




RADIO TEST REPORT


Test Report No. : 11596802S-A

Applicant : YAMAHA CORPORATION
Type of Equipment : USB WIRELESS LAN ADAPTOR
Model No. : UD-WL01
FCC ID : A6RUDWL01
Test regulation : FCC Part 15 Subpart C: 2016
Test item : Radiated spurious emission
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. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
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: January 29 to February 3, 2017

Representative test engineer: 
Yosuke Ishikawa
Engineer
Consumer Technology Division

Approved by: 
Toyokazu Imamura
Leader
Consumer Technology Division



- The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.
 There is no testing item of "Non-accreditation".

UL Japan, Inc.
Shonan EMC Lab.

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SECTION 1: Customer information

Company Name : YAMAHA CORPORATION
Address : 10-1, Nakazawa-cho, Naka-ku, Hamamatsu Shizuoka 430-8650, Japan
Telephone Number : +81-53-460-3237
Facsimile Number : +81-53-460-2778
Contact Person : Naoko Nakajima

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

2.1 Identification of E.U.T.

Type of Equipment : USB WIRELESS LAN ADAPTOR
Model No. : UD-WL01
Serial No. : Refer to Section 4, Clause 4.2
Rating : DC 5.0 V
Receipt Date of Sample : January 26, 2017
Country of Mass-production : Japan
Condition of EUT : Engineering prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT : No Modification by the test lab.

2.2 Product Description

Model: UD-WL01 (referred to as the EUT in this report) is a USB WIRELESS LAN ADAPTOR.

Radio Specification

Radio Type : Transceiver
Frequency of Operation : 2412 MHz - 2462 MHz
Modulation : DSSS, OFDM
Power Supply (radio part input) : DC 3.3 V
Antenna type : PCB
Antenna Gain : 0.13 dBi
Clock frequency (Maximum) : 40 MHz

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

The EUT complies with FCC Part 15 Subpart B. The test is performed by the customer.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.10-2013 6. Standard test methods	FCC: Section 15.207		-	*1)
	IC: RSS-Gen 8.8	IC: RSS-Gen 8.8			
6dB Bandwidth	FCC: KDB 558074 D01 DTS Meas Guidance v03r05	FCC: Section 15.247(a)(2)			
	IC: -	IC: RSS-247 5.2(1)			
Maximum Peak Output Power	FCC: KDB 558074 D01 DTS Meas Guidance v03r05	FCC: Section 15.247(b)(3)			
	IC: RSS-Gen 6.12	IC: RSS-247 5.4(4)			
Power Density	FCC: KDB 558074 D01 DTS Meas Guidance v03r05	FCC: Section 15.247(e)			
	IC: -	IC: RSS-247 5.2(2)			
Spurious Emission Restricted Band Edges	FCC: KDB 558074 D01 DTS Meas Guidance v03r05	FCC: Section 15.247(d)	1.2 dB 4823.983 MHz, AV, Horizontal Tx 2412 MHz, 11b	Complied	Conducted (below 30 MHz)*1)/ Radiated (above 30 MHz) *2)
	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) Refer to the original test report: 33AE0243-SH-01-D.
*2) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 DTS Meas Guidance v03r05 12.2.7.

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

FCC Part 15.31 (e)

The RF transmitter is constantly provided voltage (DC 3.3 V) through the regulator regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

The antenna is not removable from the EUT. Therefore, the equipment complies with the antenna requirement.

3.3 Addition to standard

No addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor $k = 2$.

Item	Frequency range	Uncertainty (+/-)				
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR	No. 4 SAC / SR	No. 5,6,8 SR
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	2.6 dB	2.5 dB	2.6 dB	2.5 dB	2.5 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.1 dB	3.1 dB	3.1 dB	-	-
	30 MHz-200 MHz	4.6 dB	4.4 dB	4.6 dB	-	-
	200 MHz-1 GHz	5.8 dB	5.7 dB	5.8 dB	-	-
	1 GHz-13 GHz	4.9 dB	4.9 dB	4.9 dB	-	-
Radiated emission (Measurement distance: 1 m)	13 GHz-18 GHz	4.6 dB	4.6 dB	4.6 dB	-	-
	18 GHz-40 GHz	4.9 dB	4.9 dB	4.9 dB	-	-

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

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. Shonan EMC Lab.

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Telephone: +81 463 50 6400, Facsimile: +81 463 50 6401

JAB Accreditation No. RTL02610

Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.3 Semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5 m
No.4 Semi-anechoic chamber	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
No.1 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.2 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.3 Shielded room	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
No.4 Shielded room	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
No.5 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.6 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.8 shielded room	-	3.45 x 5.5 x 2.4	3.45 x 5.5	-
No.1 Measurement room	-	2.55 x 4.1 x 2.5	-	-

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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

4.1 Operating Mode(s)

Test item	Mode	Tested frequency	Power setting	Worst data rate *2)
Radiated emission (below 1GHz) *3)	Transmitting IEEE 802.11g	2437 MHz	*1)	6 Mbps, PN9
Other items	Transmitting IEEE 802.11b	2412 MHz, 2437 MHz, 2462 MHz		1 Mbps, PN9
	Transmitting IEEE 802.11g	2412 MHz, 2437 MHz, 2462 MHz		6 Mbps, PN9
	Transmitting IEEE 802.11n (HT20)	2412 MHz, 2437 MHz, 2462 MHz		MCS0, PN9

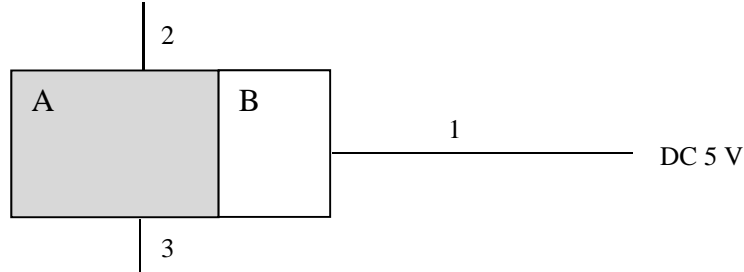
*1) EUT has the power settings by the software as follows;

Power settings	WID Command Numb:0106, Value : 02 11b: 12 dBm, 11g: 10 dBm, 11n(HT20): 9 dBm (Average)
Software	RADITS for 11n Test Mode ver .1.51

*2) The worst condition was determined based on the test result of Maximum Peak Output Power (Original test report).

*3) 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.

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	Remark
A	USB WIRELESS LAN ADAPTOR	UD-WL01	Engineering prototype No.1	YAMAHA	EUT
B	Power I/F Jig	-	-	YAMAHA	-

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC	0.75	Unshielded	Unshielded	-
2	Signal	0.03	Unshielded	Unshielded	-
3	Signal	0.03	Unshielded	Unshielded	-

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SECTION 5: Radiated Spurious Emission

Test Procedure

It was measured based on "11.0 Emissions in non-restricted frequency bands" of "558074 D01 DTS Meas Guidance v03r05".

[For below 1 GHz]

EUT was placed on a platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane. The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity. 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: 300 kHz
Test Distance	3 m	3.96 m *2) (1 GHz – 13 GHz), 1 m *3) (13 GHz – 26.5 GHz)		3.96 m *2) (1 GHz – 13 GHz), 1 m *3) (13 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: $20 \times \log(3.96 \text{ m} / 3.0 \text{ m}) = 2.42 \text{ dB}$

*3) Distance Factor: $20 \times \log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

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

Antenna polarization	Carrier (Band edge)	Spurious			
		Below 1 GHz	Above 1GHz		
			1 GHz -2.8 GHz	2.8 GHz -15 GHz	15 GHz -26.5 GHz
Horizontal	X	X	X	X	X
Vertical	Z	X	Z	Y	X

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

APPENDIX 1: Test data

Radiated Spurious Emission

Test place: Shonan EMC Lab. No.2, 3 Semi Anechoic Chamber
 Report No.: 11596802S-A
 Date: January 29, 2017 February 3, 2017 February 1, 2017
 Temperature / Humidity: 23 deg. C / 30 % RH 21 deg. C / 20 % RH 23 deg. C / 21 % RH
 Engineer: Hikaru Shirasawa Yosuke Ishikawa Yosuke Ishikawa
 (1 GHz -13 GHz) (13 GHz -18 GHz) (18 GHz -26.5 GHz)
 Mode: Tx 11b 2412 MHz

