RADIO TEST REPORT

Test Report No. : 10993397H-A-R1

Applicant	:	**silex technology, Inc.**
Type of Equipment	:	**Wireless LAN PCI Express Mini Card Module**
Model No.	:	**SX-PCEGN**
FCC ID	:	**N6C-SXPCEGN**
Test regulation	:	**FCC Part 15 Subpart C: 2015** ***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)
7. This report is a revised version of 10993397H-A. 10993397H-A is replaced with this report.

Date of test: November 19 and 28, 2015

Representative test engineer:
T. Matsui
Tomoki Matsui
Engineer
Consumer Technology Division

Approved by:
T. Hatakeda
Takahiro Hatakeda
Leader
Consumer Technology Division

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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/

REVISION HISTORY

Original Test Report No.: 10993397H-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	10993397H-A	December 16, 2015	-	-
1	10993397H-A-R1	May 20, 2016	P.4	Correction of antenna gain
1	10993397H-A-R1	May 20, 2016	P.5 10	Update of KDB Version
1	10993397H-A-R1	May 20, 2016	P.5	Update of ANSI C63.4
1	10993397H-A-R1	May 20, 2016	P.9	Correction of antenna model No.

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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	:	Wireless LAN PCI Express Mini Card Module
Model No.	:	SX-PCEGN
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 3.3 V
Receipt Date of Sample	:	October 9, 2015
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-PCEGN (referred to as the EUT in this report) is a Wireless LAN PCI Express Mini Card Module.

Equipment Type	:	Transceiver
Clock frequency	:	40MHz
Method of Frequency Generation	:	Synthesizer
Operating voltage(Power Supply)	:	DC3.3V
Operating voltage (inner)	:	DC1.2V
Maximum Antenna Gain	:	2.12dBi

	IEEE802.11b	**IEEE802.11g**	**IEEE802.11n (20HT)**	**IEEE802.11n (40HT)**
Frequency of operation	2412-2462MHz		2412 - 2462MHz	2422 - 2452MHz
Type of modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM (64QAM, 16QAM, QPSK, BPSK)	OFDM (64QAM, 16QAM, QPSK, BPSK)	
Channel spacing	5MHz		5MHz	5MHz
Antenna type	WiFi PCB Substrate Antenna			
Antenna Connector type	U.FL Alternative connector			

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
Spurious Emission Restricted Band Edges	**FCC:** KDB 558074 D01 DTS Meas Guidance v03r05	**FCC:** Section15.247(d)	1.7 dB 2390.000 MHz, PK, Vert.	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 C63.4: 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 (DC3.3V).
Therefore, this EUT complies with the requirement.

FCC Part 15.203/212 Antenna requirement

The EUT has a unique antenna connector (U.FL Alternative connector).
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 (±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

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)

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 (Long), PN9
IEEE 802.11g (11g)	9Mbps, PN9
IEEE 802.11n MIMO 20MHz BW (11n-20)	MCS 13, PN9
IEEE 802.11n MIMO 40MHz BW (11n-40)	MCS 8, PN9

*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:

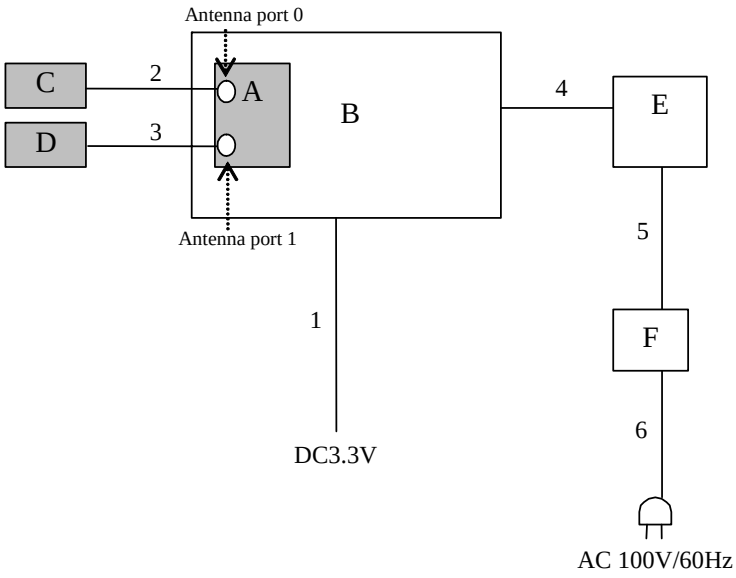
ch	1	2	3	4	5	6	7	8	9	10	11
11b	15dBm	15dBm	15dBm	15dBm	15dBm	15dBm	15dBm	15dBm	15dBm	15dBm	15dBm
11g	13dBm	15dBm	15dBm	15dBm	15dBm	15dBm	15dBm	15dBm	15dBm	15dBm	11.5dBm
11n-20	9dBm	12dBm	12dBm	12dBm	12dBm	12dBm	12dBm	12dBm	12dBm	12dBm	11dBm
11n-40	-	-	8dBm	12.5dBm	12.5dBm	12.5dBm	12.5dBm	12.5dBm	8dBm	-	-

Software: 9K Atheros Radio test
* 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
Transmitter Spurious Emission (Radiated)	11b Tx 11g Tx	0	2412MHz 2437MHz 2462MHz
	11n-20 Tx	0+1	2412MHz 2437MHz 2462MHz
	11n-40 Tx	0+1	2422MHz 2437MHz 2452MHz

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	Wireless LAN PCI Express Mini Card Module	SX-PCEGN	0080924AB9DB	silex technology, Inc.	EUT
B	Jig board	-	-	silex technology, Inc.	-
C	Antenna	H2B1BC2A1B	001	silex technology, Inc.	EUT
D	Antenna	H2B1BC2A1B	002	silex technology, Inc.	EUT
E	Laptop PC	1952-E69	L3-KY149	Lenovo	-
F	AC Adapter	92P1156	11S92P1156Z1ZDXN016ERE	Lenovo	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	1.8	Unshielded	Unshielded	-
2	Antenna Cable	0.15	Shielded	Shielded	-
3	Antenna Cable	0.15	Shielded	Shielded	-
4	HDMI Cable	0.5	Shielded	Shielded	-
5	DC Cable	1.8	Unshielded	Unshielded	-
6	AC Cable	1.7	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".

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		Spectrum Analyzer
Detector	QP	PK	AV *1)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	RBW: 1 MHz VBW: 10 Hz Detector: Peak Trace: Max Hold	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) Section 12.2.7 of "KDB 558074 D01 DTS Meas Guidance v03r05"
*2) Distance Factor: 20 x log (3.0 m / 1.0 m) = 9.5 dB

- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT (Antenna and 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 M - 26.5 GHz
Test data : APPENDIX
Test result : Pass

APPENDIX 1: Test data

Radiated Spurious Emission

Test place	Ise EMC Lab. No.3 and No.2 Semi Anechoic Chamber	
Report No.	10993397H	
Date	November 19, 2015	November 28, 2015
Temperature / Humidity	21 deg. C / 63 % RH	24 deg. C / 30 % RH
Engineer	Tomoki Matsui	Tomoki Matsui
	(1-10GHz)	(10-26.5GHz)
Mode	Tx 11b 2412 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	57.4	26.9	3.3	32.0	55.6	73.9	18.3	
Hori	3215.971	PK	51.2	28.7	3.8	31.5	52.2	73.9	21.7	
Hori	4824.000	PK	43.7	31.8	5.5	31.3	49.7	73.9	24.2	Floor Noise
Hori	7236.000	PK	43.0	36.0	6.7	32.0	53.7	73.9	20.2	Floor Noise
Hori	9648.000	PK	43.1	38.2	7.5	32.4	56.4	73.9	17.5	Floor Noise
Hori	2390.000	AV	44.1	26.9	3.3	32.0	42.3	53.9	11.6	
Hori	3215.971	AV	46.7	28.7	3.8	31.5	47.7	53.9	6.2	
Hori	4824.000	AV	28.7	31.8	5.5	31.3	34.7	53.9	19.2	Floor Noise
Hori	7236.000	AV	29.3	36.0	6.7	32.0	40.0	53.9	13.9	Floor Noise
Hori	9648.000	AV	30.1	38.2	7.5	32.4	43.4	53.9	10.5	Floor Noise
Vert	2390.000	PK	57.3	26.9	3.3	32.0	55.5	73.9	18.4	
Vert	3215.971	PK	50.0	28.7	3.8	31.5	51.0	73.9	22.9	
Vert	4824.000	PK	48.3	31.8	5.5	31.3	54.3	73.9	19.6	Floor Noise
Vert	7236.000	PK	42.4	36.0	6.7	32.0	53.1	73.9	20.8	Floor Noise
Vert	9648.000	PK	42.3	38.2	7.5	32.4	55.6	73.9	18.3	Floor Noise
Vert	2390.000	AV	44.0	26.9	3.3	32.0	42.2	53.9	11.7	
Vert	3215.971	AV	45.3	28.7	3.8	31.5	46.3	53.9	7.6	
Vert	4824.000	AV	32.5	31.8	5.5	31.3	38.5	53.9	15.4	Floor Noise
Vert	7236.000	AV	29.4	36.0	6.7	32.0	40.1	53.9	13.8	Floor Noise
Vert	9648.000	AV	29.3	38.2	7.5	32.4	42.6	53.9	11.3	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).

