RADIO TEST REPORT

Test Report No. : 11675880H-A

Applicant	:	**Panasonic Corporation of North America**
Type of Equipment	:	**Wireless Module (Tested inside of Panasonic Tablet PC CF-33)**
Model No.	:	**WL16A**
FCC ID	:	**ACJ9TGWL16A**
Test regulation	:	**FCC Part 15 Subpart C: 2016 Class II Permissive Change *WLAN part**
Test Result	:	**Complied**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
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: March 8 and 21, 2017

Representative test engineer:
Takumi Shimada
Engineer
Consumer Technology Division

Approved by:
Takahiro Hatakeda
Leader
Consumer Technology Division

NVLAP TESTING
NVLAP LAB CODE: 200572-0

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REVISION HISTORY

Original Test Report No.: 11675880H-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	11675880H-A	March 29, 2017	-	-

CONTENTS **PAGE**

SECTION 1: Customer information

Company Name	:	Panasonic Corporation of North America
Address	:	Two Riverfront Plaza, 9th Floor, Newark, NJ 07102-5490

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

2.1 Identification of E.U.T.

Type of Equipment	:	Wireless Module (Tested inside of Panasonic Tablet PC CF-33)
Model No.	:	WL16A
Serial No.	:	Refer to Section 4, Clause 4.2
Receipt Date of Sample	:	January 10, 2017
Modification of EUT	:	No Modification by the test lab

2.2 Product Description

Model: WL16A (referred to as the EUT in this report) is a Wireless Module.

Radio Specification

Tx Frequency Bands	802.11a/b/g/n/ac: 2412 - 2472 MHz, b / g / HT20 / HT40 5180 - 5240 MHz, a / HT20 / HT40 / HT80 5260 - 5320 MHz, a / HT20 / HT40 / HT80 5500 - 5720 MHz, a / HT20 / HT40 / HT80 5745 - 5825 MHz, a / HT20 / HT40 / HT80 Bluetooth: 2402 - 2480 MHz
Modulation	802.11a/b/g/n/ac : BPSK, QPSK, CCK, 16-QAM and 64-QAM and 256-QAM Bluetooth 4.0+LE: GFSK, DQPSK, 8-DPSK
Duty Cycle	WLAN: 100% Bluetooth 89%

<Contents of the change from original model>
Test Report Number of original model is 11424282H-A-R2 (issued by UL Japan, Inc.).
Specification was changed from the original model as follows:

Adding 2.4GHz whip antenna with maximum antenna gain of 5dBi under FCC Part 15C (DTS).
The 2.4GHz whip antenna cannot be connected directly to Panasonic Host PC Model CF-33 and is always connected via Car Mounter. The 2.4GHz whip antenna is provided with the Car Mounter and is professionally installed by only person authorized by Panasonic. Also, the 2.4GHz whip antenna is intended for mounting on the rooftop of vehicle. Hence, a minimum 20cm separation between 2.4GHz whip antenna and user's body is maintained. Further, due to the electrical characteristic of the Car Mounter, it does not support the transmission of 5GHz band frequency (i.e. connection cable has -10 dB loss at 5 GHz band). Hence, the operation of this external antenna is limited to only the 2.4GHz band.
This change does not affect the FCC part 15C (DSS) operation because Bluetooth does not use the external antenna.

Therefore only Conducted Emission, Maximum Peak Output Power, and Radiated Spurious Emission tests for DTS were performed in this report.

Supported Additional Antenna

Band	WLAN		Bluetooth
	Main Ant	Aux Ant	Aux Ant
2.4GHz	X		
5GHz			

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C FCC Part 15 final revised on November 14, 2016 and effective December 14, 2016
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted limits Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	**FCC:** ANSI C63.10-2013 6. Standard test methods **IC:** RSS-Gen 8.8	**FCC:** Section 15.207 **IC:** RSS-Gen 8.8	**QP** 9.5 dB, 0.20598 MHz, N **AV** 9.3 dB, 0.20598 MHz, N	Complied	-
Maximum Peak Output Power	**FCC:** KDB 558074 D01 DTS Meas Guidance v03r05 **IC:** RSS-Gen 6.12	**FCC:** Section 15.247(b)(3) **IC:** RSS-247 5.4(4)	See data.	Complied	Conducted
Spurious Emission Restricted Band Edges	**FCC:** KDB 558074 D01 DTS Meas Guidance v03r05 **IC:** RSS-Gen 6.13	**FCC:** Section15.247(d) **IC:** RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	4.6 dB 250.036 MHz, Horizontal, QP	Complied	Conducted (below 30 MHz)/ Radiated (above 30 MHz) *1)

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.
*1) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 DTS Meas Guidance v03r05 12.2.7.

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

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.

Antenna terminal test Uncertainty (+/-)							
Power meter		Conducted emission and Power density			Conducted emission		Channel power
Below 1 GHz	Above 1 GHz	Below 1 GHz	1 GHz - 3 GHz	3 GHz - 18 GHz	18 GHz - 26.5 GHz	26.5 GHz - 40 GHz	
0.9 dB	1.0 dB	1.4 dB	1.5 dB	2.8 dB	2.8 dB	2.9 dB	2.6 dB

Frequency range	Conducted emission using AMN(LISN) (+/-)
0.009 MHz - 0.15 MHz	3.5 dB
0.15 MHz - 30 MHz	3.0 dB

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

*Measurement distance

Conducted Emission test

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

Radiated emission test

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

3.5 Test Location

UL Japan, Inc. Ise EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone: +81 596 24 8999, Facsimile: +81 596 24 8124

Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms	Maximum measurement distance
No.1 semi-anechoic chamber	2973C-1	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room	10 m
No.2 semi-anechoic chamber	2973C-2	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	2973C-3	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room	3 m
No.3 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber	2973C-4	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room	3 m
No.4 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber	-	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.6 shielded room	-	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room	-	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room	-	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room	-	3.1 x 5.0 x 2.7	N/A	-	-
No.9 measurement room	-	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.11 measurement room	-	6.2 x 4.7 x 3.0	4.8 x 4.6	-	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 m x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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

4.1 Operating Mode(s)

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)	1 Mbps, PN9
IEEE 802.11g (11g)	6 Mbps, PN9
IEEE 802.11n SISO 20 MHz BW (11n-20)	MCS 0, PN9
IEEE 802.11n SISO 40 MHz BW (11n-40)	MCS 0, PN9
*Power of the EUT was set by the software as follows; Power settings: Refer to following table Software: DRTV Ver: 1.9.0-04034 *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 settings

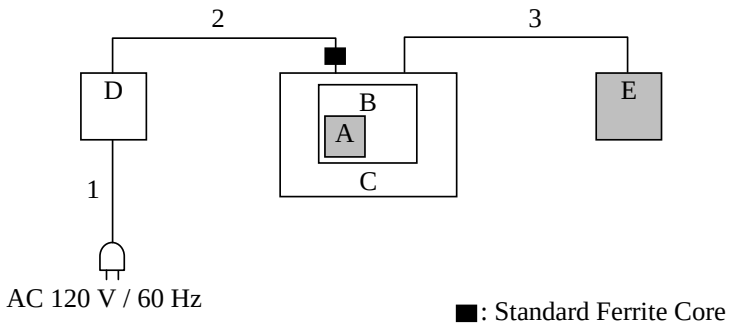
Band	Technology	Central Channel	Maximum Target Power for Host Approval (dBm)	
			Main Antenna	Aux Antenna
Wi-Fi 2.4 GHz	20MHz DSSS	1-11	15.0	15.0
		12	14.0	14.0
		13	7.0	7.0
	20MHz OFDM	1-11	15.0	15.0
		12	12.0	12.0
		13	-4.0	-4.0
	40MHz OFDM	3-7	15.0	15.0
		8	14.5	14.5
		9	14.0	14.0
		10	11.0	11.0
		11	-5.0	-5.0

*The details of Operating mode(s)

Test Item	Operating Mode	Tested frequency
Conducted Emission *1)	11n-20 Tx	2412 MHz 2437 MHz 2472 MHz
Band Edges	11b Tx 11g Tx 11n-20 Tx	2412 MHz 2472 MHz
	11n-40 Tx	2422 MHz 2462 MHz
Maximum Peak Output Power	11b Tx 11g Tx 11n-20 Tx	2412 MHz 2437 MHz 2462 MHz 2467 MHz 2472 MHz
	11n-40 Tx	2422 MHz 2437 MHz 2452 MHz 2457 MHz 2462 MHz
Spurious Emission *1)	11b Tx 11n-20 Tx	2437 MHz

*1) Test was performed with the worst condition as a representative based on the test result of original model.

