



RADIO TEST REPORT

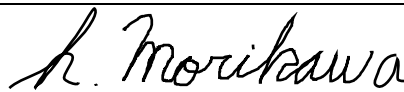
Test Report No. : 11008648S-G

Applicant : Panasonic Corporation
Type of Equipment : Car Audio System
Model No. : AT1602
FCC ID : ACJ932AT1602
Test regulation : FCC Part 15 Subpart C: 2015
Test Result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
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: October 27 to November 16, 2015

Representative test engineer:



Hiroyuki Morikawa

Engineer

Consumer Technology Division

Approved by:



Ichiro Isozaki

Manager

Consumer Technology Division



JAB
Testing
RTL02610

- ☒ 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.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

13-EM-F0429

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SECTION 1: Customer information

Company Name	:	Panasonic Corporation
Address	:	4261 Ikonobe-cho, Tsuzuki-ku, Yokohama-city, 224-8520, Japan
Telephone Number	:	+81-50-3689-6981
Contact Person	:	Hiroyuki Ishikawa

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

2.1 Identification of E.U.T.

Type of Equipment	:	Car Audio System
Model No.	:	AT1602
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 13.2 V
Receipt Date of Sample	:	October 27, 2015
Country of Mass-production	:	Japan, Czech, Mexico, Thailand
Condition of EUT	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No Modification by the test lab.

2.2 Product Description

Model: AT1602 (referred to as the EUT in this report) is a Car Audio System.

General Specification

Clock frequency(ies) in the system	:	26 MHz, 37 MHz, 48 MHz, 194 MHz, 666 MHz, 1.0 GHz
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Radio Specification

Radio Type	:	Transceiver
Frequency of Operation	:	2412 MHz - 2462 MHz
Modulation	:	DSSS
Power Supply (radio part input)	:	DC 3.3 V, DC 1.8 V
Antenna type	:	Dipole Antenna
Antenna gain with cable loss	:	-0.525 dBi

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2015, final revised on November 23, 2015
 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

*Some parts are effective on and after December 17, 2015 or December 23, 2015. The revision does not affect the test specification applied to the EUT.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.4-2009 7. AC powerline Conducted Emission measurements IC: RSS-Gen 8.8	FCC: Section 15.207 IC: RSS-Gen 8.8	-	N/A *1)	-
6dB Bandwidth	FCC: KDB 558074 D01 DTS Meas Guidance v03r03 IC: -	FCC: Section 15.247(a)(2) IC: RSS-247 5.2(1)	See data.	Complied	Conducted
Maximum Peak Output Power	FCC: KDB 558074 D01 DTS Meas Guidance v03r03 IC: RSS-Gen 6.12	FCC: Section 15.247(b)(3) IC: RSS-247 5.4(4)		Complied	Conducted
Power Density	FCC: KDB 558074 D01 DTS Meas Guidance v03r03 IC: -	FCC: Section 15.247(e) IC: RSS-247 5.2(2)		Complied	Conducted
Spurious Emission Restricted Band Edges	FCC: KDB 558074 D01 DTS Meas Guidance v03r03 IC: RSS-Gen 6.13	FCC: Section 15.247(d) IC: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	4.5 dB 2483.500 MHz, AV, Vertical Tx 2452 MHz IEEE 802.11n-40	Complied	Conducted (below 30 MHz)/ Radiated (above 30 MHz) *2)

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.

*1) The test is not applicable since the EUT has no AC mains.

*2) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 DTS Meas Guidance v03r03 12.2.7.

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

However, there is one deviation from ANSI C 63.10:2013. (ANSI C63.10:2013 is Non-accreditation)

Measurement height is not 1.5 m, but 0.8 m.

FCC Part 15.31 (e)

The equipment provides the wireless transmitter with stable power supply (RF: DC 3.3 V, I/O: DC 1.8 V).

Instead of a new battery, DC power supply was used for the test. That does not affect the test result, therefore the EUT complies with the requirement.

FCC Part 15.203

The equipment and its antenna comply with the requirement since the antenna is built in the equipment and it cannot be replaced by end users.

UL Japan, Inc.

Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	IC: RSS-Gen 6.6	IC: -	N/A	-	Conducted

Other than above, no addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor $k = 2$.
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Item	Frequency range	Uncertainty (+/-)		
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	3.6 dB	3.4 dB	3.4 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.7 dB	3.5 dB	3.5 dB
	30 MHz-300 MHz	4.9 dB	4.9 dB	4.7 dB
	300 MHz-1 GHz	5.0 dB	5.0 dB	4.8 dB
	1 GHz-13 GHz	4.9 dB	4.9 dB	4.9 dB
Radiated emission (Measurement distance: 1 m)	13 GHz-18 GHz	5.7 dB	5.7 dB	5.7 dB
	18 GHz-40 GHz	4.5 dB	4.3 dB	4.3 dB

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector)_SPM-06	0.76 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-06	0.79 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.74 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-07	1.08 dB
Spurious emission (Conducted) below 1GHz	1.5 dB
Spurious emission (Conducted) 1 GHz-3 GHz	1.7 dB
Spurious emission (Conducted) 3 GHz-18 GHz	2.4 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.5 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.5 dB
Bandwidth Measurement	0.66 %
Duty cycle and Time Measurement	0.012 %

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.
1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN
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	10m
No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
No.3 Semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
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.

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

4.1 Operating Mode(s)

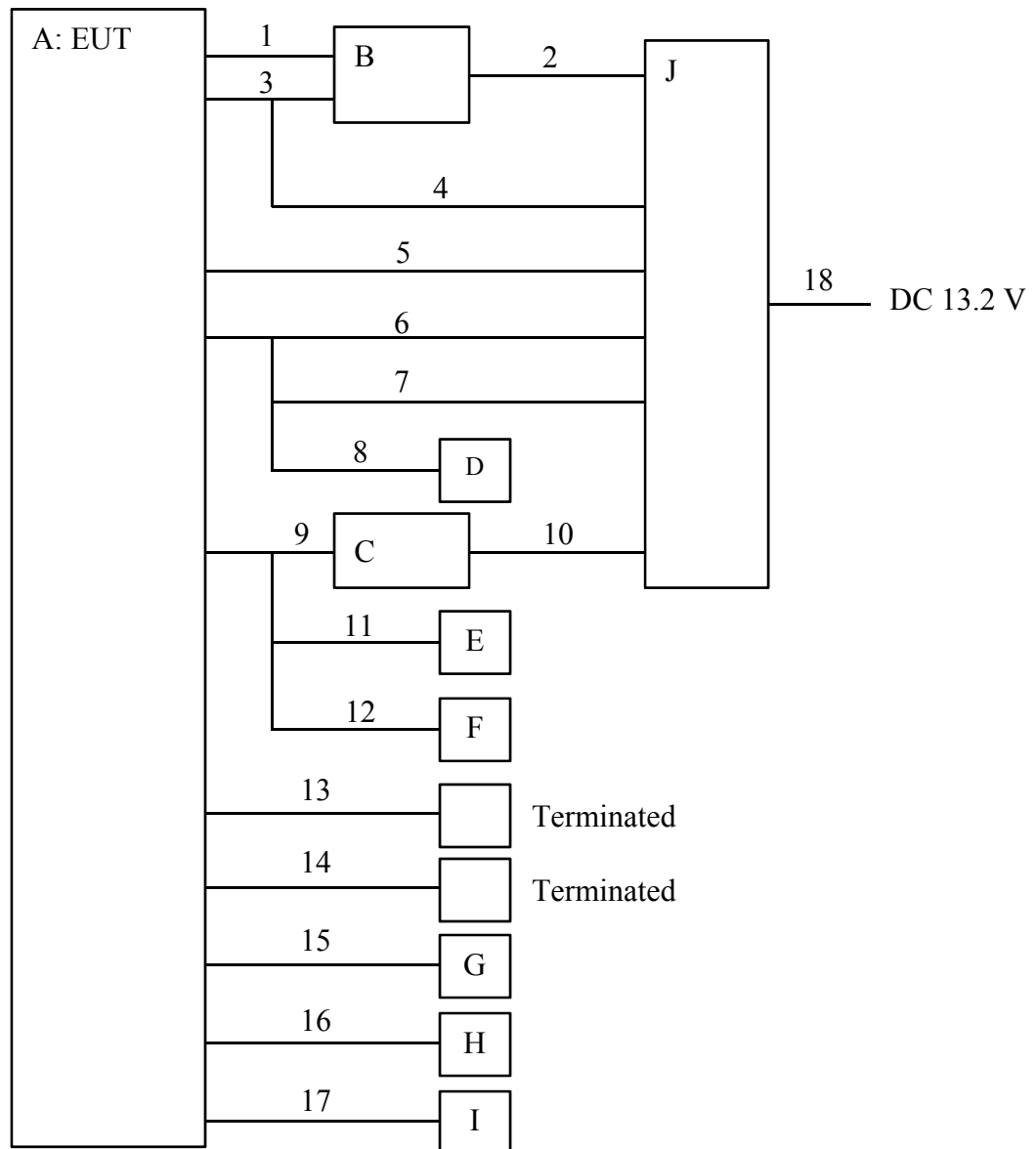
Test operating mode was determined as follows according to “Section 1 of 6 802.11 a/b/g/n testing - Managing Complex Regulatory Approvals - ” of TCB Council Workshop October 2009.

Mode	Remarks*
IEEE 802.11b (11b)	11 Mbps, PN9
IEEE 802.11g (11g)	54 Mbps, PN9
IEEE 802.11n HT20 (11n-20)	MCS 6 (800 ns GI), PN9
IEEE 802.11n HT40 (11n-40)	MCS 7 (800 ns GI), PN9
*The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)	
Power settings: Fixed	
Software (Firmware): D17517010700001V0, Ver. 1.0	

*The details of Operating mode(s)

Test Item	Operating Mode	Tested frequency
Spurious Emission (below 1 GHz)	11g Tx	2437 MHz
Spurious Emission (above 1 GHz)	11b Tx	2412 MHz
	11g Tx	2437 MHz
	11n-20 Tx	2462 MHz
	11n-40 Tx	2422 MHz
		2437 MHz 2452 MHz
Bandedge Compliance	11b Tx	2412 MHz 2462 MHz
	11g Tx 11n-20 Tx	2412 MHz 2417 MHz 2462 MHz
		2422 MHz
	11n-40 Tx	2452 MHz
6dB Bandwidth Maximum Peak Output Power Power Density 99% Occupied Bandwidth	11b Tx	2412 MHz
	11g Tx	2437 MHz
	11n-20 Tx	2462 MHz
	11n-40 Tx	2422 MHz
		2437 MHz 2452 MHz

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	Car Audio System	AT1602	CV-CS87N48X No.179	Panasonic	EUT
A'	Car Audio System	AT1603 (Display Combined Type (T2))	CV-CS87N08X No.180	Panasonic	EUT *1)
B	DCM	-	86741-53054	DENSO	-
C	AIR-con ECU	-	-	-	-
D	Steering Switch	ST-SW-IF	31	Panasonic	-
E	Microphone	-	86730-28040	-	-
F	Back Camera	-	86730-28040	-	-
G	USB	USM4GU	-	Sony	-
H	XM Antenna	-	-	-	-
I	GPS Antenna	-	-	Panasonic	-
J	Vehicle Signal Simulator	-	-	Panasonic	-

*1) For Antenna terminal conducted test, the result of AT1603 (Display Combined Type (T2)) is used since there is no difference in the radio block of AT1602 and AT1603 (Display Combined Type (T2)).

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Signal Cable	0.9	Unshielded	Unshielded	-
2	DC Cable	0.9	Unshielded	Unshielded	-
3	Signal Cable	2.3	Unshielded	Unshielded	-
4	DC Cable	0.9	Unshielded	Unshielded	-
5	DC Cable	0.9	Unshielded	Unshielded	-
6	DC Cable	1.5	Unshielded	Unshielded	-
7	DC Cable	2.5	Unshielded	Unshielded	-
8	Signal Cable	2.0	Unshielded	Unshielded	-
9	Signal Cable	1.5	Unshielded	Unshielded	-
10	DC Cable	0.9	Unshielded	Unshielded	-
11	Signal Cable	2.0	Shielded	Shielded	-
12	Signal Cable	2.5	Unshielded	Unshielded	-
13	Speaker Cable	1.1	Unshielded	Unshielded	-
14	Radio Cable	2.8	Shielded	Shielded	-
15	USB Cable	2.0	Shielded	Shielded	-
16	XM Antenna Cable	1.1	Unshielded	Unshielded	-
17	GPS Antenna Cable	2.0	Unshielded	Unshielded	-
18	DC Cable	1.5	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 v03r03".

EUT was placed on a platform of nominal size, 1.0 m by 2.0 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.

The height of the measuring antenna varied between 1 m and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.

The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.

The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).

The test was made with the detector (RBW/VBW) in the following table.

When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

Test Antennas are used as below;

Frequency	30 MHz to 300 MHz	300 MHz to 1 GHz	Above 1 GHz
Antenna Type	Biconical	Logperiodic	Horn

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

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

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV *2)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	Average Power Method: 12.2.5.2 RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (Linear voltage) Trace: 100 traces Duty factor was added to the results.	RBW: 100 kHz VBW: 300kHz
Test Distance	3m	3 m (below 13 GHz), 1 m *1) (above 13 GHz)		3 m (below 13 GHz), 1 m *1) (above 13 GHz)

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

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

The carrier level and noise levels were confirmed at angle of 0 to 30 deg. based on the product specification to see the position of maximum noise, and the test was made at the position (0 deg.) 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

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SECTION 6: Antenna Terminal Conducted Tests

Test Procedure

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

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
6dB Bandwidth	50 MHz / 100 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth *1)	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Sample	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak/ Average *2)	-	Power Meter (Sensor: 50 MHz BW)
Peak Power Density	1.5 times the 6dB Bandwidth	3 kHz	9.1 kHz	Auto	Peak	Max Hold	Spectrum Analyzer *3)
Conducted Spurious Emission *4)	9kHz to 150kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150kHz to 30MHz	10 kHz	30 kHz				
*1) Peak hold was applied as Worst-case measurement. *2) Reference data *3) Section 10.2 Method PKPSD (peak PSD) of "KDB 558074 D01 DTS Meas Guidance v03r03". *4) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents. ① Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart. (9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 10 kHz)							

