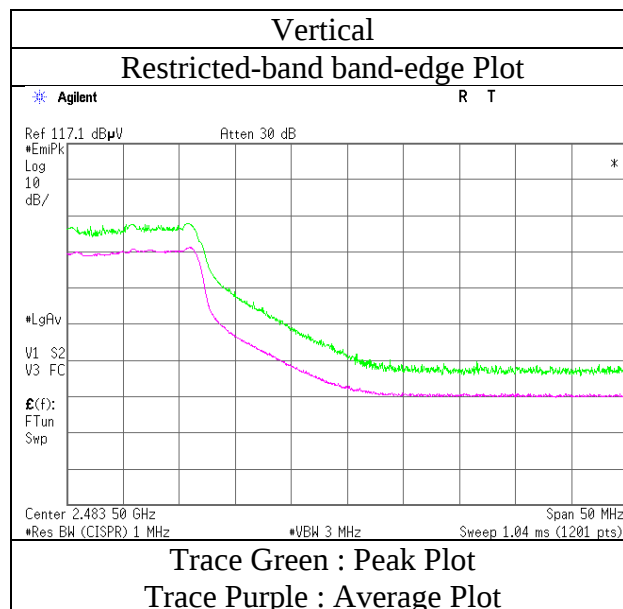
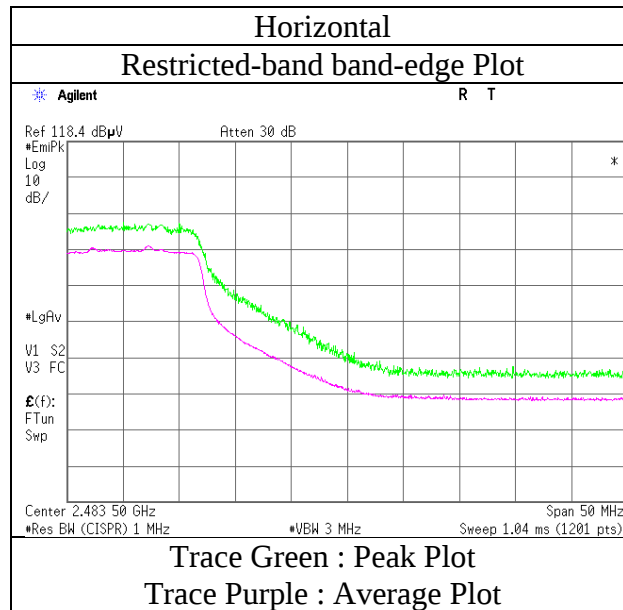
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11232718H
Date	April 5, 2016
Temperature / Humidity	21 deg. C / 49 % RH
Engineer	Keisuke Kawamura
	(1 GHz-10 GHz)
Mode	Tx 11n-40 2452 MHz



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

UL Japan, Inc.

Ise EMC Lab.

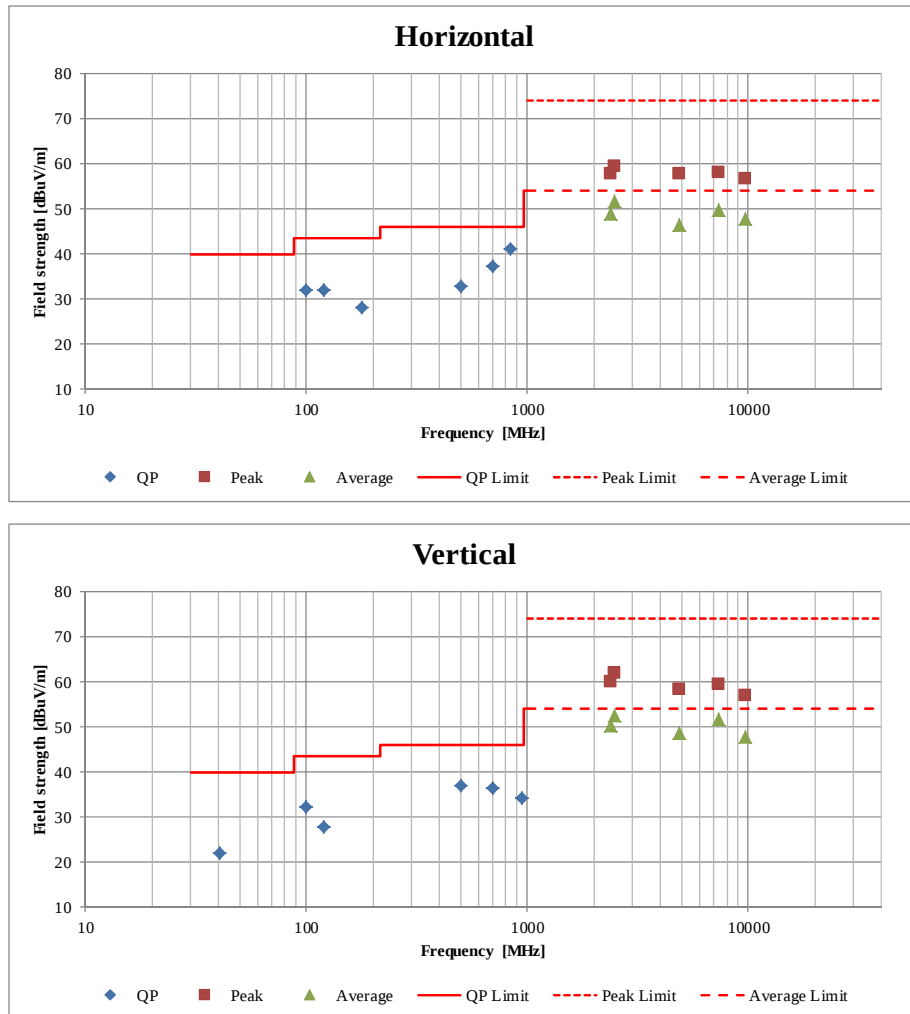
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

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

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber		
Report No.	11232718H		
Date	April 5, 2016	April 6, 2016	April 8, 2016
Temperature / Humidity	23 deg. C / 60 % RH	22 deg. C / 38 % RH	21 deg. C / 51 % RH
Engineer	Masafumi Niwa (1 GHz-10 GHz)	Masafumi Niwa (10 GHz-26.5 GHz)	Masafumi Niwa (30 MHz-1000 MHz)
Mode	Tx 11n-20 2437 MHz		



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

APPENDIX 2: Test instruments

Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2015/10/01 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	1301	RE	2016/01/21 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE	2016/08/17 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2016/05/29 * 12
MCC-167	Microwave Cable	Junkosha	MWX221	1404S374(1m) / 1405S074(5m)	RE	2016/05/20 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2016/03/24 * 12
MMM-08	DIGITAL HiTESTER	Hioki	3805	051201197	RE	2016/01/13 * 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	2016/01/21 * 12
MJM-26	Measure	KOMELON	KMC-36	-	RE	-
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
MMM-10	DIGITAL HiTESTER	Hioki	3805	051201148	RE	2016/01/18 * 12
MHF-26	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	002	RE	2015/09/17 * 12
MTR-10	EMI Test Receiver	Rohde & Schwarz	ESR26	101408	RE	2016/01/29 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2015/10/11 * 12
MLA-23	Logperiodic Antenna(200-1000MHz)	Schwarzbeck	VUSLP9111B	911B-192	RE	2016/01/30 * 12
MCC-50	Coaxial Cable	UL Japan	-	-	RE	2015/06/19 * 12
MAT-68	Attenuator	Anritsu	MP721B	6200961025	RE	2015/11/12 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2016/03/18 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2015/06/06 * 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: RE: Radiated Emission test

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