20dBc Data Sheet

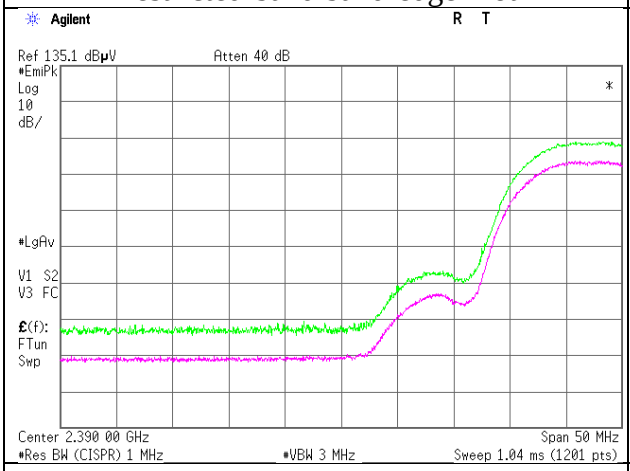
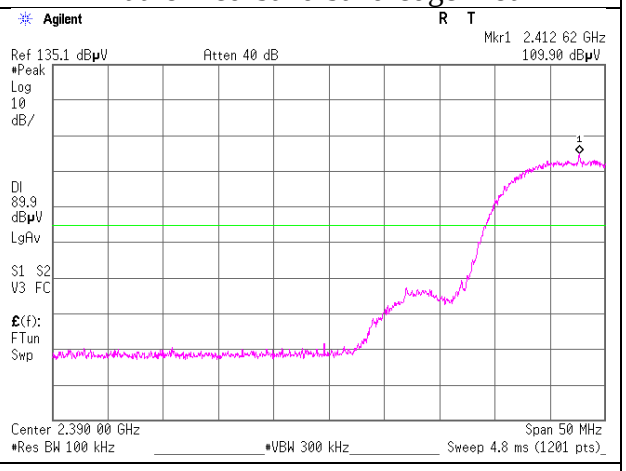
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	109.9	26.9	3.3	32.0	108.1	-	-	Carrier
Hori	2398.600	PK	74.0	26.9	3.3	32.0	72.2	88.1	15.9	
Hori	2400.000	PK	72.4	26.9	3.3	32.0	70.6	88.1	17.5	
Vert	2412.000	PK	108.5	26.9	3.3	32.0	106.7	-	-	Carrier
Vert	2398.717	PK	72.9	26.9	3.3	32.0	71.1	86.7	15.6	
Vert	2400.000	PK	71.4	26.9	3.3	32.0	69.6	86.7	17.1	

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

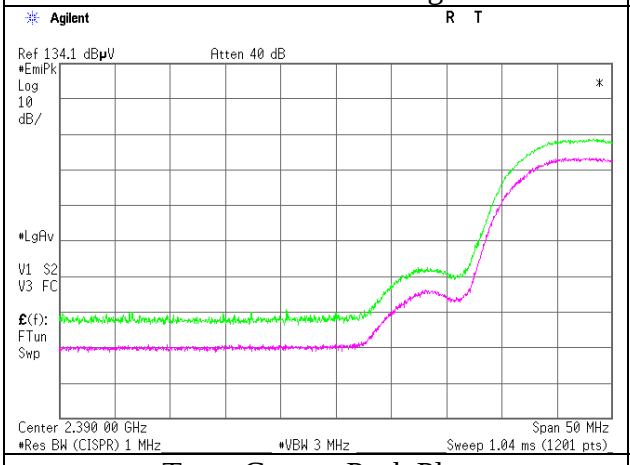
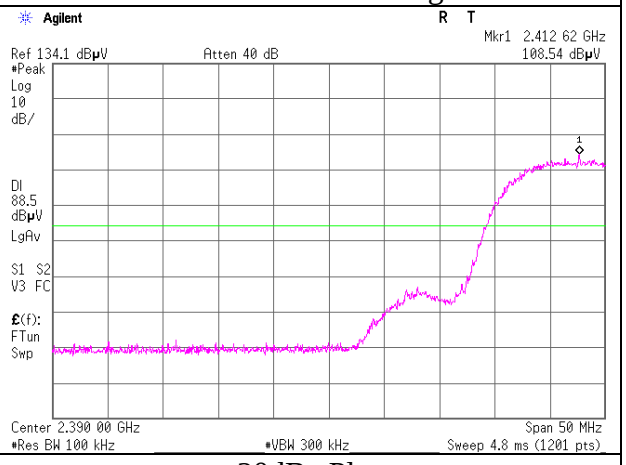
Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10993397H
Date	November 19, 2015
Temperature / Humidity	21 deg. C / 63 % RH
Engineer	Tomoki Matsui (1-10GHz)
Mode	Tx 11b 2412 MHz

Horizontal

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

Vertical

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

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

Radiated Spurious Emission

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	10993397H	
Date	November 19, 2015	November 28, 2015
Temperature / Humidity	21 deg. C / 63 % RH	24 deg. C / 30 % RH
Engineer	Tomoki Matsui (1-10GHz)	Tomoki Matsui (10-26.5GHz)
Mode	Tx 11b 2437 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	3249.306	PK	51.9	28.8	3.8	31.5	53.0	73.9	20.9	
Hori	4874.000	PK	44.1	31.9	5.5	31.3	50.2	73.9	23.7	Floor Noise
Hori	7311.000	PK	42.1	36.0	6.8	32.0	52.9	73.9	21.0	Floor Noise
Hori	9748.000	PK	42.2	38.2	7.5	32.4	55.5	73.9	18.4	Floor Noise
Hori	3249.306	AV	48.8	28.8	3.8	31.5	49.9	53.9	4.0	
Hori	4874.000	AV	28.1	31.9	5.5	31.3	34.2	53.9	19.7	Floor Noise
Hori	7311.000	AV	29.3	36.0	6.8	32.0	40.1	53.9	13.8	Floor Noise
Hori	9748.000	AV	29.6	38.2	7.5	32.4	42.9	53.9	11.0	Floor Noise
Vert	3249.306	PK	51.8	28.8	3.8	31.5	52.9	73.9	21.0	
Vert	4874.000	PK	40.8	31.9	5.5	31.3	46.9	73.9	27.0	Floor Noise
Vert	7311.000	PK	41.8	36.0	6.8	32.0	52.6	73.9	21.3	Floor Noise
Vert	9748.000	PK	42.2	38.2	7.5	32.4	55.5	73.9	18.4	Floor Noise
Vert	3249.306	AV	48.9	28.8	3.8	31.5	50.0	53.9	3.9	
Vert	4874.000	AV	27.9	31.9	5.5	31.3	34.0	53.9	19.9	Floor Noise
Vert	7311.000	AV	29.3	36.0	6.8	32.0	40.1	53.9	13.8	Floor Noise
Vert	9748.000	AV	29.3	38.2	7.5	32.4	42.6	53.9	11.3	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
26.5 GHz - 40 GHz 20log (3.0 m / 0.5 m) = 15.6 dB

Radiated Spurious Emission

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	10993397H	
Date	November 19, 2015	November 28, 2015
Temperature / Humidity	21 deg. C / 63 % RH	24 deg. C / 30 % RH
Engineer	Tomoki Matsui (1-10GHz)	Tomoki Matsui (10-26.5GHz)
Mode	Tx 11b 2462 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	57.0	26.9	3.3	32.0	55.2	73.9	18.7	
Hori	3282.667	PK	52.3	28.8	3.8	31.5	53.4	73.9	20.5	
Hori	4924.000	PK	42.8	32.0	5.4	31.3	48.9	73.9	25.0	Floor Noise
Hori	7386.000	PK	41.7	36.0	6.7	32.1	52.3	73.9	21.6	Floor Noise
Hori	9848.000	PK	42.2	38.2	7.6	32.5	55.5	73.9	18.4	Floor Noise
Hori	2483.500	AV	38.9	26.9	3.3	32.0	37.1	53.9	16.8	
Hori	3282.667	AV	49.0	28.8	3.8	31.5	50.1	53.9	3.8	
Hori	4924.000	AV	27.9	32.0	5.4	31.3	34.0	53.9	19.9	Floor Noise
Hori	7386.000	AV	29.1	36.0	6.7	32.1	39.7	53.9	14.2	Floor Noise
Hori	9848.000	AV	29.1	38.2	7.6	32.5	42.4	53.9	11.5	Floor Noise
Vert	2483.500	PK	49.5	26.9	3.3	32.0	47.7	73.9	26.2	
Vert	3282.667	PK	51.2	28.8	3.8	31.5	52.3	73.9	21.6	
Vert	4924.000	PK	40.9	32.0	5.4	31.3	47.0	73.9	26.9	Floor Noise
Vert	7386.000	PK	41.7	36.0	6.7	32.1	52.3	73.9	21.6	Floor Noise
Vert	9848.000	PK	42.0	38.2	7.6	32.5	55.3	73.9	18.6	Floor Noise
Vert	2483.500	AV	36.5	26.9	3.3	32.0	34.7	53.9	19.2	
Vert	3282.667	AV	47.9	28.8	3.8	31.5	49.0	53.9	4.9	
Vert	4924.000	AV	29.4	32.0	5.4	31.3	35.5	53.9	18.4	Floor Noise
Vert	7386.000	AV	29.1	36.0	6.7	32.1	39.7	53.9	14.2	Floor Noise
Vert	9848.000	AV	29.1	38.2	7.6	32.5	42.4	53.9	11.5	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).