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 and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Wireless Module	WL16A	*1)	Panasonic Corporation of North America	EUT
B	Personal Computer	CF-33	6LTSA00152	Panasonic Corporation	-
C	Car Mount	7160-0318-02	AO02317AAT009	Panasonic Corporation	-
D	AC Adapter	CF-AA5713A M3	5713AM316702268C	Panasonic Corporation	-
E	Antenna	24KX2	001	SAGA DENSHI KOGYO	EUT

*1) This item is controlled with B: Personal Computer.

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	AC Cable	1.5	Unshielded	Unshielded	-
2	DC Cable	1.4	Unshielded	Unshielded	-
3	Antenna Cable	2.5	Shielded	Shielded	-

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane. The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80 cm from a Line Impedance Stabilization Network (LISN) / Artificial mains Network (AMN) and excess AC cable was bundled in center.

1) For the tests on EUT with other peripherals (as a whole system)
I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane. All unused 50ohm connectors of the LISN (AMN) were resistivity terminated in 50 ohm when not connected to the measuring equipment.

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

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

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

SECTION 6: Radiated Spurious Emission

Test Procedure

It was measured based on "11.0 Emissions in non-restricted frequency bands" of "558074 D01 DTS Meas Guidance 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	30 MHz to 200 MHz	200 MHz to 1 GHz	Above 1 GHz
Antenna Type	Biconical	Logperiodic	Horn

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

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

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV *1)	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	4.3 m *2) (1 GHz – 10 GHz), 1 m *3) (10 GHz – 26.5 GHz)		4.3 m *2) (1 GHz – 10 GHz), 1 m *3) (10 GHz – 26.5 GHz)

*1) Average Power Measurement was performed based on 6. 0 & 12.2.5 of "KDB 558074 D01 DTS Meas Guidance v03r05".
*2) Distance Factor: 20 x log (4.3 m / 3.0 m) = 3.13 dB
*3) Distance Factor: 20 x log (1.0 m / 3.0 m) = -9.5 dB

- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT (Antenna) 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

SECTION 7: Antenna Terminal Conducted Tests

Test Procedure

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

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
Maximum Peak Output Power	-	-	-	Auto	Peak	-	Power Meter (Sensor: 50 MHz BW)

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

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Test data

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

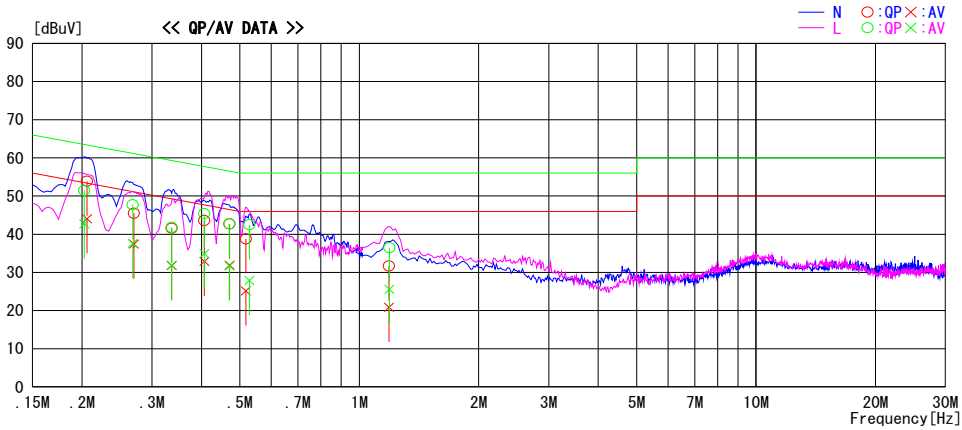
UL Japan, Inc. Ise EMC Lab. No.4 Semi Anechoic Chamber
Date : 2017/03/21

Report No. : 11675880H

Temp./Humi. : 20deg. C / 45% RH
Engineer : Ryota Yamanaka

Mode / Remarks : Tx 11n-20 2437MHz MCS0

LIMIT : FCC15.207 QP
FCC15.207 AV



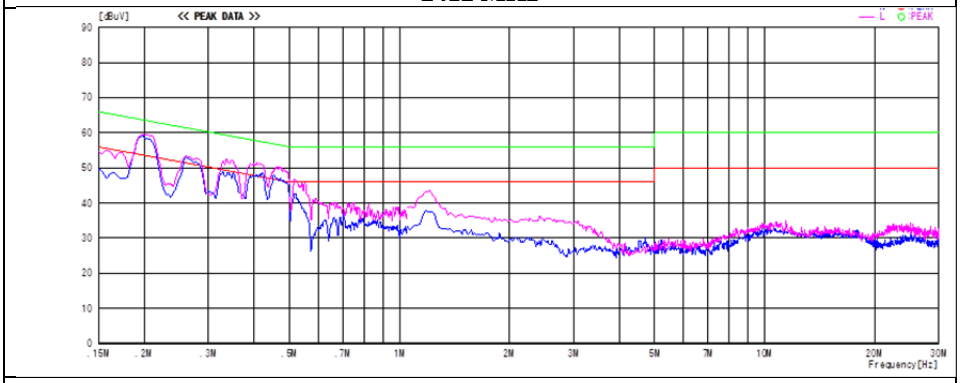
Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV	Factor	QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.20598	40.4	30.6	13.5	53.9	44.1	63.4	53.4	9.5	9.3	N	
0.27056	32.0	23.9	13.5	45.5	37.4	61.1	51.1	15.6	13.7	N	
0.33680	28.1	18.3	13.5	41.6	31.8	59.3	49.3	17.7	17.5	N	
0.40702	30.1	19.4	13.5	43.6	32.9	57.7	47.7	14.1	14.8	N	
0.47090	29.2	18.4	13.5	42.7	31.9	56.5	46.5	13.8	14.6	N	
0.51760	25.3	11.7	13.5	38.8	25.2	56.0	46.0	17.2	20.8	N	
1.18762	18.1	7.3	13.6	31.7	20.9	56.0	46.0	24.3	25.1	N	
0.20269	38.0	29.2	13.5	51.5	42.7	63.5	53.5	12.0	10.8	L	
0.26876	34.2	24.1	13.5	47.7	37.6	61.2	51.2	13.5	13.6	L	
0.33680	28.3	18.4	13.5	41.8	31.9	59.3	49.3	17.5	17.4	L	
0.40700	31.9	21.4	13.5	45.4	34.9	57.7	47.7	12.3	12.8	L	
0.47070	29.2	18.2	13.5	42.7	31.7	56.5	46.5	13.8	14.8	L	
0.52834	29.0	14.4	13.5	42.5	27.9	56.0	46.0	13.5	18.1	L	
1.19082	22.9	12.0	13.6	36.5	25.6	56.0	46.0	19.5	20.4	L	

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

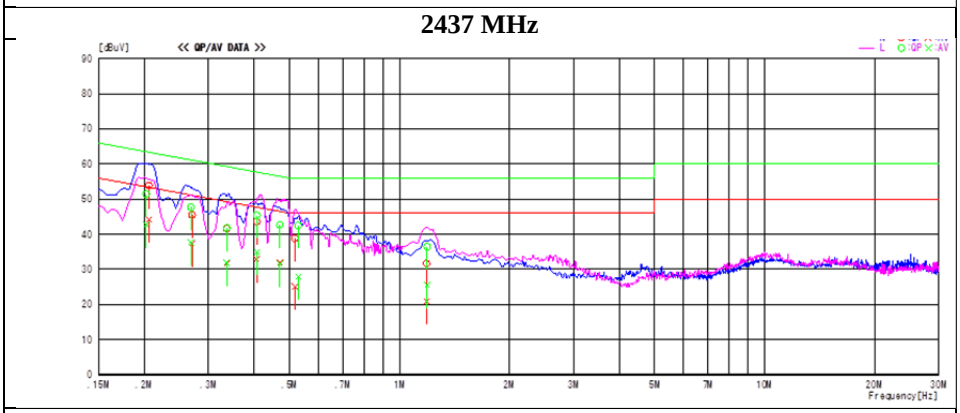
Conducted Emission

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11675880H
Date	March 21, 2017
Temperature / Humidity	20 deg. C / 45 % RH
Engineer	Ryota Yamanaka
Mode	Tx 11n-20

