



RADIO TEST REPORT

Test Report No. : 12093854S-B

Applicant : JVC KENWOOD Corporation
Type of Equipment : GPS NAVIGATION SYSTEM
Model No. : DNX775RVS
FCC ID : IOMJ5180
Test regulation : FCC Part 15 Subpart C: 2018
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: December 21, 2017 to January 10, 2018

Representative test engineer:

Yosuke Ishikawa

Engineer

Consumer Technology Division

Approved by:

Akira Sato

Engineer

Consumer Technology Division



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Testing
RTL02610

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 There is no testing item of "Non-accreditation".

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Shonan EMC Lab.

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13-EM-F0429

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SECTION 1: Customer information

Company Name : JVC KENWOOD Corporation
Address : 2967-3, Ishikawa-machi, Hachioji, Tokyo 192-8525 Japan
Telephone Number : +81-42-646-5525
Facsimile Number : +81-42-646-1440
Contact Person : Seigo Tsutsumi

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

2.1 Identification of E.U.T.

Type of Equipment : GPS NAVIGATION SYSTEM
Model No. : DNX775RVS
Serial No. : Refer to Section 4, Clause 4.2
Rating : DC 12 V
Receipt Date of Sample : December 19, 2017
Country of Mass-production : Indonesia
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: DNX775RVS (referred to as the EUT in this report) is a GPS NAVIGATION SYSTEM.

Clock frequency in the system (Maximum) : 6.3 GHz

Radio Specification

Type of radio	Bluetooth (BDR/EDR)	IEEE802.11b	IEEE802.11g	IEEE802.11a	IEEE802.11n (20 M band)	IEEE802.11n (40 M band)
Frequency of operation	2402 - 2480 MHz	2412 - 2462 MHz	2412 - 2462 MHz	5745 - 5805 MHz	2412 - 2462 MHz 5745 - 5805 MHz	5755 - 5795 MHz
Type of modulation	FHSS	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (64QAM, 16QAM, QPSK, BPSK)	OFDM (64QAM, 16QAM, QPSK, BPSK)		
Channel spacing	1 MHz	5 MHz		20 MHz	<u>2.4 GHz band</u> 5 MHz <u>5 GHz band</u> 20 MHz	<u>2.4 GHz band</u> 5 MHz <u>5 GHz band</u> 40 MHz

Antenna type	Chip Antenna
Antenna Gain	-5.9 dBi (2.4 GHz), -5.2 dBi (5 GHz)
Power Supply (radio art input)	DC 3.6 V/ 3.3 V
Clock frequency (Maximum)	37.4 MHz

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
FCC Part 15 final revised on February 2, 2018 and effective March 5, 2018

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.247 Operation within the bands 902-928 MHz,
2400-2483.5 MHz, and 5725-5850 MHz

* The revisions made after testing date do 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 C63.10-2013 6. Standard test methods ----- IC: RSS-Gen 8.8	FCC: Section 15.207 ----- IC: RSS-Gen 8.8	N/A	N/A*1)	-
6dB Bandwidth	FCC: KDB 558074 D01 DTS Meas Guidance v04 ----- IC: -	FCC: Section 15.247(a)(2) ----- IC: RSS-247 5.2(a)	See data.	Complied	Conducted
Maximum Peak Output Power	FCC: KDB 558074 D01 DTS Meas Guidance v04 ----- IC: RSS-Gen 6.12	FCC: Section 15.247(b)(3) ----- IC: RSS-247 5.4(d)		Complied	Conducted
Power Density	FCC: KDB 558074 D01 DTS Meas Guidance v04 ----- IC: -	FCC: Section 15.247(e) ----- IC: RSS-247 5.2(b)		Complied	Conducted
Spurious Emission Restricted Band Edges	FCC: KDB 558074 D01 DTS Meas Guidance v04 ----- IC: RSS-Gen 6.13	FCC: Section15.247(d) ----- IC: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	4.3 dB 466.941 MHz, QP, Hori. (Tx, 11g, 2462 MHz)	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 v04 12.2.7.

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

FCC Part 15.31 (e)

The EUT provides stable voltage (DC 3.6 V/ 3.3 V) constantly to the wireless transmitter regardless of input voltage. 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 Antenna requirement

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

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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

EMI

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	No. 4 SAC / SR	No. 5,6,8 SR
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.2 dB	3.2 dB	3.3 dB	-	-
	30 MHz-200 MHz	4.3 dB	4.3 dB	4.3 dB	-	-
	200 MHz-1 GHz	5.9 dB	5.9 dB	5.9 dB	-	-
	1 GHz-6 GHz	4.7 dB	4.7 dB	4.7 dB	-	-
	6 GHz-18 GHz	5.3 dB	5.3 dB	5.3 dB	-	-
Radiated emission (Measurement distance: 1 m)	18 GHz-40 GHz	5.6 dB	5.6 dB	5.6 dB	-	-
	18 GHz-40 GHz	5.9 dB	5.9 dB	5.9 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	0.48 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-06	0.66 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.47 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-07	0.64 dB
Spurious emission (Conducted) below 1GHz	1.8 dB
Spurious emission (Conducted) 1 GHz-3 GHz	1.7 dB
Spurious emission (Conducted) 3 GHz-18 GHz	2.5 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.5 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.7 dB
Bandwidth Measurement	1.01 %
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

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JAB Accreditation No. RTL02610
FCC Test Firm Registration Number: 839876

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.

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) *	6 Mbps, PN9
IEEE 802.11n (11n-20)	MCS 3, PN9
*The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)	
*Power of the EUT was set by the software as follows; Power settings: Fixed Firmware: Version 1.0 *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.	

*The details of Operating mode(s)

Test Item	Operating Mode	Tested frequency
Spurious Emission (Radiated, above 1 GHz)	11b Tx	2412 MHz
6dB Bandwidth	11g Tx	2437 MHz
99% Occupied Bandwidth	11n-20 Tx	2462 MHz
Maximum Peak Output Power Power Density		
Spurious Emission (Radiated below 1 GHz) Spurious Emission (Conducted below 30 MHz)	11g Tx	2462 MHz

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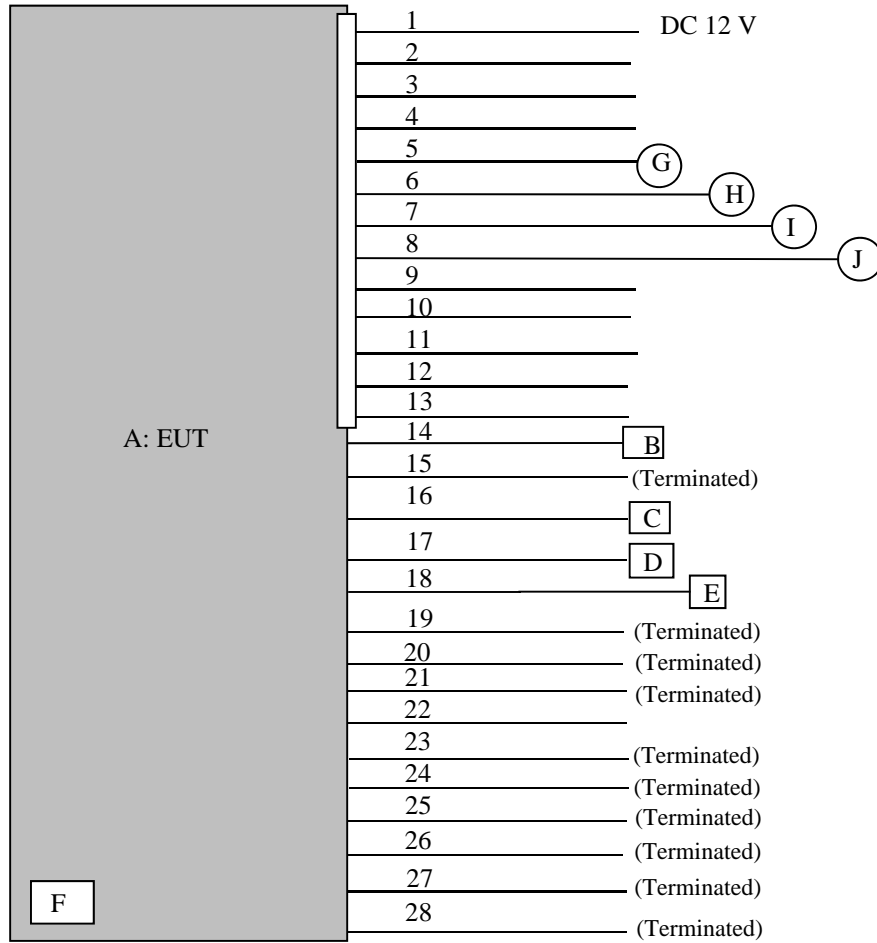
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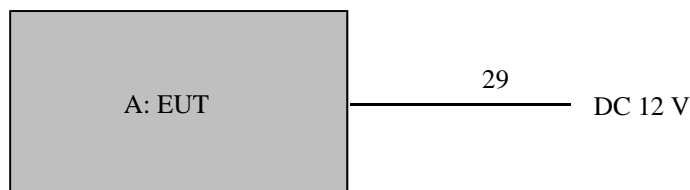
Facsimile : +81 463 50 6401

4.2 Configuration and peripherals

Radiated Emission test



Antenna Terminal conducted test



* 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	GPS NAVIGATION SYSTEM	DNX775RVS	PK-X0032 *1) PK-X0036 *2)	JVC KENWOOD Corporation	EUT
B	GPS Antenna	-	-	JVC KENWOOD Corporation	-
C	USB Memory	Data Traveler	-	Kingston	-
D	USB Memory	SDK-USM1GL	-	Sony	-
E	Mic	-	-	JVC KENWOOD Corporation	-
F	micro SDHC Card	4GB	-	TDK	-
G	Speaker	KFC-RS160	-	JVC KENWOOD Corporation	-
H	Speaker	KFC-RS160	-	JVC KENWOOD Corporation	-
I	Speaker	KFC-RS160	-	JVC KENWOOD Corporation	-
J	Speaker	KFC-RS160	-	JVC KENWOOD Corporation	-

*1) Used for Radiated Emission test

*2) Used for Antenna Terminal conducted test

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC	0.6 + 1.8	Unshielded	Unshielded	-
2	REMOTE CONT	0.1 + 1.0	Unshielded	Unshielded	-
3	ILLUMI	0.1 + 1.0	Unshielded	Unshielded	-
4	ANT. CONT	0.1 + 1.0	Unshielded	Unshielded	-
5	Speaker Front L	0.1 + 1.9	Unshielded	Unshielded	-
6	Speaker Front R	0.1 + 1.9	Unshielded	Unshielded	-
7	Speaker Rear L	0.1 + 1.9	Unshielded	Unshielded	-
8	Speaker Rear R	0.1 + 1.9	Unshielded	Unshielded	-
9	P. CONT	0.1 + 1.0	Unshielded	Unshielded	-
10	PRK SW	0.1 + 1.0	Unshielded	Unshielded	-
11	REVERSE	0.1 + 1.0	Unshielded	Unshielded	-
12	CAM+	0.1 + 1.0	Unshielded	Unshielded	-
13	CAM-	0.1 + 1.0	Unshielded	Unshielded	-
14	GPS ANT	3.5	Shielded	Shielded	-
15	iDatalink I/F	0.7	Shielded	Shielded	-
16	USB	0.2 + 1.0	Shielded	Shielded	-
17	USB	0.2 + 1.0	Shielded	Shielded	-
18	MIC	3.0	Shielded	Shielded	-
19	FRONT AUDIO	1.0	Shielded	Shielded	-
20	REAR AUDIO	2.0	Shielded	Shielded	-
21	SW	2.0	Shielded	Shielded	-
22	I/F EXT	1.0	Unshielded	Unshielded	-
23	AV-IN	1.5	Shielded	Shielded	-
24	AV-OUT	1.5	Shielded	Shielded	-
25	VIDEO OUT	0.2 + 1.0	Shielded	Shielded	-
26	REAR VIEW CAMERA	0.2 + 1.0	Shielded	Shielded	-
27	FRONT VIEW CAMERA	0.2 + 1.0	Shielded	Shielded	-
28	ANT	0.1 + 3.0	Shielded	Shielded	-
29	DC	0.6	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 "KDB 558074 D01 DTS Meas Guidance v04".