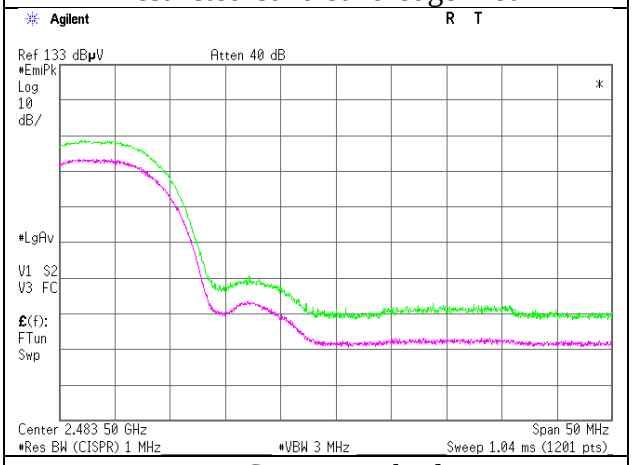
Distance factor: 10 GHz - 26.5 GHz 20log (3.0 m / 1.0 m) = 9.5 dB
26.5 GHz - 40 GHz 20log (3.0 m / 0.5 m) = 15.6 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10993397H
Date	November 19, 2015
Temperature / Humidity	21 deg. C / 63 % RH
Engineer	Tomoki Matsui
	(1-10GHz)
Mode	Tx 11b 2462 MHz

Horizontal

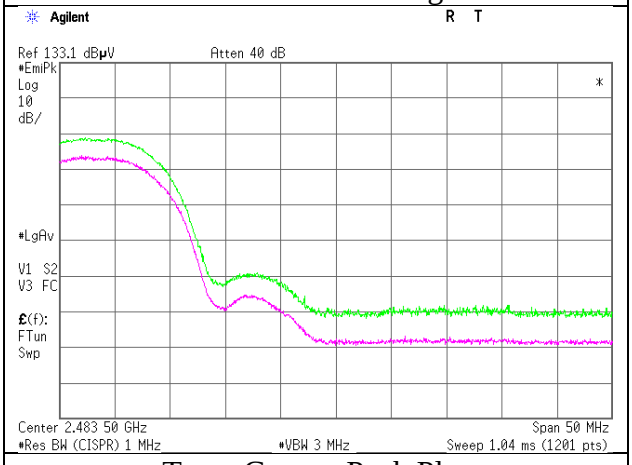
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission

Test place Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. 10993397H
Date November 28, 2015
Temperature / Humidity 24 deg. C / 30 % RH
Engineer Tomoki Matsui
Mode Tx 11g 2412 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	74.7	29.3	3.1	35.0	72.1	73.9	1.8	
Hori	3215.978	PK	53.0	29.8	3.6	34.5	51.9	73.9	22.0	
Hori	4824.000	PK	43.7	32.7	5.4	34.2	47.6	73.9	26.3	Floor Noise
Hori	7236.000	PK	43.3	36.8	6.5	34.1	52.5	73.9	21.4	Floor Noise
Hori	9648.000	PK	46.1	38.9	7.4	34.7	57.7	73.9	16.2	Floor Noise
Hori	2390.000	AV	52.7	29.3	3.1	35.0	50.1	53.9	3.8	
Hori	3215.978	AV	47.6	29.8	3.6	34.5	46.5	53.9	7.4	
Hori	4824.000	AV	30.9	32.7	5.4	34.2	34.8	53.9	19.1	Floor Noise
Hori	7236.000	AV	31.4	36.8	6.5	34.1	40.6	53.9	13.3	Floor Noise
Hori	9648.000	AV	33.1	38.9	7.4	34.7	44.7	53.9	9.2	Floor Noise
Vert	2390.000	PK	74.8	29.3	3.1	35.0	72.2	73.9	1.7	
Vert	3215.978	PK	52.9	29.8	3.6	34.5	51.8	73.9	22.1	
Vert	4824.000	PK	42.6	32.7	5.4	34.2	46.5	73.9	27.4	Floor Noise
Vert	7236.000	PK	43.1	36.8	6.5	34.1	52.3	73.9	21.6	Floor Noise
Vert	9648.000	PK	44.6	38.9	7.4	34.7	56.2	73.9	17.7	Floor Noise
Vert	2390.000	AV	52.6	29.3	3.1	35.0	50.0	53.9	3.9	
Vert	3215.978	AV	48.9	29.8	3.6	34.5	47.8	53.9	6.1	
Vert	4824.000	AV	30.9	32.7	5.4	34.2	34.8	53.9	19.1	Floor Noise
Vert	7236.000	AV	31.4	36.8	6.5	34.1	40.6	53.9	13.3	Floor Noise
Vert	9648.000	AV	33.0	38.9	7.4	34.7	44.6	53.9	9.3	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) = 9.5dB
26.5 GH - 40 GHz 20log (3.0 m / 0.5 m) = 15.6 dB

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	100.7	29.3	3.1	34.9	98.2	-	-	Carrier
Hori	2400.000	PK	76.2	29.3	3.1	35.0	73.6	78.2	4.6	
Vert	2412.000	PK	98.6	29.3	3.1	34.9	96.1	-	-	Carrier
Vert	2400.000	PK	74.2	29.3	3.1	35.0	71.6	76.1	4.5	

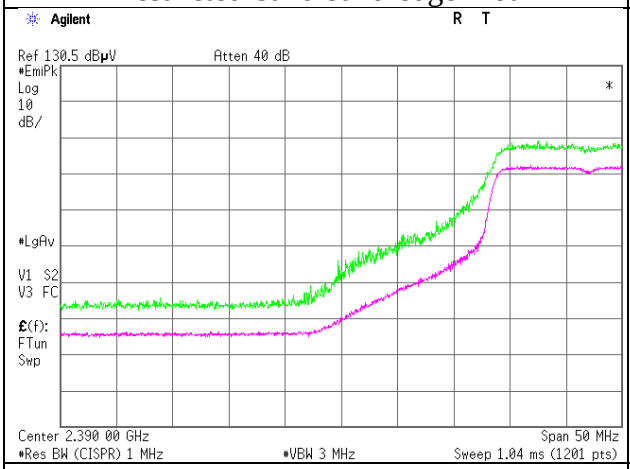
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amprifier)

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	10993397H
Date	November 28, 2015
Temperature / Humidity	24 deg. C / 30 % RH
Engineer	Tomoki Matsui
Mode	Tx 11g 2412 MHz