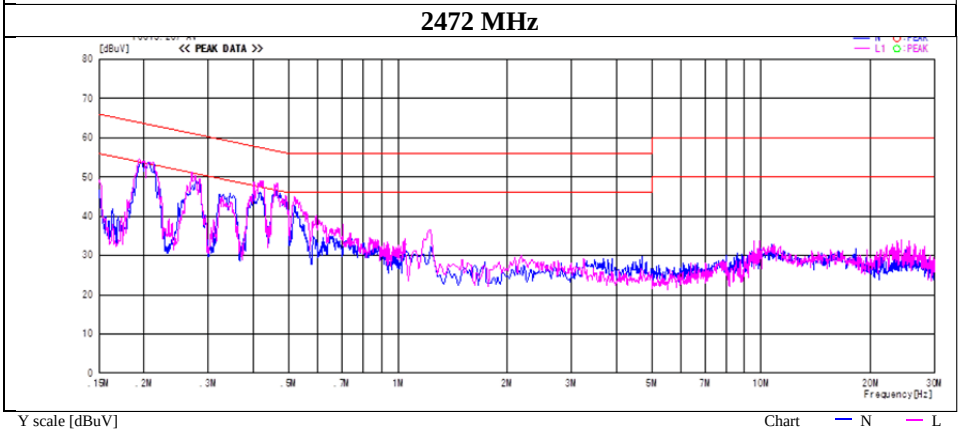
2412 MHz



2437 MHz



2472 MHz



Y scale [dBuV] Chart — N — L

Maximum Peak Output Power

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	11675880H
Date	March 8, 2017
Temperature / Humidity	24 deg. C / 42 % RH
Engineer	Shuichi Ohyama
Mode	Tx 11b

Main Antenna

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	5.30	0.95	10.19	16.44	44.05	30.00	1000	13.56
2437	5.37	0.95	10.19	16.51	44.81	30.00	1000	13.49
2462	4.98	0.98	10.19	16.15	41.18	30.00	1000	13.85
2467	4.03	0.98	10.20	15.21	33.17	30.00	1000	14.79
2472	-2.90	0.98	10.20	8.28	6.73	30.00	1000	21.72

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

Maximum Peak Output Power

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	11675880H
Date	March 8, 2017
Temperature / Humidity	24 deg. C / 42 % RH
Engineer	Shuichi Ohyama
Mode	Tx 11g

Main Antenna

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	9.24	0.95	10.19	20.38	109.14	30.00	1000	9.62
2437	9.29	0.95	10.19	20.43	110.52	30.00	1000	9.57
2462	8.89	0.98	10.19	20.06	101.32	30.00	1000	9.94
2467	5.65	0.98	10.20	16.83	48.17	30.00	1000	13.17
2472	-8.87	0.98	10.20	2.31	1.70	30.00	1000	27.69

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

Maximum Peak Output Power

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	11675880H
Date	March 8, 2017
Temperature / Humidity	24 deg. C / 42 % RH
Engineer	Shuichi Ohyama
Mode	Tx 11n-20 SISO

Main Antenna

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	9.23	0.95	10.19	20.37	108.88	30.00	1000	9.63
2437	9.30	0.95	10.19	20.44	110.77	30.00	1000	9.56
2462	8.91	0.98	10.19	20.08	101.79	30.00	1000	9.92
2467	5.64	0.98	10.20	16.82	48.06	30.00	1000	13.18
2472	-8.82	0.98	10.20	2.36	1.72	30.00	1000	27.64

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

Maximum Peak Output Power

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	11675880H
Date	March 8, 2017
Temperature / Humidity	24 deg. C / 42 % RH
Engineer	Shuichi Ohyama
Mode	Tx 11n-40 SISO

Main Antenna

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2422	8.61	0.95	10.19	19.75	94.31	30.00	1000	10.25
2437	8.55	0.95	10.19	19.69	93.02	30.00	1000	10.31
2452	7.59	0.95	10.19	18.73	74.57	30.00	1000	11.27
2457	4.61	0.95	10.19	15.75	37.55	30.00	1000	14.25
2462	-10.88	0.98	10.19	0.29	1.07	30.00	1000	29.71

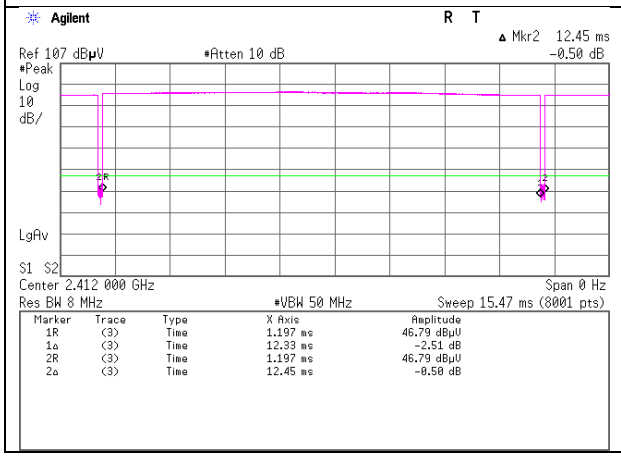
Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

Burst rate confirmation

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11675880H
Date	March 21, 2017
Temperature / Humidity	20 deg. C / 45 % RH
Engineer	Takumi Shimada
Mode	Tx

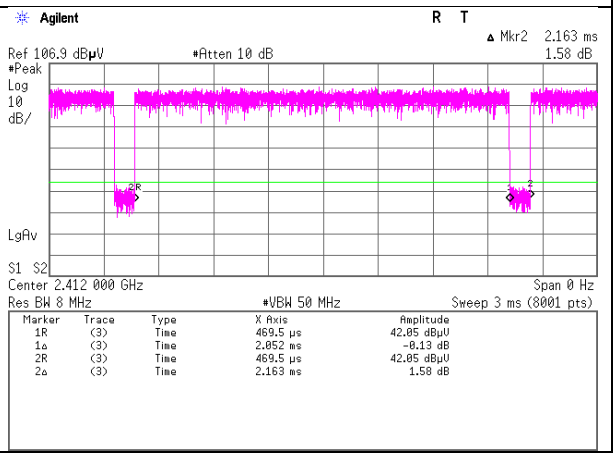
11b 1 Mbps

Tx on / (Tx on + Tx off) =	**0.990**
Tx on / (Tx on + Tx off) * 100 =	**99.0 %**
Duty factor = 10 * log (12.45 / 12.33) =	**0.04 dB**



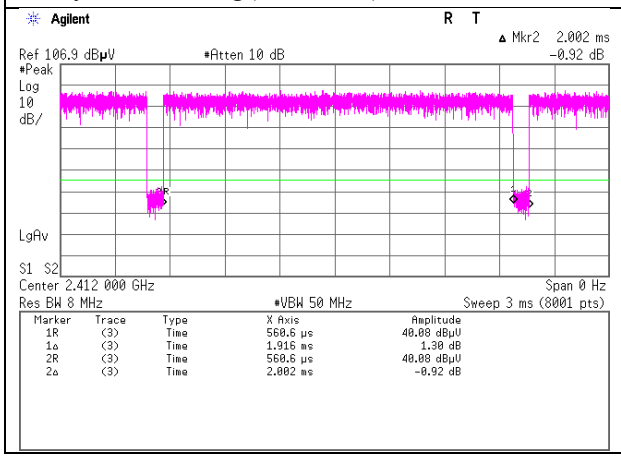
11g 6 Mbps

Tx on / (Tx on + Tx off) =	**0.949**
Tx on / (Tx on + Tx off) * 100 =	**94.9 %**
Duty factor = 10 * log (2.163 / 2.052) =	**0.23 dB**



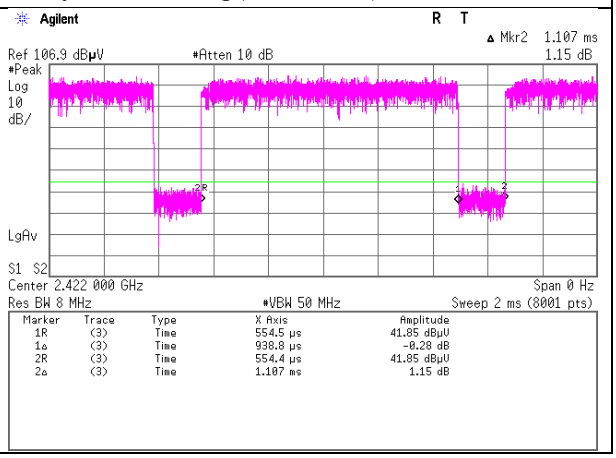
11n-20 MCS 0

Tx on / (Tx on + Tx off) =	**0.957**
Tx on / (Tx on + Tx off) * 100 =	**95.7 %**
Duty factor = 10 * log (2.002 / 1.916) =	**0.19 dB**



11n-40 MCS 0

Tx on / (Tx on + Tx off) =	**0.848**
Tx on / (Tx on + Tx off) * 100 =	**84.8 %**
Duty factor = 10 * log (1.107 / 0.9388) =	**0.72 dB**



* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

Band Edge

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11675880H
Date	March 21, 2017
Temperature / Humidity	20 deg. C / 45 % RH
Engineer	Takumi Shimada
	(1 GHz -10 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	45.1	27.4	6.3	32.1	-	46.7	73.9	27.2	
Hori	2390.000	AV	37.0	27.4	6.3	32.1	-	38.6	53.9	15.3	
Vert	2390.000	PK	43.9	27.4	6.3	32.1	-	45.5	73.9	28.4	
Vert	2390.000	AV	37.2	27.4	6.3	32.1	-	38.8	53.9	15.1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
*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 (4.3 m / 3.0 m) = 3.13 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 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	92.0	27.4	6.4	32.1	93.7	-	-	Carrier
Hori	2400.000	PK	42.6	27.4	6.3	32.1	44.2	73.7	29.5	
Vert	2412.000	PK	94.7	27.4	6.4	32.1	96.4	-	-	Carrier
Vert	2400.000	PK	46.2	27.4	6.3	32.1	47.8	76.4	28.6	

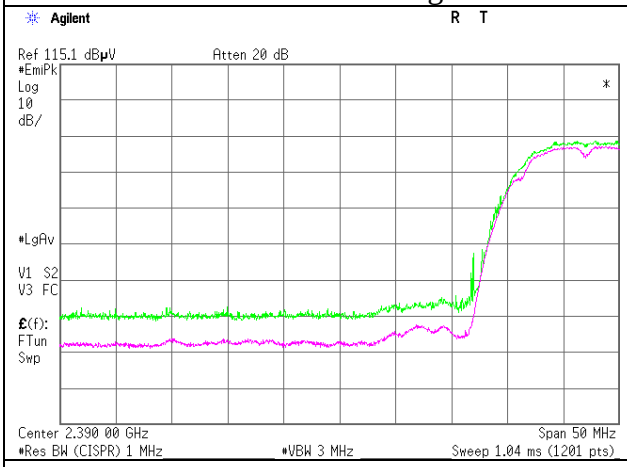
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amprifier)

Band Edge
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11675880H
Date	March 21, 2017
Temperature / Humidity	20 deg. C / 45 % RH
Engineer	Takumi Shimada
	(1 GHz -10 GHz)
Mode	Tx 11b 2412 MHz

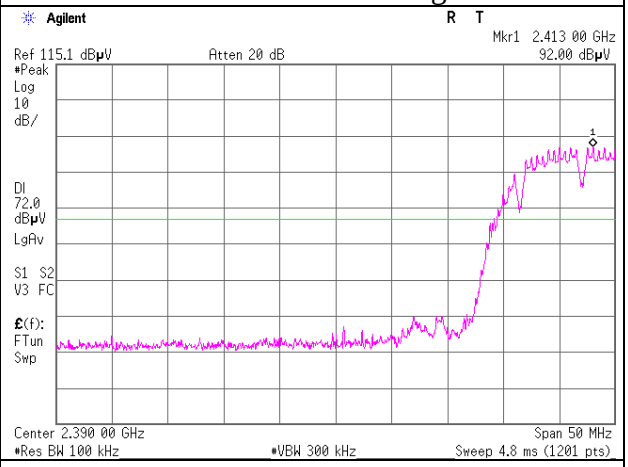
Horizontal

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

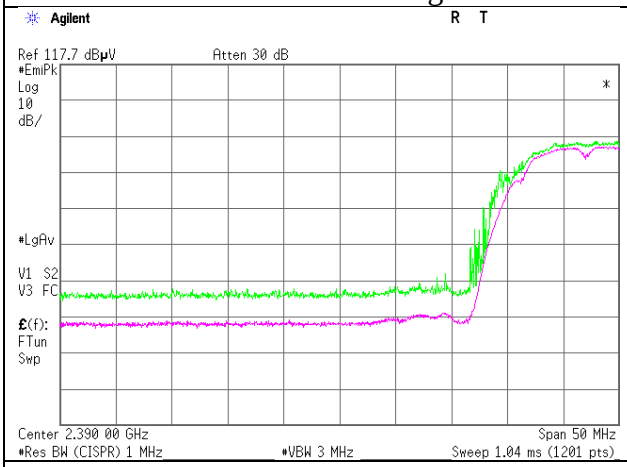
Authorized-band band-edge Plot



20dBc Plot

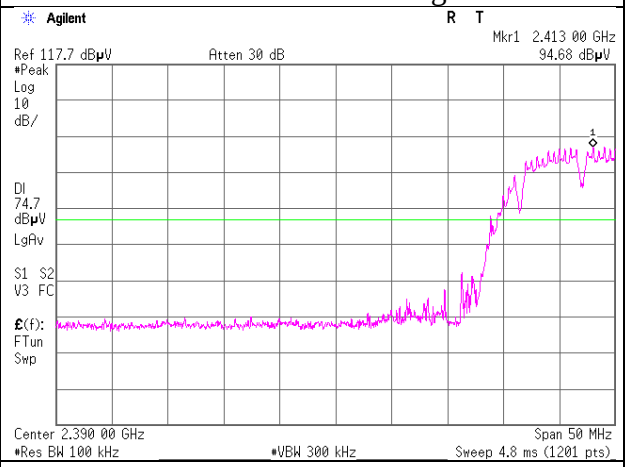
Vertical

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.

Band Edge

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11675880H
Date	March 21, 2017
Temperature / Humidity	20 deg. C / 45 % RH
Engineer	Takumi Shimada
	(1 GHz -10 GHz)
Mode	Tx 11b 2472MHz

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	43.3	27.4	6.5	32.0	-	45.2	73.9	28.7	
Hori	2484.668	PK	46.4	27.4	6.5	32.0	-	48.3	73.9	25.6	
Hori	2483.500	AV	36.7	27.4	6.5	32.0	-	38.6	53.9	15.3	
Hori	2484.668	AV	39.9	27.4	6.5	32.0	-	41.8	53.9	12.1	
Vert	2483.500	PK	34.6	27.4	6.5	32.0	-	36.5	73.9	37.4	
Vert	2484.668	PK	46.5	27.4	6.5	32.0	-	48.4	73.9	25.5	
Vert	2483.500	AV	43.0	27.4	6.5	32.0	-	44.9	53.9	9.0	
Vert	2484.668	AV	39.9	27.4	6.5	32.0	-	41.8	53.9	12.1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

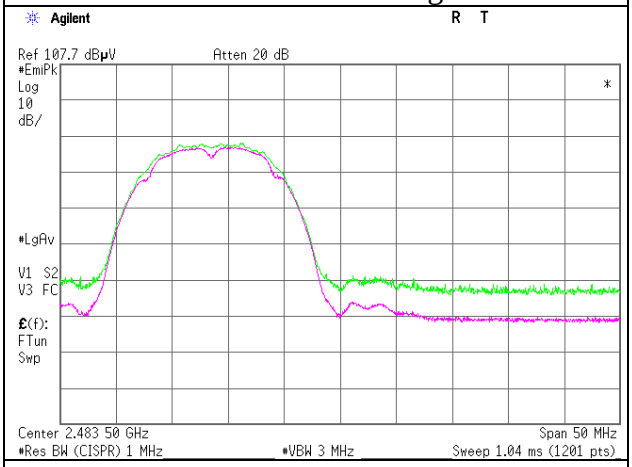
Distance factor: 1 GHz - 10 GHz 20log (4.3 m / 3.0 m) = 3.13 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Band Edge
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11675880H
Date	March 21, 2017
Temperature / Humidity	20 deg. C / 45 % RH
Engineer	Takumi Shimada (1 GHz -10 GHz)
Mode	Tx 11b 2472 MHz

Horizontal

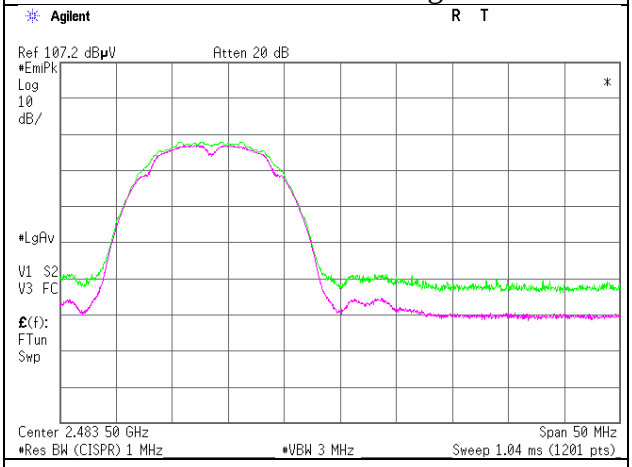
Restricted-band band-edge Plot



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.