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

Test data : APPENDIX
Test result : Pass

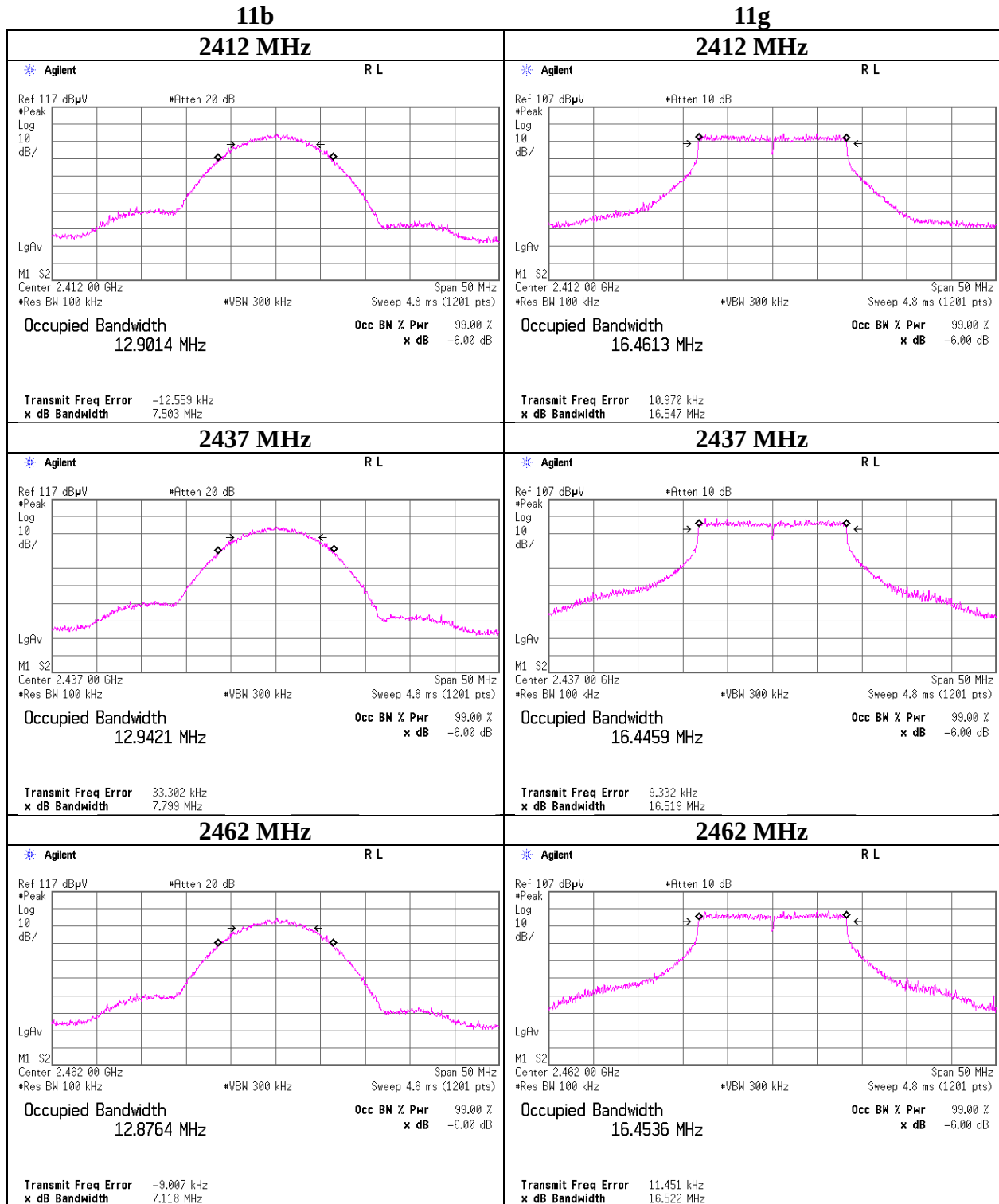
APPENDIX 1: Test data

6dB Bandwidth

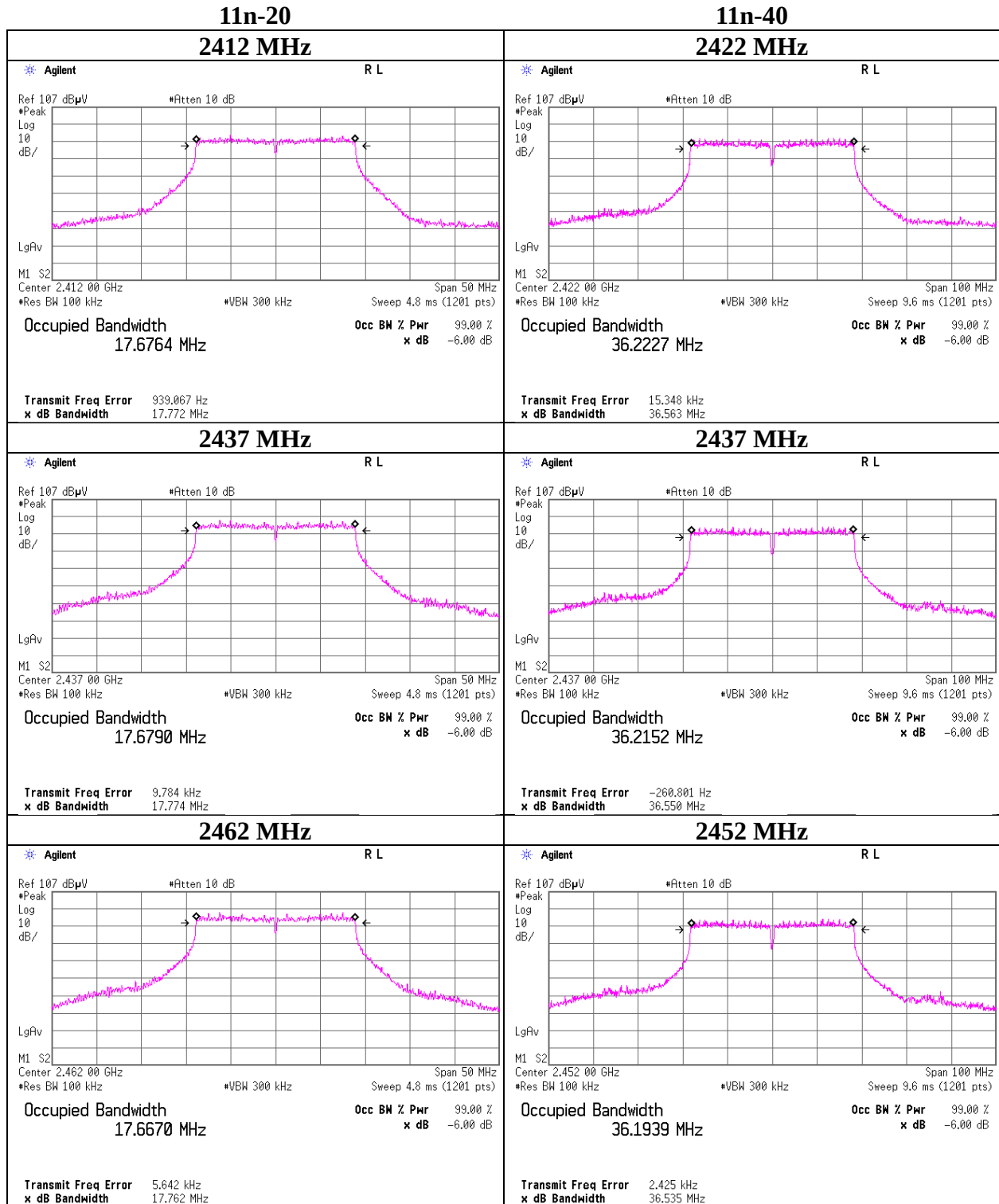
Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11008648S-G
Date	October 27, 2015
Temperature / Humidity	26 deg. C / 40 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx

Mode	Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
11b	2412	7.503	> 500
	2437	7.799	> 500
	2462	7.118	> 500
11g	2412	16.547	> 500
	2437	16.519	> 500
	2462	16.522	> 500
11n-20	2412	17.772	> 500
	2437	17.774	> 500
	2462	17.762	> 500
11n-40	2422	36.563	> 500
	2437	36.550	> 500
	2452	36.535	> 500

6dB Bandwidth



6dB Bandwidth



Maximum Peak Output Power

Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 11008648S-G
Date October 27, 2015
Temperature / Humidity 26 deg. C / 40 % RH
Engineer Hiroyuki Morikawa
Mode Tx 11b

Antenna 1

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	4.91	2.03	9.63	16.57	45.39	30.00	1000	13.43
2437	4.94	2.04	9.63	16.61	45.81	30.00	1000	13.39
2462	4.84	2.05	9.63	16.52	44.87	30.00	1000	13.48

Sample Calculation:

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

2412MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
1	4.72	
2	4.90	
5.5	4.90	
11	4.91	*

*: Worst Rate

All comparison were carried out on same frequency and measurement factors.

Maximum Peak Output Power

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11008648S-G
Date	October 27, 2015
Temperature / Humidity	26 deg. C / 40 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx 11g

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	7.20	2.03	9.63	18.86	76.91	30.00	1000	11.14
2437	10.00	2.04	9.63	21.67	146.89	30.00	1000	8.33
2462	9.88	2.05	9.63	21.56	143.22	30.00	1000	8.44

Sample Calculation:

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

2412 MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
6	2.67	
9	2.65	
12	2.57	
18	2.78	
24	7.19	
36	7.19	
48	6.24	
54	7.20	*

*: Worst Rate

All comparison were carried out on same frequency and measurement factors.

Maximum Peak Output Power

Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 11008648S-G
Date October 27, 2015
Temperature / Humidity 26 deg. C / 40 % RH
Engineer Hiroyuki Morikawa
Mode Tx 11n-20

800 ns GI

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	6.71	2.03	9.63	18.37	68.71	30.00	1000	11.63
2437	9.61	2.04	9.63	21.28	134.28	30.00	1000	8.72
2462	9.34	2.05	9.63	21.02	126.47	30.00	1000	8.98

Sample Calculation:

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

Maximum Peak Output Power

Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 11008648S-G
Date October 27, 2015
Temperature / Humidity 26 deg. C / 40 % RH
Engineer Hiroyuki Morikawa
Mode Tx 11n-20

800 ns GI, 2412 MHz

MCS Number	Reading [dBm]	Remark
0	2.02	
1	1.76	
2	1.96	
3	6.68	
4	6.45	
5	6.10	
6	6.71	*
7	6.32	

* Worst MCS

400 ns GI, 2412 MHz

MCS Number	Reading [dBm]	Remark
16	2.01	
17	1.75	
18	1.95	
19	6.67	
20	6.45	
21	6.08	
22	6.69	
23	6.30	

Maximum Peak Output Power

Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 11008648S-G
Date October 27, 2015
Temperature / Humidity 26 deg. C / 40 % RH
Engineer Hiroyuki Morikawa
Mode Tx 11n-40

800 ns GI

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2422	6.45	2.03	9.63	18.11	64.71	30.00	1000	11.89
2437	9.35	2.04	9.63	21.02	126.47	30.00	1000	8.98
2452	9.28	2.04	9.63	20.95	124.45	30.00	1000	9.05

Sample Calculation:

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

Maximum Peak Output Power

Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 11008648S-G
Date October 27, 2015
Temperature / Humidity 26 deg. C / 40 % RH
Engineer Hiroyuki Morikawa
Mode Tx 11n-40

800 ns GI, 2422 MHz

MCS Number	Reading [dBm]	Remark
0	1.36	
1	1.55	
2	1.37	
3	5.20	
4	5.80	
5	5.87	
6	5.38	
7	6.45	*

* Worst MCS

400 ns GI, 2422 MHz

MCS Number	Reading [dBm]	Remark
16	1.35	
17	1.54	
18	1.33	
19	5.18	
20	5.79	
21	5.86	
22	5.37	
23	6.42	

Average Output Power (Reference data)

Test place : Shonan EMC Lab. No.5 Shielded Room
Report No. : 11008648S-G
Date : October 27, 2015
Temperature / Humidity : 26 deg. C / 40 % RH
Engineer : Hiroyuki Morikawa
Mode : Tx

11b 5.5 Mbps

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Frame power)		Duty factor [dB]	Result (Burst power)	
				[dBm]	[mW]		[dBm]	[mW]
2412	2.44	2.03	9.63	14.10	25.70	0.01	14.11	25.76
2437	2.47	2.04	9.63	14.14	25.94	0.01	14.15	26.00
2462	2.24	2.05	9.63	13.92	24.66	0.01	13.93	24.72

11g 54 Mbps

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Frame power)		Duty factor [dB]	Result (Burst power)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-3.75	2.03	9.63	7.91	6.18	0.15	8.06	6.40
2437	-0.14	2.04	9.63	11.53	14.22	0.15	11.68	14.72
2462	-0.18	2.05	9.63	11.50	14.13	0.15	11.65	14.62

11n-20 MCS 4 (800 ns GI)

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Frame power)		Duty factor [dB]	Result (Burst power)	
				[dBm]	[mW]		[dBm]	[mW]
2412	-4.63	2.03	9.63	7.03	5.05	0.11	7.14	5.18
2437	-1.09	2.04	9.63	10.58	11.43	0.11	10.69	11.72
2462	-1.19	2.05	9.63	10.49	11.19	0.11	10.60	11.48

11n-40 MCS 7 (800 ns GI)

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Frame power)		Duty factor [dB]	Result (Burst power)	
				[dBm]	[mW]		[dBm]	[mW]
2422	-6.07	2.03	9.63	5.59	3.62	0.66	6.25	4.22
2437	-2.53	2.04	9.63	9.14	8.20	0.66	9.80	9.55
2452	-2.67	2.04	9.63	9.00	7.94	0.66	9.66	9.25

Sample Calculation:

Result (Frame power) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuat

Result (Burst power) = Frame power + Duty factor

Average Output Power (Reference data)

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11008648S-G
Date	October 27, 2015
Temperature / Humidity	26 deg. C / 40 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx

2412 MHz

Mode	Rate Mbps	Reading [dBm]	Duty factor [dB]	Burst power [dBm]	Remarks
11b	1	2.02	0.00	2.02	
	2	2.30	0.00	2.30	
	5.5	2.44	0.01	2.45	*
	11	2.32	0.03	2.35	
11g	6	-4.11	0.02	-4.09	
	9	-4.00	0.02	-3.98	
	12	-4.19	0.03	-4.16	
	18	-4.27	0.05	-4.22	
	24	-3.79	0.07	-3.72	
	36	-3.73	0.10	-3.63	
	48	-3.84	0.13	-3.71	
	54	-3.75	0.15	-3.60	*

* Worst rate

Sample Calculation:

Burst power = Reading (timed average) + Duty factor

All comparison were carried out on same frequency and measurement factors.

11n-20, 2412 MHz

Mode	Rate MCS	Reading [dBm]	Duty factor [dB]	Burst power [dBm]	Remarks
800 ns	0	-5.10	0.02	-5.08	
	1	-5.21	0.03	-5.18	
	2	-5.16	0.06	-5.10	
	3	-4.71	0.07	-4.64	
	4	-4.63	0.11	-4.52	*
	5	-4.70	0.14	-4.56	
	6	-4.74	0.16	-4.58	
	7	-4.73	0.19	-4.54	
400 ns	0	-5.12	0.02	-5.10	
	1	-5.22	0.03	-5.19	
	2	-5.18	0.06	-5.12	
	3	-4.72	0.07	-4.65	
	4	-4.66	0.11	-4.55	
	5	-4.71	0.14	-4.57	
	6	-4.75	0.16	-4.59	
	7	-4.74	0.19	-4.55	

* Worst rate

Sample Calculation:

Burst power = Reading (timed average) + Duty factor

All comparison were carried out on same frequency and measurement factors.

UL Japan, Inc.

Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Average Output Power (Reference data)

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11008648S-G
Date	October 27, 2015
Temperature / Humidity	26 deg. C / 40 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx

11n-40, 2422MHz

Mode	Rate MCS	Reading [dBm]	Duty factor [dB]	Burst power [dBm]	Remarks
800 ns	0	-5.82	0.08	-5.74	
	1	-5.86	0.15	-5.71	
	2	-5.94	0.23	-5.71	
	3	-5.71	0.29	-5.42	
	4	-5.93	0.42	-5.51	
	5	-6.12	0.54	-5.58	
	6	-6.16	0.63	-5.53	
	7	-6.07	0.66	-5.41	*
400 ns	0	-5.84	0.08	-5.76	
	1	-5.88	0.15	-5.73	
	2	-5.95	0.23	-5.72	
	3	-5.72	0.29	-5.43	
	4	-5.94	0.42	-5.52	
	5	-6.13	0.54	-5.59	
	6	-6.18	0.63	-5.55	
	7	-6.08	0.66	-5.42	

* Worst rate

Sample Calculation:

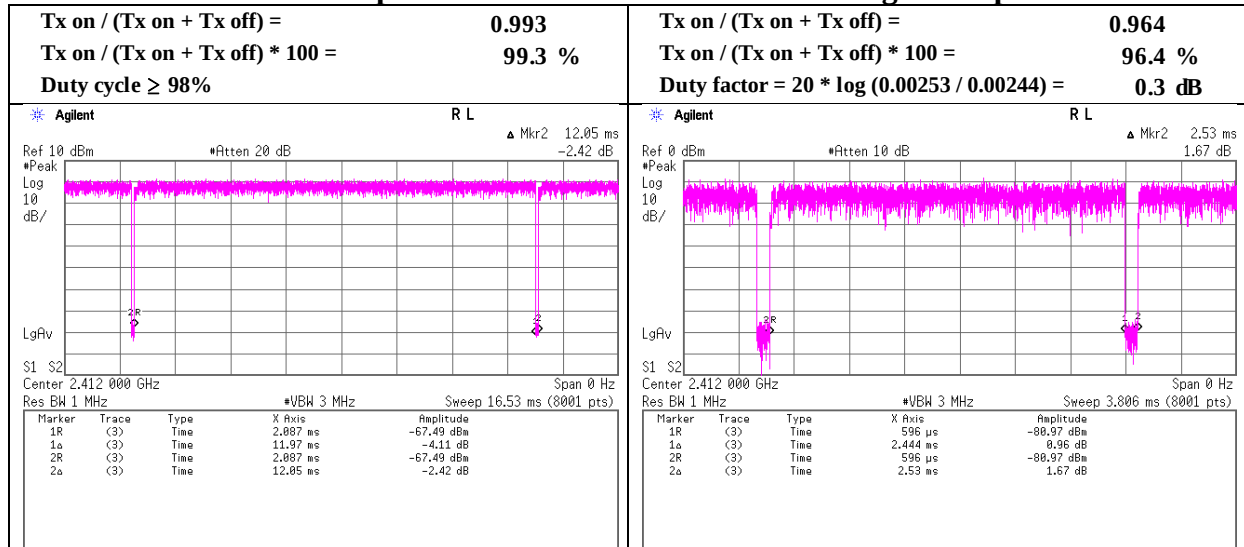
Burst power = Reading (timed average) + Duty factor

All comparison were carried out on same frequency and measurement factors.