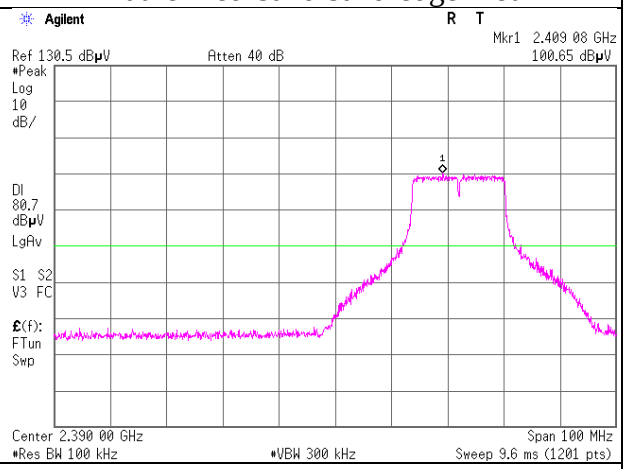
Horizontal

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

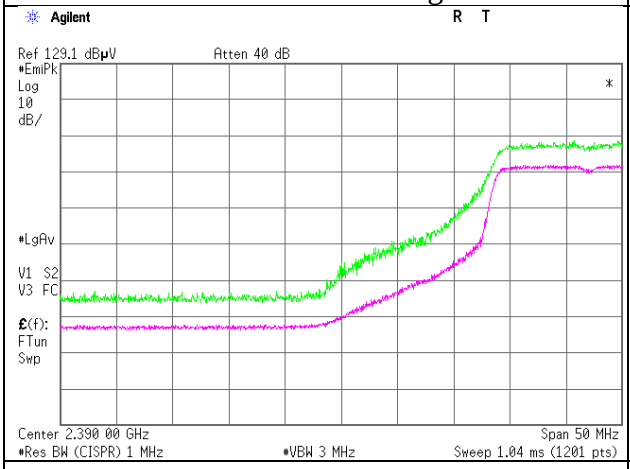
Authorized-band band-edge Plot



20dBc Plot

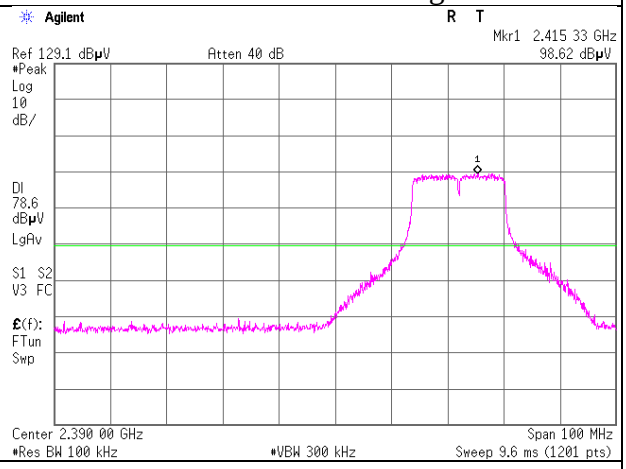
Vertical

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.3 Semi Anechoic Chamber	
Report No.	10993397H	
Date	November 19, 2015	November 28, 2015
Temperature / Humidity	21 deg. C / 63 % RH	24 deg. C / 30 % RH
Engineer	Tomoki Matsui (1-10GHz)	Tomoki Matsui (10-26.5GHz)
Mode	Tx 11g 2437 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	4874.000	PK	40.7	31.9	5.5	31.3	46.8	73.9	27.1	Floor Noise
Hori	7311.000	PK	42.4	36.0	6.8	32.0	53.2	73.9	20.7	Floor Noise
Hori	9748.000	PK	42.2	38.2	7.5	32.4	55.5	73.9	18.4	Floor Noise
Hori	4874.000	AV	28.2	31.9	5.5	31.3	34.3	53.9	19.6	Floor Noise
Hori	7311.000	AV	29.3	36.0	6.8	32.0	40.1	53.9	13.8	Floor Noise
Hori	9748.000	AV	29.5	38.2	7.5	32.4	42.8	53.9	11.1	Floor Noise
Vert	4874.000	PK	41.1	31.9	5.5	31.3	47.2	73.9	26.7	Floor Noise
Vert	7311.000	PK	42.1	36.0	6.8	32.0	52.9	73.9	21.0	Floor Noise
Vert	9748.000	PK	42.3	38.2	7.5	32.4	55.6	73.9	18.3	Floor Noise
Vert	4874.000	AV	27.9	31.9	5.5	31.3	34.0	53.9	19.9	Floor Noise
Vert	7311.000	AV	29.3	36.0	6.8	32.0	40.1	53.9	13.8	Floor Noise
Vert	9748.000	AV	29.5	38.2	7.5	32.4	42.8	53.9	11.1	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amprifier)
*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
26.5 GHz - 40 GHz 20log (3.0 m / 0.5 m) = 15.6 dB

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	2437.000	PK	104.1	29.3	3.2	34.9	101.7	-	-	Carrier
Hori	3249.314	PK	57.6	29.8	3.7	34.5	56.6	81.7	25.1	
Vert	2437.000	PK	102.8	29.3	3.2	34.9	100.4	-	-	Carrier
Vert	3249.314	PK	57.2	29.8	3.7	34.5	56.2	80.4	24.2	

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

Radiated Spurious Emission

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	10993397H	
Date	November 19, 2015	November 28, 2015
Temperature / Humidity	21 deg. C / 63 % RH	24 deg. C / 30 % RH
Engineer	Tomoki Matsui (1-10GHz)	Tomoki Matsui (10-26.5GHz)
Mode	Tx 11g 2462 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	72.9	26.9	3.3	32.0	71.1	73.9	2.8	
Hori	3282.667	PK	53.2	28.8	3.8	31.5	54.3	73.9	19.6	
Hori	4924.000	PK	40.6	32.0	5.4	31.3	46.7	73.9	27.2	Floor Noise
Hori	7386.000	PK	43.0	36.0	6.7	32.1	53.6	73.9	20.3	Floor Noise
Hori	9848.000	PK	42.0	38.2	7.6	32.5	55.3	73.9	18.6	Floor Noise
Hori	2483.500	AV	52.7	26.9	3.3	32.0	50.9	53.9	3.0	
Hori	3282.667	AV	50.2	28.8	3.8	31.5	51.3	53.9	2.6	
Hori	4924.000	AV	28.7	32.0	5.4	31.3	34.8	53.9	19.1	Floor Noise
Hori	7386.000	AV	30.1	36.0	6.7	32.1	40.7	53.9	13.2	Floor Noise
Hori	9848.000	AV	30.1	38.2	7.6	32.5	43.4	53.9	10.5	Floor Noise
Vert	2483.500	PK	69.5	26.9	3.3	32.0	67.7	73.9	6.2	
Vert	3282.667	PK	51.6	28.8	3.8	31.5	52.7	73.9	21.2	
Vert	4924.000	PK	40.7	32.0	5.4	31.3	46.8	73.9	27.1	Floor Noise
Vert	7386.000	PK	42.3	36.0	6.7	32.1	52.9	73.9	21.0	Floor Noise
Vert	9848.000	PK	41.8	38.2	7.6	32.5	55.1	73.9	18.8	Floor Noise
Vert	2483.500	AV	49.3	26.9	3.3	32.0	47.5	53.9	6.4	
Vert	3282.667	AV	48.4	28.8	3.8	31.5	49.5	53.9	4.4	
Vert	4924.000	AV	28.7	32.0	5.4	31.3	34.8	53.9	19.1	Floor Noise
Vert	7386.000	AV	30.1	36.0	6.7	32.1	40.7	53.9	13.2	Floor Noise
Vert	9848.000	AV	30.1	38.2	7.6	32.5	43.4	53.9	10.5	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).

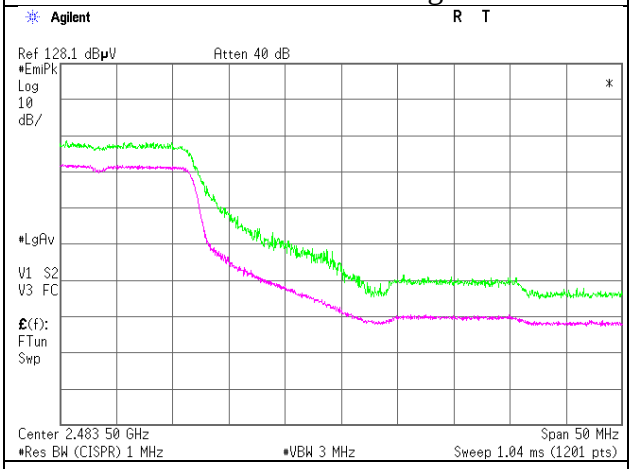
Distance factor: 10 GHz - 26.5 GHz 20log (3.0 m / 1.0 m) = 9.5 dB
26.5 GHz - 40 GHz 20log (3.0 m / 0.5 m) = 15.6 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10993397H
Date	November 28, 2015
Temperature / Humidity	24 deg. C / 30 % RH
Engineer	Tomoki Matsui
Mode	Tx 11g 2462 MHz

Horizontal

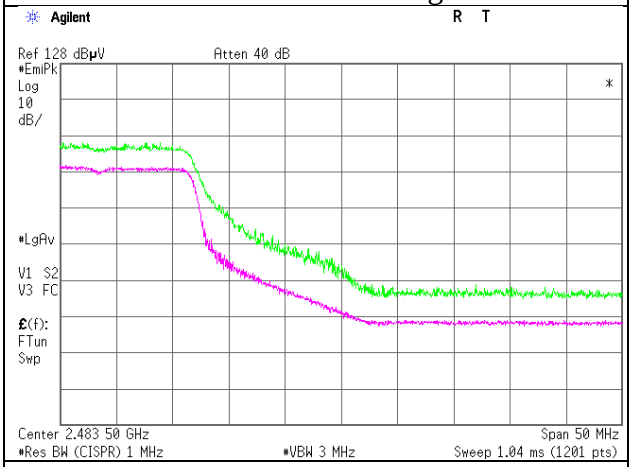
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission

Test place Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. 10993397H
Date November 28, 2015
Temperature / Humidity 24 deg. C / 30 % RH
Engineer Tomoki Matsui
Mode Tx 11n-20 2412 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	67.3	29.3	3.1	35.0	64.7	73.9	9.2	
Hori	3215.986	PK	55.4	29.8	3.6	34.5	54.3	73.9	19.6	
Hori	4824.000	PK	42.9	32.7	5.4	34.2	46.8	73.9	27.1	Floor Noise
Hori	7236.000	PK	44.7	36.8	6.5	34.1	53.9	73.9	20.0	Floor Noise
Hori	9648.000	PK	45.1	38.9	7.4	34.7	56.7	73.9	17.2	Floor Noise
Hori	2390.000	AV	47.3	29.3	3.1	35.0	44.7	53.9	9.2	
Hori	3215.986	AV	52.7	29.8	3.6	34.5	51.6	53.9	2.3	
Hori	4824.000	AV	29.5	32.7	5.4	34.2	33.4	53.9	20.5	Floor Noise
Hori	7236.000	AV	30.0	36.8	6.5	34.1	39.2	53.9	14.7	Floor Noise
Hori	9648.000	AV	31.7	38.9	7.4	34.7	43.3	53.9	10.6	Floor Noise
Vert	2390.000	PK	68.7	29.3	3.1	35.0	66.1	73.9	7.8	
Vert	3215.986	PK	56.3	29.8	3.6	34.5	55.2	73.9	18.7	
Vert	4824.000	PK	42.9	32.7	5.4	34.2	46.8	73.9	27.1	Floor Noise
Vert	7236.000	PK	43.3	36.8	6.5	34.1	52.5	73.9	21.4	Floor Noise
Vert	9648.000	PK	45.2	38.9	7.4	34.7	56.8	73.9	17.1	Floor Noise
Vert	2390.000	AV	48.9	29.3	3.1	35.0	46.3	53.9	7.6	
Vert	3215.986	AV	52.3	29.8	3.6	34.5	51.2	53.9	2.7	
Vert	4824.000	AV	30.8	32.7	5.4	34.2	34.7	53.9	19.2	Floor Noise
Vert	7236.000	AV	31.2	36.8	6.5	34.1	40.4	53.9	13.5	Floor Noise
Vert	9648.000	AV	32.9	38.9	7.4	34.7	44.5	53.9	9.4	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) = 9.5dB
26.5 GH - 40 GHz 20log (3.0 m / 0.5 m) = 15.6 dB