Band Edge

Test place	Ise EMC Lab. No.4Semi Anechoic Chamber
Report No.	11675880H
Date	March 21, 2017
Temperature / Humidity	20 deg. C / 45 % 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	52.7	27.4	6.3	32.1	-	54.3	73.9	19.6	
Hori	2390.000	AV	41.6	27.4	6.3	32.1	0.2	43.4	53.9	10.5	*1)
Vert	2390.000	PK	53.0	27.4	6.3	32.1	-	54.6	73.9	19.3	
Vert	2390.000	AV	39.7	27.4	6.3	32.1	0.2	41.5	53.9	12.4	*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 (4.3 m / 3.0 m) = 3.13 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

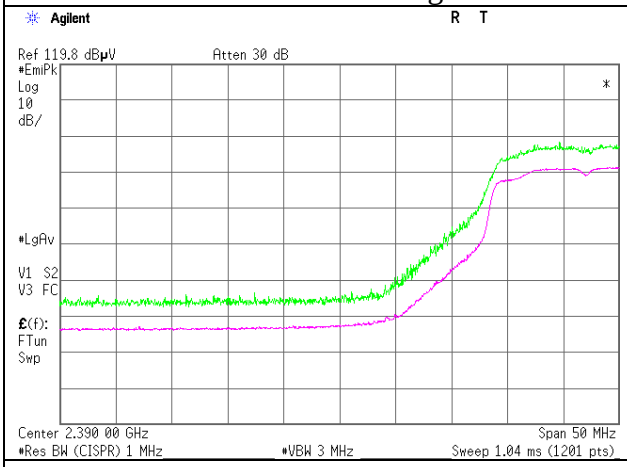
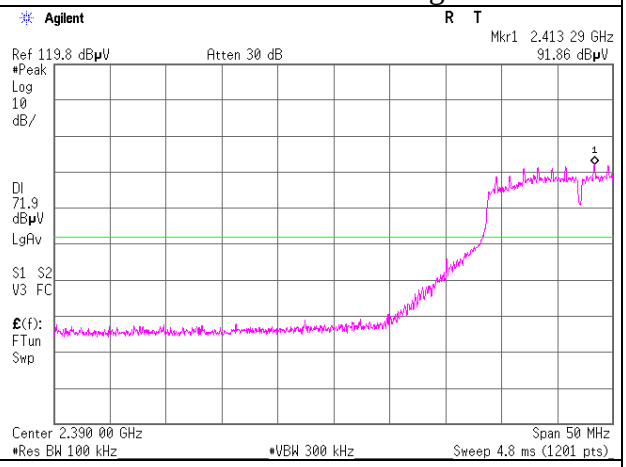
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	91.9	27.4	6.4	32.1	93.6	-	-	Carrier
Hori	2400.000	PK	62.6	27.4	6.3	32.1	64.2	73.6	9.4	
Vert	2412.000	PK	94.6	27.4	6.4	32.1	96.3	-	-	Carrier
Vert	2400.000	PK	63.7	27.4	6.3	32.1	65.3	76.3	11.0	

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

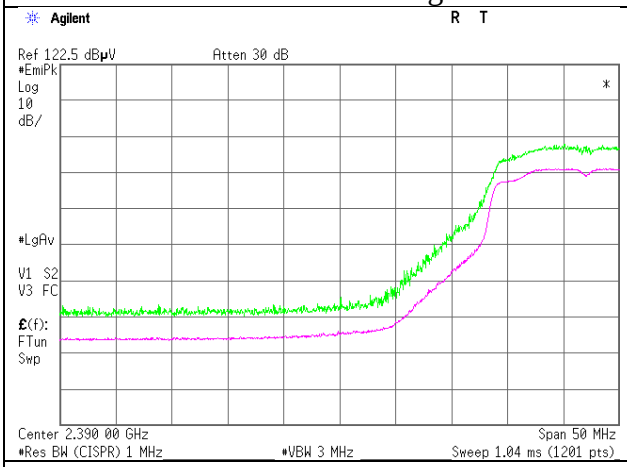
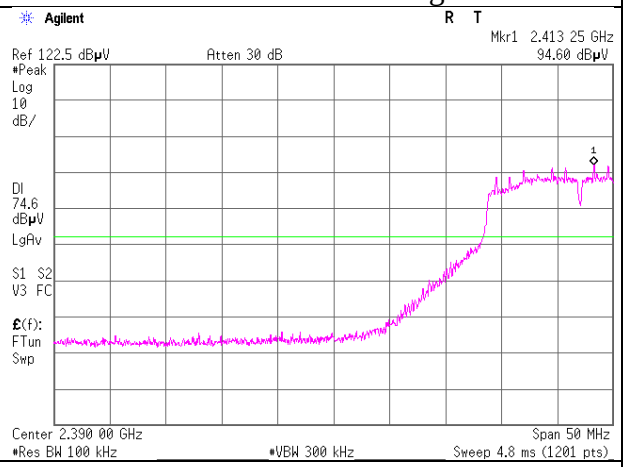
Band Edge
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11675880H
Date	March 21, 2017
Temperature / Humidity	20 deg. C / 45 % RH
Engineer	Takumi Shimada (1 GHz -10 GHz)
Mode	Tx 11g 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.

Band Edge

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11675880H
Date	March 21, 2017
Temperature / Humidity	20 deg. C / 45 % RH
Engineer	Takumi Shimada
	(1 GHz -10 GHz)
Mode	Tx 11g 2472MHz

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	57.3	27.4	6.5	32.0	-	59.2	73.9	14.7	
Hori	2483.500	AV	45.1	27.4	6.5	32.0	0.2	47.2	53.9	6.7	*1)
Vert	2483.500	PK	56.5	27.4	6.5	32.0	-	58.4	73.9	15.5	
Vert	2483.500	AV	44.6	27.4	6.5	32.0	0.2	46.7	53.9	7.2	*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).

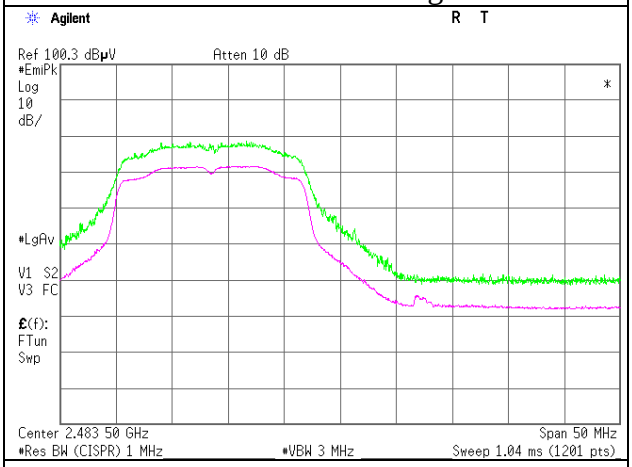
Distance factor: 1 GHz - 10 GHz 20log (4.3 m / 3.0 m) = 3.13 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB
*1) Not Out of Band emission(Leakage Power)

Band Edge
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11675880H
Date	March 21, 2017
Temperature / Humidity	20 deg. C / 45 % RH
Engineer	Takumi Shimada (1 GHz -10 GHz)
Mode	Tx 11g 2472 MHz

Horizontal

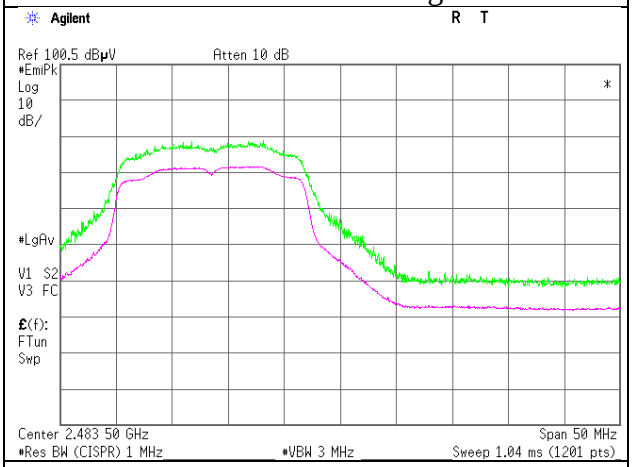
Restricted-band band-edge Plot



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.