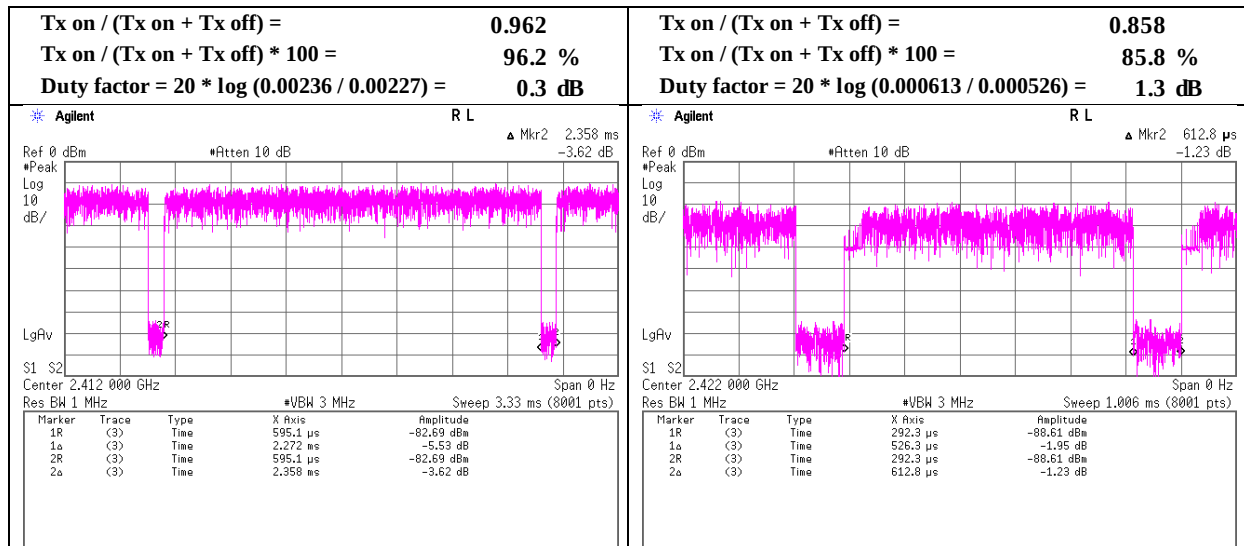
Burst rate confirmation

Test place : Shonan EMC Lab. No.5 Shielded Room
Report No. : 11008648S-G
Date : October 27, 2015
Temperature / Humidity : 26 deg. C / 40 % RH
Engineer : Hiroyuki Morikawa
Mode : Tx

11b 11 Mbps



11n-20 MCS 6



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Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11008648S-G		
Date	November 5, 2015	November 11, 2015	
Temperature / Humidity	25 deg. C / 37 % RH	24 deg. C / 41 % RH	
Engineer	Hiroyuki Morikawa (1-13 GHz)	Hiroyuki Morikawa (13-26 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	52.2	27.8	13.7	41.0	2.0	54.7	73.9	19.2	100	296	
Hori.	4824.000	PK	45.4	31.5	5.7	39.5	2.0	45.1	73.9	28.8	100	219	
Hori.	7236.000	PK	45.4	36.9	7.1	40.1	2.0	51.3	73.9	22.6	100	0	
Hori.	9648.000	PK	45.3	38.5	8.2	39.6	2.0	54.4	73.9	19.5	100	0	
Hori.	2390.000	AV	43.8	27.8	13.7	41.0	2.0	46.3	53.9	7.6	100	296	
Hori.	4824.000	AV	36.9	31.5	5.7	39.5	2.0	36.6	53.9	17.3	100	219	
Hori.	7236.000	AV	36.5	36.9	7.1	40.1	2.0	42.4	53.9	11.5	100	0	
Hori.	9648.000	AV	36.6	38.5	8.2	39.6	2.0	45.7	53.9	8.2	100	0	
Vert.	2390.000	PK	52.4	27.8	13.7	41.0	2.0	54.9	73.9	19.0	113	297	
Vert.	4824.000	PK	45.1	31.5	5.7	39.5	2.0	44.8	73.9	29.1	100	328	
Vert.	7236.000	PK	45.6	36.9	7.1	40.1	2.0	51.5	73.9	22.4	100	0	
Vert.	9648.000	PK	45.2	38.5	8.2	39.6	2.0	54.3	73.9	19.6	100	0	
Vert.	2390.000	AV	43.5	27.8	13.7	41.0	2.0	46.0	53.9	7.9	113	297	
Vert.	4824.000	AV	36.4	31.5	5.7	39.5	2.0	36.1	53.9	17.8	100	328	
Vert.	7236.000	AV	36.5	36.9	7.1	40.1	2.0	42.4	53.9	11.5	100	0	
Vert.	9648.000	AV	36.8	38.5	8.2	39.6	2.0	45.9	53.9	8.0	100	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

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	97.4	27.8	13.7	41.0	2.0	99.9	-	-	Carrier
Hori.	2400.000	PK	52.1	27.8	13.7	41.0	2.0	54.6	79.9	25.3	
Vert.	2412.000	PK	97.8	27.8	13.7	41.0	2.0	100.3	-	-	Carrier
Vert.	2400.000	PK	52.1	27.8	13.7	41.0	2.0	54.6	80.3	25.7	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

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Shonan EMC Lab.

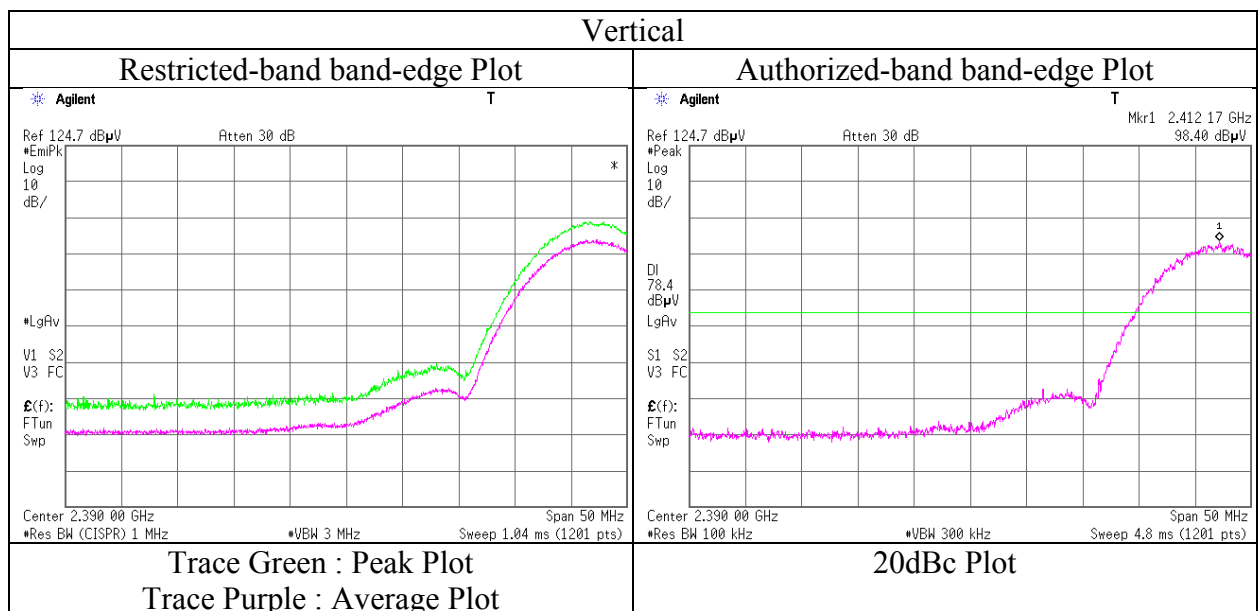
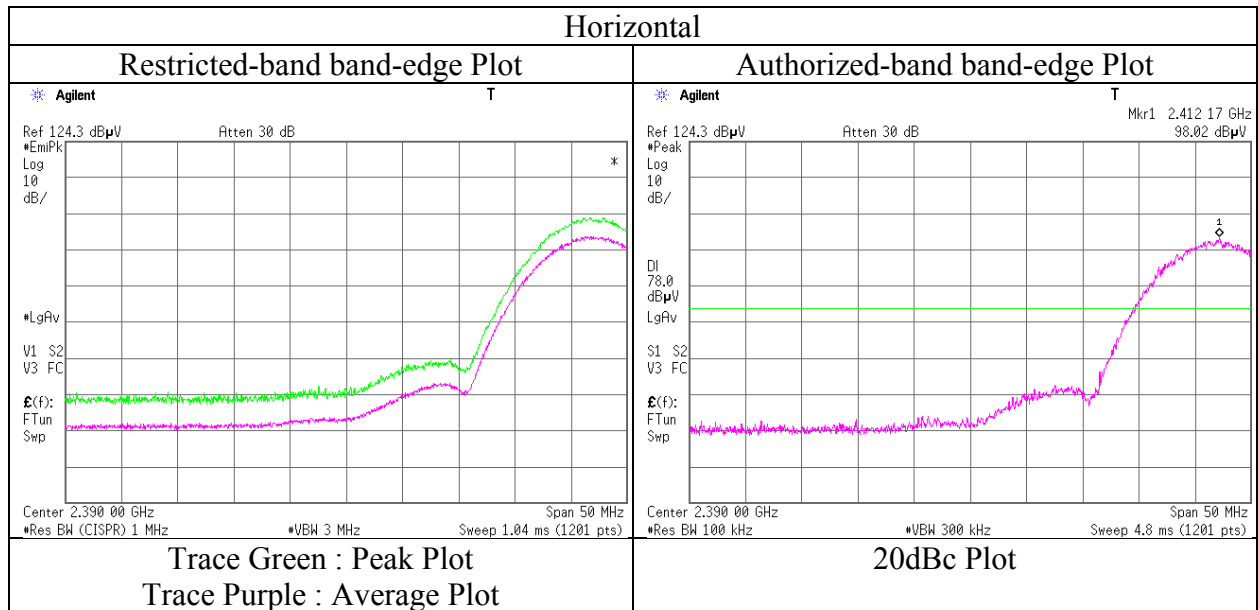
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11008648S-G
Date	November 5, 2015
Temperature / Humidity	25 deg. C / 37 % RH
Engineer	Hiroyuki Morikawa (1-13 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.3 Semi Anechoic Chamber
Report No. : 11008648S-G
Date : November 5, 2015 November 11, 2015
Temperature / Humidity : 25 deg. C / 37 % RH 24 deg. C / 41 % RH
Engineer : Hiroyuki Morikawa Hiroyuki Morikawa
 (1-13 GHz) (13-26 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.	4874.000	PK	45.5	31.7	5.8	39.5	2.0	45.5	73.9	28.4	100	215	
Hori.	7311.000	PK	45.1	36.9	7.2	40.2	2.0	51.0	73.9	22.9	100	0	
Hori.	9748.000	PK	44.5	38.5	8.2	39.5	2.0	53.7	73.9	20.2	100	0	
Hori.	4874.000	AV	36.8	31.7	5.8	39.5	2.0	36.8	53.9	17.1	100	215	
Hori.	7311.000	AV	36.2	36.9	7.2	40.2	2.0	42.1	53.9	11.8	100	0	
Hori.	9748.000	AV	36.2	38.5	8.2	39.5	2.0	45.4	53.9	8.5	100	0	
Vert.	4874.000	PK	44.7	31.7	5.8	39.5	2.0	44.7	73.9	29.2	100	9	
Vert.	7311.000	PK	45.3	36.9	7.2	40.2	2.0	51.2	73.9	22.7	100	0	
Vert.	9748.000	PK	45.5	38.5	8.2	39.5	2.0	54.7	73.9	19.2	100	0	
Vert.	4874.000	AV	35.6	31.7	5.8	39.5	2.0	35.6	53.9	18.3	100	9	
Vert.	7311.000	AV	36.3	36.9	7.2	40.2	2.0	42.2	53.9	11.7	100	0	
Vert.	9748.000	AV	36.2	38.5	8.2	39.5	2.0	45.4	53.9	8.5	100	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11008648S-G
Date : November 5, 2015 November 11, 2015
Temperature / Humidity : 25 deg. C / 37 % RH 24 deg. C / 41 % RH
Engineer : Hiroyuki Morikawa Hiroyuki Morikawa
 (1-13 GHz) (13-26 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	49.8	27.9	13.8	41.0	2.0	52.5	73.9	21.4	100	11	
Hori.	4924.000	PK	45.3	31.9	5.8	39.4	2.0	45.6	73.9	28.3	100	216	
Hori.	7386.000	PK	45.0	36.9	7.2	40.3	2.0	50.8	73.9	23.1	100	0	
Hori.	9848.000	PK	44.1	38.5	8.2	39.4	2.0	53.4	73.9	20.5	100	0	
Hori.	2483.500	AV	40.4	27.9	13.8	41.0	2.0	43.1	53.9	10.8	100	11	
Hori.	4924.000	AV	36.6	31.9	5.8	39.4	2.0	36.9	53.9	17.0	100	216	
Hori.	7386.000	AV	35.8	36.9	7.2	40.3	2.0	41.6	53.9	12.3	100	0	
Hori.	9848.000	AV	35.9	38.5	8.2	39.4	2.0	45.2	53.9	8.7	100	0	
Vert.	2483.500	PK	51.3	27.9	13.8	41.0	2.0	54.0	73.9	19.9	100	0	
Vert.	4924.000	PK	45.3	31.9	5.8	39.4	2.0	45.6	73.9	28.3	100	236	
Vert.	7386.000	PK	44.9	36.9	7.2	40.3	2.0	50.7	73.9	23.2	100	0	
Vert.	9848.000	PK	43.7	38.5	8.2	39.4	2.0	53.0	73.9	20.9	100	0	
Vert.	2483.500	AV	42.2	27.9	13.8	41.0	2.0	44.9	53.9	9.0	100	0	
Vert.	4924.000	AV	36.2	31.9	5.8	39.4	2.0	36.5	53.9	17.4	100	236	
Vert.	7386.000	AV	35.8	36.9	7.2	40.3	2.0	41.6	53.9	12.3	100	0	
Vert.	9848.000	AV	35.5	38.5	8.2	39.4	2.0	44.8	53.9	9.1	100	0	

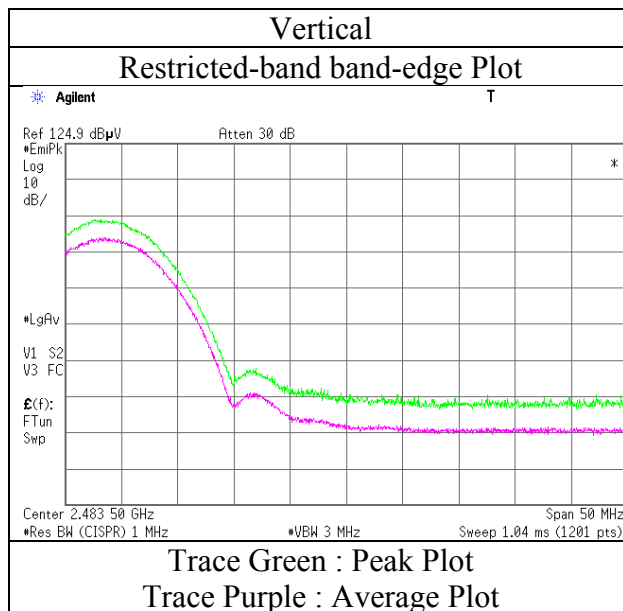
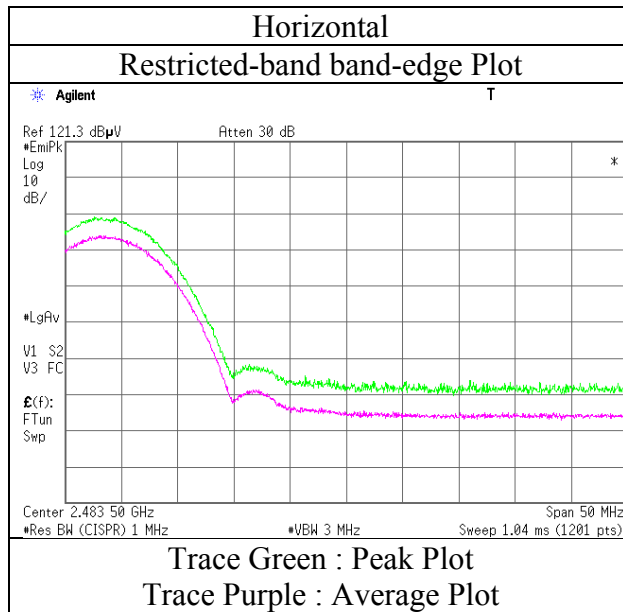
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11008648S-G
Date	November 5, 2015
Temperature / Humidity	25 deg. C / 37 % RH
Engineer	Hiroyuki Morikawa (1-13 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.3 Semi Anechoic Chamber
Report No. : 11008648S-G
Date : November 6, 2015 November 11, 2015
Temperature / Humidity : 25 deg. C / 39 % RH 24 deg. C / 41 % RH
Engineer : Hiroyuki Morikawa Hiroyuki Morikawa
(1-13 GHz) (13-26 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	50.1	27.7	14.8	41.0	2.0	53.6	73.9	20.3	104	320	
Hori.	4824.000	PK	44.6	31.4	7.4	39.5	2.0	45.9	73.9	28.0	100	200	
Hori.	7236.000	PK	45.5	36.6	9.0	40.1	2.0	53.0	73.9	20.9	100	0	
Hori.	9648.000	PK	45.7	38.0	9.9	39.6	2.0	56.0	73.9	17.9	100	0	
Vert.	2390.000	PK	55.5	27.7	14.8	41.0	2.0	59.0	73.9	14.9	219	351	
Vert.	4824.000	PK	44.4	31.4	7.4	39.5	2.0	45.7	73.9	28.2	100	301	
Vert.	7236.000	PK	45.0	36.6	9.0	40.1	2.0	52.5	73.9	21.4	100	0	
Vert.	9648.000	PK	45.5	38.0	9.9	39.6	2.0	55.8	73.9	18.1	100	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	39.6	27.7	14.8	41.0	0.3	2.0	43.4	53.9	10.5	*1)
Hori.	4824.000	AV	36.1	31.4	7.4	39.5	0.3	2.0	37.7	53.9	16.2	
Hori.	7236.000	AV	36.2	36.6	9.0	40.1	0.3	2.0	44.0	53.9	9.9	
Hori.	9648.000	AV	36.8	38.0	9.9	39.6	0.3	2.0	47.4	53.9	6.5	
Vert.	2390.000	AV	42.7	27.7	14.8	41.0	0.3	2.0	46.5	53.9	7.4	*1)
Vert.	4824.000	AV	35.6	31.4	7.4	39.5	0.3	2.0	37.2	53.9	16.7	
Vert.	7236.000	AV	36.4	36.6	9.0	40.1	0.3	2.0	44.2	53.9	9.7	
Vert.	9648.000	AV	36.5	38.0	9.9	39.6	0.3	2.0	47.1	53.9	6.8	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