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	46.33	27.17	14.15	37.06	2.42	53.01	73.90	20.9	282	269	
Hori.	4823.983	PK	53.13	31.17	6.65	37.13	2.42	56.24	73.90	17.7	119	19	
Hori.	7236.000	PK	43.20	36.49	7.99	37.86	2.42	52.24	73.90	21.7	120	128	
Hori.	9648.000	PK	44.59	38.34	8.91	39.15	2.42	55.11	73.90	18.8	150	0	
Hori.	12060.000	PK	45.76	39.15	10.37	39.38	2.42	58.32	73.90	15.6	150	0	
Hori.	2390.000	AV	34.26	27.17	14.15	37.06	2.42	40.94	53.90	13.0	282	269	
Hori.	4823.983	AV	49.58	31.17	6.65	37.13	2.42	52.69	53.90	1.2	119	19	
Hori.	7236.000	AV	34.13	36.49	7.99	37.86	2.42	43.17	53.90	10.7	120	128	
Hori.	9648.000	AV	35.26	38.34	8.91	39.15	2.42	45.78	53.90	8.1	150	0	
Hori.	12060.000	AV	36.55	39.15	10.37	39.38	2.42	49.11	53.90	4.8	150	0	
Vert.	2390.000	PK	44.04	27.17	14.15	37.06	2.42	50.72	73.90	23.2	132	109	
Vert.	4824.023	PK	50.27	31.17	6.65	37.13	2.42	53.38	73.90	20.5	103	325	
Vert.	7236.000	PK	43.87	36.49	7.99	37.86	2.42	52.91	73.90	21.0	100	51	
Vert.	9648.000	PK	44.19	38.34	8.91	39.15	2.42	54.71	73.90	19.2	150	0	
Vert.	12060.000	PK	45.42	39.15	10.37	39.38	2.42	57.98	73.90	15.9	150	0	
Vert.	2390.000	AV	34.52	27.17	14.15	37.06	2.42	41.20	53.90	12.7	132	109	
Vert.	4824.023	AV	46.55	31.17	6.65	37.13	2.42	49.66	53.90	4.2	103	325	
Vert.	7236.000	AV	33.37	36.49	7.99	37.86	2.42	42.41	53.90	11.5	100	51	
Vert.	9648.000	AV	35.93	38.34	8.91	39.15	2.42	46.45	53.90	7.4	150	0	
Vert.	12060.000	AV	36.42	39.15	10.37	39.38	2.42	48.98	53.90	4.9	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.96\text{ m} / 3.0\text{ m}) = 2.42\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	86.13	27.24	14.16	37.04	2.42	92.91	-	-	Carrier
Hori.	2400.000	PK	40.96	27.20	14.15	37.05	2.42	47.68	72.91	25.2	
Vert.	2412.000	PK	86.58	27.24	14.16	37.04	2.42	93.36	-	-	Carrier
Vert.	2400.000	PK	44.94	27.20	14.15	37.05	2.42	51.66	73.36	21.7	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.96\text{ m} / 3.0\text{ m}) = 2.42\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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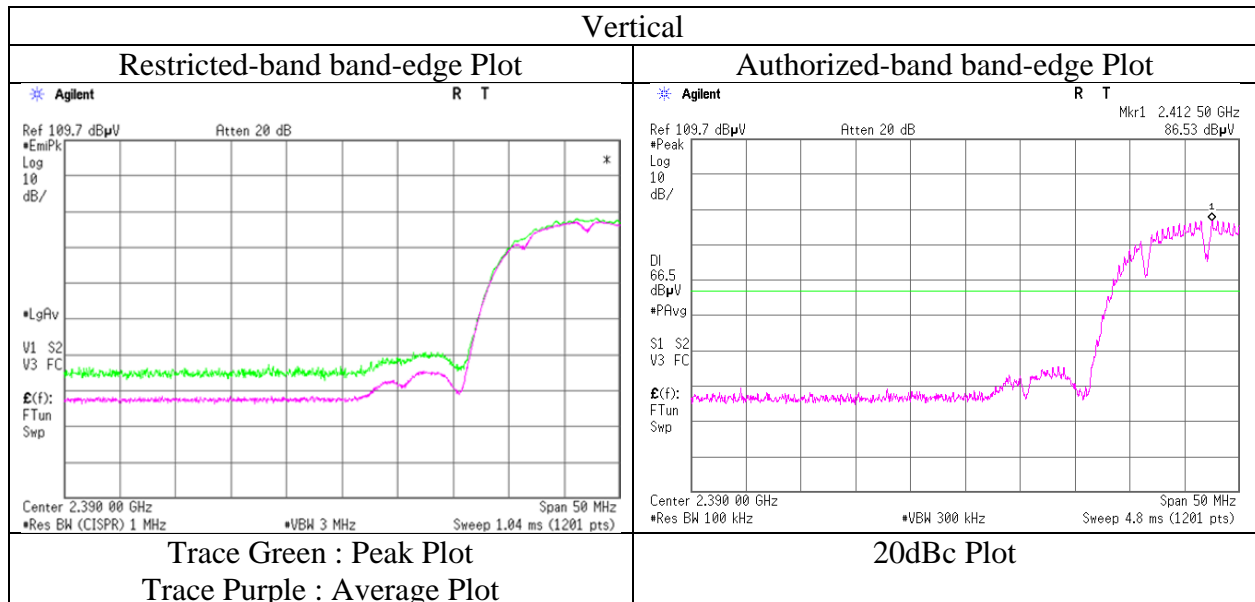
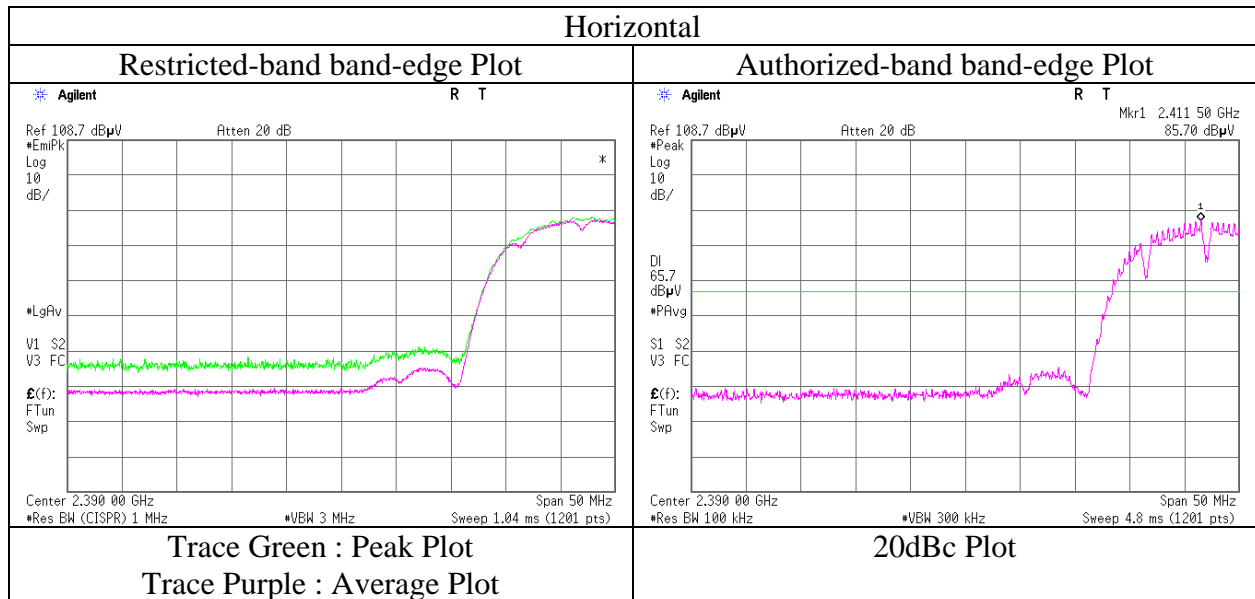
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Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11596802S-A
Date	January 29, 2017
Temperature / Humidity	23 deg. C / 30 % RH
Engineer	Hikaru Shirasawa (1 GHz -13 GHz)
Mode	Tx 11b 2412 MHz