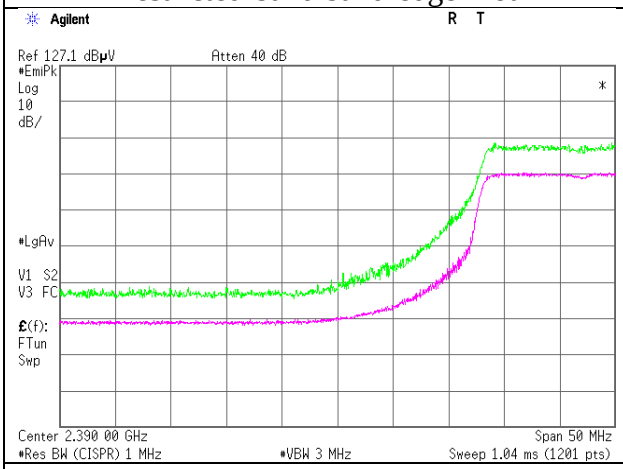
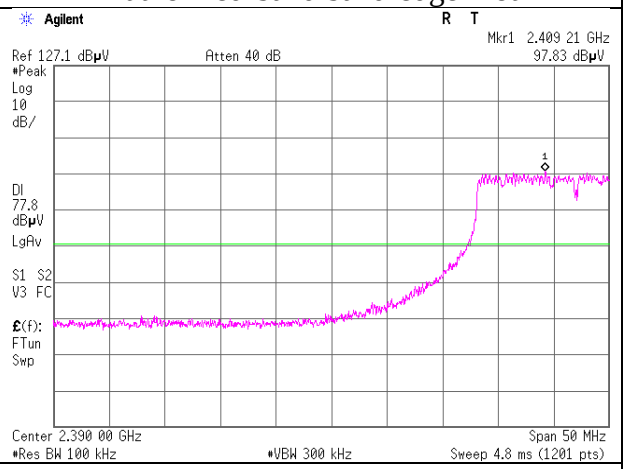
20dBc Data Sheet

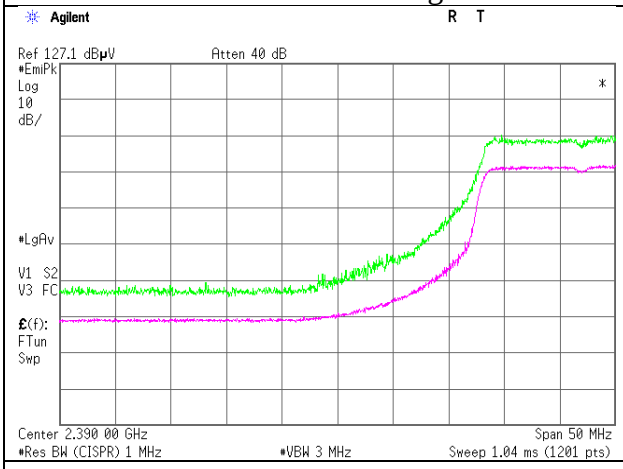
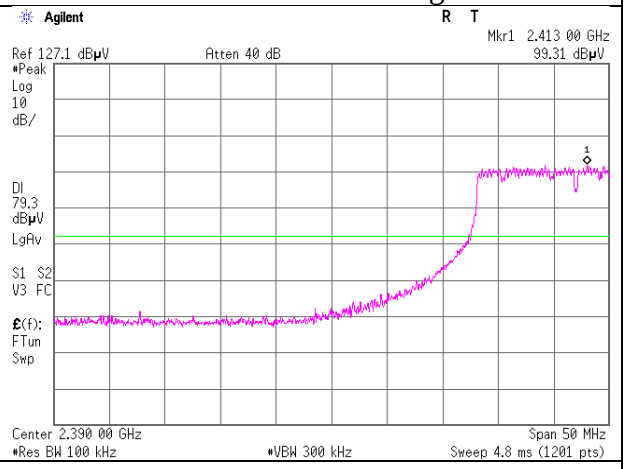
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m	Margin [dB]	Remark
Hori	2412.000	PK	97.8	29.3	3.1	34.9	95.3	-	-	Carrier
Hori	2400.000	PK	70.6	29.3	3.1	35.0	68.0	75.3	7.3	
Vert	2412.000	PK	99.3	29.3	3.1	34.9	96.8	-	-	Carrier
Vert	2400.000	PK	71.1	29.3	3.1	35.0	68.5	76.8	8.3	

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

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	10993397H
Date	November 28, 2015
Temperature / Humidity	24 deg. C / 30 % RH
Engineer	Tomoki Matsui
Mode	Tx 11n-20 2412 MHz

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

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

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

Radiated Spurious Emission

Test place Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. 10993397H
Date November 28, 2015
Temperature / Humidity 24 deg. C / 30 % RH
Engineer Tomoki Matsui
Mode Tx 11n-20 2437 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	4874.000	PK	43.2	32.8	5.4	34.2	47.2	73.9	26.7	Floor Noise
Hori	7311.000	PK	43.1	36.8	6.6	34.1	52.4	73.9	21.5	Floor Noise
Hori	9748.000	PK	44.7	39.0	7.4	34.7	56.4	73.9	17.5	Floor Noise
Hori	4874.000	AV	31.1	32.8	5.4	34.2	35.1	53.9	18.8	Floor Noise
Hori	7311.000	AV	31.2	36.8	6.6	34.1	40.5	53.9	13.4	Floor Noise
Hori	9748.000	AV	32.8	39.0	7.4	34.7	44.5	53.9	9.4	Floor Noise
Vert	4874.000	PK	45.0	32.8	5.4	34.2	49.0	73.9	24.9	Floor Noise
Vert	7311.000	PK	44.0	36.8	6.6	34.1	53.3	73.9	20.6	Floor Noise
Vert	9748.000	PK	44.3	39.0	7.4	34.7	56.0	73.9	17.9	Floor Noise
Vert	4874.000	AV	32.9	32.8	5.4	34.2	36.9	53.9	17.0	Floor Noise
Vert	7311.000	AV	31.3	36.8	6.6	34.1	40.6	53.9	13.3	Floor Noise
Vert	9748.000	AV	32.7	39.0	7.4	34.7	44.4	53.9	9.5	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) = 9.5dB
26.5 GH - 40 GHz 20log (3.0 m / 0.5 m) = 15.6 dB

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	2437.000	PK	101.3	29.3	3.2	34.9	98.9	-	-	Carrier
Hori	3249.321	PK	57.1	29.8	3.7	34.5	56.1	78.9	22.8	
Vert	2437.000	PK	101.2	29.3	3.2	34.9	98.8	-	-	Carrier
Vert	3249.321	PK	56.2	29.8	3.7	34.5	55.2	78.8	23.6	

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

Radiated Spurious Emission

Test place Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. 10993397H
Date November 28, 2015
Temperature / Humidity 24 deg. C / 30 % RH
Engineer Tomoki Matsui
Mode Tx 11n-20 2462 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	69.3	29.3	3.2	34.9	66.9	73.9	7.0	
Hori	3282.650	PK	55.4	29.8	3.7	34.5	54.4	73.9	19.5	
Hori	4924.000	PK	43.7	32.9	5.5	34.2	47.9	73.9	26.0	Floor Noise
Hori	7386.000	PK	44.1	36.8	6.6	34.2	53.3	73.9	20.6	Floor Noise
Hori	9848.000	PK	45.8	39.0	7.4	34.7	57.5	73.9	16.4	Floor Noise
Hori	2483.500	AV	53.2	29.3	3.2	34.9	50.8	53.9	3.1	
Hori	3282.650	AV	52.7	29.8	3.7	34.5	51.7	53.9	2.2	
Hori	4924.000	AV	30.7	32.9	5.5	34.2	34.9	53.9	19.0	Floor Noise
Hori	7386.000	AV	31.1	36.8	6.6	34.2	40.3	53.9	13.6	Floor Noise
Hori	9848.000	AV	32.7	39.0	7.4	34.7	44.4	53.9	9.5	Floor Noise
Vert	2483.500	PK	69.0	29.3	3.2	34.9	66.6	73.9	7.3	
Vert	3282.650	PK	54.7	29.8	3.7	34.5	53.7	73.9	20.2	
Vert	4924.000	PK	42.4	32.9	5.5	34.2	46.6	73.9	27.3	Floor Noise
Vert	7386.000	PK	43.5	36.8	6.6	34.2	52.7	73.9	21.2	Floor Noise
Vert	9848.000	PK	45.8	39.0	7.4	34.7	57.5	73.9	16.4	Floor Noise
Vert	2483.500	AV	52.6	29.3	3.2	34.9	50.2	53.9	3.7	
Vert	3282.650	AV	51.3	29.8	3.7	34.5	50.3	53.9	3.6	
Vert	4924.000	AV	30.8	32.9	5.5	34.2	35.0	53.9	18.9	Floor Noise
Vert	7386.000	AV	31.1	36.8	6.6	34.2	40.3	53.9	13.6	Floor Noise
Vert	9848.000	AV	32.7	39.0	7.4	34.7	44.4	53.9	9.5	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).