*1) Not out of band emission (Leakage Power)

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	86.2	27.7	14.9	41.0	2.0	89.8	-	-	Carrier
Hori.	2400.000	PK	51.9	27.7	14.9	41.0	2.0	55.5	69.7	14.2	
Vert.	2412.000	PK	90.9	27.7	14.9	41.0	2.0	94.5	-	-	Carrier
Vert.	2400.000	PK	57.0	27.7	14.9	41.0	2.0	60.6	74.5	13.9	

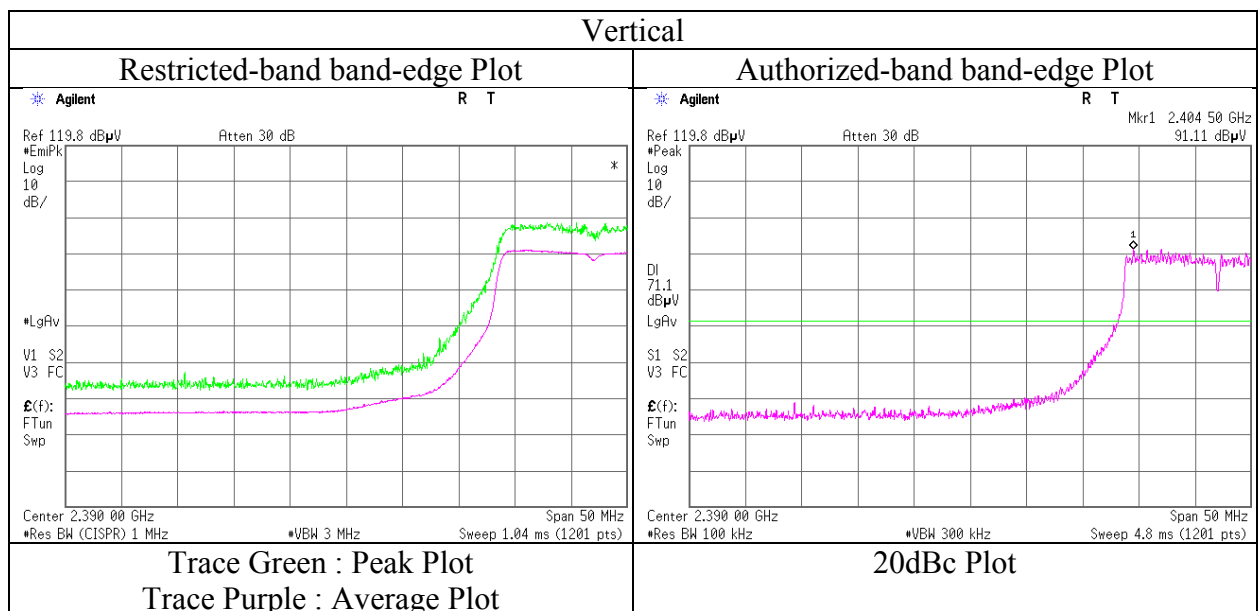
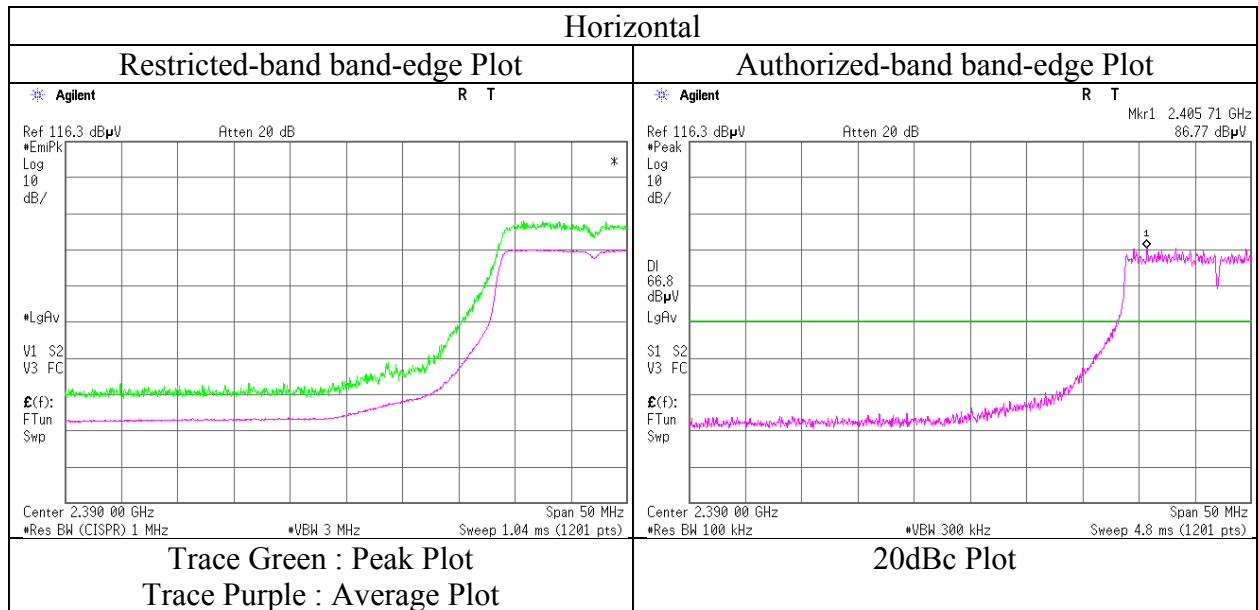
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11008648S-G
Date	November 6, 2015
Temperature / Humidity	25 deg. C / 39 % RH
Engineer	Hiroyuki Morikawa (1-13 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.3 Semi Anechoic Chamber
Report No. : 11008648S-G
Date : November 16, 2015
Temperature / Humidity : 24 deg. C / 45 % RH
Engineer : Yosuke Ishikawa
(1-2.8 GHz)
Mode : Tx 11g 2417 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	50.6	27.8	13.7	41.0	2.0	53.1	73.9	20.8	276	291	
Vert.	2390.000	PK	53.5	27.8	13.7	41.0	2.0	56.0	73.9	17.9	100	350	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	38.9	27.8	13.7	41.0	0.3	2.0	41.7	53.9	12.2	*1)
Vert.	2390.000	AV	41.3	27.8	13.7	41.0	0.3	2.0	44.1	53.9	9.8	*1)

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

*1) Not out of band emission (Leakage Power)

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.	2417.000	PK	89.7	27.8	13.7	41.0	2.0	92.2	-	-	Carrier
Hori.	2400.000	PK	47.7	27.8	13.7	41.0	2.0	50.2	72.2	22.0	
Vert.	2417.000	PK	91.9	27.8	13.7	41.0	2.0	94.4	-	-	Carrier
Vert.	2400.000	PK	51.3	27.8	13.7	41.0	2.0	53.8	74.4	20.6	

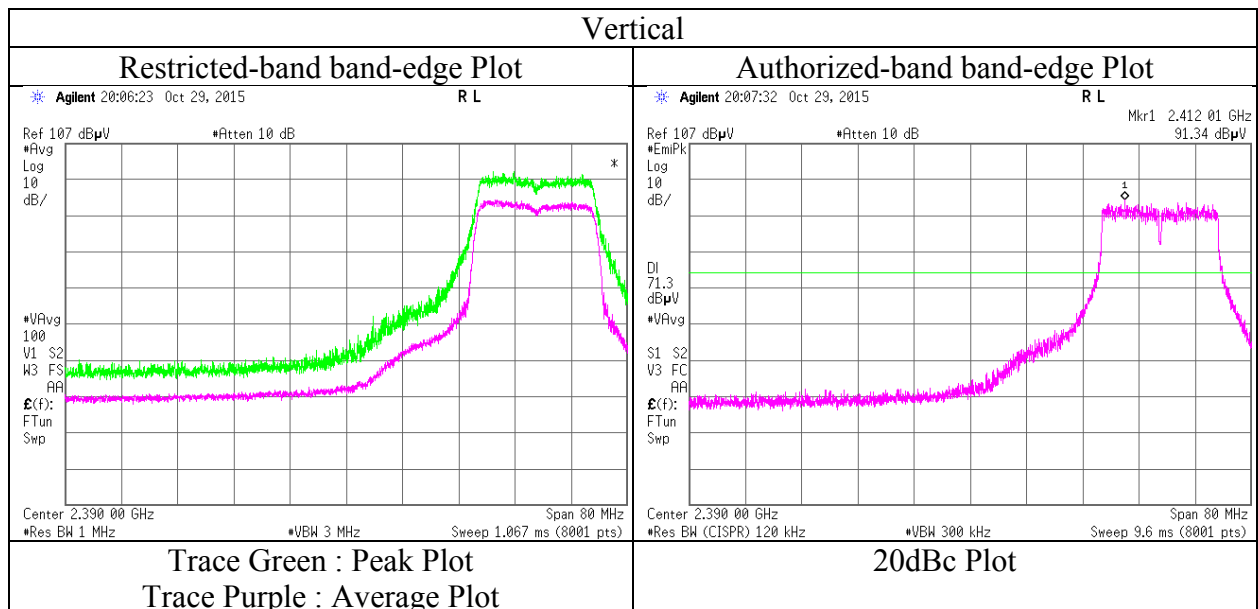
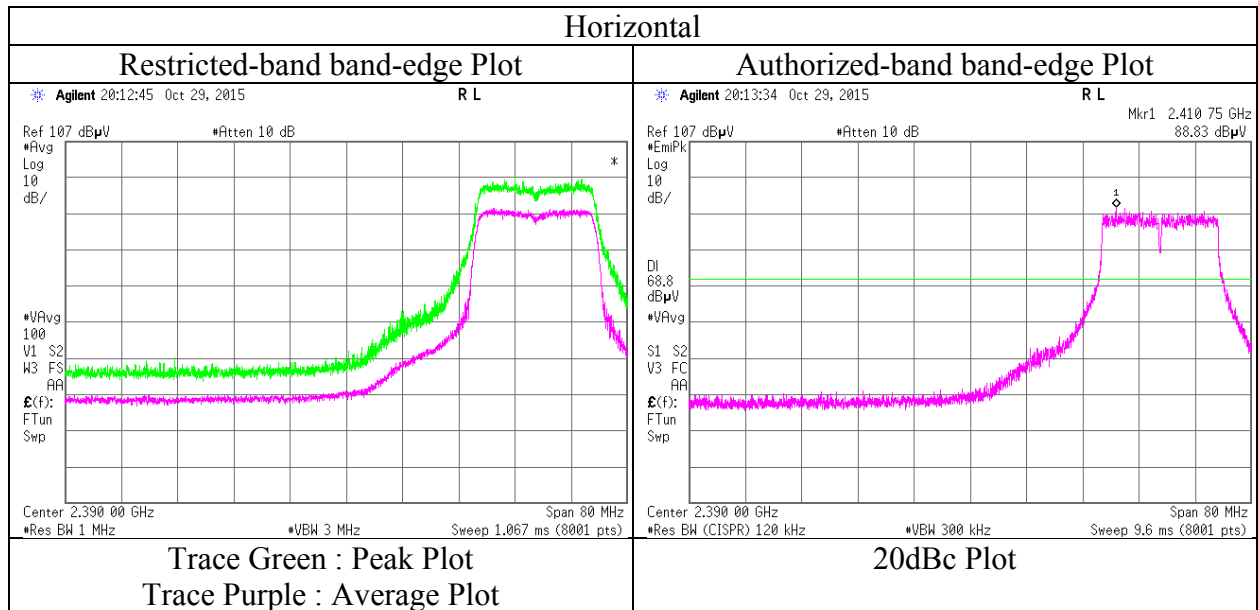
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11008648S-G
Date	November 16, 2015
Temperature / Humidity	24 deg. C / 45 % RH
Engineer	Yosuke Ishikawa (1-2.8 GHz)
Mode	Tx 11g 2417 MHz



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

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11008648S-G		
Date	November 6, 2015	November 11, 2015	November 12, 2015
Temperature / Humidity	25 deg. C / 39 % RH	24 deg. C / 41 % RH	23 deg. C / 40 % RH
Engineer	Hiroyuki Morikawa (1-13 GHz)	Hiroyuki Morikawa (13-26 GHz)	Hiroyuki Morikawa (30-1000 MHz)
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.	259.043	QP	39.4	17.5	9.4	31.7	0.0	34.6	46.0	11.4	143	183	
Hori.	384.006	QP	36.0	17.2	7.1	31.7	0.0	28.6	46.0	17.4	100	118	
Hori.	387.821	QP	46.7	17.3	7.2	31.7	0.0	39.5	46.0	6.5	100	220	
Hori.	396.005	QP	40.0	17.6	7.2	31.7	0.0	33.1	46.0	12.9	100	222	
Hori.	401.995	QP	42.1	17.7	7.2	31.7	0.0	35.3	46.0	10.7	100	241	
Hori.	491.229	QP	44.6	18.2	7.8	31.6	0.0	39.0	46.0	7.0	100	358	
Hori.	502.945	QP	44.4	18.3	7.8	31.6	0.0	38.9	46.0	7.1	100	177	
Hori.	509.279	QP	45.0	18.3	7.9	31.6	0.0	39.6	46.0	6.4	100	284	
Hori.	853.209	QP	31.7	22.4	9.5	31.0	0.0	32.6	46.0	13.4	100	202	
Hori.	925.132	QP	34.5	22.7	9.9	30.6	0.0	36.5	46.0	9.5	100	258	
Hori.	4874.000	PK	45.0	31.6	7.4	39.5	2.0	46.5	73.9	27.4	100	216	
Hori.	7311.000	PK	45.1	36.7	9.0	40.2	2.0	52.6	73.9	21.3	100	0	
Hori.	9748.000	PK	44.5	38.0	9.9	39.5	2.0	54.9	73.9	19.0	100	0	
Vert.	814.133	QP	36.3	22.3	9.3	31.2	0.0	36.7	46.0	9.3	100	53	
Vert.	925.137	QP	31.4	22.7	9.9	30.6	0.0	33.4	46.0	12.6	100	246	
Vert.	4874.000	PK	45.6	31.6	7.4	39.5	2.0	47.1	73.9	26.8	100	0	
Vert.	7311.000	PK	45.2	36.7	9.0	40.2	2.0	52.7	73.9	21.2	100	0	
Vert.	9748.000	PK	44.8	38.0	9.9	39.5	2.0	55.2	73.9	18.7	100	0	

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

Distance factor : 1 GHz - 13 GHz : 20log (3.75 m / 3.0 m) = 2.0 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.5 dB

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4874.000	AV	35.6	31.6	7.4	39.5	0.3	2.0	37.4	53.9	16.5	
Hori.	7311.000	AV	36.3	36.7	9.0	40.2	0.3	2.0	44.1	53.9	9.8	
Hori.	9748.000	AV	36.2	38.0	9.9	39.5	0.3	2.0	46.9	53.9	7.0	
Vert.	4874.000	AV	35.3	31.6	7.4	39.5	0.3	2.0	37.1	53.9	16.8	
Vert.	7311.000	AV	36.0	36.7	9.0	40.2	0.3	2.0	43.8	53.9	10.1	
Vert.	9748.000	AV	36.0	38.0	9.9	39.5	0.3	2.0	46.7	53.9	7.2	

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

Distance factor : 1 GHz - 13 GHz : 20log (3.75 m / 3.0 m) = 2.0 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.5 dB

Duty factor refer to "Duty factor Calculation chart" sheet.