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.2, 3 Semi Anechoic Chamber
Report No. : 11596802S-A
Date : January 29, 2017 February 3, 2017 February 1, 2017
Temperature / Humidity : 23 deg. C / 30 % RH 21 deg. C / 20 % RH 23 deg. C / 21 % RH
Engineer : Hikaru Shirasawa Yosuke Ishikawa Yosuke Ishikawa
 (1 GHz -13 GHz) (13 GHz -18 GHz) (18 GHz -26.5 GHz)
Mode : Tx 11b 2437 MHz

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4874.022	PK	48.24	31.28	6.69	37.15	2.42	51.48	73.90	22.4	119	13	
Hori.	7311.000	PK	44.29	36.62	8.01	37.91	2.42	53.43	73.90	20.5	124	120	
Hori.	9748.000	PK	45.07	38.50	8.95	39.19	2.42	55.75	73.90	18.2	150	0	
Hori.	12185.000	PK	44.69	39.15	10.40	39.39	2.42	57.27	73.90	16.6	150	0	
Hori.	4874.022	AV	44.17	31.28	6.69	37.15	2.42	47.41	53.90	6.5	119	13	
Hori.	7311.000	AV	34.73	36.62	8.01	37.91	2.42	43.87	53.90	10.0	124	120	
Hori.	9748.000	AV	34.71	38.50	8.95	39.19	2.42	45.39	53.90	8.5	150	0	
Hori.	12185.000	AV	35.09	39.15	10.40	39.39	2.42	47.67	53.90	6.2	150	0	
Vert.	4874.018	PK	51.84	31.28	6.69	37.15	2.42	55.08	73.90	18.8	105	337	
Vert.	7311.000	PK	43.77	36.62	8.01	37.91	2.42	52.91	73.90	21.0	100	45	
Vert.	9748.000	PK	44.97	38.50	8.95	39.19	2.42	55.65	73.90	18.3	150	0	
Vert.	12185.000	PK	45.77	39.15	10.40	39.39	2.42	58.35	73.90	15.6	150	0	
Vert.	4874.018	AV	48.72	31.28	6.69	37.15	2.42	51.96	53.90	1.9	105	337	
Vert.	7311.000	AV	34.40	36.62	8.01	37.91	2.42	43.54	53.90	10.4	100	45	
Vert.	9748.000	AV	34.74	38.50	8.95	39.19	2.42	45.42	53.90	8.5	150	0	
Vert.	12185.000	AV	34.94	39.15	10.40	39.39	2.42	47.52	53.90	6.4	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : 20log(3.96 m / 3.0 m) = 2.42 dB

13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.2, 3 Semi Anechoic Chamber
Report No. : 11596802S-A
Date : January 29, 2017 February 3, 2017 February 1, 2017
Temperature / Humidity : 23 deg. C / 30 % RH 21 deg. C / 20 % RH 23 deg. C / 21 % RH
Engineer : Hikaru Shirasawa Yosuke Ishikawa Yosuke Ishikawa
 (1 GHz -13 GHz) (13 GHz -18 GHz) (18 GHz -26.5 GHz)
Mode : Tx 11b 2462 MHz

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	43.85	27.49	14.22	37.01	2.42	50.97	73.90	22.9	221	256	
Hori.	4924.138	PK	49.43	31.38	6.73	37.18	2.42	52.78	73.90	21.1	113	55	
Hori.	7386.000	PK	43.90	36.75	8.04	37.96	2.42	53.15	73.90	20.8	120	130	
Hori.	9848.000	PK	45.75	38.65	8.99	39.23	2.42	56.58	73.90	17.3	150	0	
Hori.	12310.000	PK	44.80	39.15	10.45	39.39	2.42	57.43	73.90	16.5	150	0	
Hori.	2483.500	AV	34.59	27.49	14.22	37.01	2.42	41.71	53.90	12.2	221	256	
Hori.	4924.138	AV	43.80	31.38	6.73	37.18	2.42	47.15	53.90	6.8	113	55	
Hori.	7386.000	AV	34.89	36.75	8.04	37.96	2.42	44.14	53.90	9.8	120	130	
Hori.	9848.000	AV	34.45	38.65	8.99	39.23	2.42	45.28	53.90	8.6	150	0	
Hori.	12310.000	AV	34.70	39.15	10.45	39.39	2.42	47.33	53.90	6.6	150	0	
Vert.	2483.500	PK	44.06	27.49	14.22	37.01	2.42	51.18	73.90	22.7	132	96	
Vert.	4923.998	PK	50.53	31.38	6.73	37.18	2.42	53.88	73.90	20.0	107	348	
Vert.	7386.000	PK	43.95	36.75	8.04	37.96	2.42	53.20	73.90	20.7	100	48	
Vert.	9848.000	PK	44.35	38.65	8.99	39.23	2.42	55.18	73.90	18.7	150	0	
Vert.	12310.000	PK	44.63	39.15	10.45	39.39	2.42	57.26	73.90	16.6	150	0	
Vert.	2483.500	AV	33.18	27.49	14.22	37.01	2.42	40.30	53.90	13.6	132	96	
Vert.	4923.998	AV	47.08	31.38	6.73	37.18	2.42	50.43	53.90	3.5	107	348	
Vert.	7386.000	AV	33.50	36.75	8.04	37.96	2.42	42.75	53.90	11.2	100	48	
Vert.	9848.000	AV	36.26	38.65	8.99	39.23	2.42	47.09	53.90	6.8	150	0	
Vert.	12310.000	AV	36.45	39.15	10.45	39.39	2.42	49.08	53.90	4.8	150	0	

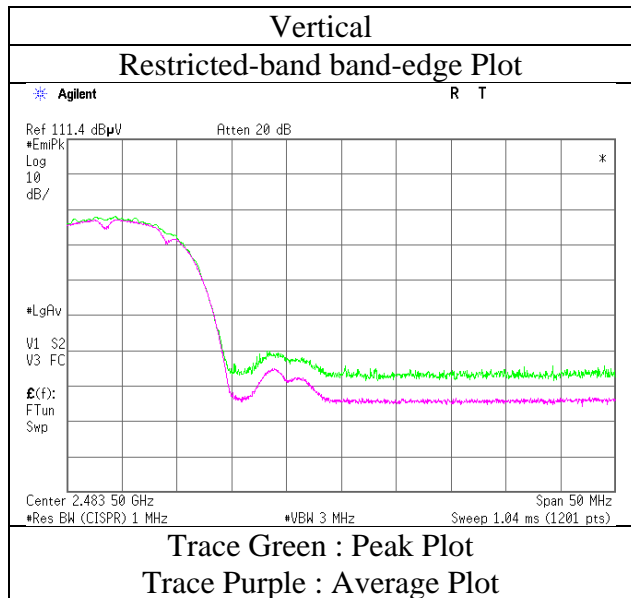
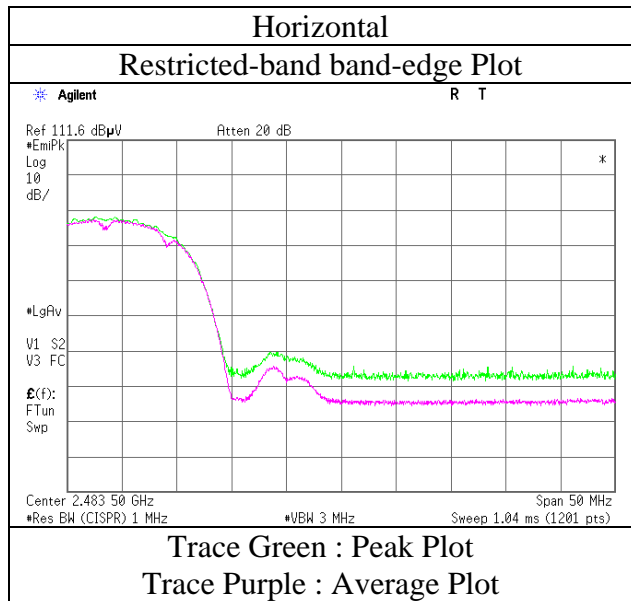
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.96\text{ m} / 3.0\text{ m}) = 2.42\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11596802S-A
Date	January 29, 2017
Temperature / Humidity	23 deg. C / 30 % RH
Engineer	Hikaru Shirasawa (1 GHz -13 GHz)
Mode	Tx 11b 2462 MHz