[For below 1 GHz]

EUT was placed on a urethane platform of nominal size, 1.0 m by 2.0 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane.

The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane.

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

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

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

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

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

Test Antennas are used as below;

Frequency	30 MHz to 200 MHz	200 MHz to 1 GHz	Above 1 GHz
Antenna Type	Biconical	Logperiodic	Horn

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

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

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV *1)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	<u>12.2.5.2</u> 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	3 m	3.88 m*2) (1 GHz – 13 GHz), 1 m*3) (13 GHz – 31.5 GHz),		3.88 m*2) (1 GHz – 13 GHz), 1 m*3) (13 GHz – 31.5 GHz),

*1) Average Power Measurement was performed based on 6.0 & 12.2.5 of "KDB 558074 D01 DTS Meas Guidance v04".

*2) Distance Factor: $20 \times \log(3.88 \text{ m}/3.0 \text{ m}) = 2.24 \text{ dB}$

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

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

Worst case:

Antenna polarization	Carrier (Band edge)	Spurious			
		Below 1 GHz	Above 1 GHz		
			1 GHz – 2.8 GHz	2.8 GHz - 13 GHz	13 GHz – 31.5 GHz
Horizontal	30 deg.	30 deg.	30 deg.	30 deg.	0 deg.
Vertical	30 deg.	30 deg.	30 deg.	30 deg.	0 deg.

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

Measurement range : 30 MHz – 31.5 GHz

Test data : APPENDIX

Test result : Pass

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 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	Peak	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)	9 kHz to 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz to 30 MHz	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 v04".

*4) In the frequency range below 30 MHz, RBW was narrowed to separate the noise contents.

Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.

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

Test data : APPENDIX

Test result : Pass

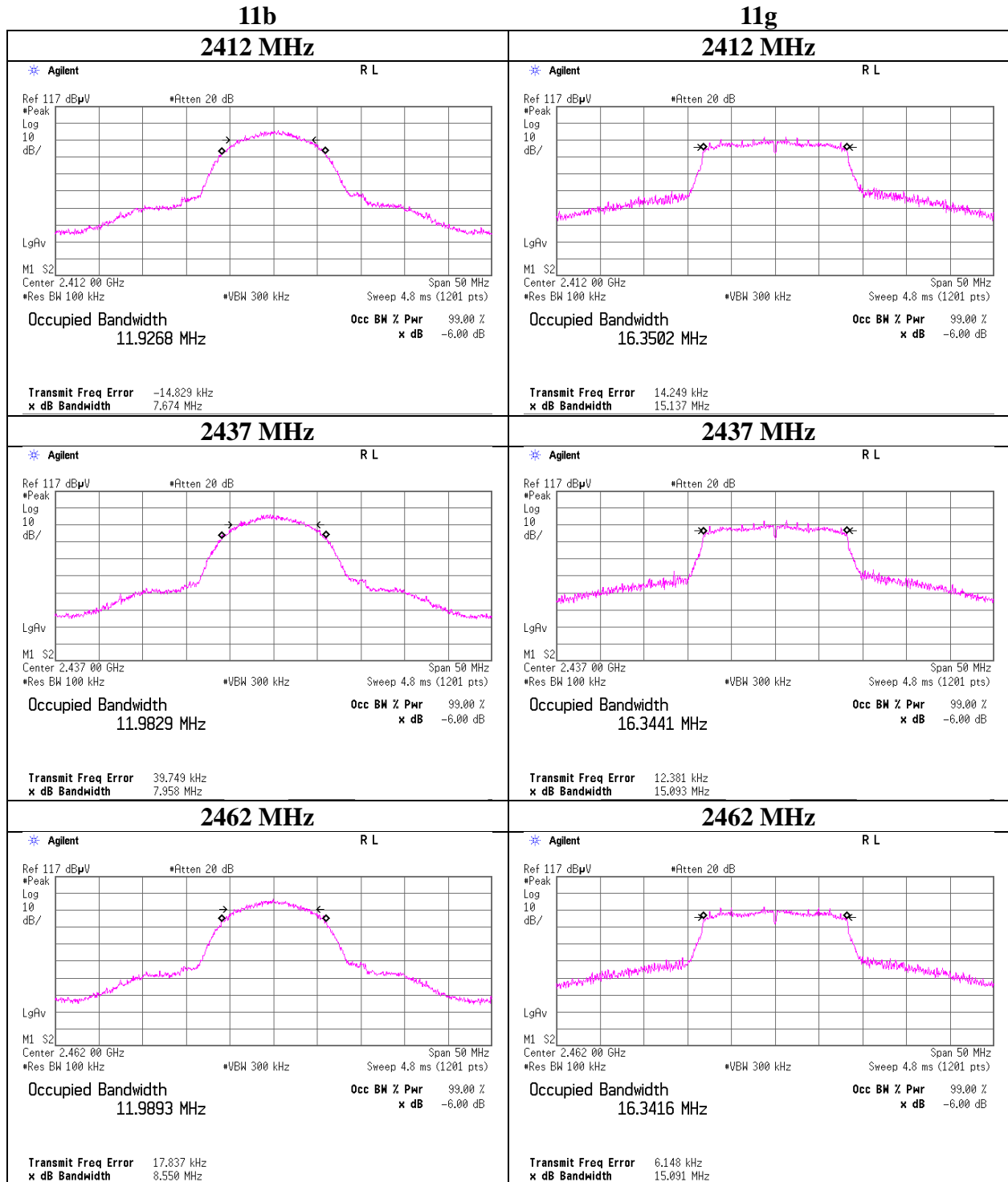
APPENDIX 1: Test data

6 dB Bandwidth and 99 % Occupied Bandwidth

Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 12093854S-B
Date December 22, 2017
Temperature / Humidity 23 deg. C / 37 % RH
Engineer Kazuya Noda
Mode Tx

Mode	Frequency [MHz]	99% Occupied Bandwidth [kHz]	6dB Bandwidth [MHz]	Limit for 6dB Bandwidth [MHz]
11b	2412	11940.6	7.674	> 0.5000
	2437	12000.2	7.958	> 0.5000
	2462	12054.4	8.550	> 0.5000
11g	2412	16574.7	15.137	> 0.5000
	2437	16586.0	15.093	> 0.5000
	2462	16560.3	15.091	> 0.5000
11n-20	2412	17647.6	16.288	> 0.5000
	2437	17646.2	15.699	> 0.5000
	2462	17657.9	16.986	> 0.5000