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11008648S-G
Date : November 6, 2015 November 11, 2015 November 12, 2015
Temperature / Humidity : 25 deg. C / 39 % RH 24 deg. C / 41 % RH 23 deg. C / 40 % RH
Engineer : Hiroyuki Morikawa Hiroyuki Morikawa Hiroyuki Morikawa
(1-13 GHz) (13-26 GHz) (30-1000 MHz)
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	59.5	27.8	15.0	41.0	2.0	63.3	73.9	10.6	100	321	
Hori.	4924.000	PK	44.7	31.7	7.5	39.4	2.0	46.5	73.9	27.4	100	205	
Hori.	7386.000	PK	45.0	36.7	8.9	40.3	2.0	52.3	73.9	21.6	100	0	
Hori.	9848.000	PK	44.6	38.1	10.0	39.4	2.0	55.3	73.9	18.6	100	0	
Vert.	2483.500	PK	64.5	27.8	15.0	41.0	2.0	68.3	73.9	5.6	253	352	
Vert.	4924.000	PK	44.5	31.7	7.5	39.4	2.0	46.3	73.9	27.6	100	221	
Vert.	7386.000	PK	45.4	36.7	8.9	40.3	2.0	52.7	73.9	21.2	100	0	
Vert.	9848.000	PK	44.4	38.1	10.0	39.4	2.0	55.1	73.9	18.8	100	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	41.9	27.8	15.0	41.0	0.3	2.0	46.0	53.9	7.9	*1)
Hori.	4924.000	AV	36.1	31.7	7.5	39.4	0.3	2.0	38.2	53.9	15.7	
Hori.	7386.000	AV	35.9	36.7	8.9	40.3	0.3	2.0	43.5	53.9	10.4	
Hori.	9848.000	AV	35.7	38.1	10.0	39.4	0.3	2.0	46.7	53.9	7.2	
Vert.	2483.500	AV	45.1	27.8	15.0	41.0	0.3	2.0	49.2	53.9	4.7	*1)
Vert.	4924.000	AV	35.5	31.7	7.5	39.4	0.3	2.0	37.6	53.9	16.3	
Vert.	7386.000	AV	36.1	36.7	8.9	40.3	0.3	2.0	43.7	53.9	10.2	
Vert.	9848.000	AV	35.8	38.1	10.0	39.4	0.3	2.0	46.8	53.9	7.1	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

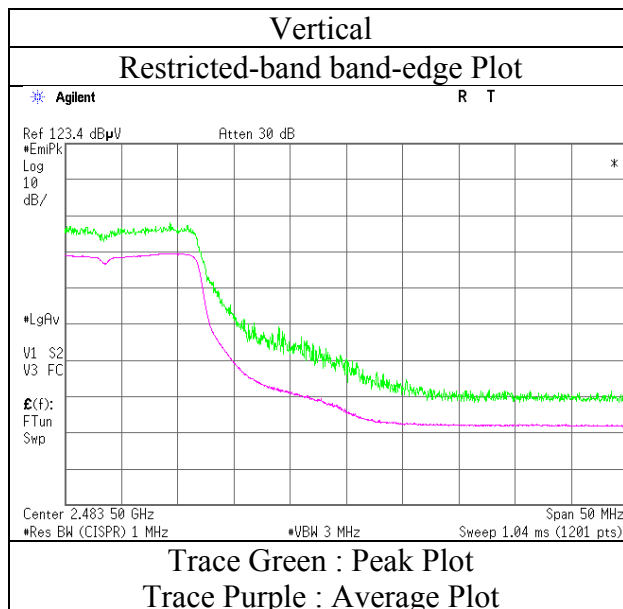
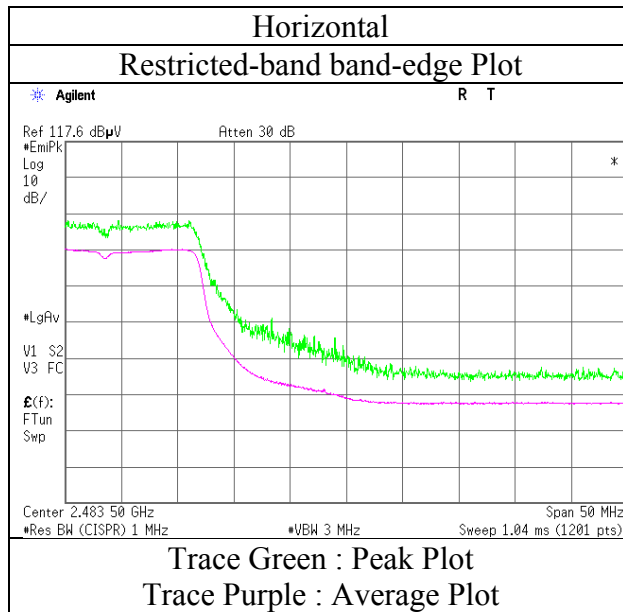
13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11008648S-G
Date	November 6, 2015
Temperature / Humidity	25 deg. C / 39 % RH
Engineer	Hiroyuki Morikawa (1-13 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.3 Semi Anechoic Chamber
Report No. : 11008648S-G
Date : November 6, 2015 November 11, 2015
Temperature / Humidity : 25 deg. C / 39 % RH 24 deg. C / 41 % RH
Engineer : Hiroyuki Morikawa Hiroyuki Morikawa
 (1-13 GHz) (13-26 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	51.0	27.7	14.8	41.0	2.0	54.5	73.9	19.4	111	322	
Hori.	4824.000	PK	45.5	31.4	7.4	39.5	2.0	46.8	73.9	27.1	100	204	
Hori.	7236.000	PK	45.7	36.6	9.0	40.1	2.0	53.2	73.9	20.7	100	0	
Hori.	9648.000	PK	45.0	38.0	9.9	39.6	2.0	55.3	73.9	18.6	100	0	
Vert.	2390.000	PK	55.9	27.7	14.8	41.0	2.0	59.4	73.9	14.5	262	352	
Vert.	4824.000	PK	44.6	31.4	7.4	39.5	2.0	45.9	73.9	28.0	100	12	
Vert.	7236.000	PK	45.4	36.6	9.0	40.1	2.0	52.9	73.9	21.0	100	0	
Vert.	9648.000	PK	45.1	38.0	9.9	39.6	2.0	55.4	73.9	18.5	100	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	39.6	27.7	14.8	41.0	0.3	2.0	43.4	53.9	10.5	*1)
Hori.	4824.000	AV	36.4	31.4	7.4	39.5	0.3	2.0	38.0	53.9	15.9	
Hori.	7236.000	AV	36.4	36.6	9.0	40.1	0.3	2.0	44.2	53.9	9.7	
Hori.	9648.000	AV	36.6	38.0	9.9	39.6	0.3	2.0	47.2	53.9	6.7	
Vert.	2390.000	AV	42.7	27.7	14.8	41.0	0.3	2.0	46.5	53.9	7.4	*1)
Vert.	4824.000	AV	35.8	31.4	7.4	39.5	0.3	2.0	37.4	53.9	16.5	
Vert.	7236.000	AV	36.7	36.6	9.0	40.1	0.3	2.0	44.5	53.9	9.4	
Vert.	9648.000	AV	36.6	38.0	9.9	39.6	0.3	2.0	47.2	53.9	6.7	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

*1) Not out of band emission (Leakage Power)

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	84.6	27.7	14.9	41.0	2.0	88.2	-	-	Carrier
Hori.	2400.000	PK	51.8	27.7	14.9	41.0	2.0	55.4	68.2	12.8	
Vert.	2412.000	PK	89.9	27.7	14.9	41.0	2.0	93.5	-	-	Carrier
Vert.	2400.000	PK	57.3	27.7	14.9	41.0	2.0	60.9	73.5	12.6	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

UL Japan, Inc.

Shonan EMC Lab.

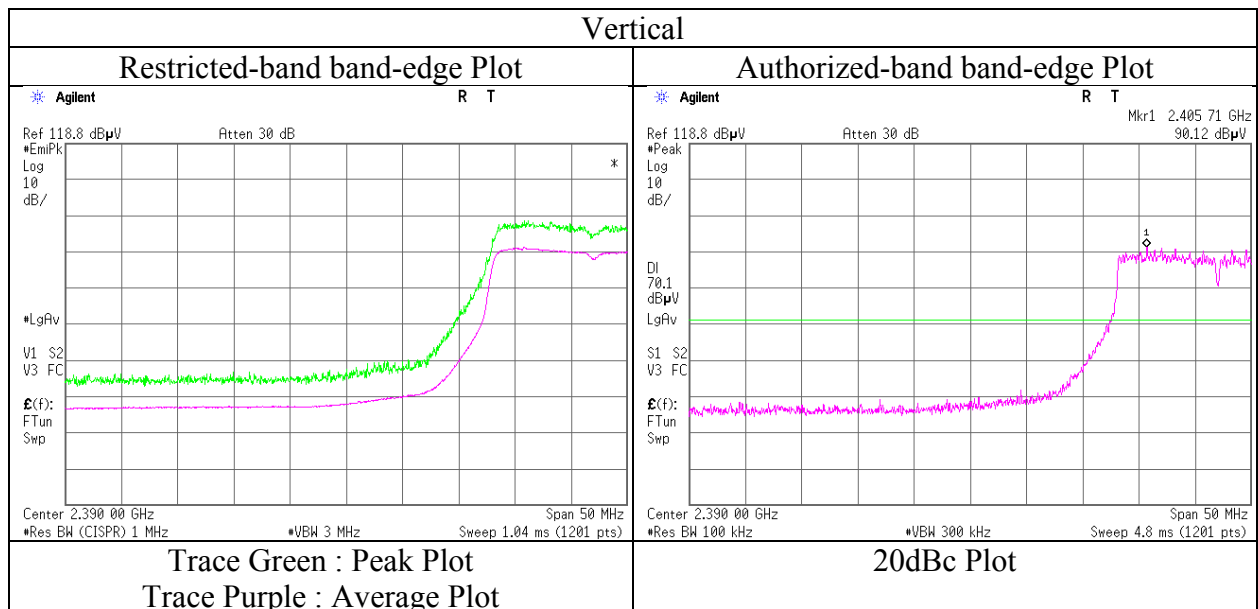
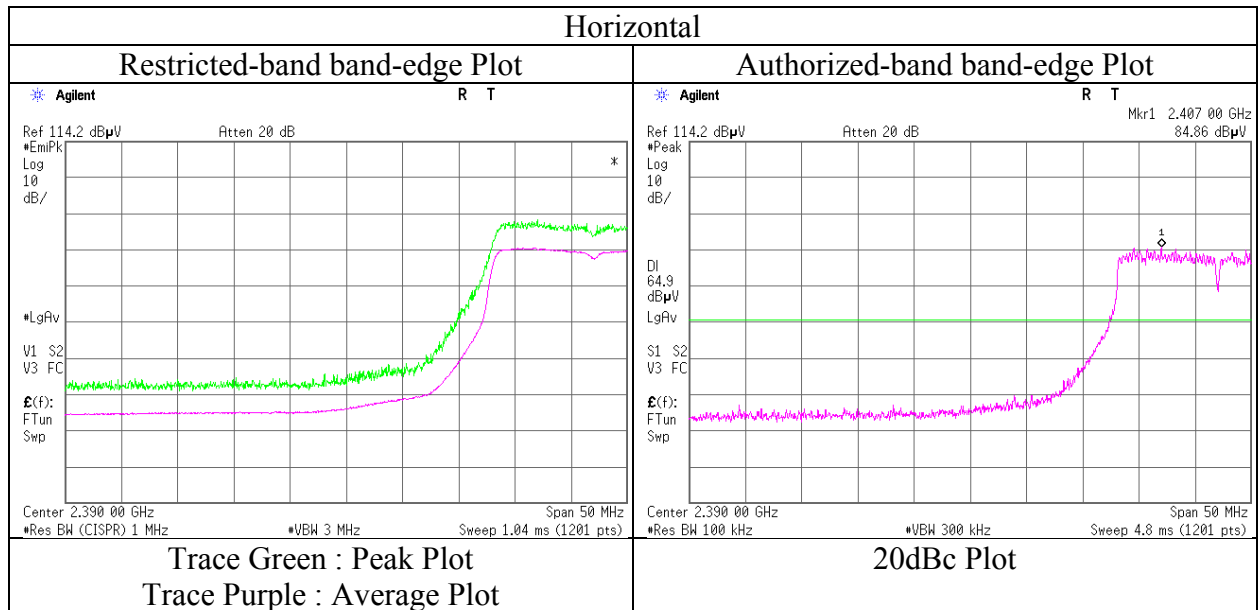
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11008648S-G
Date	November 6, 2015
Temperature / Humidity	25 deg. C / 39 % RH
Engineer	Hiroyuki Morikawa (1-13 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.3 Semi Anechoic Chamber
Report No. : 11008648S-G
Date : November 16, 2015
Temperature / Humidity : 24 deg. C / 45 % RH
Engineer : Yosuke Ishikawa
(1-2.8 GHz)
Mode : Tx 11n-20 2417 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	52.6	27.8	13.7	41.0	2.0	55.1	73.9	18.8	288	291	
Vert.	2390.000	PK	53.8	27.8	13.7	41.0	2.0	56.3	73.9	17.6	100	3	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	39.4	27.8	13.7	41.0	1.3	2.0	43.2	53.9	10.7	*1)
Vert.	2390.000	AV	40.3	27.8	13.7	41.0	1.3	2.0	44.1	53.9	9.8	*1)

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

*1) Not out of band emission (Leakage Power)

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.	2417.000	PK	88.3	27.8	13.7	41.0	2.0	90.8	-	-	Carrier
Hori.	2400.000	PK	48.9	27.8	13.7	41.0	2.0	51.4	70.9	19.5	
Vert.	2417.000	PK	89.7	27.8	13.7	41.0	2.0	92.2	-	-	Carrier
Vert.	2400.000	PK	50.3	27.8	13.7	41.0	2.0	52.8	72.2	19.4	