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.2, 3 Semi Anechoic Chamber
Report No. : 11596802S-A
Date : January 29, 2017 February 3, 2017 February 1, 2017
Temperature / Humidity : 23 deg. C / 30 % RH 21 deg. C / 20 % RH 23 deg. C / 21 % RH
Engineer : Hikaru Shirasawa Yosuke Ishikawa Yosuke Ishikawa
 (1 GHz -13 GHz) (13 GHz -18 GHz) (18 GHz -26.5 GHz)
Mode : Tx 11g 2412 MHz

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	49.52	27.17	14.15	37.06	2.42	56.20	73.90	17.7	229	246	
Hori.	4823.917	PK	49.00	31.17	6.65	37.13	2.42	52.11	73.90	21.8	147	170	
Hori.	7236.000	PK	44.36	36.49	7.99	37.86	2.42	53.40	73.90	20.5	123	144	
Hori.	9648.000	PK	45.26	38.34	8.91	39.15	2.42	55.78	73.90	18.1	100	0	
Hori.	12060.000	PK	44.62	39.15	10.37	39.38	2.42	57.18	73.90	16.7	100	0	
Hori.	2390.000	AV	37.27	27.17	14.15	37.06	2.42	43.95	53.90	10.0	229	246	
Hori.	4823.917	AV	39.18	31.17	6.65	37.13	2.42	42.29	53.90	11.6	147	170	
Hori.	7236.000	AV	34.90	36.49	7.99	37.86	2.42	43.94	53.90	10.0	123	144	
Hori.	9648.000	AV	34.58	38.34	8.91	39.15	2.42	45.10	53.90	8.8	100	0	
Hori.	12060.000	AV	35.12	39.15	10.37	39.38	2.42	47.68	53.90	6.2	100	0	
Vert.	2390.000	PK	51.40	27.17	14.15	37.06	2.42	58.08	73.90	15.8	112	103	
Vert.	4824.083	PK	48.90	31.17	6.65	37.13	2.42	52.01	73.90	21.9	102	327	
Vert.	7236.000	PK	44.89	36.49	7.99	37.86	2.42	53.93	73.90	20.0	119	51	
Vert.	9648.000	PK	45.23	38.34	8.91	39.15	2.42	55.75	73.90	18.2	150	0	
Vert.	12060.000	PK	45.77	39.15	10.37	39.38	2.42	58.33	73.90	15.6	150	0	
Vert.	2390.000	AV	38.23	27.17	14.15	37.06	2.42	44.91	53.90	9.0	112	103	
Vert.	4824.083	AV	38.16	31.17	6.65	37.13	2.42	41.27	53.90	12.6	102	327	
Vert.	7236.000	AV	34.65	36.49	7.99	37.86	2.42	43.69	53.90	10.2	119	51	
Vert.	9648.000	AV	34.67	38.34	8.91	39.15	2.42	45.19	53.90	8.7	150	0	
Vert.	12060.000	AV	36.18	39.15	10.37	39.38	2.42	48.74	53.90	5.2	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.96\text{ m} / 3.0\text{ m}) = 2.42\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	83.21	27.24	14.16	37.04	2.42	89.99	-	-	Carrier
Hori.	2400.000	PK	53.84	27.20	14.15	37.05	2.42	60.56	69.99	9.4	
Vert.	2412.000	PK	83.96	27.24	14.16	37.04	2.42	90.74	-	-	Carrier
Vert.	2400.000	PK	55.11	27.20	14.15	37.05	2.42	61.83	70.74	8.9	

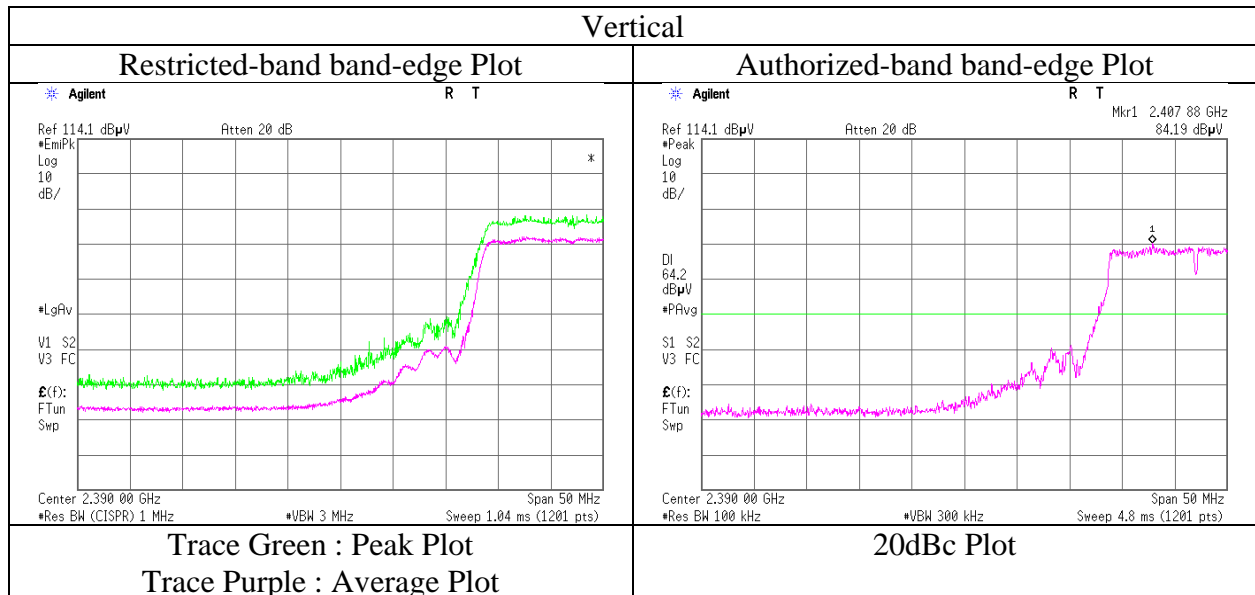
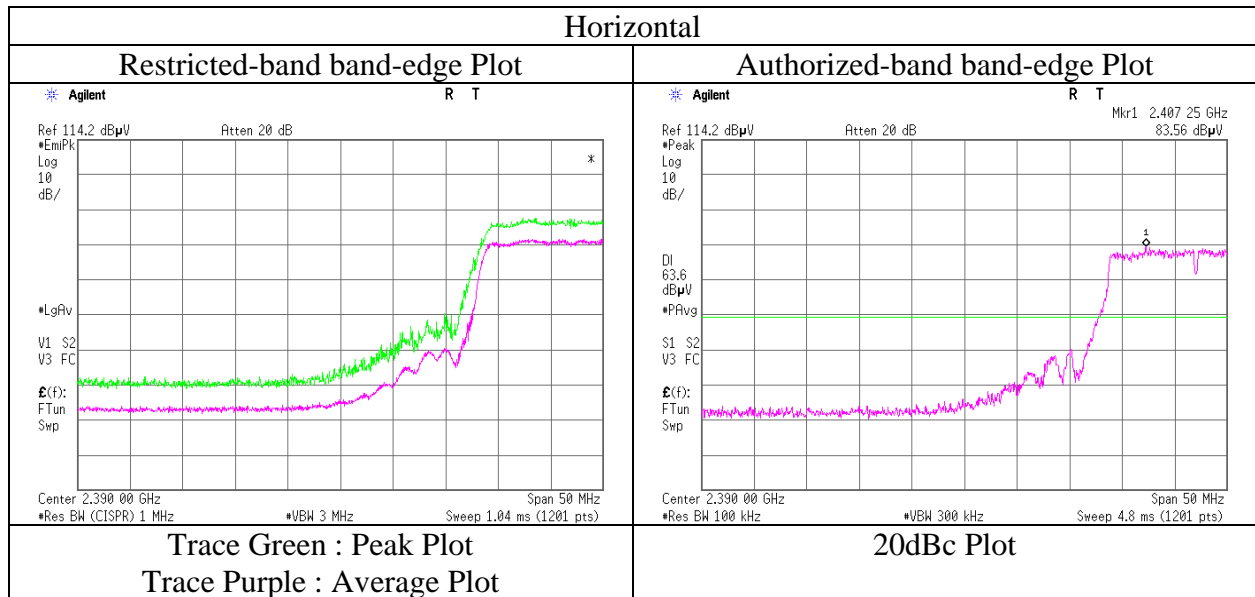
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.96\text{ m} / 3.0\text{ m}) = 2.42\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11596802S-A
Date	January 29, 2017
Temperature / Humidity	23 deg. C / 30 % RH
Engineer	Hikaru Shirasawa (1 GHz -13 GHz)
Mode	Tx 11g 2412 MHz