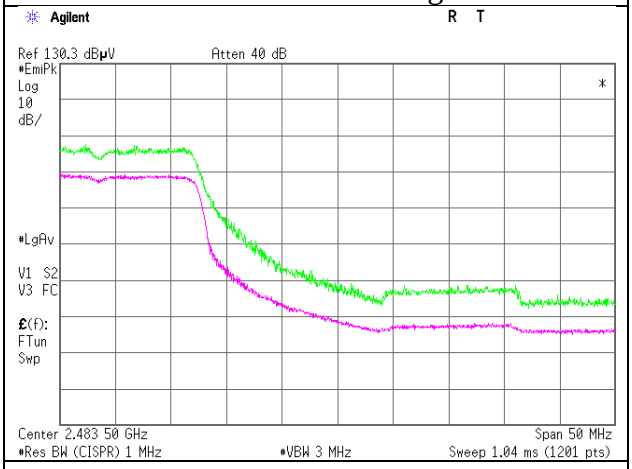
Distance factor: 10 GHz - 26.5 GHz 20log (3.0 m / 1.0 m) = 9.5dB
26.5 GH - 40 GHz 20log (3.0 m / 0.5 m) = 15.6 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	10993397H
Date	November 28, 2015
Temperature / Humidity	24 deg. C / 30 % RH
Engineer	Tomoki Matsui
Mode	Tx 11n-20 2462 MHz

Horizontal

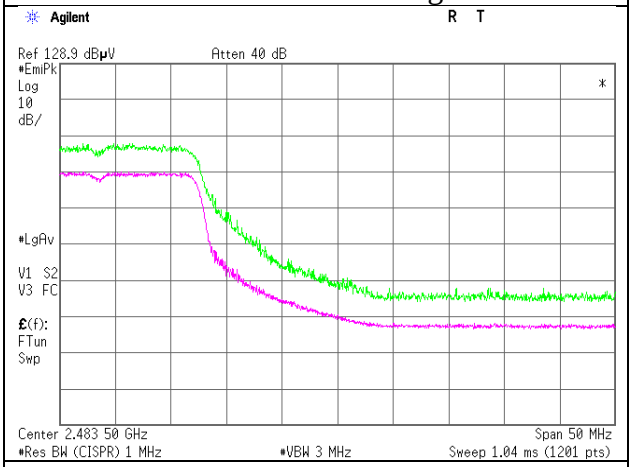
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission

Test place Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. 10993397H
Date November 28, 2015
Temperature / Humidity 24 deg. C / 30 % RH
Engineer Tomoki Matsui
Mode Tx 11n-40 2422 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	66.1	29.3	3.1	35.0	63.5	73.9	10.4	
Hori	3229.316	PK	54.7	29.8	3.6	34.5	53.6	73.9	20.3	
Hori	4844.000	PK	43.9	32.7	5.4	34.2	47.8	73.9	26.1	Floor Noise
Hori	7266.000	PK	44.5	36.8	6.6	34.1	53.8	73.9	20.1	Floor Noise
Hori	9688.000	PK	46.9	38.9	7.4	34.7	58.5	73.9	15.4	Floor Noise
Hori	2390.000	AV	48.3	29.3	3.1	35.0	45.7	53.9	8.2	
Hori	3229.316	AV	51.5	29.8	3.6	34.5	50.4	53.9	3.5	
Hori	4844.000	AV	30.9	32.7	5.4	34.2	34.8	53.9	19.1	Floor Noise
Hori	7266.000	AV	31.5	36.8	6.6	34.1	40.8	53.9	13.1	Floor Noise
Hori	9688.000	AV	33.3	38.9	7.4	34.7	44.9	53.9	9.0	Floor Noise
Vert	2390.000	PK	68.1	29.3	3.1	35.0	65.5	73.9	8.4	
Vert	3229.316	PK	53.3	29.8	3.6	34.5	52.2	73.9	21.7	
Vert	4844.000	PK	42.7	32.7	5.4	34.2	46.6	73.9	27.3	Floor Noise
Vert	7266.000	PK	43.3	36.8	6.6	34.1	52.6	73.9	21.3	Floor Noise
Vert	9688.000	PK	45.3	38.9	7.4	34.7	56.9	73.9	17.0	Floor Noise
Vert	2390.000	AV	48.7	29.3	3.1	35.0	46.1	53.9	7.8	
Vert	3229.316	AV	50.2	29.8	3.6	34.5	49.1	53.9	4.8	
Vert	4844.000	AV	30.9	32.7	5.4	34.2	34.8	53.9	19.1	Floor Noise
Vert	7266.000	AV	31.4	36.8	6.6	34.1	40.7	53.9	13.2	Floor Noise
Vert	9688.000	AV	33.1	38.9	7.4	34.7	44.7	53.9	9.2	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) = 9.5dB
26.5 GH - 40 GHz 20log (3.0 m / 0.5 m) = 15.6 dB

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	2422.000	PK	91.2	29.3	3.1	34.9	88.7	-	-	Carrier
Hori	2400.000	PK	64.4	29.3	3.1	35.0	61.8	68.7	6.9	
Vert	2422.000	PK	91.9	29.3	3.1	34.9	89.4	-	-	Carrier
Vert	2400.000	PK	64.9	29.3	3.1	35.0	62.3	69.4	7.1	

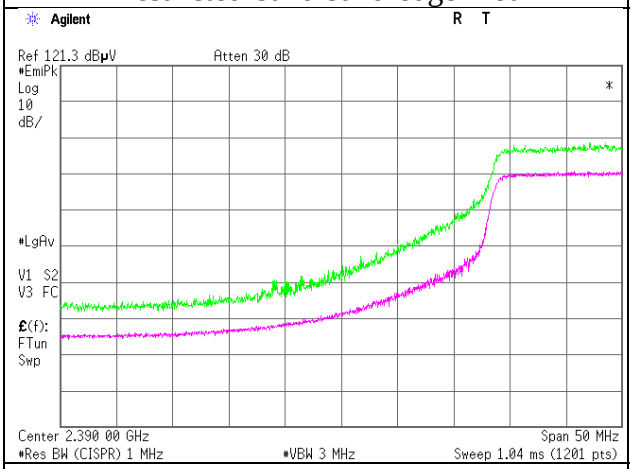
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amprifier)

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	10993397H
Date	November 28, 2015
Temperature / Humidity	24 deg. C / 30 % RH
Engineer	Tomoki Matsui
Mode	Tx 11n-40 2422 MHz