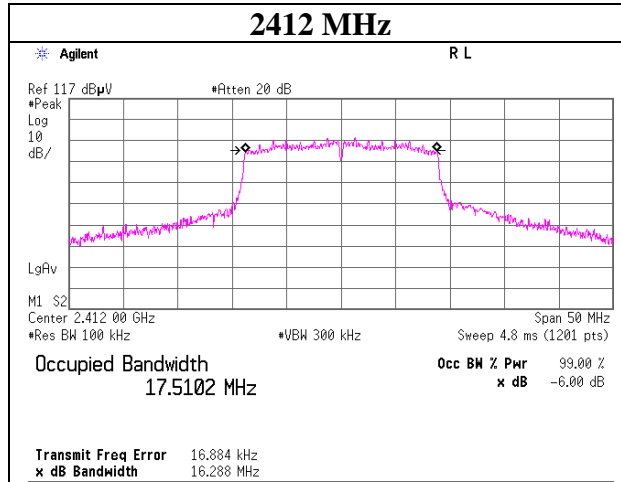
6dB Bandwidth



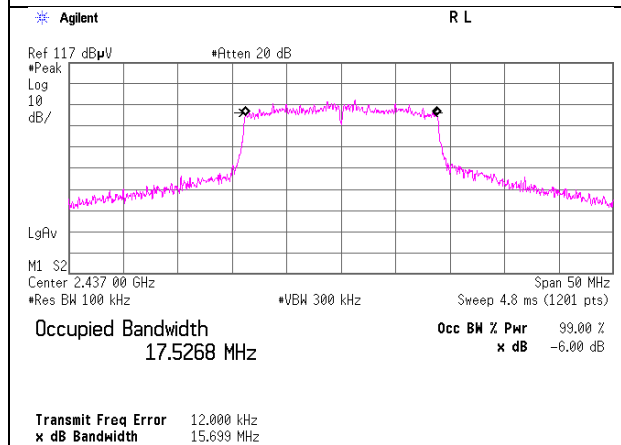
6dB Bandwidth

11n-20

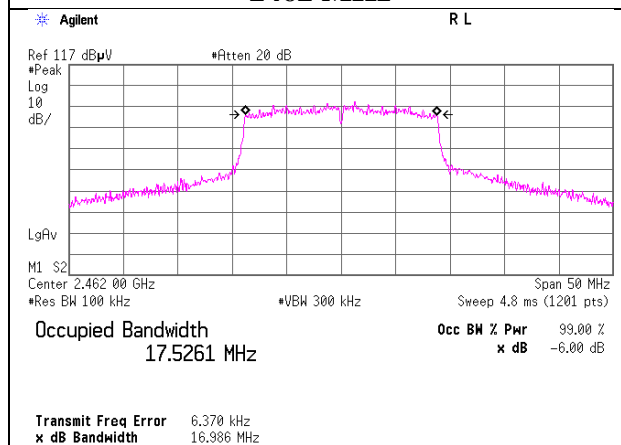
2412 MHz



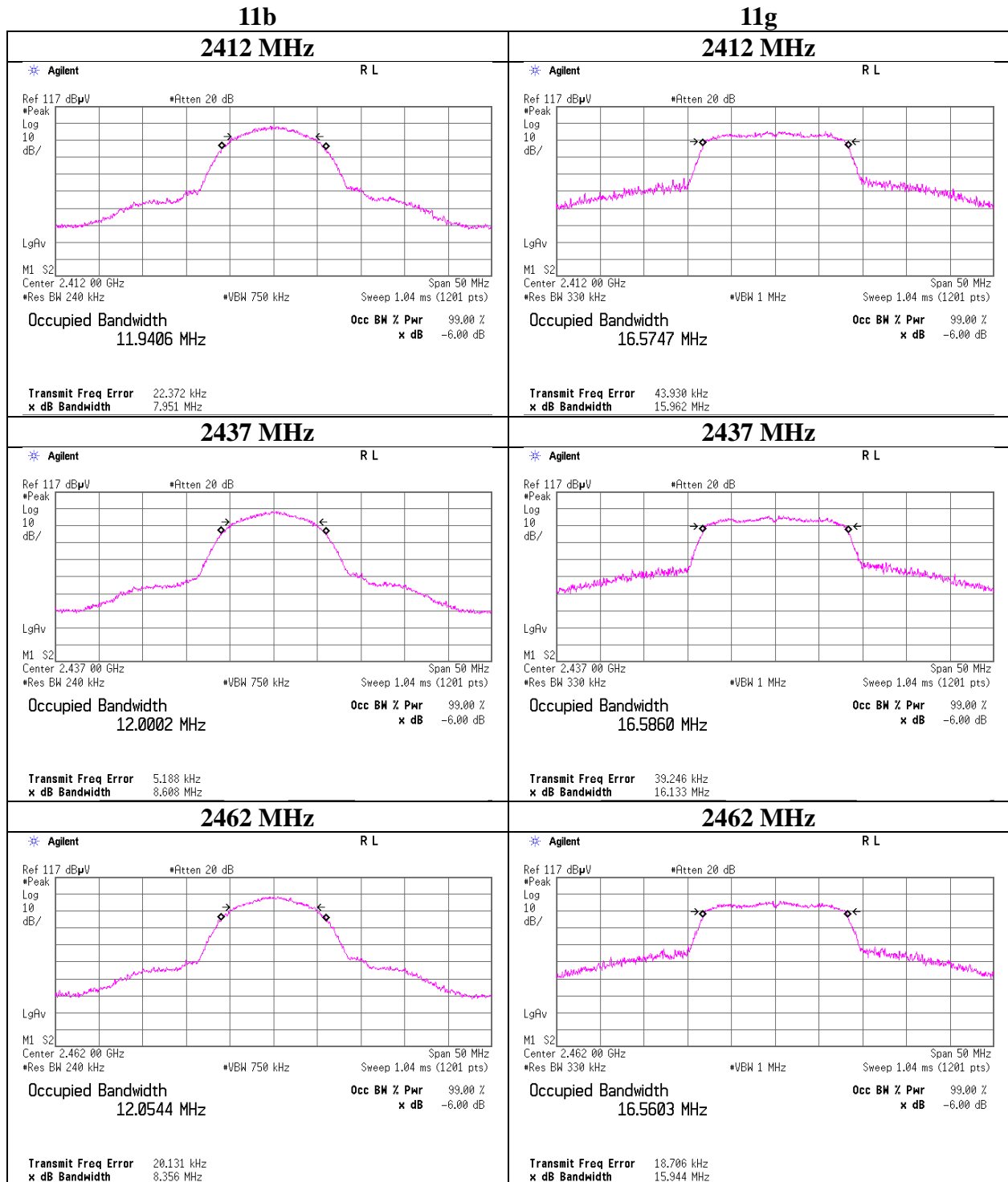
2437 MHz



2462 MHz



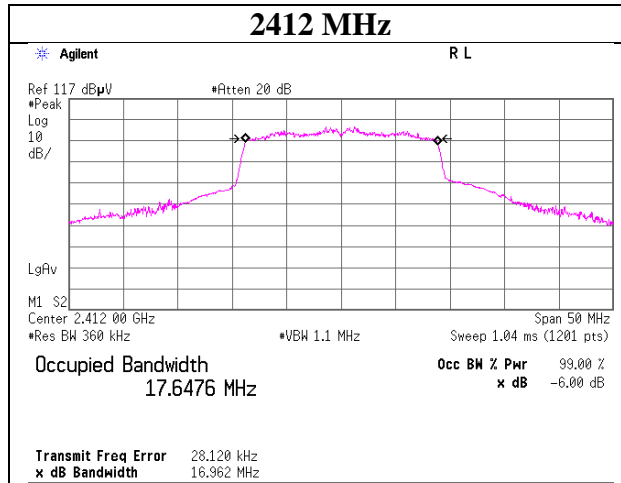
99% Occupied Bandwidth



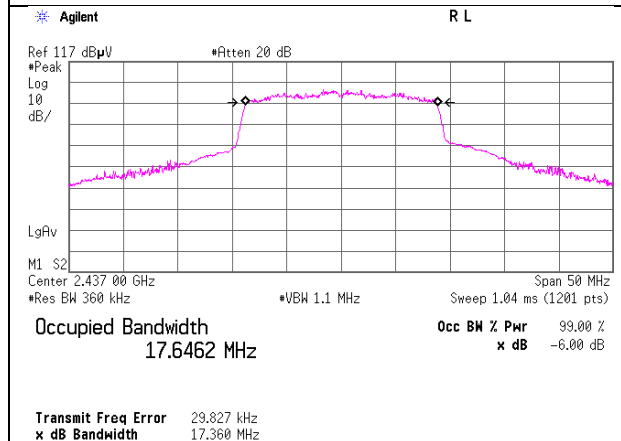
99% Occupied Bandwidth

11n-20

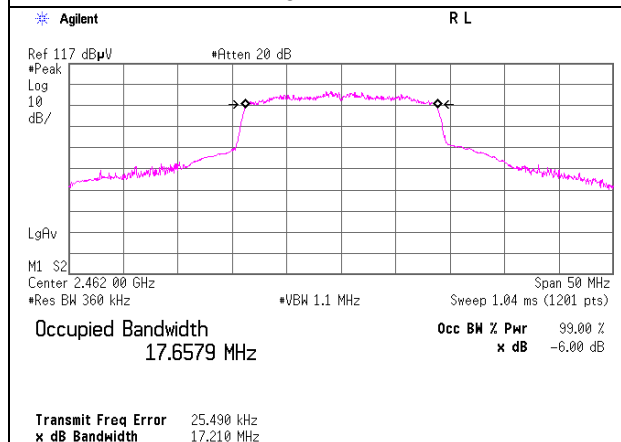
2412 MHz



2437 MHz



2462 MHz



Maximum Peak Output Power

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	12093854S-B
Date	December 21, 2017
Temperature / Humidity	22 deg. C / 39 % RH
Engineer	Kazuya Noda
Mode	Tx 11g

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	11.01	2.35	9.85	23.21	209.41	30.00	1000	6.79
2437	11.16	2.36	9.85	23.37	217.27	30.00	1000	6.63
2462	11.25	2.37	9.84	23.46	221.82	30.00	1000	6.54

Sample Calculation:

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

*The equipment and cables were not used for factor 0 dB of the data sheets.

2437 MHz

Rate [Mbps]	Reading [dBm]	Remark
6	11.16	*
9	11.12	
12	10.95	
18	10.92	
24	10.74	
36	10.75	
48	10.71	
54	10.77	

*: 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.	12093854S-B
Date	December 21, 2017
Temperature / Humidity	22 deg. C / 39 % RH
Engineer	Kazuya Noda
Mode	Tx 11n-20

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	11.04	2.35	9.85	23.24	210.86	30.00	1000	6.76
2437	11.11	2.36	9.85	23.32	214.78	30.00	1000	6.68
2462	11.13	2.37	9.84	23.34	215.77	30.00	1000	6.66

Sample Calculation:

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

*The equipment and cables were not used for factor 0 dB of the data sheets.

2437 MHz

MCS Number	Reading [dBm]	Remark
0	10.75	
1	10.75	
2	10.74	
3	11.11	*
4	10.67	
5	10.58	
6	10.61	
7	10.52	

*: Worst Rate

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

Average Output Power
(Reference data for RF Exposure)

Test place : Shonan EMC Lab. No.5 Shielded Room
Report No. : 12093854S-B
Date : December 21, 2017
Temperature / Humidity : 22 deg. C / 39 % RH
Engineer : Kazuya Noda
Mode : Tx

11b 11 Mbps

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	3.37	2.35	9.85	15.57	36.06	0.26	15.83	38.28
2437	3.63	2.36	9.85	15.84	38.37	0.26	16.10	40.74
2462	3.74	2.37	9.84	15.95	39.36	0.26	16.21	41.78

11g 6 Mbps

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	2.56	2.35	9.85	14.76	29.92	0.16	14.92	31.05
2437	2.86	2.36	9.85	15.07	32.14	0.16	15.23	33.34
2462	2.98	2.37	9.84	15.19	33.04	0.16	15.35	34.28

11n-20 MCS 0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	1.52	2.35	9.85	13.72	23.55	0.17	13.89	24.49
2437	1.89	2.36	9.85	14.10	25.70	0.17	14.27	26.73
2462	1.96	2.37	9.84	14.17	26.12	0.17	14.34	27.16

Sample Calculation:

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

Result (Burst power average) = Time average + Duty factor

*The equipment and cables were not used for factor 0 dB of the data sheets.

Average Output Power
(Reference data for RF Exposure)

Test place : Shonan EMC Lab. No.5 Shielded Room
Report No. : 12093854S-B
Date : December 21, 2017
Temperature / Humidity : 22 deg. C / 39 % RH
Engineer : Kazuya Noda
Mode : Tx

2437 MHz

Mode	Rate Mbps	Reading [dBm]	Duty factor [dB]	Burst power [dBm]	Remarks
11b	1	3.76	0.02	3.78	
	2	3.83	0.05	3.88	
	5.5	3.71	0.14	3.85	
	11	3.63	0.26	3.89	*

Mode	Rate Mbps	Reading [dBm]	Duty factor [dB]	Burst power [dBm]	Remarks
11g	6	2.86	0.16	3.02	*
	9	2.67	0.24	2.91	
	12	2.67	0.30	2.97	
	18	2.56	0.45	3.01	
	24	1.52	0.61	2.13	
	36	1.22	0.86	2.08	
	48	0.92	1.10	2.02	
	54	0.79	1.22	2.01	

Mode	Rate MCS Number	Reading [dBm]	Duty factor [dB]	Burst power [dBm]	Remarks
11n-20	0	1.89	0.17	2.06	*
	1	1.68	0.33	2.01	
	2	1.42	0.50	1.92	
	3	1.30	0.64	1.94	
	4	1.07	0.91	1.98	
	5	0.02	1.14	1.16	
	6	0.03	1.25	1.28	
	7	-0.01	1.34	1.33	

* Worst rate

Sample Calculation:

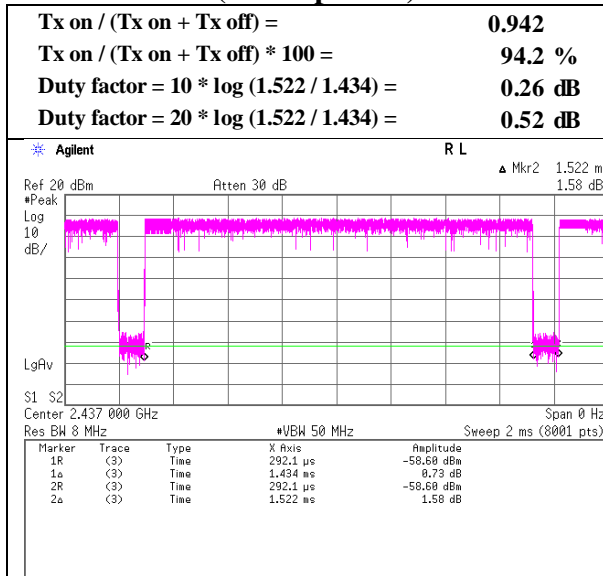
$$\text{Burst power} = \text{Reading (timed average)} + \text{Duty factor}$$

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

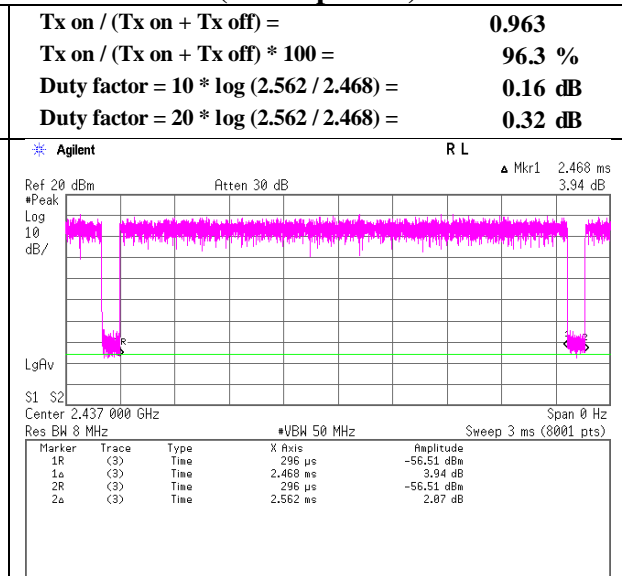
Burst rate confirmation

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	12093854S-B
Date	December 21, 2017
Temperature / Humidity	22 deg. C / 39 % RH
Engineer	Kazuya Noda
Mode	Tx

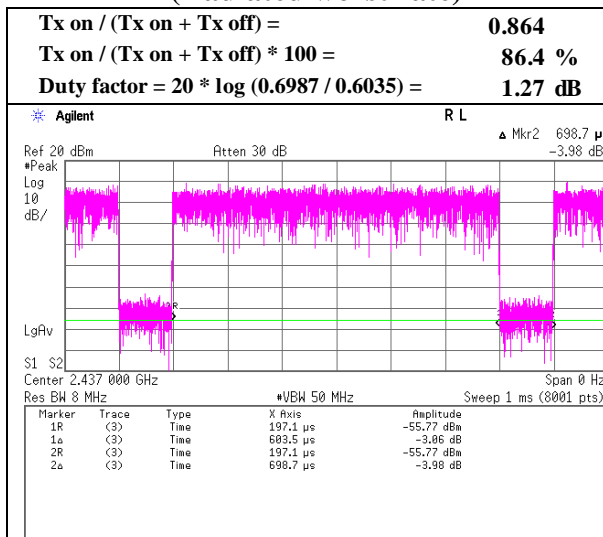
11b 11 Mbps (Radiated worst rate) (RF Exposure)