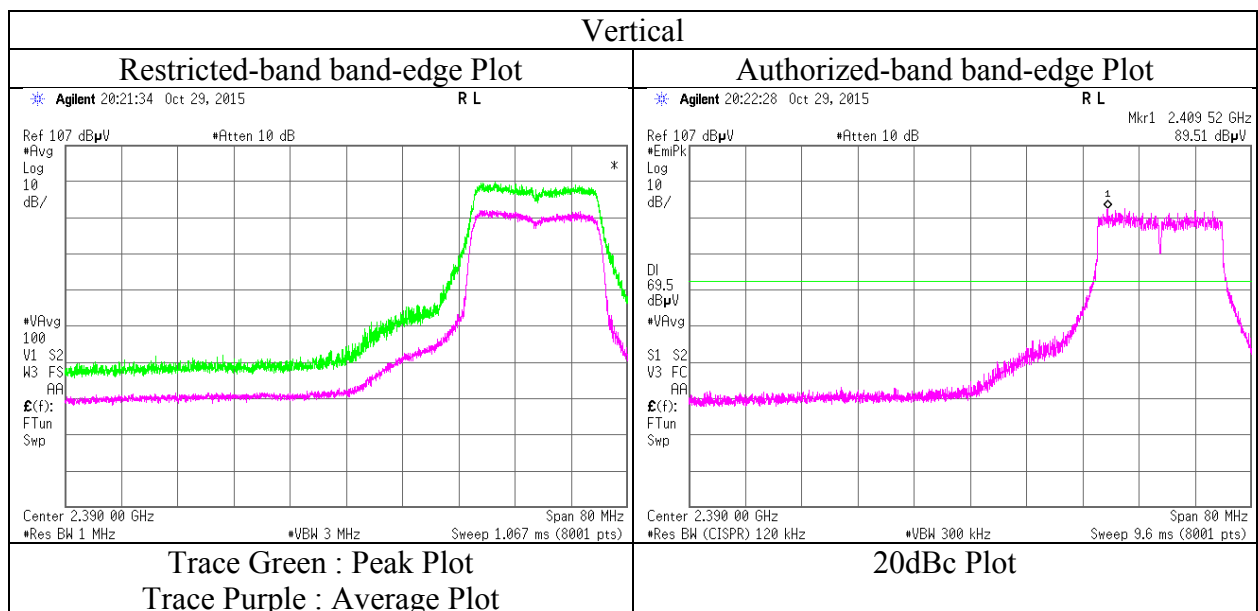
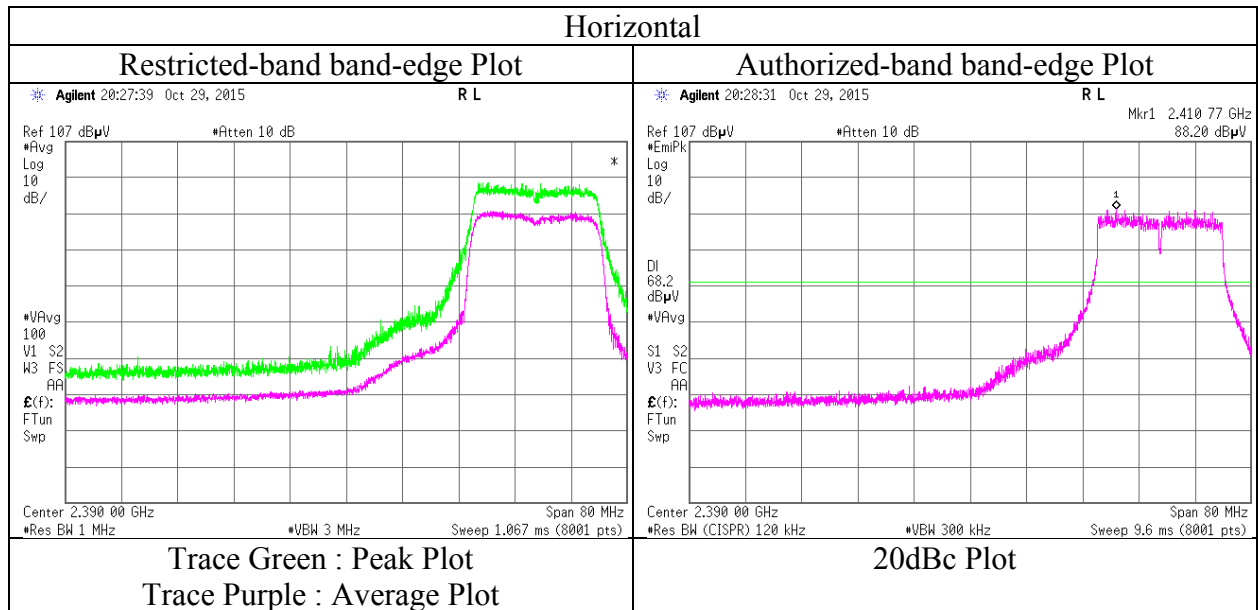
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11008648S-G
Date	November 16, 2015
Temperature / Humidity	24 deg. C / 45 % RH
Engineer	Yosuke Ishikawa
	(1-2.8 GHz)
Mode	Tx 11n-20 2417 MHz



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11008648S-G
Date : November 6, 2015 November 11, 2015
Temperature / Humidity : 25 deg. C / 39 % RH 24 deg. C / 41 % RH
Engineer : Hiroyuki Morikawa Hiroyuki Morikawa
(1-13 GHz) (13-26 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.	4874.000	PK	44.2	31.6	7.4	39.5	2.0	45.7	73.9	28.2	100	212	
Hori.	7311.000	PK	45.0	36.7	9.0	40.2	2.0	52.5	73.9	21.4	100	0	
Hori.	9748.000	PK	45.3	38.0	9.9	39.5	2.0	55.7	73.9	18.2	100	0	
Vert.	4874.000	PK	44.1	31.6	7.4	39.5	2.0	45.6	73.9	28.3	100	0	
Vert.	7311.000	PK	45.6	36.7	9.0	40.2	2.0	53.1	73.9	20.8	100	0	
Vert.	9748.000	PK	44.5	38.0	9.9	39.5	2.0	54.9	73.9	19.0	100	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4874.000	AV	35.7	31.6	7.4	39.5	0.3	2.0	37.5	53.9	16.4	
Hori.	7311.000	AV	36.1	36.7	9.0	40.2	0.3	2.0	43.9	53.9	10.0	
Hori.	9748.000	AV	36.3	38.0	9.9	39.5	0.3	2.0	47.0	53.9	6.9	
Vert.	4874.000	AV	35.3	31.6	7.4	39.5	0.3	2.0	37.1	53.9	16.8	
Vert.	7311.000	AV	36.2	36.7	9.0	40.2	0.3	2.0	44.0	53.9	9.9	
Vert.	9748.000	AV	36.2	38.0	9.9	39.5	0.3	2.0	46.9	53.9	7.0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11008648S-G
Date : November 6, 2015 November 11, 2015
Temperature / Humidity : 25 deg. C / 39 % RH 24 deg. C / 41 % RH
Engineer : Hiroyuki Morikawa Hiroyuki Morikawa
 (1-13 GHz) (13-26 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	58.5	27.8	15.0	41.0	2.0	62.3	73.9	11.6	100	321	
Hori.	4924.000	PK	44.5	31.7	7.5	39.4	2.0	46.3	73.9	27.6	100	214	
Hori.	7386.000	PK	45.4	36.7	8.9	40.3	2.0	52.7	73.9	21.2	100	0	
Hori.	9848.000	PK	43.9	38.1	10.0	39.4	2.0	54.6	73.9	19.3	100	0	
Vert.	2483.500	PK	64.1	27.8	15.0	41.0	2.0	67.9	73.9	6.0	254	352	
Vert.	4924.000	PK	44.8	31.7	7.5	39.4	2.0	46.6	73.9	27.3	100	0	
Vert.	7386.000	PK	44.5	36.7	8.9	40.3	2.0	51.8	73.9	22.1	100	0	
Vert.	9848.000	PK	43.6	38.1	10.0	39.4	2.0	54.3	73.9	19.6	100	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	39.1	27.8	15.0	41.0	0.3	2.0	43.2	53.9	10.7	*1)
Hori.	4924.000	AV	35.7	31.7	7.5	39.4	0.3	2.0	37.8	53.9	16.1	
Hori.	7386.000	AV	35.7	36.7	8.9	40.3	0.3	2.0	43.3	53.9	10.6	
Hori.	9848.000	AV	35.3	38.1	10.0	39.4	0.3	2.0	46.3	53.9	7.6	
Vert.	2483.500	AV	43.8	27.8	15.0	41.0	0.3	2.0	47.9	53.9	6.0	*1)
Vert.	4924.000	AV	35.2	31.7	7.5	39.4	0.3	2.0	37.3	53.9	16.6	
Vert.	7386.000	AV	35.8	36.7	8.9	40.3	0.3	2.0	43.4	53.9	10.5	
Vert.	9848.000	AV	35.1	38.1	10.0	39.4	0.3	2.0	46.1	53.9	7.8	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

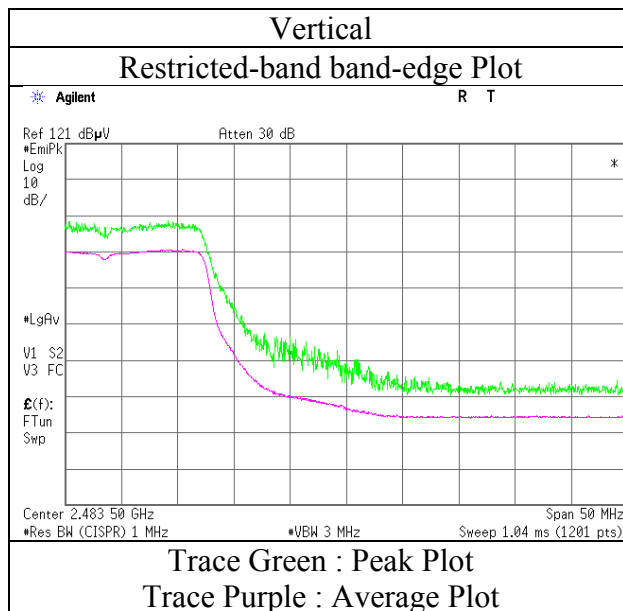
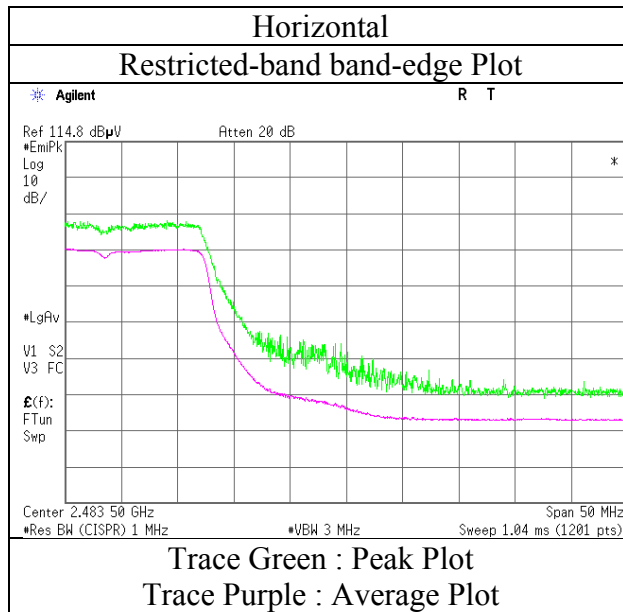
13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11008648S-G
Date	November 6, 2015
Temperature / Humidity	25 deg. C / 39 % RH
Engineer	Hiroyuki Morikawa (1-13 GHz)
Mode	Tx 11n-20 2462 MHz



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11008648S-G
Date : November 6, 2015 November 11, 2015
Temperature / Humidity : 25 deg. C / 39 % RH 24 deg. C / 41 % RH
Engineer : Hiroyuki Morikawa Hiroyuki Morikawa
 (1-13 GHz) (13-26 GHz)
Mode : Tx 11n-40 2422 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	50.4	27.7	14.8	41.0	2.0	53.9	73.9	20.0	100	322	
Hori.	4844.000	PK	45.2	31.5	7.4	39.5	2.0	46.6	73.9	27.3	100	223	
Hori.	7266.000	PK	44.6	36.6	9.0	40.2	2.0	52.0	73.9	21.9	100	0	
Hori.	9688.000	PK	44.9	38.0	9.9	39.6	2.0	55.2	73.9	18.7	100	0	
Vert.	2390.000	PK	54.8	27.7	14.8	41.0	2.0	58.3	73.9	15.6	257	351	
Vert.	4844.000	PK	44.5	31.5	7.4	39.5	2.0	45.9	73.9	28.0	100	0	
Vert.	7266.000	PK	44.6	36.6	9.0	40.2	2.0	52.0	73.9	21.9	100	0	
Vert.	9688.000	PK	45.2	38.0	9.9	39.6	2.0	55.5	73.9	18.4	100	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	39.5	27.7	14.8	41.0	1.3	2.0	44.3	53.9	9.6	*1)
Hori.	4844.000	AV	35.6	31.5	7.4	39.5	1.3	2.0	38.3	53.9	15.6	
Hori.	7266.000	AV	36.4	36.6	9.0	40.2	1.3	2.0	45.1	53.9	8.8	
Hori.	9688.000	AV	36.7	38.0	9.9	39.6	1.3	2.0	48.3	53.9	5.6	
Vert.	2390.000	AV	43.8	27.7	14.8	41.0	1.3	2.0	48.6	53.9	5.3	*1)
Vert.	4844.000	AV	35.5	31.5	7.4	39.5	1.3	2.0	38.2	53.9	15.7	
Vert.	7266.000	AV	36.4	36.6	9.0	40.2	1.3	2.0	45.1	53.9	8.8	
Vert.	9688.000	AV	36.4	38.0	9.9	39.6	1.3	2.0	48.0	53.9	5.9	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

*1) Not out of band emission (Leakage Power)

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.	2422.000	PK	78.9	27.7	14.9	41.0	2.0	82.5	-	-	Carrier
Hori.	2400.000	PK	49.0	27.7	14.9	41.0	2.0	52.6	62.5	9.9	
Vert.	2422.000	PK	84.6	27.7	14.9	41.0	2.0	88.2	-	-	Carrier
Vert.	2400.000	PK	54.7	27.7	14.9	41.0	2.0	58.3	68.2	9.9	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

UL Japan, Inc.

Shonan EMC Lab.

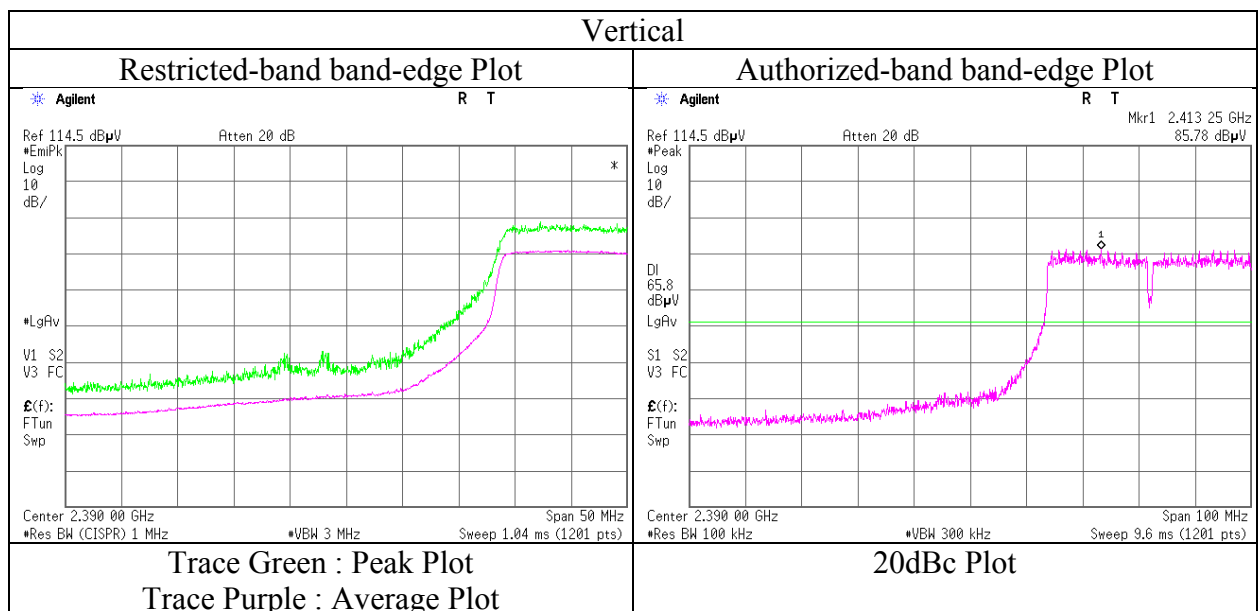
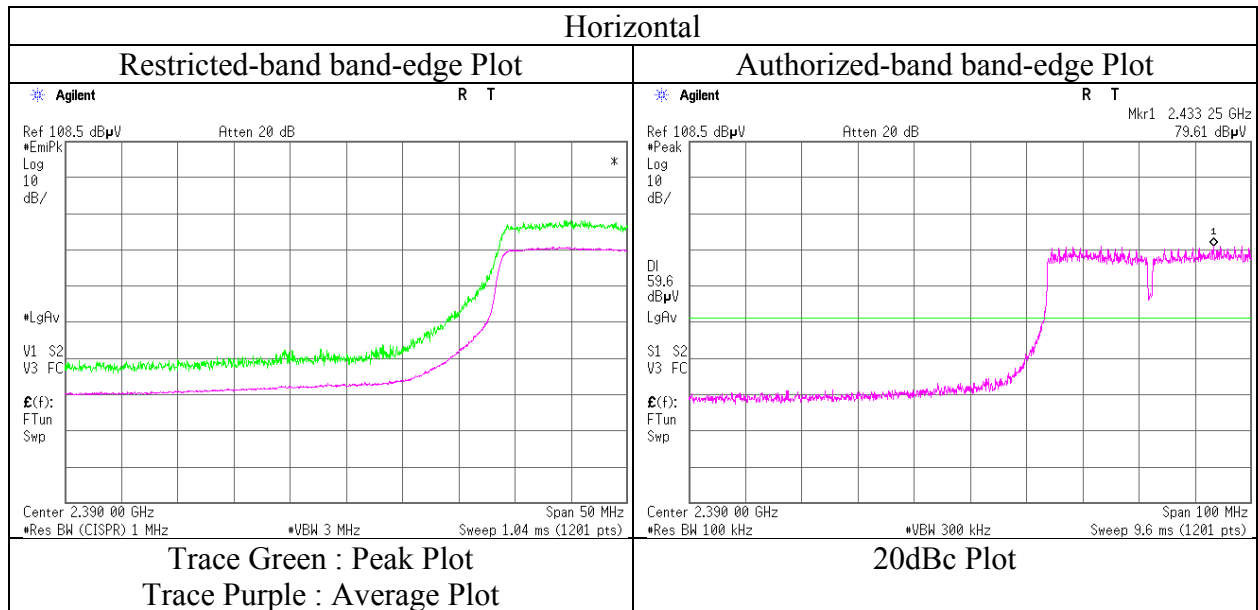
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11008648S-G
Date	November 6, 2015
Temperature / Humidity	25 deg. C / 39 % RH
Engineer	Hiroyuki Morikawa (1-13 GHz)
Mode	Tx 11n-40 2422 MHz