Band Edge

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11675880H
Date	March 21, 2017
Temperature / Humidity	20 deg. C / 45 % RH
Engineer	Takumi Shimada
	(1 GHz -10 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	53.8	27.4	6.3	32.1	-	55.4	73.9	18.5	
Hori	2390.000	AV	42.9	27.4	6.3	32.1	0.2	44.7	53.9	9.2	*1)
Vert	2390.000	PK	53.9	27.4	6.3	32.1	-	55.5	73.9	18.4	
Vert	2390.000	AV	40.1	27.4	6.3	32.1	0.2	41.9	53.9	12.0	*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 (4.3 m / 3.0 m) = 3.13 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

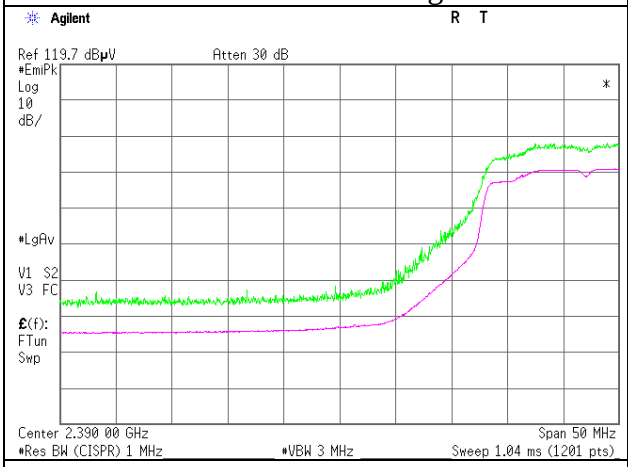
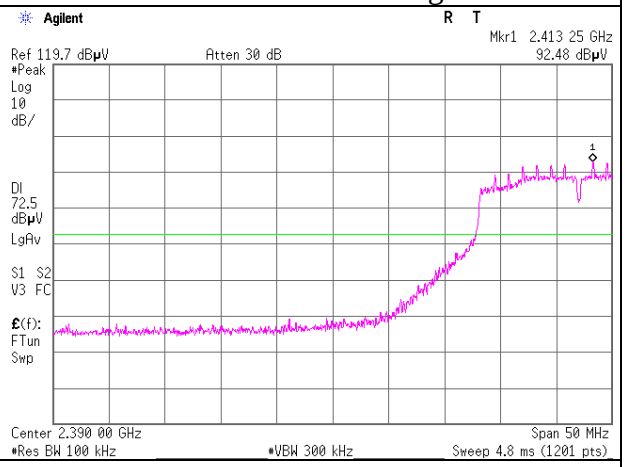
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	92.5	27.4	6.4	32.1	94.2	-	-	Carrier
Hori	2400.000	PK	62.8	27.4	6.3	32.1	64.4	74.2	9.8	
Vert	2412.000	PK	93.8	27.4	6.4	32.1	95.5	-	-	Carrier
Vert	2400.000	PK	64.1	27.4	6.3	32.1	65.7	75.5	9.8	

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

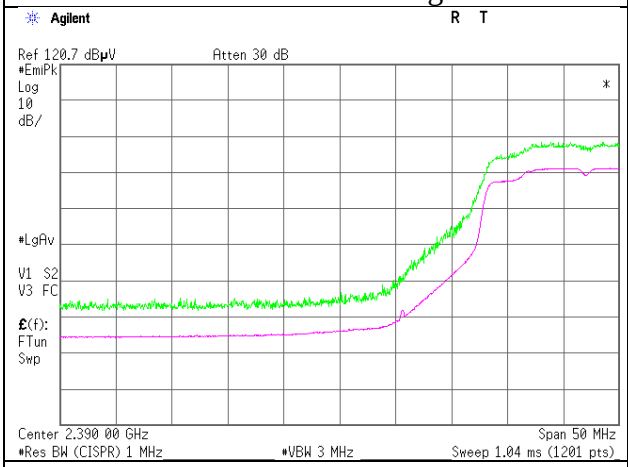
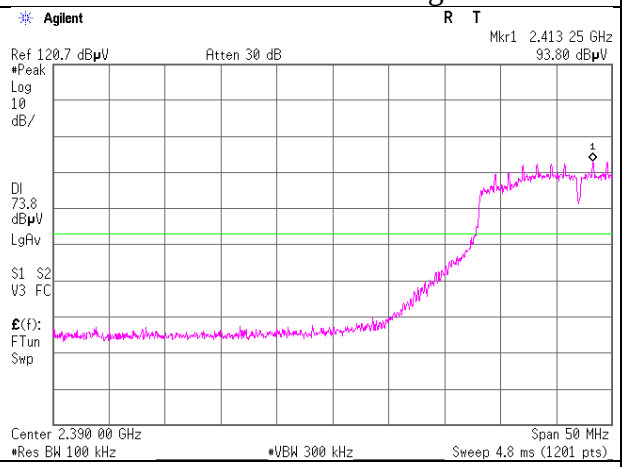
Band Edge
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11675880H
Date	March 21, 2017
Temperature / Humidity	20 deg. C / 45 % RH
Engineer	Takumi Shimada
	(1 GHz -10 GHz)
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.

Band Edge

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11675880H
Date	March 21, 2017
Temperature / Humidity	20 deg. C / 45 % RH
Engineer	Takumi Shimada
	(1 GHz -10 GHz)
Mode	Tx 11n-20 2472MHz

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	59.4	27.4	6.5	32.0	-	61.3	73.9	12.6	
Hori	2483.500	AV	41.4	27.4	6.5	32.0	0.2	43.5	53.9	10.4	*1)
Vert	2483.500	PK	59.2	27.4	6.5	32.0	-	61.1	73.9	12.8	
Vert	2483.500	AV	41.3	27.4	6.5	32.0	0.2	43.4	53.9	10.5	*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).

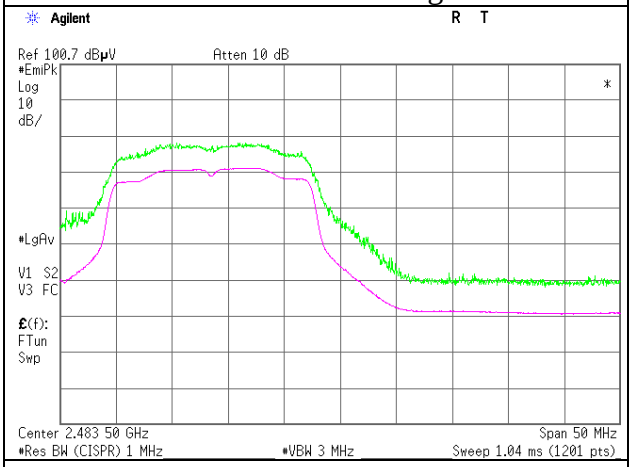
Distance factor: 1 GHz - 10 GHz 20log (4.3 m / 3.0 m) = 3.13 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Band Edge
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11675880H
Date	March 21, 2017
Temperature / Humidity	20 deg. C / 45 % RH
Engineer	Takumi Shimada (1 GHz -10 GHz)
Mode	Tx 11n-20 2472 MHz

Horizontal

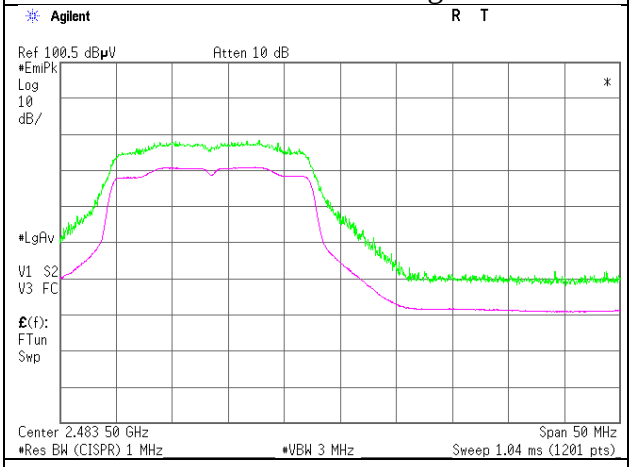
Restricted-band band-edge Plot



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.