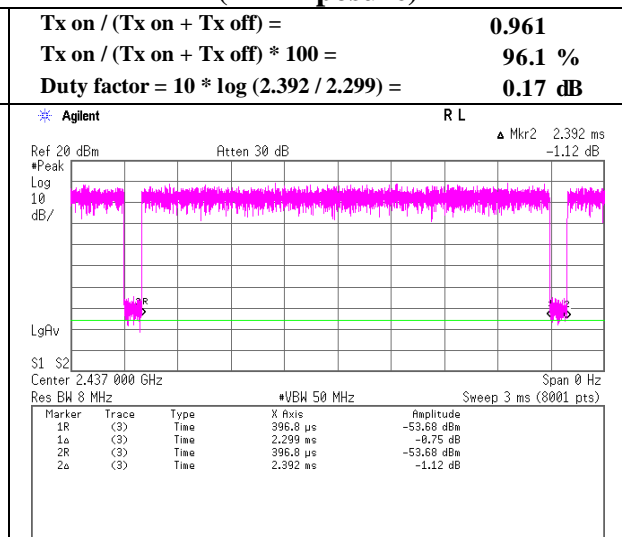
11g 6 Mbps (Radiated worst rate) (RF Exposure)



11n-20 MCS 3 (Radiated worst rate)



11n-20 MCS 0 (RF Exposure)



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

Radiated Spurious Emission

Report No.	12093854S-B		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	1	3	3
Date	January 9, 2018	January 10, 2018	January 9, 2018
Temperature / Humidity	20 deg.C / 39 %RH	20 deg.C / 31 %RH	23 deg.C / 34 %RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa	Kazuya Noda
	(1 GHz - 13 GHz)	(13 GHz - 26.5 GHz)	(26.5 GHz - 31.5 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	49.92	27.14	14.19	44.13	2.24	49.36	73.90	24.5	141	301	
Hori.	4824.000	PK	48.29	31.18	6.81	44.46	2.24	44.06	73.90	29.8	150	0	
Hori.	7236.000	PK	47.62	36.39	8.42	44.00	2.24	50.67	73.90	23.2	150	0	
Hori.	9648.000	PK	48.21	38.18	9.40	43.83	2.24	54.20	73.90	19.7	150	0	
Vert.	2390.000	PK	51.38	27.14	14.19	44.13	2.24	50.82	73.90	23.0	137	185	
Vert.	4824.000	PK	49.06	31.18	6.81	44.46	2.24	44.83	73.90	29.0	150	0	
Vert.	7236.000	PK	47.63	36.39	8.42	44.00	2.24	50.68	73.90	23.2	150	0	
Vert.	9648.000	PK	48.81	38.18	9.40	43.83	2.24	54.80	73.90	19.1	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 (3.88 m / 3.0 m) = 2.24 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 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	39.18	27.14	14.19	44.13	0.52	2.24	39.14	53.90	14.8	*1)
Hori.	4824.000	AV	38.71	31.18	6.81	44.46	0.52	2.24	35.00	53.90	18.9	
Hori.	7236.000	AV	37.40	36.39	8.42	44.00	0.52	2.24	40.97	53.90	12.9	
Hori.	9648.000	AV	38.59	38.18	9.40	43.83	0.52	2.24	45.10	53.90	8.8	
Vert.	2390.000	AV	40.43	27.14	14.19	44.13	0.52	2.24	40.39	53.90	13.5	*1)
Vert.	4824.000	AV	38.84	31.18	6.81	44.46	0.52	2.24	35.13	53.90	18.8	
Vert.	7236.000	AV	37.57	36.39	8.42	44.00	0.52	2.24	41.14	53.90	12.8	
Vert.	9648.000	AV	38.61	38.18	9.40	43.83	0.52	2.24	45.12	53.90	8.8	

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

Distance factor : 1 GHz - 13 GHz : 20log (3.88 m / 3.0 m) = 2.24 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 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	92.65	27.21	14.21	44.14	2.24	92.17	-	-	Carrier
Hori.	2400.000	PK	49.68	27.17	14.19	44.14	2.24	49.14	72.17	23.0	
Vert.	2412.000	PK	95.21	27.21	14.21	44.14	2.24	94.73	-	-	Carrier
Vert.	2400.000	PK	53.15	27.17	14.19	44.14	2.24	52.61	74.73	22.1	

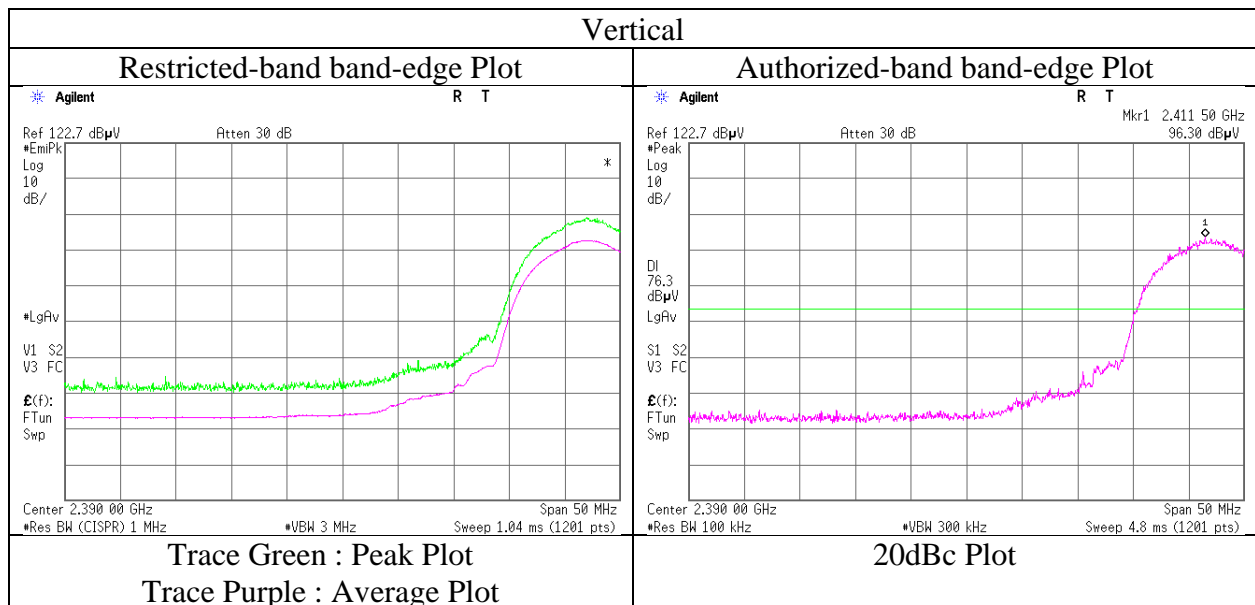
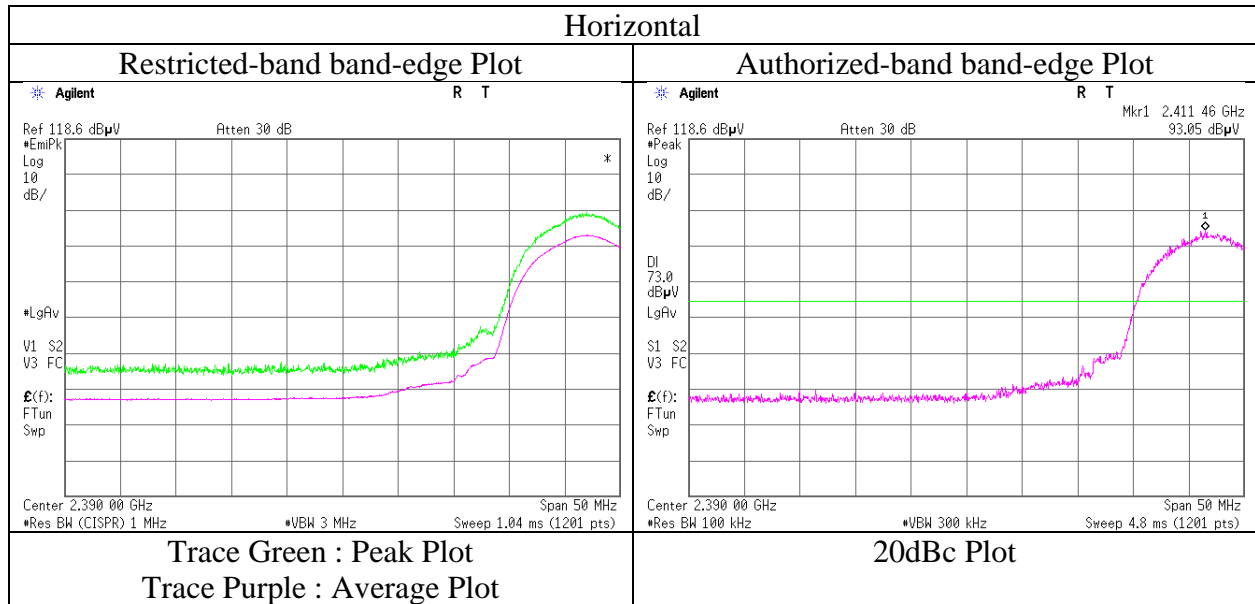
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : 20log (3.88 m / 3.0 m) = 2.24 dB

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

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No. 12093854S-B
Test place Shonan EMC Lab.
Semi Anechoic Chamber 1
Date January 9, 2018
Temperature / Humidity 20 deg.C / 39 %RH
Engineer Yosuke Ishikawa
(1 GHz - 13 GHz)
Mode Tx 11b 2412 MHz



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

Radiated Spurious Emission

Report No.	12093854S-B		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	1	3	3
Date	January 9, 2018	January 10, 2018	January 9, 2018
Temperature / Humidity	20 deg.C / 39 %RH	20 deg.C / 31 %RH	23 deg.C / 34 %RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa	Kazuya Noda
	(1 GHz - 13 GHz)	(13 GHz - 26.5 GHz)	(26.5 GHz - 31.5 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.	4874.000	PK	48.61	31.29	6.84	44.47	2.24	44.51	73.90	29.3	150	0	
Hori.	7311.000	PK	47.62	36.50	8.50	44.03	2.24	50.83	73.90	23.0	150	0	
Hori.	9748.000	PK	48.31	38.34	9.46	43.84	2.24	54.51	73.90	19.3	150	0	
Vert.	4874.000	PK	47.95	31.29	6.84	44.47	2.24	43.85	73.90	30.0	150	0	
Vert.	7311.000	PK	47.62	36.50	8.50	44.03	2.24	50.83	73.90	23.0	150	0	
Vert.	9748.000	PK	48.52	38.34	9.46	43.84	2.24	54.72	73.90	19.1	150	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.24\text{ dB}$

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

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	38.85	31.29	6.84	44.47	0.52	2.24	35.27	53.90	18.6	
Hori.	7311.000	AV	38.14	36.50	8.50	44.03	0.52	2.24	41.87	53.90	12.0	
Hori.	9748.000	AV	38.36	38.34	9.46	43.84	0.52	2.24	45.08	53.90	8.8	
Vert.	4874.000	AV	38.63	31.29	6.84	44.47	0.52	2.24	35.05	53.90	18.8	
Vert.	7311.000	AV	37.98	36.50	8.50	44.03	0.52	2.24	41.71	53.90	12.2	
Vert.	9748.000	AV	38.49	38.34	9.46	43.84	0.52	2.24	45.21	53.90	8.7	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.24\text{ dB}$