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11008648S-G
Date : November 6, 2015 November 11, 2015
Temperature / Humidity : 25 deg. C / 39 % RH 24 deg. C / 41 % RH
Engineer : Hiroyuki Morikawa Hiroyuki Morikawa
(1-13 GHz) (13-26 GHz)
Mode : Tx 11n-40 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.	4874.000	PK	44.2	31.6	7.4	39.5	2.0	45.7	73.9	28.2	100	206	
Hori.	7311.000	PK	44.6	36.7	9.0	40.2	2.0	52.1	73.9	21.8	100	0	
Hori.	9748.000	PK	45.1	38.0	9.9	39.5	2.0	55.5	73.9	18.4	100	0	
Vert.	4874.000	PK	44.2	31.6	7.4	39.5	2.0	45.7	73.9	28.2	100	0	
Vert.	7311.000	PK	45.1	36.7	9.0	40.2	2.0	52.6	73.9	21.3	100	0	
Vert.	9748.000	PK	45.0	38.0	9.9	39.5	2.0	55.4	73.9	18.5	100	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4874.000	AV	35.6	31.6	7.4	39.5	1.3	2.0	38.4	53.9	15.5	
Hori.	7311.000	AV	36.2	36.7	9.0	40.2	1.3	2.0	45.0	53.9	8.9	
Hori.	9748.000	AV	36.5	38.0	9.9	39.5	1.3	2.0	48.2	53.9	5.7	
Vert.	4874.000	AV	35.2	31.6	7.4	39.5	1.3	2.0	38.0	53.9	15.9	
Vert.	7311.000	AV	36.4	36.7	9.0	40.2	1.3	2.0	45.2	53.9	8.7	
Vert.	9748.000	AV	36.1	38.0	9.9	39.5	1.3	2.0	47.8	53.9	6.1	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 11008648S-G
Date : November 6, 2015 November 11, 2015
Temperature / Humidity : 25 deg. C / 39 % RH 24 deg. C / 41 % RH
Engineer : Hiroyuki Morikawa Hiroyuki Morikawa
 (1-13 GHz) (13-26 GHz)
Mode : Tx 11n-40 2452 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	56.1	27.8	15.0	41.0	2.0	59.9	73.9	14.0	100	322	
Hori.	4904.000	PK	44.2	31.7	7.5	39.4	2.0	46.0	73.9	27.9	100	211	
Hori.	7356.000	PK	45.7	36.7	8.9	40.3	2.0	53.0	73.9	20.9	100	0	
Hori.	9808.000	PK	44.4	38.1	9.9	39.5	2.0	54.9	73.9	19.0	255	351	
Vert.	2483.500	PK	60.2	27.8	15.0	41.0	2.0	64.0	73.9	9.9	100	0	
Vert.	4904.000	PK	44.9	31.7	7.5	39.4	2.0	46.7	73.9	27.2	100	0	
Vert.	7356.000	PK	44.8	36.7	8.9	40.3	2.0	52.1	73.9	21.8	100	0	
Vert.	9808.000	PK	45.1	38.1	9.9	39.5	2.0	55.6	73.9	18.3	100	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	40.5	27.8	15.0	41.0	1.3	2.0	45.6	53.9	8.3	*1)
Hori.	4904.000	AV	35.6	31.7	7.5	39.4	1.3	2.0	38.7	53.9	15.2	
Hori.	7356.000	AV	36.1	36.7	8.9	40.3	1.3	2.0	44.7	53.9	9.2	
Hori.	9808.000	AV	35.6	38.1	9.9	39.5	1.3	2.0	47.4	53.9	6.5	
Vert.	2483.500	AV	44.3	27.8	15.0	41.0	1.3	2.0	49.4	53.9	4.5	*1)
Vert.	4904.000	AV	35.3	31.7	7.5	39.4	1.3	2.0	38.4	53.9	15.5	
Vert.	7356.000	AV	36.0	36.7	8.9	40.3	1.3	2.0	44.6	53.9	9.3	
Vert.	9808.000	AV	35.6	38.1	9.9	39.5	1.3	2.0	47.4	53.9	6.5	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.75\text{ m} / 3.0\text{ m}) = 2.0\text{ dB}$

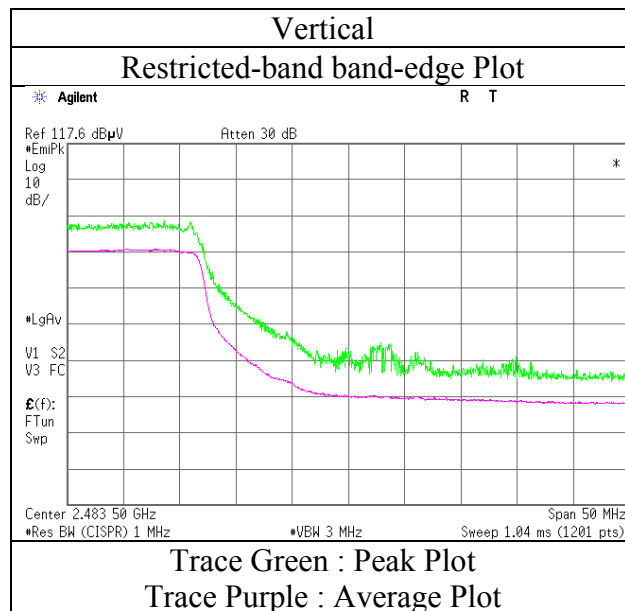
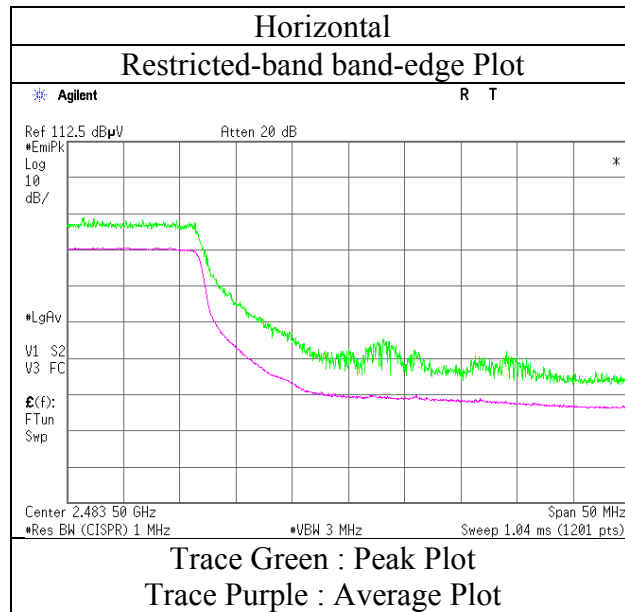
13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Duty factor refer to "Duty factor Calculation chart" sheet.

*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission (Reference Plot for band-edge)

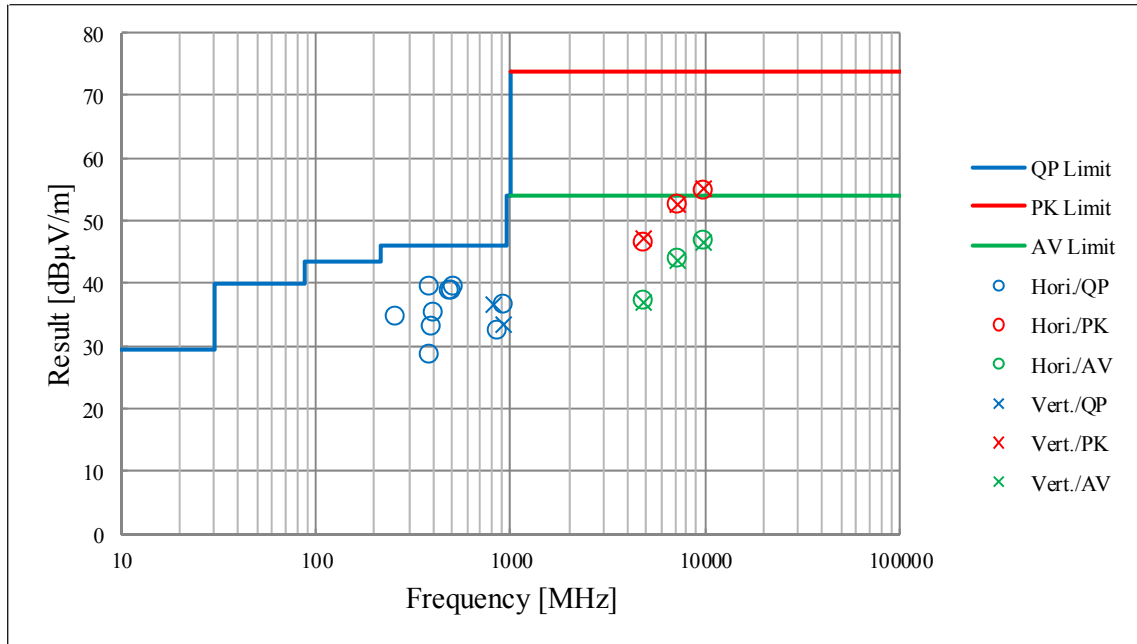
Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11008648S-G
Date	November 6, 2015
Temperature / Humidity	25 deg. C / 39 % RH
Engineer	Hiroyuki Morikawa (1-13 GHz)
Mode	Tx 11n-40 2452 MHz



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

Radiated Spurious Emission
(Plot data, Worst case)

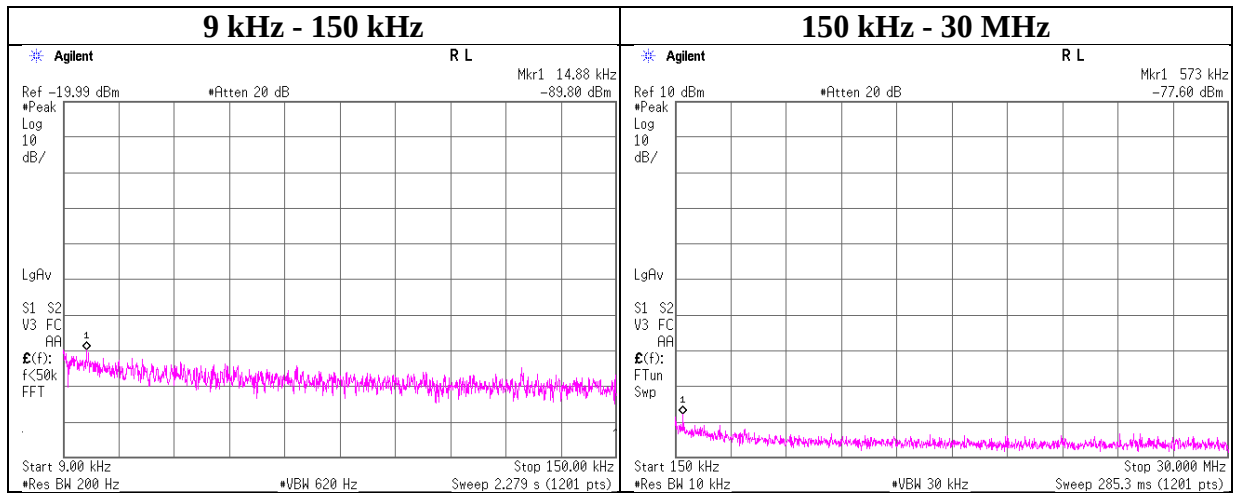
Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11008648S-G		
Date	November 6, 2015	November 11, 2015	November 12, 2015
Temperature / Humidity	25 deg. C / 39 % RH	24 deg. C / 41 % RH	23 deg. C / 40 % RH
Engineer	Hiroyuki Morikawa (1-13 GHz)	Hiroyuki Morikawa (13-26 GHz)	Hiroyuki Morikawa (30-1000 MHz)
Mode	Tx 11g 2437 MHz		



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

Conducted Spurious Emission

Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 11008648S-G
Date October 27, 2015
Temperature / Humidity 26 deg. C / 40 % RH
Engineer Hiroyuki Morikawa
Mode Tx 11g 2437 MHz



Power Density

Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 11008648S-G
Date October 27, 2015
Temperature / Humidity 26 deg. C / 40 % RH
Engineer Hiroyuki Morikawa
Mode Tx

11b

Freq.	Reading	Cable Loss	Atten. Loss	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-15.99	2.03	9.63	-4.33	8.00	12.33
2437.00	-15.06	2.04	9.63	-3.39	8.00	11.39
2462.00	-13.54	2.05	9.63	-1.86	8.00	9.86

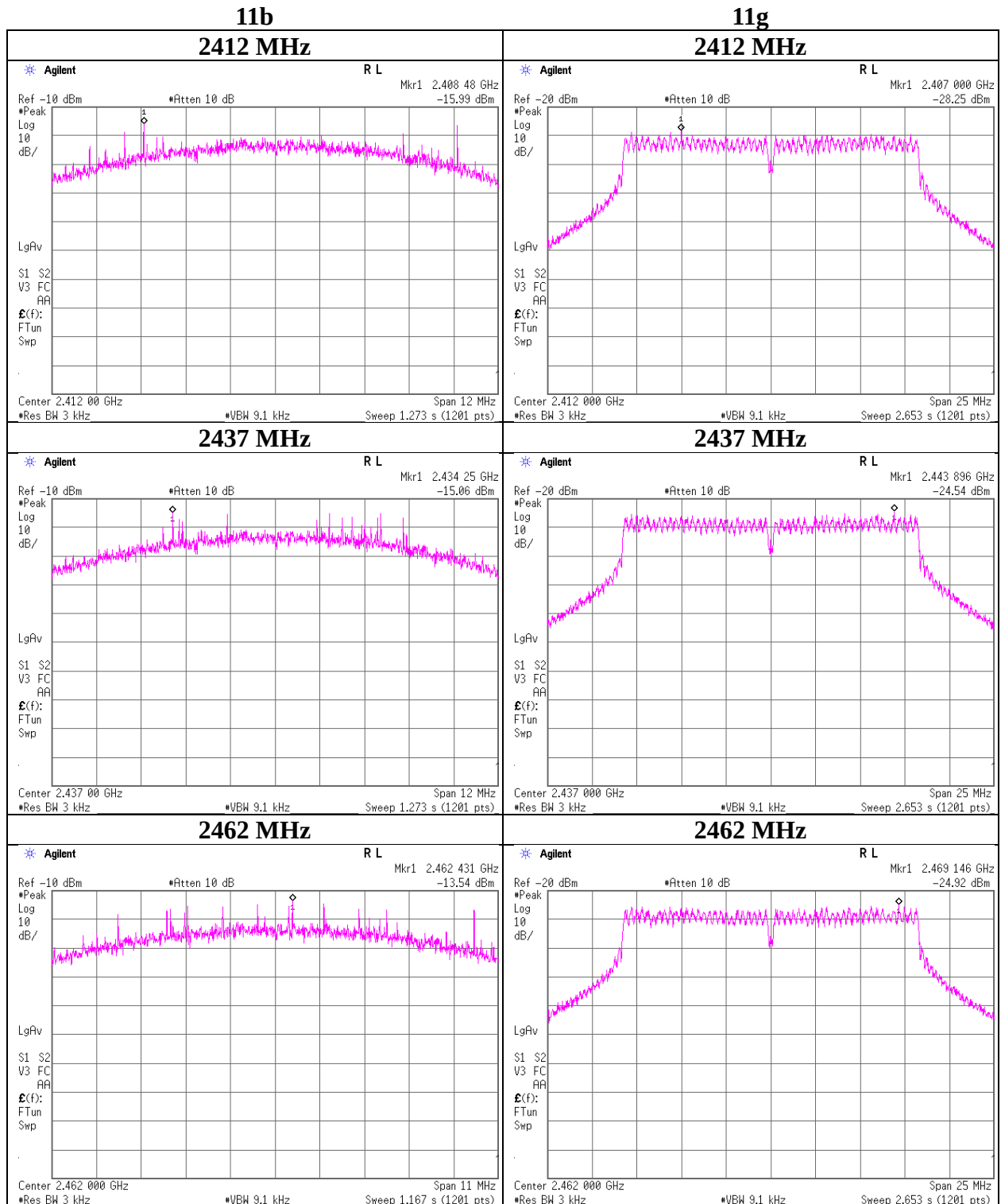
11g

Freq.	Reading	Cable Loss	Atten. Loss	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-28.25	2.03	9.63	-16.59	8.00	24.59
2437.00	-24.54	2.04	9.63	-12.87	8.00	20.87
2462.00	-24.92	2.05	9.63	-13.24	8.00	21.24

Sample Calculation:

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

Power Density



UL Japan, Inc.

Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Power Density

Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 11008648S-G
Date October 27, 2015
Temperature / Humidity 26 deg. C / 40 % RH
Engineer Hiroyuki Morikawa
Mode Tx

11n-20

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit [dBm]	Margin [dB]
				[dBm]	[mW]		
2412.00	-29.38	2.03	9.63	-17.72	0.02	8.00	25.72
2437.00	-26.19	2.04	9.63	-14.52	0.04	8.00	22.52
2462.00	-25.93	2.05	9.63	-14.25	0.04	8.00	22.25

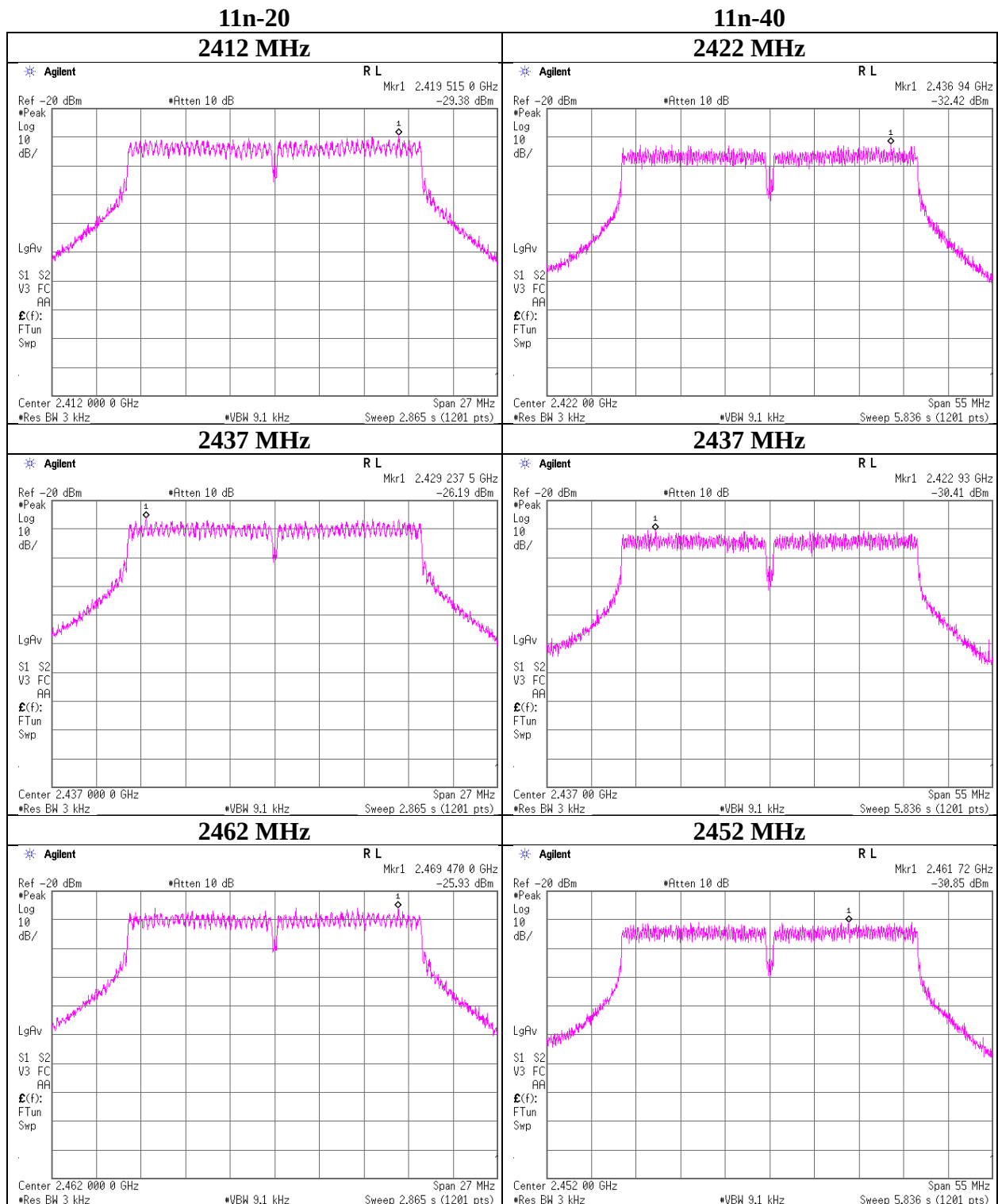
11n-40

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit [dBm]	Margin [dB]
				[dBm]	[mW]		
2422.00	-32.42	2.03	9.63	-20.76	0.01	8.00	28.76
2437.00	-30.41	2.04	9.63	-18.74	0.01	8.00	26.74
2452.00	-30.85	2.04	9.63	-19.18	0.01	8.00	27.18

Sample Calculation:

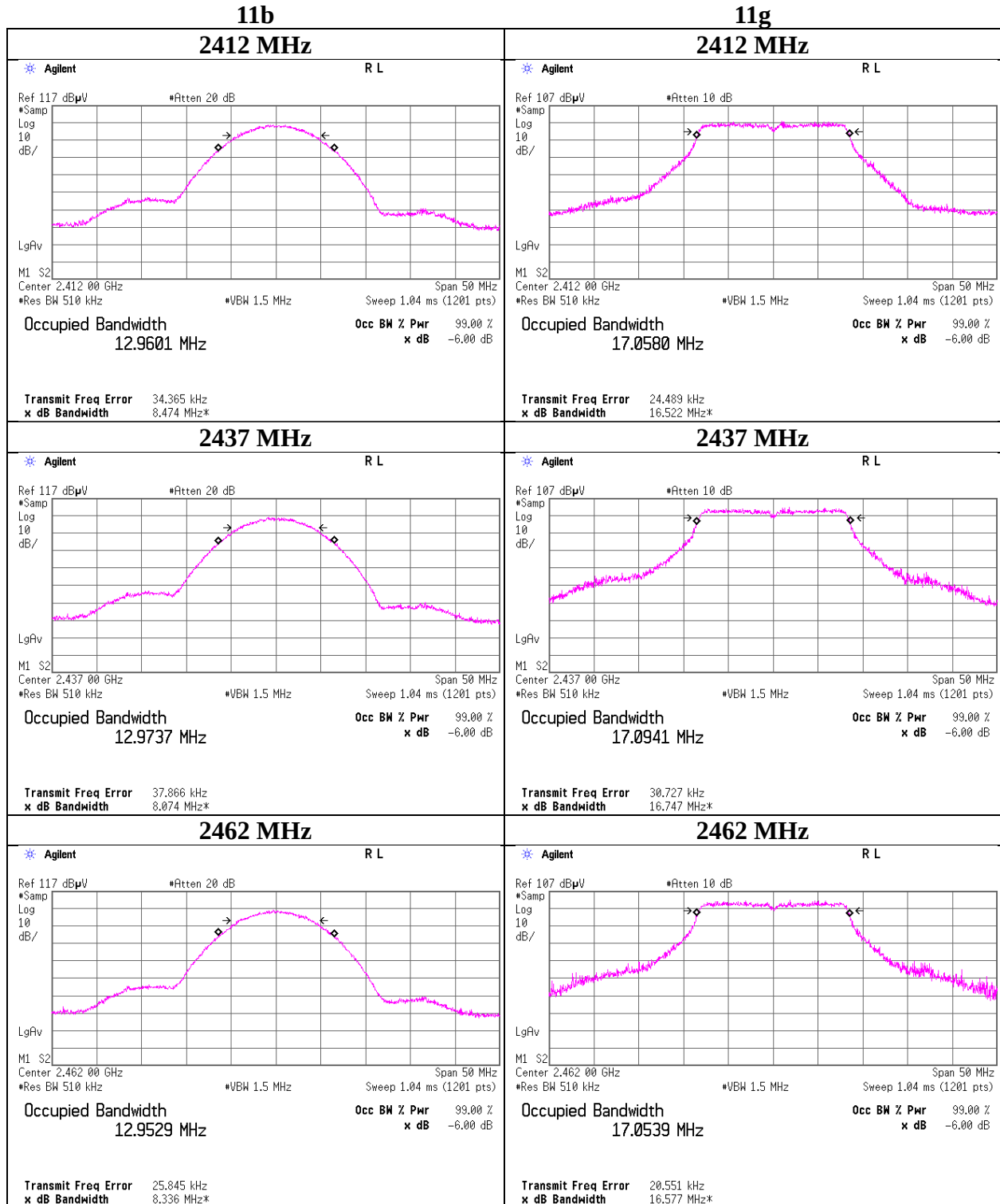
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

Power Density



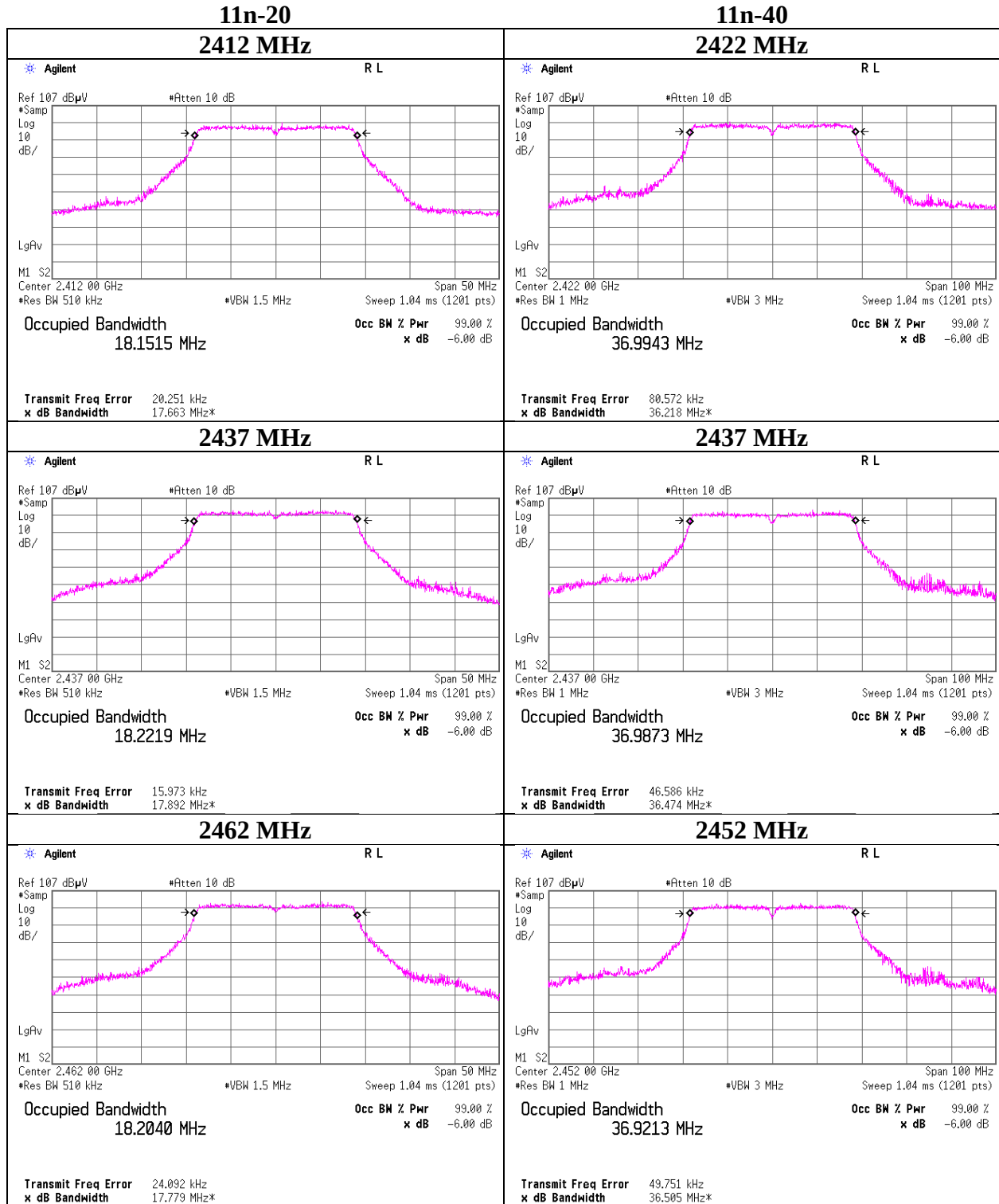
99%Occupied Bandwidth

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11008648S-G
Date	October 27, 2015
Temperature / Humidity	26 deg. C / 40 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx



99% Occupied Bandwidth

Test place : Shonan EMC Lab. No.5 Shielded Room
Report No. : 11008648S-G
Date : October 27, 2015
Temperature / Humidity : 26 deg. C / 40 % RH
Engineer : Hiroyuki Morikawa
Mode : Tx



APPENDIX 2: Test instruments

Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2015/05/27 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2015/03/26 * 12
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2015/11/04 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2015/11/16 * 12
SCC-G01	Coaxial Cable	Suhner	SUCOFLEX 104A	46497/4A	RE	2015/04/17 * 12
SCC-G21	Coaxial Cable	Suhner	SUCOFLEX 104	296169/4	RE	2015/05/19 * 12
SHA-01	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-725	RE	2015/08/10 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2015/10/22 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE	-
SAEC-01(SVSWR)	Semi-Anechoic Chamber	TDK	SAEC-01(SVSWR)	1	RE	2015/07/08 * 12
STS-01	Digital Hitester	Hioki	3805-50	080997812	RE	2015/11/18 * 12
SAEC-02(NSA)	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	RE	2015/07/15 * 12
KAF-04	Pre Amplifier	Agilent	8449B	3008A01600	RE	2015/04/28 * 12
SCC-G05	Coaxial Cable	Junkosha	J12J102207-00	APR-30-15-037	RE	2015/05/11 * 12
SCC-G22	Coaxial Cable	Suhner	SUCOFLEX 104	296199/4	RE	2015/05/19 * 12
SHA-02	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-726	RE	2015/08/10 * 12
SOS-03	Humidity Indicator	A&D	AD-5681	4063325	RE	2015/10/22 * 12
SJM-14	Measure	ASKUL	-	-	RE	-
STS-02	Digital Hitester	Hioki	3805-50	080997819	RE	2015/03/10 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2015/03/23 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2015/03/17 * 12
SCC-G15	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	RE	2015/03/11 * 12
SAF-02	Pre Amplifier	SONOMA	310N	290212	RE	2015/02/18 * 12
SAT6-02	Attenuator	JFW	50HF-006N	-	RE	2015/02/18 * 12
KAT3-11	Attenuator	JFW IND. INC.	50HF-003N	-	RE	2015/08/31 * 12
SBA-02	Biconical Antenna	Schwarzbeck	BBA9106	91032665	RE	2015/11/02 * 12
SCC-B1/B3/B5/B7/B8/B13/SRS E-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/T OYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2015/04/17 * 12
SCC-B2/B4/B6/B7/B8/B13/SRS E-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/T OYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2015/04/17 * 12
SLA-02	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0893	RE	2015/11/03 * 12
STR-07	Test Receiver	Rohde & Schwarz	ESU26	100484	RE	2015/09/04 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE	-
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	AT	2015/09/16 * 12
SPM-07	Power Meter	Agilent	8990B	MY5100272	AT	2015/04/02 * 12
SPSS-04	Power sensor	Agilent	N1923A	MY5326009	AT	2015/04/02 * 12
SCC-G14	Coaxial Cable	Suhner	SUCOFLEX 102	31600/2	AT	2015/03/11 * 12
SAT10-09	Attenuator	Weinschel Corp.	54A-10	W5692	AT	2015/11/04 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2014/12/24 * 12
STS-05	Digital Hitester	Hioki	3805-50	080997828	AT	2015/11/18 * 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

UL Japan, Inc.

Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401