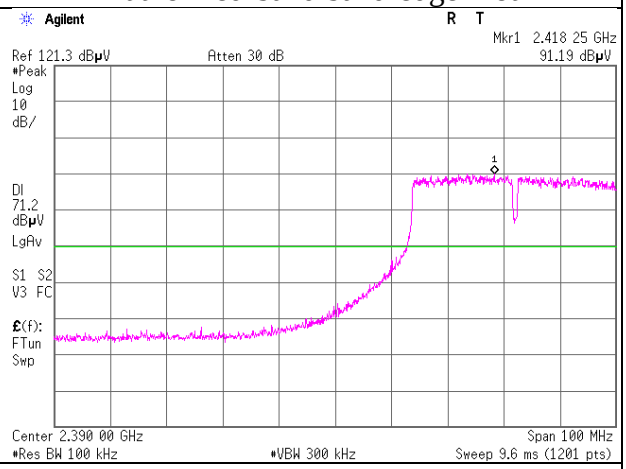
Horizontal

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

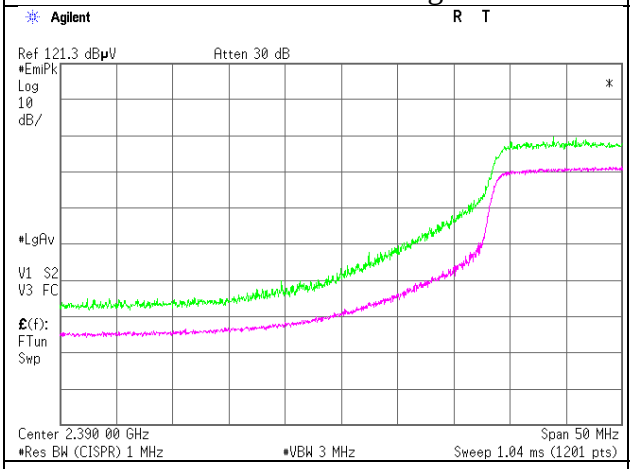
Authorized-band band-edge Plot



20dBc Plot

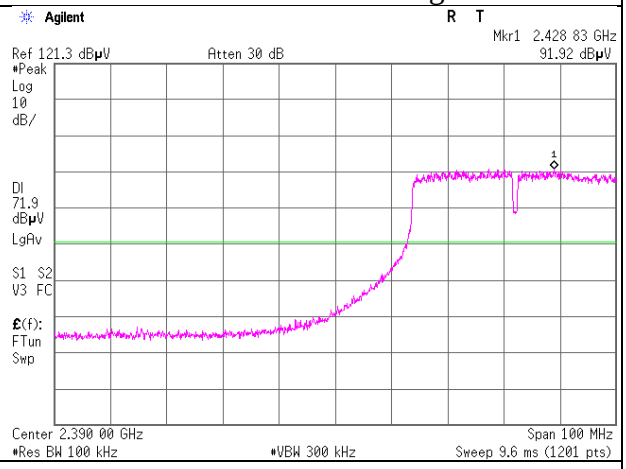
Vertical

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.2 Semi Anechoic Chamber	
Report No.	10993397H	
Date	November 28, 2015	December 8, 2015
Temperature / Humidity	24 deg. C / 30 % RH	24 deg. C / 35 % RH
Engineer	Tomoki Matsui (Above 1GHz)	Keisuke Kawamura (Below 1GHz)
Mode	Tx 11n-40 2437 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	36.311	QP	23.0	15.3	6.8	28.5	16.6	40.0	23.4	
Hori	57.269	QP	35.6	8.1	7.1	28.5	22.3	40.0	17.7	
Hori	114.547	QP	46.7	11.8	7.6	28.1	38.0	43.5	5.5	
Hori	372.333	QP	37.6	16.4	9.3	28.0	35.3	46.0	10.7	
Hori	733.302	QP	38.6	20.9	10.7	28.0	42.2	46.0	3.8	
Hori	912.505	QP	35.7	22.4	11.3	27.3	42.1	46.0	3.9	
Hori	4874.000	PK	43.4	32.8	5.4	34.2	47.4	73.9	26.5	Floor Noise
Hori	7311.000	PK	43.6	36.8	6.6	34.1	52.9	73.9	21.0	Floor Noise
Hori	9748.000	PK	45.0	39.0	7.4	34.7	56.7	73.9	17.2	Floor Noise
Hori	4874.000	AV	31.0	32.8	5.4	34.2	35.0	53.9	18.9	Floor Noise
Hori	7311.000	AV	31.3	36.8	6.6	34.1	40.6	53.9	13.3	Floor Noise
Hori	9748.000	AV	32.6	39.0	7.4	34.7	44.3	53.9	9.6	Floor Noise
Vert	57.273	QP	46.1	8.1	7.1	28.5	32.8	40.0	7.2	
Vert	114.543	QP	44.6	11.7	7.6	28.1	35.8	43.5	7.7	
Vert	120.000	QP	41.5	12.5	7.6	28.1	33.5	43.5	10.0	
Vert	166.279	QP	37.7	15.6	7.9	27.9	33.3	43.5	10.2	
Vert	733.302	QP	35.2	20.9	10.7	28.0	38.8	46.0	7.2	
Vert	903.172	QP	31.0	22.3	11.3	27.3	37.3	46.0	8.7	
Vert	4874.000	PK	44.4	32.8	5.4	34.2	48.4	73.9	25.5	Floor Noise
Vert	7311.000	PK	44.3	36.8	6.6	34.1	53.6	73.9	20.3	Floor Noise
Vert	9748.000	PK	45.4	39.0	7.4	34.7	57.1	73.9	16.8	Floor Noise
Vert	4874.000	AV	31.1	32.8	5.4	34.2	35.1	53.9	18.8	Floor Noise
Vert	7311.000	AV	31.3	36.8	6.6	34.1	40.6	53.9	13.3	Floor Noise
Vert	9748.000	AV	32.8	39.0	7.4	34.7	44.5	53.9	9.4	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) = 9.5dB
26.5 GH - 40 GHz 20log (3.0 m / 0.5 m) = 15.6 dB

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	2437.000	PK	96.4	29.3	3.2	34.9	94.0	-	-	Carrier
Hori	3249.329	PK	55.1	29.8	3.7	34.5	54.1	74.0	19.9	
Vert	2437.000	PK	98.0	29.3	3.2	34.9	95.6	-	-	Carrier
Vert	3249.329	PK	56.2	29.8	3.7	34.5	55.2	75.6	20.4	

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

Radiated Spurious Emission

Test place Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. 10993397H
Date November 28, 2015
Temperature / Humidity 24 deg. C / 30 % RH
Engineer Tomoki Matsui
Mode Tx 11n-40 2452 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	66.3	29.3	3.2	34.9	63.9	73.9	10.0	
Hori	3269.316	PK	54.4	29.8	3.7	34.5	53.4	73.9	20.5	
Hori	4904.000	PK	43.2	32.9	5.5	34.2	47.4	73.9	26.5	Floor Noise
Hori	7356.000	PK	43.7	36.8	6.6	34.1	53.0	73.9	20.9	Floor Noise
Hori	9808.000	PK	46.1	39.0	7.4	34.7	57.8	73.9	16.1	Floor Noise
Hori	2483.500	AV	49.9	29.3	3.2	34.9	47.5	53.9	6.4	
Hori	3269.316	AV	51.5	29.8	3.7	34.5	50.5	53.9	3.4	
Hori	4904.000	AV	30.9	32.9	5.5	34.2	35.1	53.9	18.8	Floor Noise
Hori	7356.000	AV	30.7	36.8	6.6	34.1	40.0	53.9	13.9	Floor Noise
Hori	9808.000	AV	33.1	39.0	7.4	34.7	44.8	53.9	9.1	Floor Noise
Vert	2483.500	PK	67.2	29.3	3.2	34.9	64.8	73.9	9.1	
Vert	3269.316	PK	54.5	29.8	3.7	34.5	53.5	73.9	20.4	
Vert	4904.000	PK	43.8	32.9	5.5	34.2	48.0	73.9	25.9	Floor Noise
Vert	7356.000	PK	43.6	36.8	6.6	34.1	52.9	73.9	21.0	Floor Noise
Vert	9808.000	PK	45.9	39.0	7.4	34.7	57.6	73.9	16.3	Floor Noise
Vert	2483.500	AV	50.5	29.3	3.2	34.9	48.1	53.9	5.8	
Vert	3269.316	AV	51.5	29.8	3.7	34.5	50.5	53.9	3.4	
Vert	4904.000	AV	30.9	32.9	5.5	34.2	35.1	53.9	18.8	Floor Noise
Vert	7356.000	AV	30.8	36.8	6.6	34.1	40.1	53.9	13.8	Floor Noise
Vert	9808.000	AV	33.0	39.0	7.4	34.7	44.7	53.9	9.2	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).

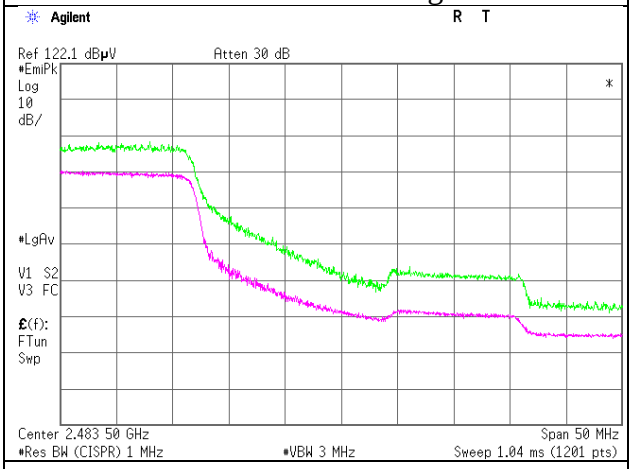
Distance factor: 10 GHz - 26.5 GHz 20log (3.0 m / 1.0 m) = 9.5dB
26.5 GH - 40 GHz 20log (3.0 m / 0.5 m) = 15.6 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	10993397H
Date	November 28, 2015
Temperature / Humidity	24 deg. C / 30 % RH
Engineer	Tomoki Matsui
Mode	Tx 11n-40 2452 MHz

Horizontal

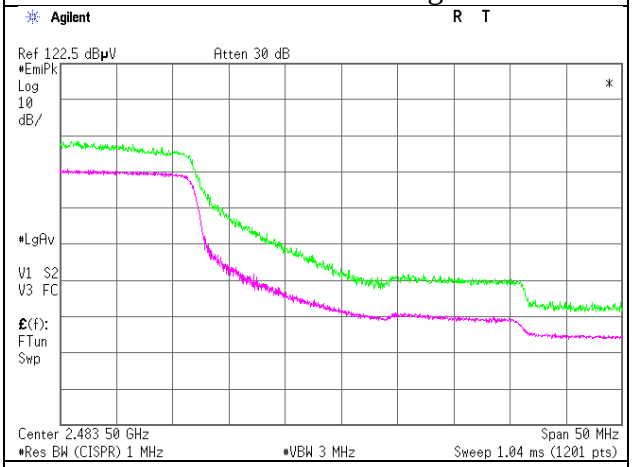
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot