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

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

Radiated Spurious Emission

Report No.	12093854S-B		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	1	3	3
Date	January 9, 2018	January 10, 2018	January 9, 2018
Temperature / Humidity	20 deg.C / 39 %RH	20 deg.C / 31 %RH	23 deg.C / 34 %RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa	Kazuya Noda
	(1 GHz - 13 GHz)	(13 GHz - 26.5 GHz)	(26.5 GHz - 31.5 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	50.21	27.45	14.28	44.16	2.24	50.02	73.90	23.8	133	338	
Hori.	4924.000	PK	48.16	31.40	6.88	44.49	2.24	44.19	73.90	29.7	150	0	
Hori.	7386.000	PK	47.45	36.60	8.58	44.06	2.24	50.81	73.90	23.0	150	0	
Hori.	9848.000	PK	47.60	38.51	9.55	43.86	2.24	54.04	73.90	19.8	150	0	
Vert.	2483.500	PK	52.20	27.45	14.28	44.16	2.24	52.01	73.90	21.8	178	189	
Vert.	4924.000	PK	49.20	31.40	6.88	44.49	2.24	45.23	73.90	28.6	150	0	
Vert.	7386.000	PK	47.33	36.60	8.58	44.06	2.24	50.69	73.90	23.2	150	0	
Vert.	9848.000	PK	47.90	38.51	9.55	43.86	2.24	54.34	73.90	19.5	150	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.24\text{ dB}$

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

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	40.60	27.45	14.28	44.16	0.52	2.24	40.93	53.90	13.0	*1)
Hori.	4924.000	AV	38.58	31.40	6.88	44.49	0.52	2.24	35.13	53.90	18.8	
Hori.	7386.000	AV	38.69	36.60	8.58	44.06	0.52	2.24	42.57	53.90	11.3	
Hori.	9848.000	AV	38.56	38.51	9.55	43.86	0.52	2.24	45.52	53.90	8.4	
Vert.	2483.500	AV	42.49	27.45	14.28	44.16	0.52	2.24	42.82	53.90	11.1	*1)
Vert.	4924.000	AV	38.99	31.40	6.88	44.49	0.52	2.24	35.54	53.90	18.4	
Vert.	7386.000	AV	38.45	36.60	8.58	44.06	0.52	2.24	42.33	53.90	11.6	
Vert.	9848.000	AV	38.75	38.51	9.55	43.86	0.52	2.24	45.71	53.90	8.2	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.24\text{ dB}$

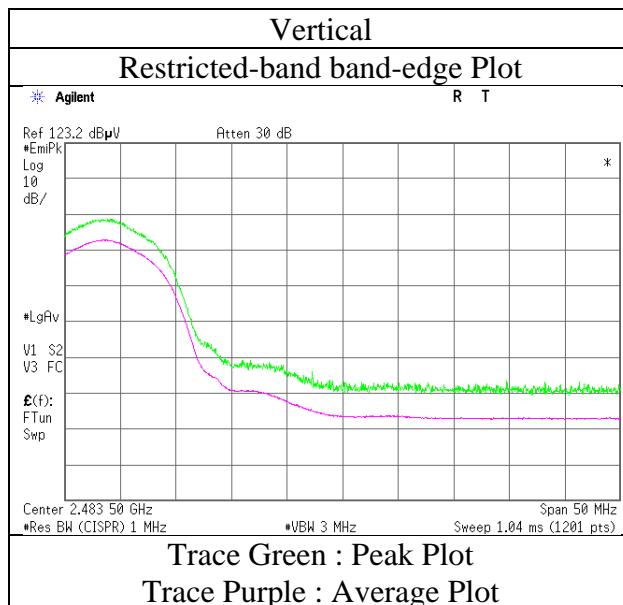
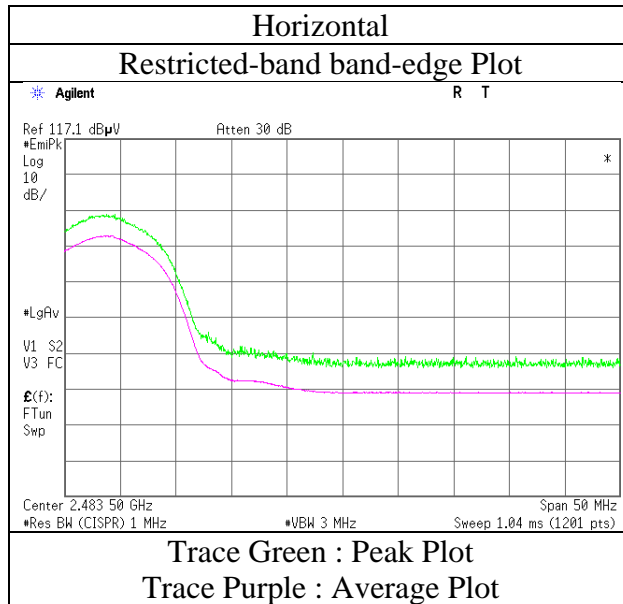
13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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)

Report No. 12093854S-B
Test place Shonan EMC Lab.
Semi Anechoic Chamber 1
Date January 9, 2018
Temperature / Humidity 20 deg.C / 39 %RH
Engineer Yosuke Ishikawa
(1 GHz - 13 GHz)
Mode Tx 11b 2462 MHz



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

Radiated Spurious Emission

Report No.	12093854S-B		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	1	3	3
Date	January 9, 2018	January 10, 2018	January 9, 2018
Temperature / Humidity	20 deg.C / 39 %RH	20 deg.C / 31 %RH	23 deg.C / 34 %RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa	Kazuya Noda
	(1 GHz - 13 GHz)	(13 GHz - 26.5 GHz)	(26.5 GHz - 31.5 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	57.38	27.14	14.19	44.13	2.24	56.82	73.90	17.0	137	305	
Hori.	4824.000	PK	48.14	31.18	6.81	44.46	2.24	43.91	73.90	29.9	150	0	
Hori.	7236.000	PK	47.40	36.39	8.42	44.00	2.24	50.45	73.90	23.4	150	0	
Hori.	9648.000	PK	48.29	38.18	9.40	43.83	2.24	54.28	73.90	19.6	150	0	
Vert.	2390.000	PK	59.59	27.14	14.19	44.13	2.24	59.03	73.90	14.8	135	183	
Vert.	4824.000	PK	48.56	31.18	6.81	44.46	2.24	44.33	73.90	29.5	150	0	
Vert.	7236.000	PK	47.11	36.39	8.42	44.00	2.24	50.16	73.90	23.7	150	0	
Vert.	9648.000	PK	48.28	38.18	9.40	43.83	2.24	54.27	73.90	19.6	150	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.24\text{ dB}$

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

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	41.16	27.14	14.19	44.13	0.32	2.24	40.92	53.90	13.0	*1)
Hori.	4824.000	AV	39.27	31.18	6.81	44.46	0.32	2.24	35.36	53.90	18.5	
Hori.	7236.000	AV	37.73	36.39	8.42	44.00	0.32	2.24	41.10	53.90	12.8	
Hori.	9648.000	AV	39.23	38.18	9.40	43.83	0.32	2.24	45.54	53.90	8.4	
Vert.	2390.000	AV	42.45	27.14	14.19	44.13	0.32	2.24	42.21	53.90	11.7	*1)
Vert.	4824.000	AV	39.20	31.18	6.81	44.46	0.32	2.24	35.29	53.90	18.6	
Vert.	7236.000	AV	37.85	36.39	8.42	44.00	0.32	2.24	41.22	53.90	12.7	
Vert.	9648.000	AV	38.72	38.18	9.40	43.83	0.32	2.24	45.03	53.90	8.9	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.24\text{ dB}$

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

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	86.23	27.21	14.21	44.14	2.24	85.75	-	-	Carrier
Hori.	2400.000	PK	51.33	27.17	14.19	44.14	2.24	50.79	65.75	15.0	
Vert.	2412.000	PK	90.17	27.21	14.21	44.14	2.24	89.69	-	-	Carrier
Vert.	2400.000	PK	54.58	27.17	14.19	44.14	2.24	54.04	69.69	15.7	

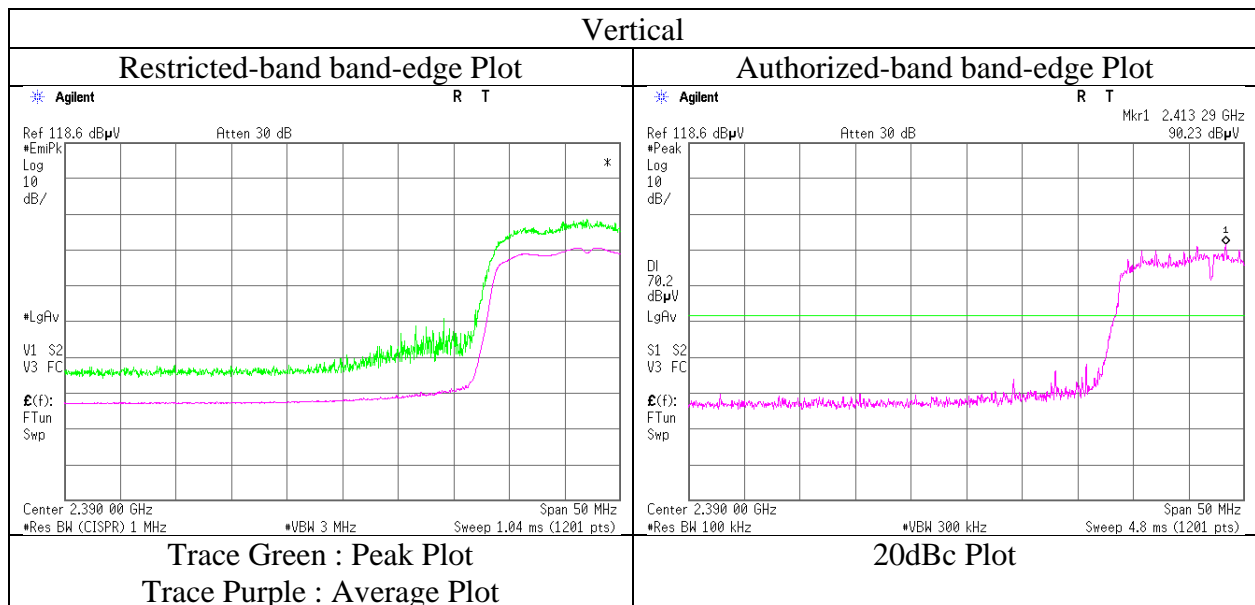
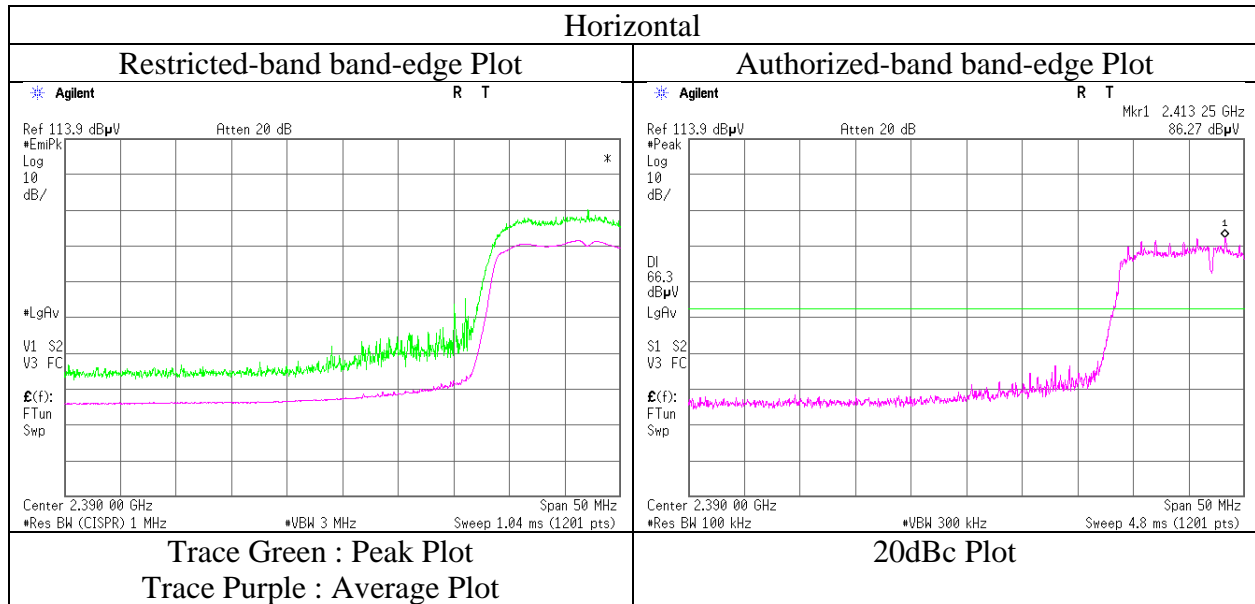
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.24\text{ dB}$