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

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2, 3 Semi Anechoic Chamber		
Report No.	11596802S-A		
Date	January 29, 2017	February 3, 2017	February 1, 2017
Temperature / Humidity	23 deg. C / 30 % RH	21 deg. C / 20 % RH	23 deg. C / 21 % RH
Engineer	Hikaru Shirasawa (1 GHz -13 GHz)	Yosuke Ishikawa (13 GHz -18 GHz)	Yosuke Ishikawa (30 MHz -1000 MHz) (18 GHz -26.5 GHz)
Mode	Tx 11g 2437 MHz		

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	159.746	QP	22.26	15.38	7.99	32.08	0.00	13.55	43.50	29.9	100	0	
Hori.	463.205	QP	21.58	16.90	9.45	31.93	0.00	16.00	46.00	30.0	100	359	
Hori.	4874.829	PK	47.17	31.28	6.69	37.15	2.42	50.41	73.90	23.5	134	28	
Hori.	7311.000	PK	43.90	36.62	8.01	37.91	2.42	53.04	73.90	20.9	121	135	
Hori.	9748.000	PK	45.42	38.50	8.95	39.19	2.42	56.10	73.90	17.8	150	0	
Hori.	12185.000	PK	45.13	39.15	10.40	39.39	2.42	57.71	73.90	16.2	150	0	
Hori.	4874.829	AV	39.41	31.28	6.69	37.15	2.42	42.65	53.90	11.3	134	28	
Hori.	7311.000	AV	36.05	36.62	8.01	37.91	2.42	45.19	53.90	8.7	121	135	
Hori.	9748.000	AV	36.21	38.50	8.95	39.19	2.42	46.89	53.90	7.0	150	0	
Hori.	12185.000	AV	36.54	39.15	10.40	39.39	2.42	49.12	53.90	4.8	150	0	
Vert.	80.347	QP	39.16	6.26	7.71	32.15	0.00	20.98	40.00	19.0	119	126	
Vert.	82.781	QP	37.45	6.76	7.73	32.15	0.00	19.79	40.00	20.2	129	120	
Vert.	85.243	QP	34.38	7.26	7.75	32.15	0.00	17.24	40.00	22.7	118	129	
Vert.	87.665	QP	41.72	7.75	7.72	32.15	0.00	25.04	40.00	14.9	124	59	
Vert.	90.097	QP	39.39	8.25	7.69	32.15	0.00	23.18	43.50	20.3	118	103	
Vert.	624.805	QP	21.68	19.11	10.09	31.93	0.00	18.95	46.00	27.0	100	0	
Vert.	4874.321	PK	45.79	31.28	6.69	37.15	2.42	49.03	73.90	24.9	137	347	
Vert.	7311.000	PK	44.41	36.62	8.01	37.91	2.42	53.55	73.90	20.4	114	39	
Vert.	9748.000	PK	45.01	38.50	8.95	39.19	2.42	55.69	73.90	18.2	150	0	
Vert.	12185.000	PK	45.54	39.15	10.40	39.39	2.42	58.12	73.90	15.8	150	0	
Vert.	4874.321	AV	38.09	31.28	6.69	37.15	2.42	41.33	53.90	12.6	137	347	
Vert.	7311.000	AV	35.84	36.62	8.01	37.91	2.42	44.98	53.90	8.9	114	39	
Vert.	9748.000	AV	34.67	38.50	8.95	39.19	2.42	45.35	53.90	8.5	150	0	
Vert.	12185.000	AV	36.12	39.15	10.40	39.39	2.42	48.70	53.90	5.2	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log(3.96 m / 3.0 m) = 2.42 dB
13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.54 dB

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Radiated Spurious Emission

Test place : Shonan EMC Lab. No.2, 3 Semi Anechoic Chamber
Report No. : 11596802S-A
Date : January 29, 2017 February 3, 2017 February 1, 2017
Temperature / Humidity : 23 deg. C / 30 % RH 21 deg. C / 20 % RH 23 deg. C / 21 % RH
Engineer : Hikaru Shirasawa Yosuke Ishikawa Yosuke Ishikawa
 (1 GHz -13 GHz) (13 GHz -18 GHz) (18 GHz -26.5 GHz)
Mode : Tx 11g 2462 MHz

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	52.12	27.49	14.22	37.01	2.42	59.24	73.90	14.7	232	258	
Hori.	4924.153	PK	49.13	31.38	6.73	37.18	2.42	52.48	73.90	21.4	126	311	
Hori.	7311.000	PK	44.53	36.62	8.01	37.91	2.42	53.67	73.90	20.2	124	129	
Hori.	9748.000	PK	45.24	38.50	8.95	39.19	2.42	55.92	73.90	18.0	150	0	
Hori.	12185.000	PK	45.42	39.15	10.40	39.39	2.42	58.00	73.90	15.9	150	0	
Hori.	2483.500	AV	38.89	27.49	14.22	37.01	2.42	46.01	53.90	7.9	232	258	
Hori.	4924.153	AV	40.56	31.38	6.73	37.18	2.42	43.91	53.90	10.0	126	311	
Hori.	7311.000	AV	35.12	36.62	8.01	37.91	2.42	44.26	53.90	9.6	124	129	
Hori.	9748.000	AV	36.41	38.50	8.95	39.19	2.42	47.09	53.90	6.8	150	0	
Hori.	12185.000	AV	36.02	39.15	10.40	39.39	2.42	48.60	53.90	5.3	150	0	
Vert.	2483.500	PK	52.12	27.49	14.22	37.01	2.42	59.24	73.90	14.7	126	113	
Vert.	4923.845	PK	47.26	31.38	6.73	37.17	2.42	50.62	73.90	23.3	118	41	
Vert.	7311.000	PK	43.80	36.62	8.01	37.91	2.42	52.94	73.90	21.0	108	342	
Vert.	9748.000	PK	45.66	38.50	8.95	39.19	2.42	56.34	73.90	17.6	150	0	
Vert.	12185.000	PK	45.74	39.15	10.40	39.39	2.42	58.32	73.90	15.6	150	0	
Vert.	2483.500	AV	37.92	27.49	14.22	37.01	2.42	45.04	53.90	8.9	126	113	
Vert.	4923.845	AV	38.62	31.38	6.73	37.17	2.42	41.98	53.90	11.9	118	41	
Vert.	7311.000	AV	33.41	36.62	8.01	37.91	2.42	42.55	53.90	11.4	108	342	
Vert.	9748.000	AV	34.31	38.50	8.95	39.19	2.42	44.99	53.90	8.9	150	0	
Vert.	12185.000	AV	35.62	39.15	10.40	39.39	2.42	48.20	53.90	5.7	150	0	