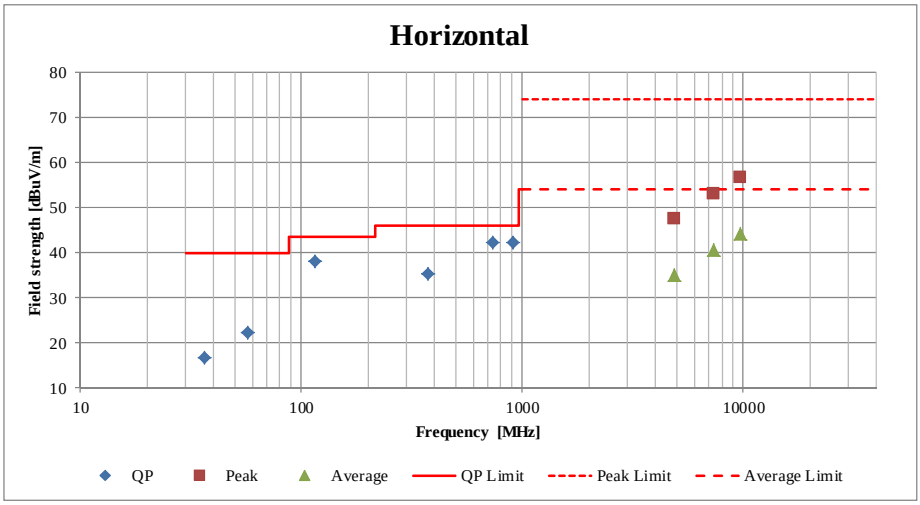


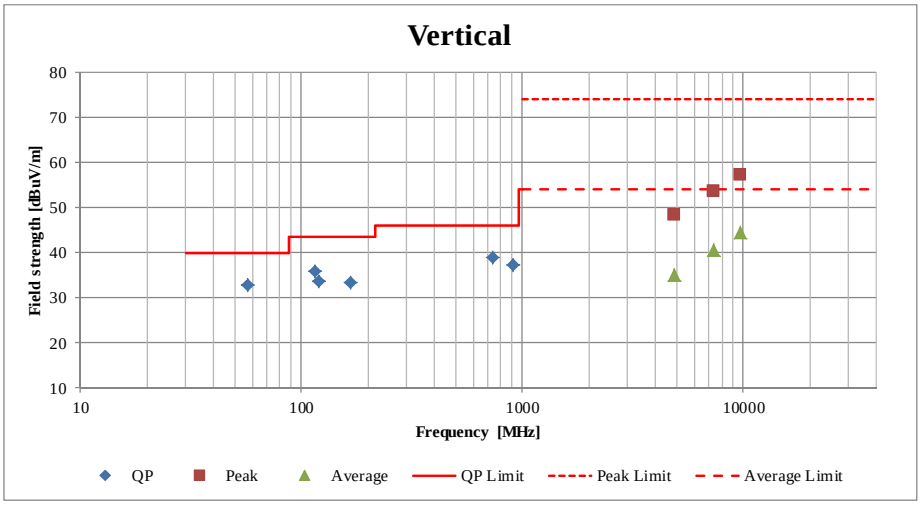
Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission
(Plot data, Worst case)

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber	
Report No.	10993397H	
Date	November 28, 2015	December 8, 2015
Temperature / Humidity	24 deg. C / 30 % RH	24 deg. C / 35 % RH
Engineer	Tomoki Matsui (Above 1GHz)	Keisuke Kawamura (Below 1GHz)
Mode	Tx 11n-40 2437 MHz	





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Telephone : +81 596 24 8999
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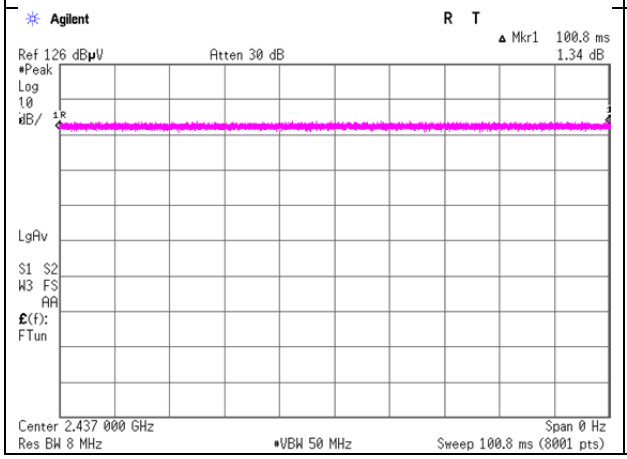
Burst rate confirmation

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	10993397H
Date	November 28, 2015
Temperature / Humidity	24 deg. C / 30 % RH
Engineer	Tomoki Matsui
Mode	Tx

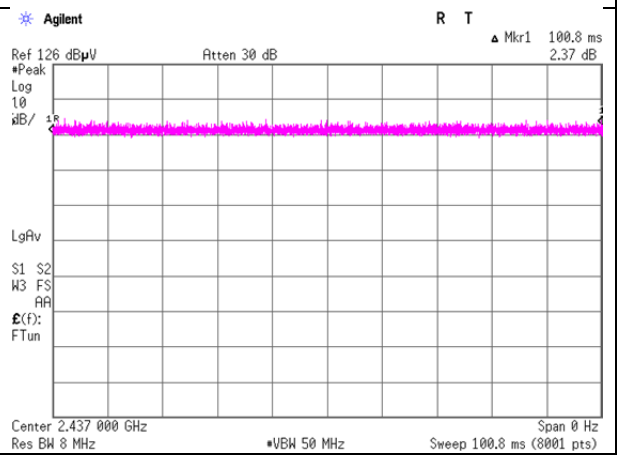
11b 11 Mbps

Tx on / (Tx on + Tx off) =	**1.000**
Tx on / (Tx on + Tx off) * 100 =	**100.0 %**
Duty factor = 10 * log (1 / 1) =	**0.00 dB**



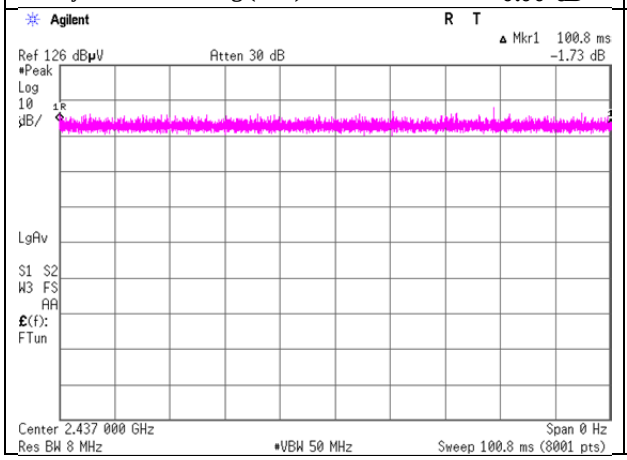
11g 9 Mbps

Tx on / (Tx on + Tx off) =	**1.000**
Tx on / (Tx on + Tx off) * 100 =	**100.0 %**
Duty factor = 10 * log (100 / 100) =	**0.00 dB**



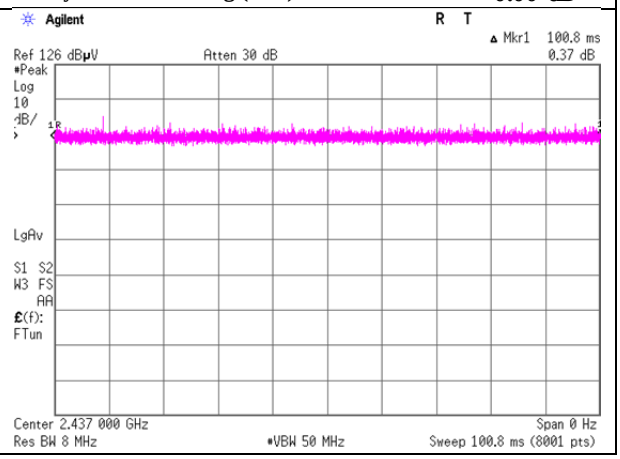
11n-20 MCS 13

Tx on / (Tx on + Tx off) =	**1.000**
Tx on / (Tx on + Tx off) * 100 =	**100.0 %**
Duty factor = 10 * log (1 / 1) =	**0.00 dB**



11n-40 MCS 8

Tx on / (Tx on + Tx off) =	**1.000**
Tx on / (Tx on + Tx off) * 100 =	**100.0 %**
Duty factor = 10 * log (1 / 1) =	**0.00 dB**



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	2015/07/01 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2015/01/13 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2015/11/06 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2015/09/02 * 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	2015/02/06 * 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-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	2015/01/13 * 12
MSA-15	Spectrum Analyzer	Agilent	E4440A	MY46187105	RE	2015/11/11 * 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	2015/03/19 * 12
MMM-08	DIGITAL HiTESTER	Hioki	3805	051201197	RE	2015/01/16 * 12
MHF-25	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	RE	2015/09/16 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE	-
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
MHA-02	Horn Antenna 18-26.5GHz	EMCO	3160-09	1265	RE	2015/02/05 * 12
MHF-26	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	002	RE	2015/09/17 * 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