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)

Report No. 12093854S-B
Test place Shonan EMC Lab.
Semi Anechoic Chamber 1
Date January 9, 2018
Temperature / Humidity 20 deg.C / 39 %RH
Engineer Yosuke Ishikawa
(1 GHz - 13 GHz)
Mode Tx 11g 2412 MHz



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

Radiated Spurious Emission

Report No.	12093854S-B		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	1	3	3
Date	January 9, 2018	January 10, 2018	January 9, 2018
Temperature / Humidity	20 deg.C / 39 %RH	20 deg.C / 31 %RH	23 deg.C / 34 %RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa	Kazuya Noda
	(1 GHz - 13 GHz)	(13 GHz - 26.5 GHz)	(26.5 GHz - 31.5 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.	4874.000	PK	48.60	31.29	6.84	44.47	2.24	44.50	73.90	29.4	150	0	
Hori.	7311.000	PK	47.44	36.50	8.50	44.03	2.24	50.65	73.90	23.2	150	0	
Hori.	9748.000	PK	47.71	38.34	9.46	43.84	2.24	53.91	73.90	19.9	150	0	
Vert.	4874.000	PK	48.52	31.29	6.84	44.47	2.24	44.42	73.90	29.4	150	0	
Vert.	7311.000	PK	47.95	36.50	8.50	44.03	2.24	51.16	73.90	22.7	150	0	
Vert.	9748.000	PK	48.16	38.34	9.46	43.84	2.24	54.36	73.90	19.5	150	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.24\text{ dB}$

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

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	38.97	31.29	6.84	44.47	0.32	2.24	35.19	53.90	18.7	
Hori.	7311.000	AV	38.17	36.50	8.50	44.03	0.32	2.24	41.70	53.90	12.2	
Hori.	9748.000	AV	38.49	38.34	9.46	43.84	0.32	2.24	45.01	53.90	8.9	
Vert.	4874.000	AV	39.10	31.29	6.84	44.47	0.32	2.24	35.32	53.90	18.6	
Vert.	7311.000	AV	38.12	36.50	8.50	44.03	0.32	2.24	41.65	53.90	12.2	
Vert.	9748.000	AV	38.67	38.34	9.46	43.84	0.32	2.24	45.19	53.90	8.7	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.24\text{ dB}$

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

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

Radiated Spurious Emission

Report No. 12093854S-B
Test place Shonan EMC Lab.
Semi Anechoic Chamber 2 1 3 3
Date December 26, 2017 January 9, 2018 January 10, 2018 January 9, 2018
Temperature / Humidity 22 deg.C / 30 %RH 20 deg.C / 39 %RH 20 deg.C / 31 %RH 23 deg.C / 34 %RH
Engineer Yasumasa Owaki Yosuke Ishikawa Yosuke Ishikawa Kazuya Noda
(30 MHz - 1000 MHz) (1 GHz - 13 GHz) (13 GHz - 26.5 GHz) (26.5 GHz - 31.5 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.	168.013	QP	42.40	15.65	8.82	31.79	0.00	35.08	43.50	8.4	182	30	
Hori.	172.031	QP	43.70	15.81	8.82	31.78	0.00	36.55	43.50	6.9	196	51	
Hori.	179.612	QP	41.40	16.11	8.80	31.78	0.00	34.53	43.50	8.9	180	242	
Hori.	191.509	QP	38.60	16.25	8.84	31.77	0.00	31.92	43.50	11.5	161	238	
Hori.	264.001	QP	50.50	12.19	6.18	31.69	0.00	37.18	46.00	8.8	128	345	
Hori.	336.001	QP	50.10	14.26	6.71	31.63	0.00	39.44	46.00	6.5	100	201	
Hori.	408.001	QP	46.50	15.98	7.19	31.62	0.00	38.05	46.00	7.9	100	87	
Hori.	432.002	QP	43.80	16.44	7.36	31.62	0.00	35.98	46.00	10.0	100	7	
Hori.	466.941	QP	48.60	17.13	7.56	31.60	0.00	41.69	46.00	4.3	100	179	
Hori.	498.404	QP	38.40	17.74	7.71	31.59	0.00	32.26	46.00	13.7	185	117	
Hori.	742.501	QP	40.60	20.30	8.92	31.47	0.00	38.35	46.00	7.6	100	223	
Hori.	960.257	QP	40.30	22.55	9.94	30.40	0.00	42.39	53.90	11.5	100	282	
Hori.	2483.500	PK	57.58	27.45	14.28	44.16	2.24	57.39	73.90	16.5	129	339	
Hori.	4924.000	PK	48.40	31.40	6.88	44.49	2.24	44.43	73.90	29.4	150	0	
Hori.	7386.000	PK	48.78	36.60	8.58	44.06	2.24	52.14	73.90	21.7	150	0	
Hori.	9848.000	PK	48.12	38.51	9.55	43.86	2.24	54.56	73.90	19.3	150	0	
Vert.	172.036	QP	44.50	15.81	8.82	31.78	0.00	37.35	43.50	6.1	100	103	
Vert.	179.659	QP	41.10	16.12	8.80	31.78	0.00	34.24	43.50	9.2	100	307	
Vert.	2483.500	PK	63.76	27.45	14.28	44.16	2.24	63.57	73.90	10.3	179	188	
Vert.	4924.000	PK	48.12	31.40	6.88	44.49	2.24	44.15	73.90	29.7	150	0	
Vert.	7386.000	PK	47.84	36.60	8.58	44.06	2.24	51.20	73.90	22.7	150	0	
Vert.	9848.000	PK	47.89	38.51	9.55	43.86	2.24	54.33	73.90	19.5	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(3.88 m / 3.0 m) = 2.24 dB

13 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.54 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	40.96	27.45	14.28	44.16	0.32	2.24	41.09	53.90	12.8	*1)
Hori.	4924.000	AV	38.96	31.40	6.88	44.49	0.32	2.24	35.31	53.90	18.6	
Hori.	7386.000	AV	38.40	36.60	8.58	44.06	0.32	2.24	42.08	53.90	11.8	
Hori.	9848.000	AV	38.65	38.51	9.55	43.86	0.32	2.24	45.41	53.90	8.5	
Vert.	2483.500	AV	44.44	27.45	14.28	44.16	0.32	2.24	44.57	53.90	9.3	*1)
Vert.	4924.000	AV	38.97	31.40	6.88	44.49	0.32	2.24	35.32	53.90	18.6	
Vert.	7386.000	AV	38.35	36.60	8.58	44.06	0.32	2.24	42.03	53.90	11.9	
Vert.	9848.000	AV	38.68	38.51	9.55	43.86	0.32	2.24	45.44	53.90	8.5	

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

Distance factor : 1 GHz - 13 GHz : 20log(3.88 m / 3.0 m) = 2.24 dB

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

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

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

UL Japan, Inc.

Shonan EMC Lab.

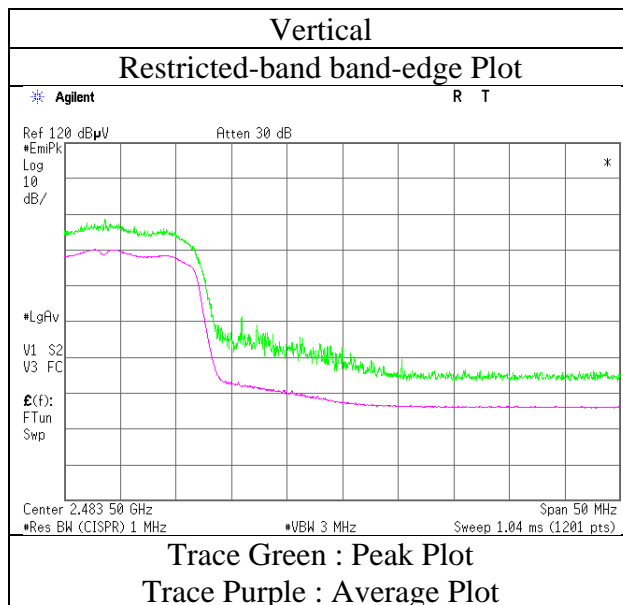
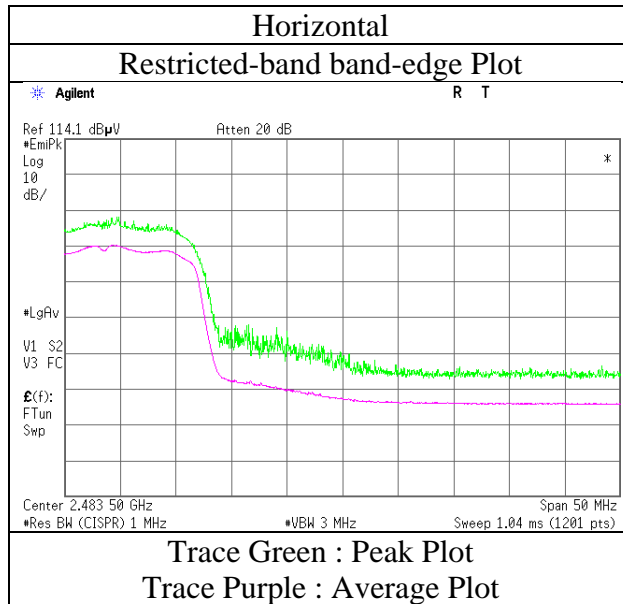
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No. 12093854S-B
Test place Shonan EMC Lab.
Semi Anechoic Chamber 1
Date January 9, 2018
Temperature / Humidity 20 deg.C / 39 %RH
Engineer Yosuke Ishikawa
(1 GHz - 13 GHz)
Mode Tx 11g 2462 MHz



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

Radiated Spurious Emission

Report No. 12093854S-B
Test place Shonan EMC Lab.
Semi Anechoic Chamber 1 3 3
Date January 9, 2018 January 10, 2018 January 9, 2018
Temperature / Humidity 20 deg.C / 39 %RH 20 deg.C / 31 %RH 23 deg.C / 34 %RH
Engineer Yosuke Ishikawa Yosuke Ishikawa Kazuya Noda
(1 GHz - 13 GHz) (13 GHz - 26.5 GHz) (26.5 GHz - 31.5 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	55.95	27.14	14.19	44.13	2.24	55.39	73.90	18.5	140	303	
Hori.	4824.000	PK	48.92	31.18	6.81	44.46	2.24	44.69	73.90	29.2	150	0	
Hori.	7236.000	PK	47.32	36.39	8.42	44.00	2.24	50.37	73.90	23.5	150	0	
Hori.	9648.000	PK	48.55	38.18	9.40	43.83	2.24	54.54	73.90	19.3	150	0	
Vert.	2390.000	PK	59.27	27.14	14.19	44.13	2.24	58.71	73.90	15.1	132	185	
Vert.	4824.000	PK	48.36	31.18	6.81	44.46	2.24	44.13	73.90	29.7	150	0	
Vert.	7236.000	PK	47.43	36.39	8.42	44.00	2.24	50.48	73.90	23.4	150	0	
Vert.	9648.000	PK	48.42	38.18	9.40	43.83	2.24	54.41	73.90	19.4	150	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.24\text{ dB}$

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

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	40.46	27.14	14.19	44.13	1.27	2.24	41.17	53.90	12.7	*1)
Hori.	4824.000	AV	39.17	31.18	6.81	44.46	1.27	2.24	36.21	53.90	17.7	
Hori.	7236.000	AV	37.90	36.39	8.42	44.00	1.27	2.24	42.22	53.90	11.7	
Hori.	9648.000	AV	38.80	38.18	9.40	43.83	1.27	2.24	46.06	53.90	7.8	
Vert.	2390.000	AV	41.48	27.14	14.19	44.13	1.27	2.24	42.19	53.90	11.7	*1)
Vert.	4824.000	AV	39.22	31.18	6.81	44.46	1.27	2.24	36.26	53.90	17.6	
Vert.	7236.000	AV	37.65	36.39	8.42	44.00	1.27	2.24	41.97	53.90	11.9	
Vert.	9648.000	AV	38.77	38.18	9.40	43.83	1.27	2.24	46.03	53.90	7.9	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.24\text{ dB}$