Band Edge

Test place	Ise EMC Lab. No.4Semi Anechoic Chamber
Report No.	11675880H
Date	March 21, 2017
Temperature / Humidity	20 deg. C / 45 % RH
Engineer	Takumi Shimada
	(1 GHz -10 GHz)
Mode	Tx 11n-40 2422 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	56.1	27.4	6.3	32.1	-	57.7	73.9	16.2	
Hori	2390.000	AV	45.2	27.4	6.3	32.1	0.7	47.5	53.9	6.4	*1)
Vert	2390.000	PK	56.1	27.4	6.3	32.1	-	57.7	73.9	16.2	
Vert	2390.000	AV	46.9	27.4	6.3	32.1	0.7	49.2	53.9	4.7	*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 (4.3 m / 3.0 m) = 3.13 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

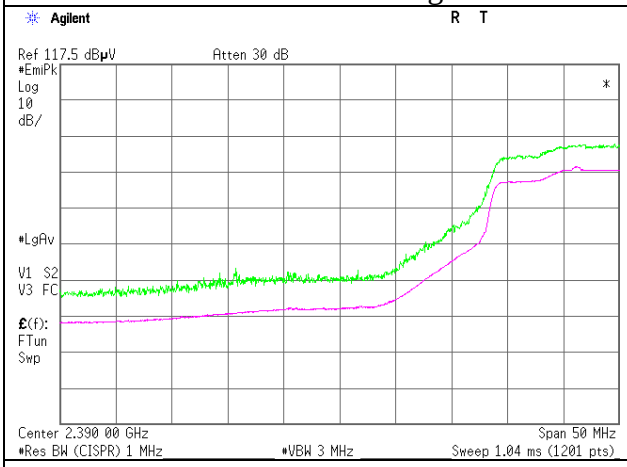
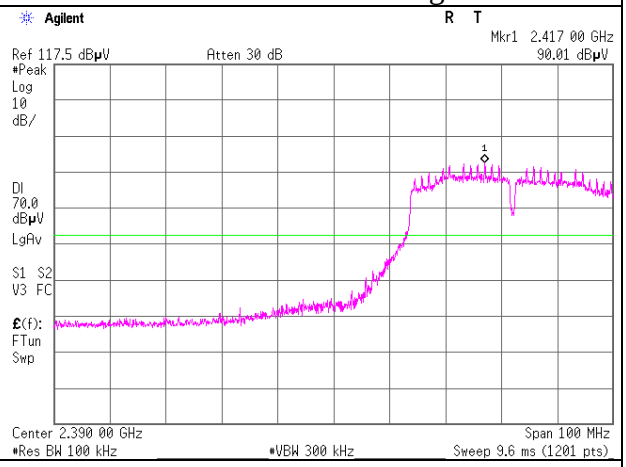
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2422.000	PK	90.0	27.4	6.4	32.1	91.7	-	-	Carrier
Hori	2400.000	PK	60.5	27.4	6.3	32.1	62.1	71.7	9.6	
Vert	2422.000	PK	91.1	27.4	6.4	32.1	92.8	-	-	Carrier
Vert	2400.000	PK	62.1	27.4	6.3	32.1	63.7	72.8	9.1	

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

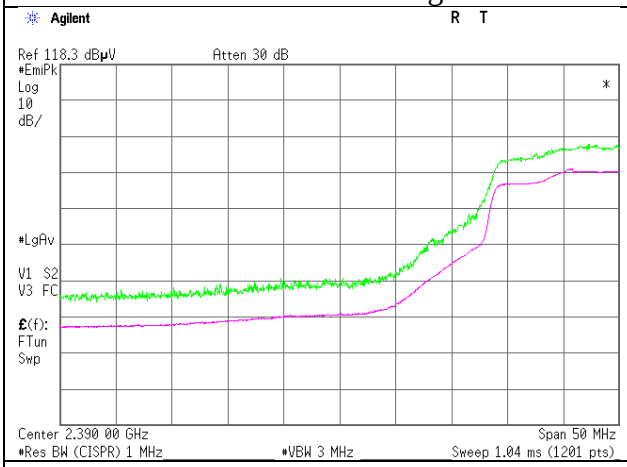
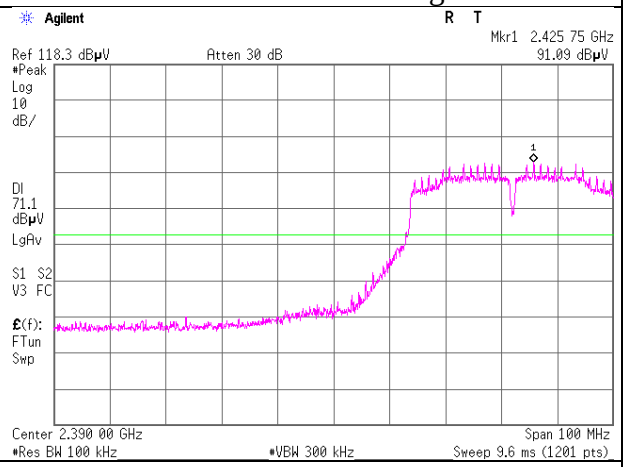
Band Edge
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11675880H
Date	March 21, 2017
Temperature / Humidity	20 deg. C / 45 % RH
Engineer	Takumi Shimada (1 GHz -10 GHz)
Mode	Tx 11n-40 2422 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.

Band Edge

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11675880H
Date	March 21, 2017
Temperature / Humidity	20 deg. C / 45 % RH
Engineer	Takumi Shimada
	(1 GHz -10 GHz)
Mode	Tx 11n-40 2462MHz

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	53.9	27.4	6.5	32.0	-	55.8	73.9	18.1	
Hori	2483.500	AV	42.1	27.4	6.5	32.0	0.7	44.7	53.9	9.2	*1)
Vert	2483.500	PK	54.7	27.4	6.5	32.0	-	56.6	73.9	17.3	
Vert	2483.500	AV	42.4	27.4	6.5	32.0	0.7	45.0	53.9	8.9	*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 (4.3 m / 3.0 m) = 3.13 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

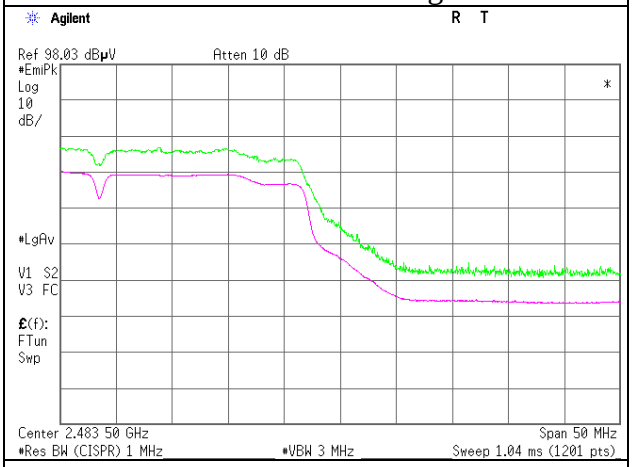
*1) Not Out of Band emission(Leakage Power)

Band Edge
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11675880H
Date	March 21, 2017
Temperature / Humidity	20 deg. C / 45 % RH
Engineer	Takumi Shimada
	(1 GHz -10 GHz)
Mode	Tx 11n-40 2462 MHz