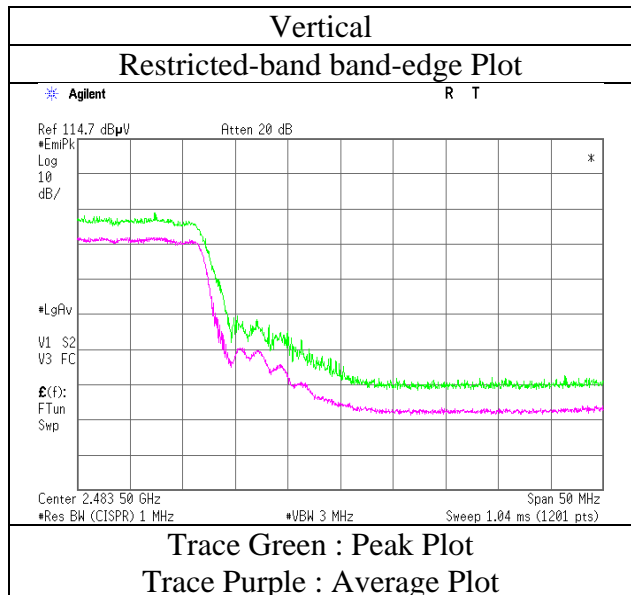
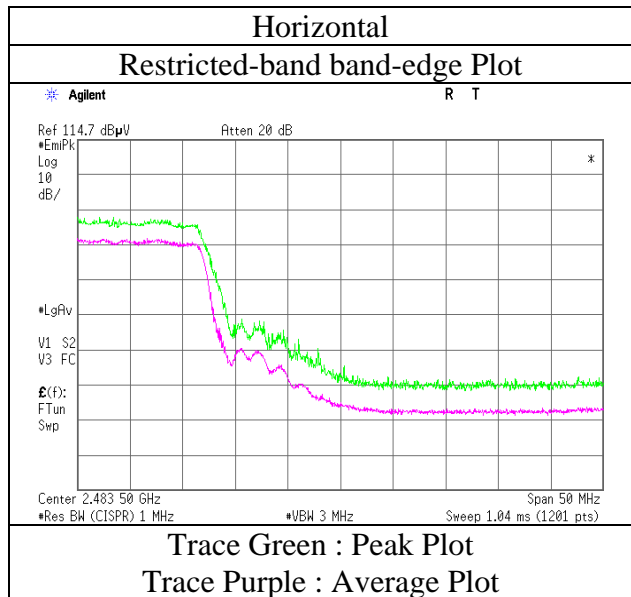
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.96\text{ m} / 3.0\text{ m}) = 2.42\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11596802S-A
Date	January 29, 2017
Temperature / Humidity	23 deg. C / 30 % RH
Engineer	Hikaru Shirasawa (1 GHz -13 GHz)
Mode	Tx 11g 2462 MHz



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.2, 3 Semi Anechoic Chamber
Report No. : 11596802S-A
Date : January 29, 2017 February 3, 2017 February 1, 2017
Temperature / Humidity : 23 deg. C / 30 % RH 21 deg. C / 20 % RH 23 deg. C / 21 % RH
Engineer : Hikaru Shirasawa Yosuke Ishikawa Yosuke Ishikawa
 (1 GHz -13 GHz) (13 GHz -18 GHz) (18 GHz -26.5 GHz)
Mode : Tx 11n-20 2412 MHz

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	50.47	27.17	14.15	37.06	2.42	57.15	73.90	16.8	204	266	
Hori.	4823.850	PK	47.92	31.17	6.65	37.13	2.42	51.03	73.90	22.9	128	319	
Hori.	7236.000	PK	44.07	36.49	7.99	37.86	2.42	53.11	73.90	20.8	145	133	
Hori.	9648.000	PK	45.61	38.34	8.91	39.15	2.42	56.13	73.90	17.8	150	0	
Hori.	12060.000	PK	45.44	39.15	10.37	39.38	2.42	58.00	73.90	15.9	150	0	
Hori.	2390.000	AV	37.69	27.17	14.15	37.06	2.42	44.37	53.90	9.5	204	266	
Hori.	4823.850	AV	40.29	31.17	6.65	37.13	2.42	43.40	53.90	10.5	128	319	
Hori.	7236.000	AV	34.79	36.49	7.99	37.86	2.42	43.83	53.90	10.1	145	133	
Hori.	9648.000	AV	35.12	38.34	8.91	39.15	2.42	45.64	53.90	8.3	150	0	
Hori.	12060.000	AV	15.67	39.15	10.37	39.38	2.42	28.23	53.90	25.7	150	0	
Vert.	2390.000	PK	51.00	27.17	14.15	37.06	2.42	57.68	73.90	16.2	122	111	
Vert.	4824.118	PK	46.30	31.17	6.65	37.13	2.42	49.41	73.90	24.5	235	16	
Vert.	7236.000	PK	44.15	36.49	7.99	37.86	2.42	53.19	73.90	20.7	115	298	
Vert.	9648.000	PK	44.81	38.34	8.91	39.15	2.42	55.33	73.90	18.6	150	0	
Vert.	12060.000	PK	45.51	39.15	10.37	39.38	2.42	58.07	73.90	15.8	150	0	
Vert.	2390.000	AV	37.47	27.17	14.15	37.06	2.42	44.15	53.90	9.7	122	111	
Vert.	4824.118	AV	36.57	31.17	6.65	37.13	2.42	39.68	53.90	14.2	235	16	
Vert.	7236.000	AV	34.85	36.49	7.99	37.86	2.42	43.89	53.90	10.0	115	298	
Vert.	9648.000	AV	35.12	38.34	8.91	39.15	2.42	45.64	53.90	8.3	150	0	
Vert.	12060.000	AV	36.03	39.15	10.37	39.38	2.42	48.59	53.90	5.3	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.96\text{ m} / 3.0\text{ m}) = 2.42\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	82.98	27.24	14.16	37.04	2.42	89.76	-	-	Carrier
Hori.	2400.000	PK	53.04	27.20	14.15	37.05	2.42	59.76	69.76	10.0	
Vert.	2412.000	PK	82.98	27.24	14.16	37.04	2.42	89.76	-	-	Carrier
Vert.	2400.000	PK	52.47	27.20	14.15	37.05	2.42	59.19	69.76	10.6	

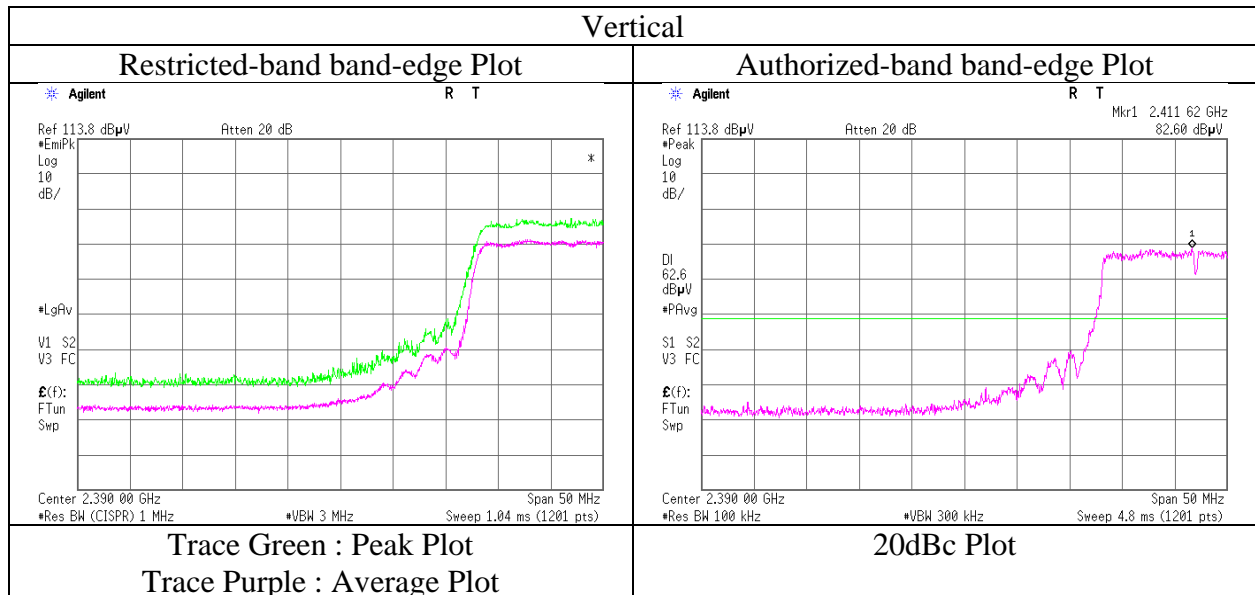
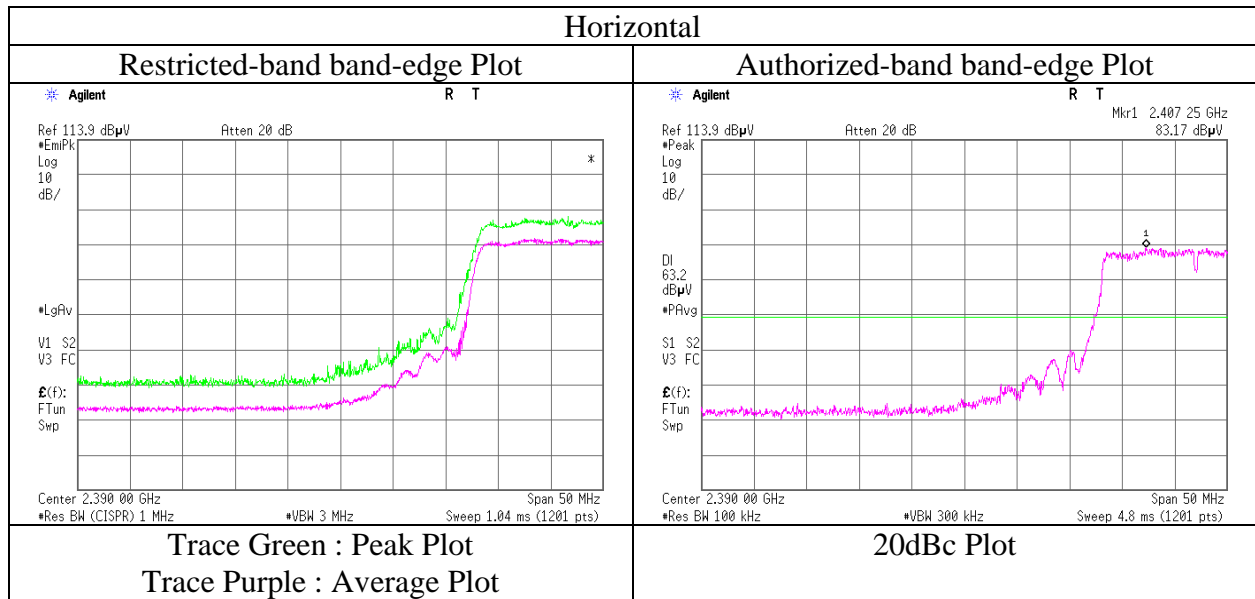
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.96\text{ m} / 3.0\text{ m}) = 2.42\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11596802S-A
Date	January 29, 2017
Temperature / Humidity	23 deg. C / 30 % RH
Engineer	Hikaru Shirasawa (1 GHz -13 GHz)
Mode	Tx 11n-20 2412 MHz