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

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	85.66	27.21	14.21	44.14	2.24	85.18	-	-	Carrier
Hori.	2400.000	PK	49.14	27.17	14.19	44.14	2.24	48.60	65.18	16.6	
Vert.	2412.000	PK	88.95	27.21	14.21	44.14	2.24	88.47	-	-	Carrier
Vert.	2400.000	PK	51.01	27.17	14.19	44.14	2.24	50.47	68.47	18.0	

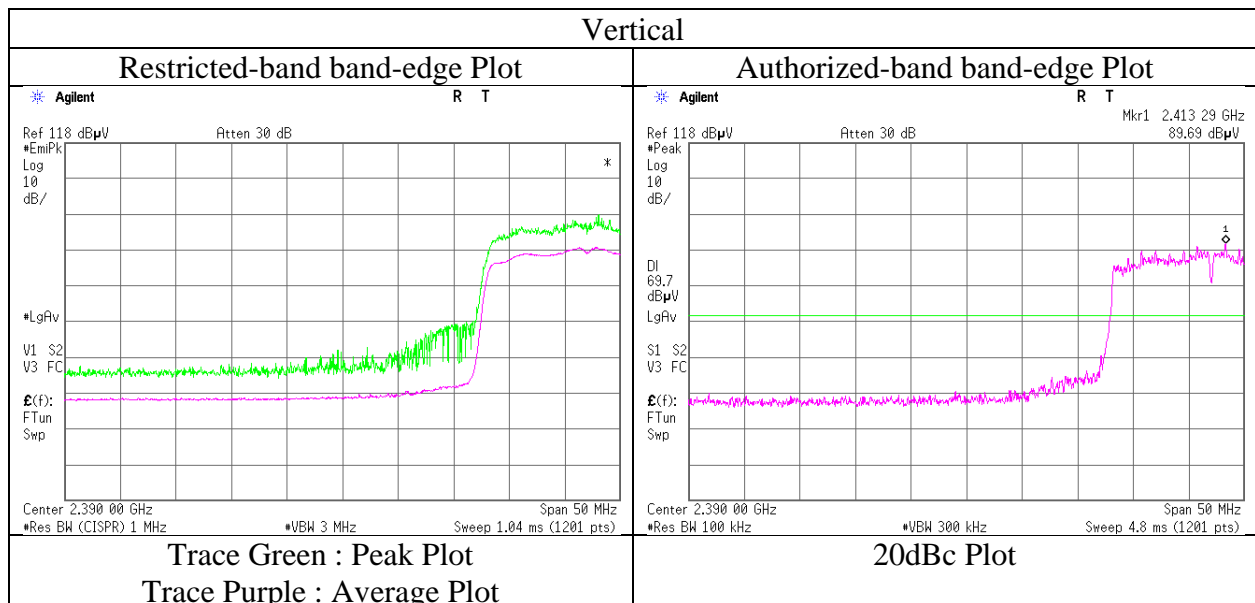
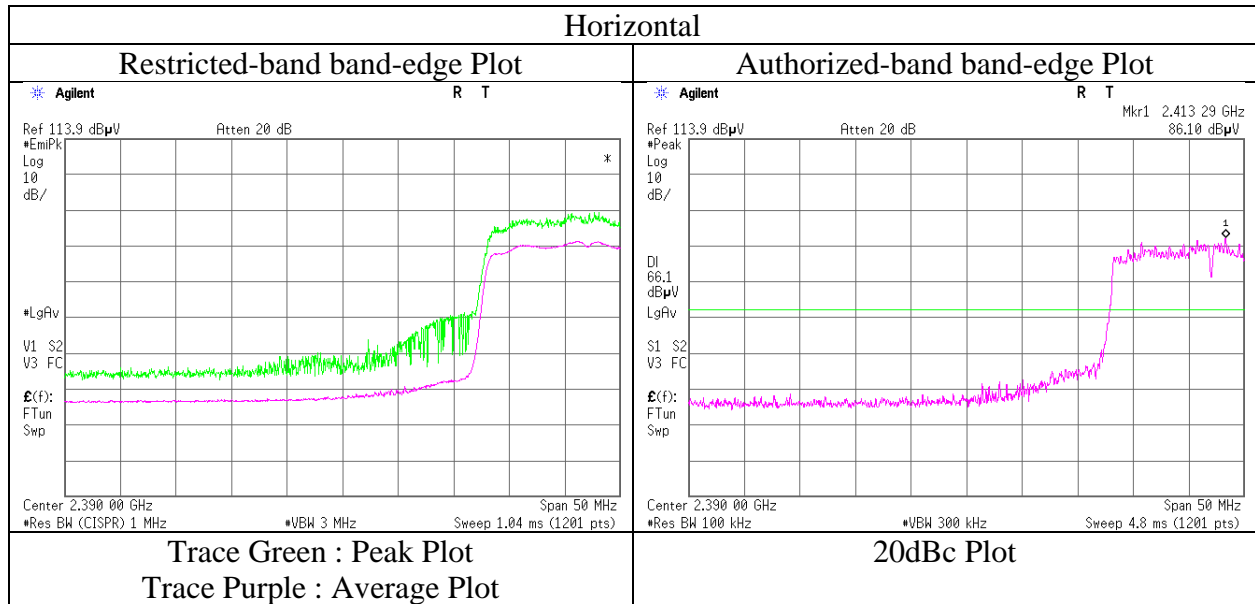
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.24\text{ dB}$

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)

Report No. 12093854S-B
Test place Shonan EMC Lab.
Semi Anechoic Chamber 1
Date January 9, 2018
Temperature / Humidity 20 deg.C / 39 %RH
Engineer Yosuke Ishikawa
(1 GHz - 13 GHz)
Mode Tx 11n-20 2412 MHz



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

Radiated Spurious Emission

Report No.	12093854S-B		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	1	3	3
Date	January 9, 2018	January 10, 2018	January 9, 2018
Temperature / Humidity	20 deg.C / 39 %RH	20 deg.C / 31 %RH	23 deg.C / 34 %RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa	Kazuya Noda
	(1 GHz - 13 GHz)	(13 GHz - 26.5 GHz)	(26.5 GHz - 31.5 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.	4874.000	PK	48.62	31.29	6.84	44.47	2.24	44.52	73.90	29.3	150	0	
Hori.	7311.000	PK	47.14	36.50	8.50	44.03	2.24	50.35	73.90	23.5	150	0	
Hori.	9748.000	PK	47.57	38.34	9.46	43.84	2.24	53.77	73.90	20.1	150	0	
Vert.	4874.000	PK	48.11	31.29	6.84	44.47	2.24	44.01	73.90	29.8	150	0	
Vert.	7311.000	PK	47.46	36.50	8.50	44.03	2.24	50.67	73.90	23.2	150	0	
Vert.	9748.000	PK	47.29	38.34	9.46	43.84	2.24	53.49	73.90	20.4	150	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.24\text{ dB}$

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

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	38.96	31.29	6.84	44.47	1.27	2.24	36.13	53.90	17.8	
Hori.	7311.000	AV	38.40	36.50	8.50	44.03	1.27	2.24	42.88	53.90	11.0	
Hori.	9748.000	AV	38.63	38.34	9.46	43.84	1.27	2.24	46.10	53.90	7.8	
Vert.	4874.000	AV	38.83	31.29	6.84	44.47	1.27	2.24	36.00	53.90	17.9	
Vert.	7311.000	AV	38.27	36.50	8.50	44.03	1.27	2.24	42.75	53.90	11.2	
Vert.	9748.000	AV	38.45	38.34	9.46	43.84	1.27	2.24	45.92	53.90	8.0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.24\text{ dB}$

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

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

Radiated Spurious Emission

Report No.	12093854S-B		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	1	3	3
Date	January 9, 2018	January 10, 2018	January 9, 2018
Temperature / Humidity	20 deg.C / 39 %RH	20 deg.C / 31 %RH	23 deg.C / 34 %RH
Engineer	Yosuke Ishikawa (1 GHz - 13 GHz)	Yosuke Ishikawa (13 GHz - 26.5 GHz)	Kazuya Noda (26.5 GHz - 31.5 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	58.16	27.45	14.28	44.16	2.24	57.97	73.90	15.9	133	338	
Hori.	4924.000	PK	48.79	31.40	6.88	44.49	2.24	44.82	73.90	29.0	150	0	
Hori.	7386.000	PK	47.79	36.60	8.58	44.06	2.24	51.15	73.90	22.7	150	0	
Hori.	9848.000	PK	48.01	38.51	9.55	43.86	2.24	54.45	73.90	19.4	150	0	
Vert.	2483.500	PK	61.67	27.45	14.28	44.16	2.24	61.48	73.90	12.4	180	189	
Vert.	4924.000	PK	48.74	31.40	6.88	44.49	2.24	44.77	73.90	29.1	150	0	
Vert.	7386.000	PK	47.72	36.60	8.58	44.06	2.24	51.08	73.90	22.8	150	0	
Vert.	9848.000	PK	48.17	38.51	9.55	43.86	2.24	54.61	73.90	19.2	150	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.24\text{ dB}$

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

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	40.60	27.45	14.28	44.16	1.27	2.24	41.68	53.90	12.2	*1)
Hori.	4924.000	AV	39.31	31.40	6.88	44.49	1.27	2.24	36.61	53.90	17.3	
Hori.	7386.000	AV	38.59	36.60	8.58	44.06	1.27	2.24	43.22	53.90	10.7	
Hori.	9848.000	AV	38.70	38.51	9.55	43.86	1.27	2.24	46.41	53.90	7.5	
Vert.	2483.500	AV	43.73	27.45	14.28	44.16	1.27	2.24	44.81	53.90	9.1	*1)
Vert.	4924.000	AV	39.30	31.40	6.88	44.49	1.27	2.24	36.60	53.90	17.3	
Vert.	7386.000	AV	38.51	36.60	8.58	44.06	1.27	2.24	43.14	53.90	10.8	
Vert.	9848.000	AV	38.56	38.51	9.55	43.86	1.27	2.24	46.27	53.90	7.6	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.24\text{ dB}$

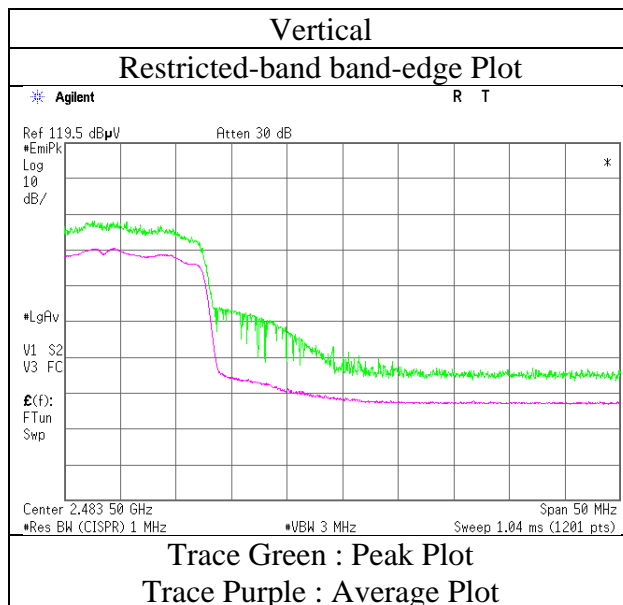
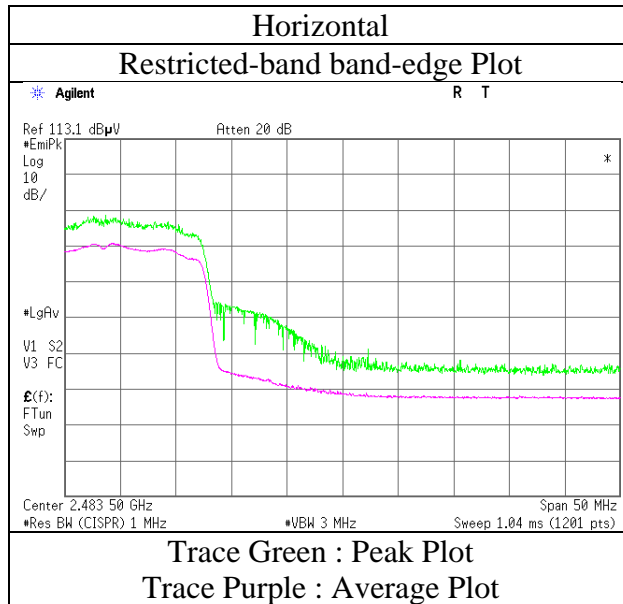
13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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)