Horizontal

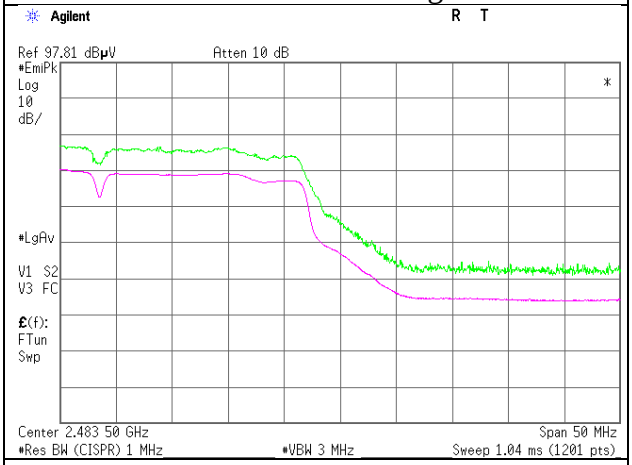
Restricted-band band-edge Plot



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.1 Semi Anechoic Chamber
Report No.	11675880H
Date	March 21, 2017
Temperature / Humidity	20 deg. C / 45 % RH
Engineer	Takumi Shimada
	(Above 1GHz)
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	39.6	31.0	8.9	31.2	-	48.3	73.9	25.6	Floor noise
Hori	7311.000	PK	41.1	36.4	9.8	32.5	-	54.8	73.9	19.1	Floor noise
Hori	9748.000	PK	40.2	38.6	10.7	32.8	-	56.7	73.9	17.2	Floor noise
Hori	4874.000	AV	31.4	31.0	8.9	31.2	-	40.1	53.9	13.8	Floor noise
Hori	7311.000	AV	32.1	36.4	9.8	32.5	-	45.8	53.9	8.1	Floor noise
Hori	9748.000	AV	31.3	38.6	10.7	32.8	-	47.8	53.9	6.1	Floor noise
Vert	4874.000	PK	40.1	31.0	8.9	31.2	-	48.8	73.9	25.1	Floor noise
Vert	7311.000	PK	40.3	36.4	9.8	32.5	-	54.0	73.9	19.9	Floor noise
Vert	9748.000	PK	40.4	38.6	10.7	32.8	-	56.9	73.9	17.0	Floor noise
Vert	4874.000	AV	31.4	31.0	8.9	31.2	-	40.1	53.9	13.8	Floor noise
Vert	7311.000	AV	32.2	36.4	9.8	32.5	-	45.9	53.9	8.0	Floor noise
Vert	9748.000	AV	31.3	38.6	10.7	32.8	-	47.8	53.9	6.1	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
*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 (4.3 m / 3.0 m) = 3.13 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber	
Report No.	11675880H	
Date	March 21, 2017	March 21, 2017
Temperature / Humidity	20 deg. C / 45 % RH	20 deg. C / 45 % RH
Engineer	Takumi Shimada (Above 1GHz)	Ryota Yamanaka (Below 1GHz)
Mode	Tx 11n-20 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	250.036	QP	51.3	12.5	9.5	31.9	-	41.4	46.0	4.6	
Hori	375.063	QP	40.8	15.2	10.3	32.0	-	34.3	46.0	11.7	
Hori	480.026	QP	27.6	17.3	11.0	32.2	-	23.7	46.0	22.3	
Hori	500.062	QP	30.6	17.7	11.1	32.2	-	27.2	46.0	18.8	
Hori	875.118	QP	28.2	21.7	12.9	31.3	-	31.5	46.0	14.5	
Hori	960.042	QP	27.0	22.3	13.3	30.9	-	31.7	53.9	22.2	
Hori	4874.000	PK	39.7	31.0	8.9	31.2	-	48.4	73.9	25.5	Floor noise
Hori	7311.000	PK	41.3	36.4	9.8	32.5	-	55.0	73.9	18.9	Floor noise
Hori	9748.000	PK	40.1	38.6	10.7	32.8	-	56.6	73.9	17.3	Floor noise
Hori	4874.000	AV	31.0	31.0	8.9	31.2	-	39.7	53.9	14.2	Floor noise
Hori	7311.000	AV	32.1	36.4	9.8	32.5	-	45.8	53.9	8.1	Floor noise
Hori	9748.000	AV	31.2	38.6	10.7	32.8	-	47.7	53.9	6.2	Floor noise
Vert	250.036	QP	46.5	12.5	9.5	31.9	-	36.6	46.0	9.4	
Vert	375.063	QP	34.9	15.2	10.3	32.0	-	28.4	46.0	17.6	
Vert	480.026	QP	29.6	17.3	11.0	32.2	-	25.7	46.0	20.3	
Vert	500.062	QP	32.5	17.7	11.1	32.2	-	29.1	46.0	16.9	
Vert	875.118	QP	28.5	21.7	12.9	31.3	-	31.8	46.0	14.2	
Vert	960.042	QP	30.2	22.3	13.3	30.9	-	34.9	53.9	19.0	
Vert	4874.000	PK	39.8	31.0	8.9	31.2	-	48.5	73.9	25.4	Floor noise
Vert	7311.000	PK	40.4	36.4	9.8	32.5	-	54.1	73.9	19.8	Floor noise
Vert	9748.000	PK	39.6	38.6	10.7	32.8	-	56.1	73.9	17.8	Floor noise
Vert	4874.000	AV	31.3	31.0	8.9	31.2	-	40.0	53.9	13.9	Floor noise
Vert	7311.000	AV	32.3	36.4	9.8	32.5	-	46.0	53.9	7.9	Floor noise
Vert	9748.000	AV	31.2	38.6	10.7	32.8	-	47.7	53.9	6.2	Floor noise

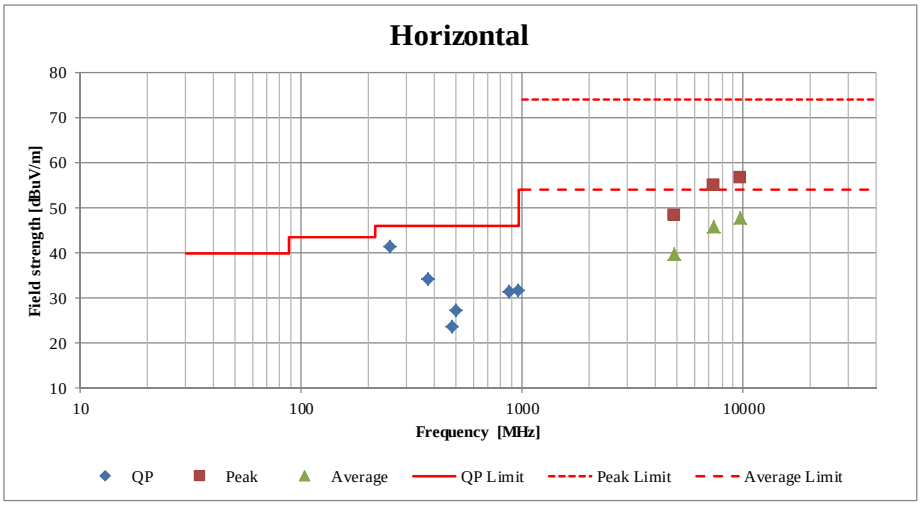
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

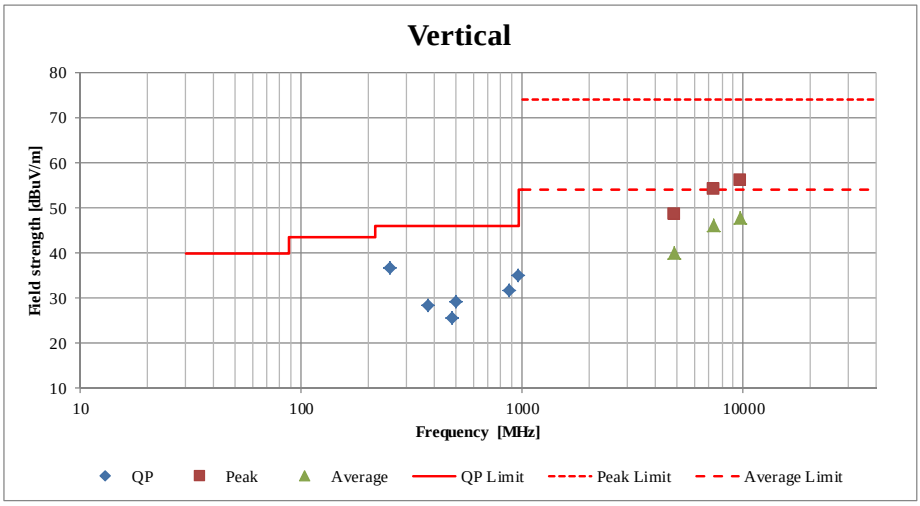
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (4.3 m / 3.0 m) = 3.13 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission
(Plot data, Worst case)

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber	
Report No.	11675880H	
Date	March 21, 2017	March 21, 2017
Temperature / Humidity	20 deg. C / 45 % RH	20 deg. C / 45 % RH
Engineer	Takumi Shimada (Above 1GHz)	Ryota Yamanaka (Below 1GHz)
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-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE,CE	2016/10/19 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	1501	RE,CE	2017/01/20 * 12
MJM-26	Measure	KOMELON	KMC-36	-	RE,CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE,CE	-
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE	2016/05/19 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2016/09/28 * 12
MCC-141	Microwave Cable	Junkosha	MWX221	1305S002R(1m) / 1405S146(5m)	RE	2016/06/21 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	00650	RE	2016/10/21 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2016/06/24 * 12
MMM-10	DIGITAL HiTESTER	Hioki	3805	051201148	RE,CE	2017/01/19 * 12
MHF-26	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	002	RE	2016/09/19 * 12
MTR-10	EMI Test Receiver	Rohde & Schwarz	ESR26	101408	RE,CE	2017/01/12 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2016/11/23 * 12
MLA-23	Logperiodic Antenna(200-1000MHz)	Schwarzbeck	VUSLP9111B	911B-192	RE	2017/01/26 * 12
MCC-50	Coaxial Cable	UL Japan	-	-	RE	2016/06/20 * 12
MAT-97	Attenuator	KEYSIGHT	8491A	MY52462282	RE	2016/10/31 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2016/03/18 * 12
MLS-23	LISN(AMN)	Schwarzbeck	NSLK8127	8127-729	CE(EUT)	2016/07/07 * 12
MAT-67	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2016/12/24 * 12
MCC-113	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SFM141(5m)/421-010(1m)/sucoform141-PE(1m)/RFM-E121(Switcher)	-/04178	CE	2016/07/20 * 12
MPM-16	Power Meter	Agilent	8990B	MY51000271	AT	2016/04/07 * 12
MPSE-22	Power sensor	Agilent	N1923A	MY54070003	AT	2016/04/07 * 12
MAT-23	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2016/03/18 * 12

The expiration date of the calibration is the end of the expired month.
All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

Test Item: **CE: Conducted Emission test**
RE: Radiated Emission test
AT: Antenna Terminal Conducted test