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.2, 3 Semi Anechoic Chamber
Report No. : 11596802S-A
Date : January 29, 2017 February 3, 2017 February 1, 2017
Temperature / Humidity : 23 deg. C / 30 % RH 21 deg. C / 20 % RH 23 deg. C / 21 % RH
Engineer : Hikaru Shirasawa Yosuke Ishikawa Yosuke Ishikawa
 (1 GHz -13 GHz) (13 GHz -18 GHz) (18 GHz -26.5 GHz)
Mode : Tx 11n-20 2437 MHz

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4874.004	PK	47.81	31.28	6.69	37.15	2.42	51.05	73.90	22.9	118	325	
Hori.	7311.000	PK	43.41	36.62	8.01	37.91	2.42	52.55	73.90	21.4	128	164	
Hori.	9748.000	PK	44.85	38.50	8.95	39.19	2.42	55.53	73.90	18.4	150	0	
Hori.	12185.000	PK	45.10	39.15	10.40	39.39	2.42	57.68	73.90	16.2	150	0	
Hori.	4874.004	AV	40.89	31.28	6.69	37.15	2.42	44.13	53.90	9.8	118	325	
Hori.	7311.000	AV	34.97	36.62	8.01	37.91	2.42	44.11	53.90	9.8	128	164	
Hori.	9748.000	AV	36.53	38.50	8.95	39.19	2.42	47.21	53.90	6.7	150	0	
Hori.	12185.000	AV	36.12	39.15	10.40	39.39	2.42	48.70	53.90	5.2	150	0	
Vert.	4874.072	PK	46.73	31.28	6.69	37.15	2.42	49.97	73.90	23.9	120	355	
Vert.	7311.000	PK	43.84	36.62	8.01	37.91	2.42	52.98	73.90	20.9	118	164	
Vert.	9748.000	PK	45.43	38.50	8.95	39.19	2.42	56.11	73.90	17.8	150	0	
Vert.	12185.000	PK	46.01	39.15	10.40	39.39	2.42	58.59	73.90	15.3	150	0	
Vert.	4874.072	AV	38.16	31.28	6.69	37.15	2.42	41.40	53.90	12.5	120	355	
Vert.	7311.000	AV	34.86	36.62	8.01	37.91	2.42	44.00	53.90	9.9	118	164	
Vert.	9748.000	AV	35.21	38.50	8.95	39.19	2.42	45.89	53.90	8.0	150	0	
Vert.	12185.000	AV	35.65	39.15	10.40	39.39	2.42	48.23	53.90	5.7	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : 20log(3.96 m / 3.0 m) = 2.42 dB

13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.54 dB

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Radiated Spurious Emission

Test place : Shonan EMC Lab. No.2, 3 Semi Anechoic Chamber
Report No. : 11596802S-A
Date : January 29, 2017 February 3, 2017 February 1, 2017
Temperature / Humidity : 23 deg. C / 30 % RH 21 deg. C / 20 % RH 23 deg. C / 21 % RH
Engineer : Hikaru Shirasawa Yosuke Ishikawa Yosuke Ishikawa
 (1 GHz -13 GHz) (13 GHz -18 GHz) (18 GHz -26.5 GHz)
Mode : Tx 11n-20 2462 MHz

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	46.34	27.49	14.22	37.01	2.42	53.46	73.90	20.4	212	266	
Hori.	4924.032	PK	47.53	31.38	6.73	37.18	2.42	50.88	73.90	23.0	146	319	
Hori.	7386.000	PK	43.79	36.75	8.04	37.96	2.42	53.04	73.90	20.9	106	54	
Hori.	9848.000	PK	44.86	38.65	8.99	39.23	2.42	55.69	73.90	18.2	150	0	
Hori.	12310.000	PK	45.86	39.15	10.45	39.39	2.42	58.49	73.90	15.4	150	0	
Hori.	2483.500	AV	35.62	27.49	14.22	37.01	2.42	42.74	53.90	11.2	212	266	
Hori.	4924.032	AV	41.35	31.38	6.73	37.18	2.42	44.70	53.90	9.2	146	319	
Hori.	7386.000	AV	34.19	36.75	8.04	37.96	2.42	43.44	53.90	10.5	106	54	
Hori.	9848.000	AV	35.07	38.65	8.99	39.23	2.42	45.90	53.90	8.0	150	0	
Hori.	12310.000	AV	36.14	39.15	10.45	39.39	2.42	48.77	53.90	5.1	150	0	
Vert.	2483.500	PK	45.26	27.49	14.22	37.01	2.42	52.38	73.90	21.5	156	125	
Vert.	4923.984	PK	45.86	31.38	6.73	37.18	2.42	49.21	73.90	24.7	115	354	
Vert.	7386.000	PK	44.02	36.75	8.04	37.96	2.42	53.27	73.90	20.6	120	164	
Vert.	9848.000	PK	45.32	38.65	8.99	39.23	2.42	56.15	73.90	17.8	150	0	
Vert.	12310.000	PK	45.79	39.15	10.45	39.39	2.42	58.42	73.90	15.5	150	0	
Vert.	2483.500	AV	34.94	27.49	14.22	37.01	2.42	42.06	53.90	11.8	156	125	
Vert.	4923.984	AV	37.49	31.38	6.73	37.18	2.42	40.84	53.90	13.1	115	354	
Vert.	7386.000	AV	34.65	36.75	8.04	37.96	2.42	43.90	53.90	10.0	120	164	
Vert.	9848.000	AV	34.51	38.65	8.99	39.23	2.42	45.34	53.90	8.6	150	0	
Vert.	12310.000	AV	35.54	39.15	10.45	39.39	2.42	48.17	53.90	5.7	150	0	

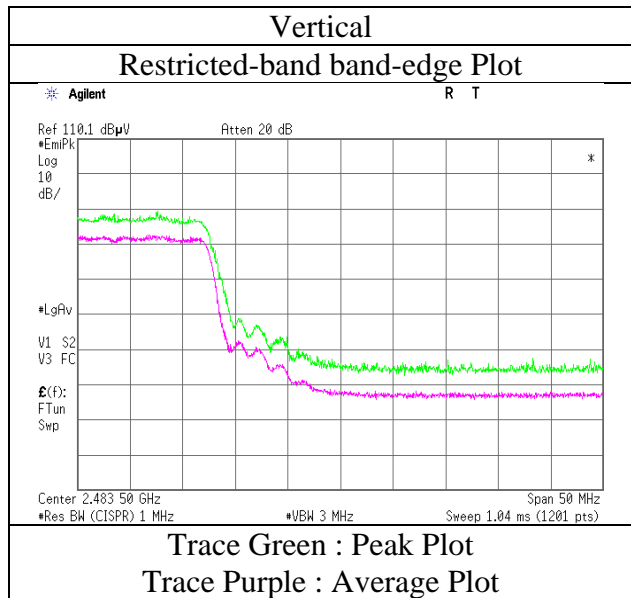
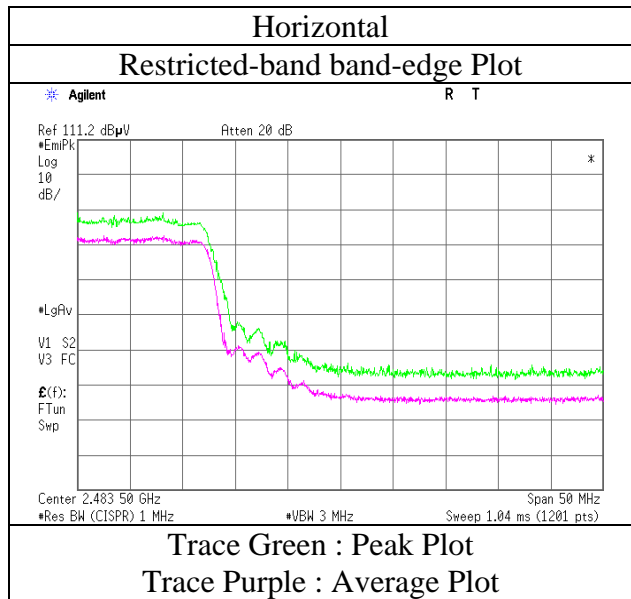
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : 20log (3.96 m / 3.0 m) = 2.42 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

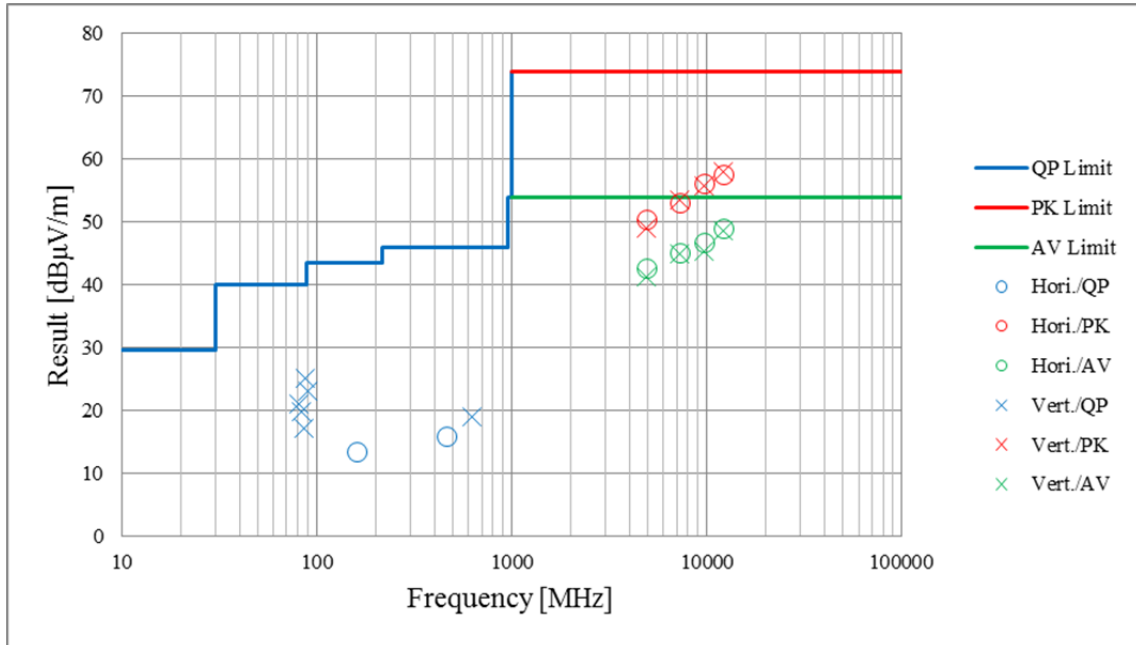
Test place	Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11596802S-A
Date	January 29, 2017
Temperature / Humidity	23 deg. C / 30 % RH
Engineer	Hikaru Shirasawa (1 GHz -13 GHz)
Mode	Tx 11n-20 2462 MHz



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

Radiated Spurious Emission
(Plot data, Worst case)

Test place	Shonan EMC Lab. No.2, 3 Semi Anechoic Chamber		
Report No.	11596802S-A		
Date	January 29, 2017	February 3, 2017	February 1, 2017
Temperature / Humidity	23 deg. C / 30 % RH	21 deg. C / 20 % RH	23 deg. C / 21 % RH
Engineer	Hikaru Shirasawa (1 GHz -13 GHz)	Yosuke Ishikawa (13 GHz -18 GHz)	Yosuke Ishikawa (30 MHz -1000 MHz) (18 GHz -26.5 GHz)
Mode	Tx 11g 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)
SAEC-02(NSA)	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	RE	2016/07/13 * 12
SAF-05	Pre Amplifier	TOYO Corporation	TPA0118-36	1440490	RE	2016/02/10 * 12
SCC-G05	Coaxial Cable	Junkosha	J12J102207-00	APR-30-15-03 7	RE	2017/01/08 * 12
SCC-G22	Coaxial Cable	Suhner	SUCOFLEX 104	296199/4	RE	2016/05/11 * 12
SHA-02	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-726	RE	2016/08/09 * 12
SOS-03	Humidity Indicator	A&D	AD-5681	4063325	RE	2016/10/12 * 12
SRENT-08	Spectrum Analyzer	Agilent	E4448A	MY501800 19	RE	2016/10/24 * 12
SJM-09	Measure	PROMART	SEN1935	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,C E, RFI,MF)	-	RE	-
STS-02	Digital Hitester	Hioki	3805-50	080997819	RE	2016/03/22 * 12
SCC-G41	Coaxial Cable	Junkosha	MWX221-01000 NF SNMS/B	1612S006	RE	2017/01/08 * 12
SFL-18	Highpass Filter	MICRO-TRONICS	HPM50111	119	RE	2016/04/18 * 12
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2016/11/07 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2016/07/15 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26 W	00000019	RE	2016/03/23 * 12
SCC-G33	Coaxial Cable	Junkosha	MWX241-01000 KM SKMS	-	RE	2016/04/18 * 12
SCC-G15	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	RE	2016/03/08 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2016/03/15 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2016/10/12 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE	-
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE	2016/10/17 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2016/10/18 * 12
SLA-07	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	196	RE	2017/01/26 * 12
SAT6-08	Attenuator	HIROSE ELECTRIC CO.,LTD.	AT-406(40)	-	RE	2016/08/04 * 12
SCC-C1/C2/C 3/C4/C5/C10/ SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suh ne r/Suhner/Suhner/Suhn er/TOYO	8D2W/12DSFA/1 4 1PE/141PE/141P E /141PE/NS4906	-/0901-271 (RF Selector)	RE	2016/04/22 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2016/02/25 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	RE	2016/03/28 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2016/08/22 * 12
SAEC-03(SVS W R)	Semi-Anechoic Chamber	TDK	SAEC-03(SVSW R)	3	RE	2016/07/25 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2016/11/29 * 12
SCC-G40	Coaxial Cable	Junkosha	MWX221-01000 NF SNMS/B	1612S005	RE	2017/01/08 * 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

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