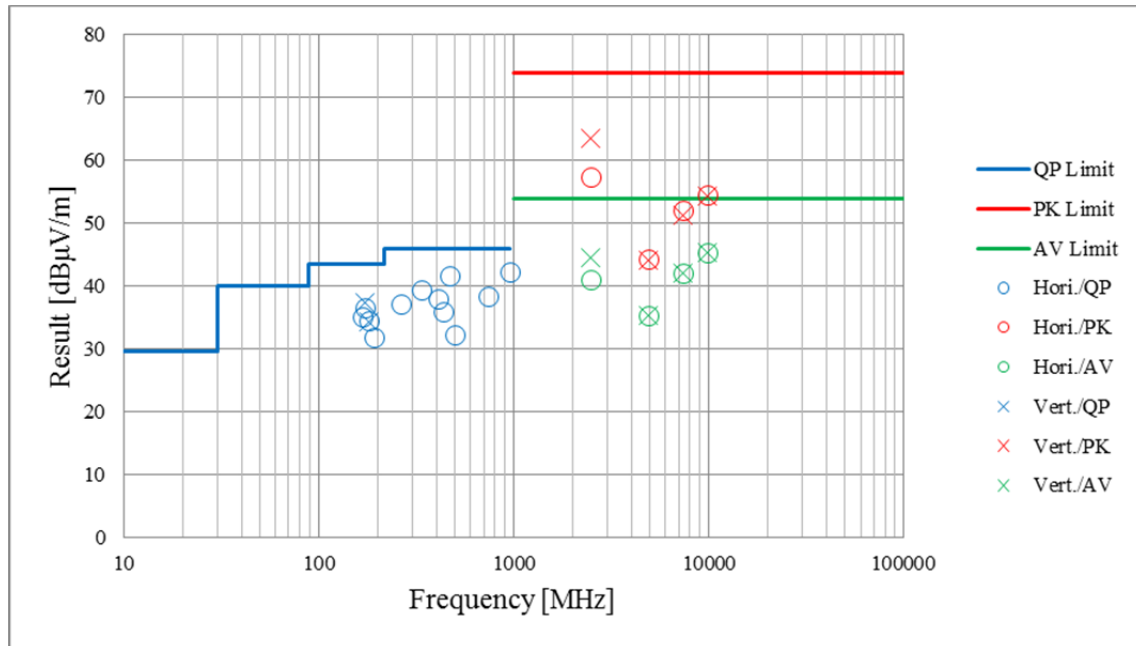
Report No. 12093854S-B
Test place Shonan EMC Lab.
Semi Anechoic Chamber 1
Date January 9, 2018
Temperature / Humidity 20 deg.C / 39 %RH
Engineer Yosuke Ishikawa
(1 GHz - 13 GHz)
Mode Tx 11n-20 2462 MHz



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

Radiated Spurious Emission (Plot data, Worst case)

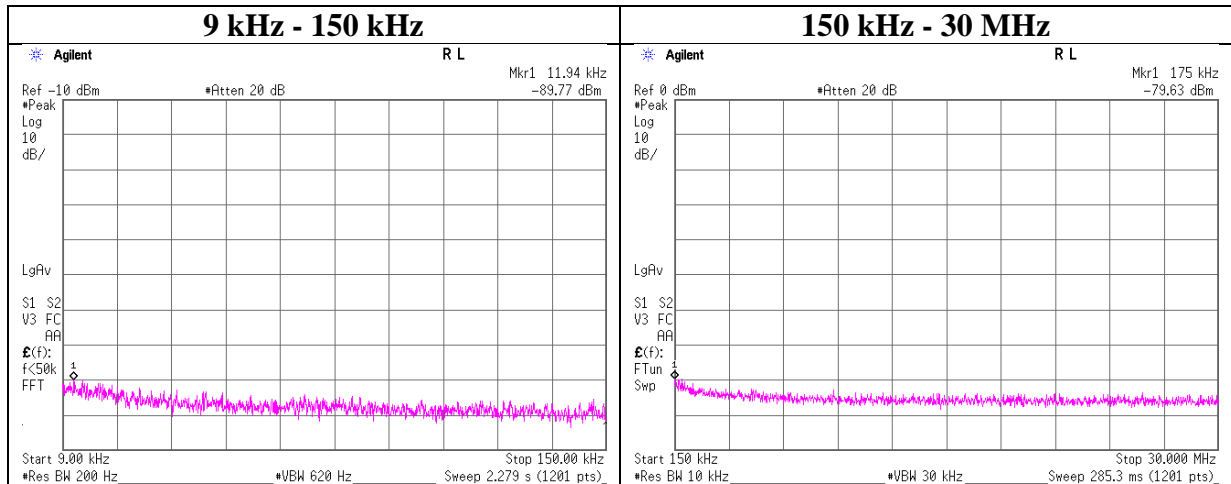
Report No.	12093854S-B			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	2	1	3	3
Date	December 26, 2017	January 9, 2018	January 10, 2018	January 9, 2018
Temperature / Humidity	22 deg.C / 30 %RH	20 deg.C / 39 %RH	20 deg.C / 31 %RH	23 deg.C / 34 %RH
Engineer	Yasumasa Owaki	Yosuke Ishikawa	Yosuke Ishikawa	Kazuya Noda
Mode	(30 MHz – 1000 MHz) Tx 11g 2462 MHz	(1 GHz - 13 GHz)	(13 GHz – 26.5 GHz)	(26.5 GHz – 31.5 GHz)



*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. : 12093854S-B
 Date : December 22, 2017
 Temperature / Humidity : 23 deg. C / 37 % RH
 Engineer : Kazuya Noda
 Mode : Tx 11g 2462 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain* [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
11.94	-89.8	0.01	9.8	2.0	1	-77.9	300	6.0	-16.7	46.0	62.7	
175.00	-79.6	0.01	9.8	2.0	1	-67.8	300	6.0	-6.5	22.7	29.2	

$$E \text{ [dBuV/m]} = \text{EIRP [dBm]} - 20 \log(\text{Distance [m]}) + \text{Ground bounce [dB]} + 104.8 \text{ [dBuV/m]}$$

$$\text{EIRP [dBm]} = \text{Reading [dBm]} + \text{Cable loss [dB]} + \text{Attenuator Loss [dB]} + \text{Antenna gain [dBi]} + 10 * \log(N)$$

N: Number of output

*2.0 dBi was applied to the test result based on KDB 558074 since antenna gain was less than 2.0 dBi.

Power Density

Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 12093854S-B
Date December 22, 2017
Temperature / Humidity 23 deg. C / 37 % RH
Engineer Kazuya Noda
Mode Tx

11b

Freq.	Reading	Cable Loss	Atten. Loss	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-18.75	2.35	9.85	-6.55	8.00	14.55
2437.00	-18.84	2.36	9.85	-6.63	8.00	14.63
2462.00	-17.38	2.37	9.84	-5.17	8.00	13.17

11g

Freq.	Reading	Cable Loss	Atten. Loss	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-21.16	2.35	9.85	-8.96	8.00	16.96
2437.00	-21.16	2.36	9.85	-8.95	8.00	16.95
2462.00	-20.61	2.37	9.84	-8.40	8.00	16.40

11n-20

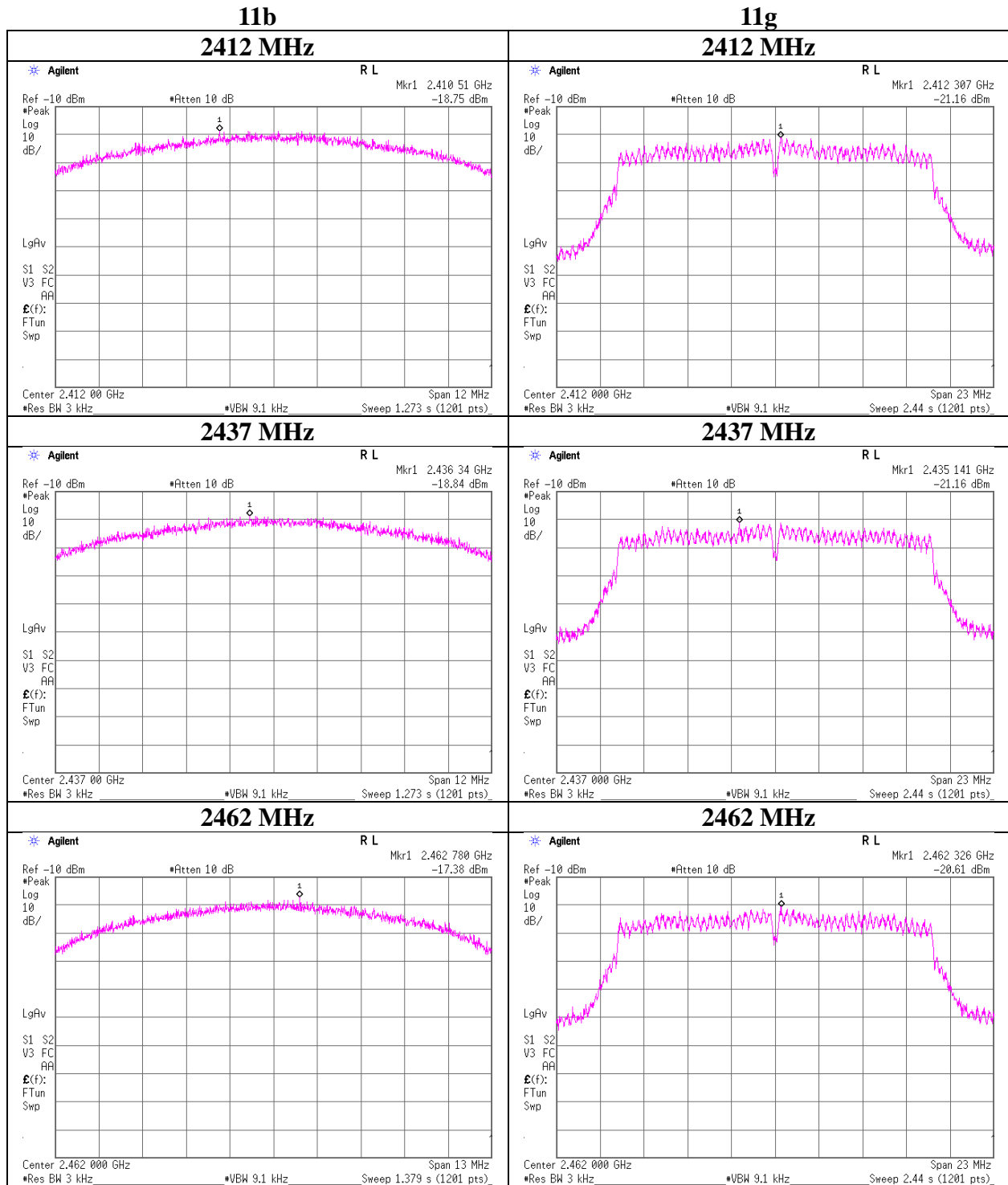
Freq.	Reading	Cable Loss	Atten. Loss	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-22.12	2.35	9.85	-9.92	8.00	17.92
2437.00	-21.33	2.36	9.85	-9.12	8.00	17.12
2462.00	-22.42	2.37	9.84	-10.21	8.00	18.21

Sample Calculation:

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

*The equipment and cables were not used for factor 0 dB of the data sheets.

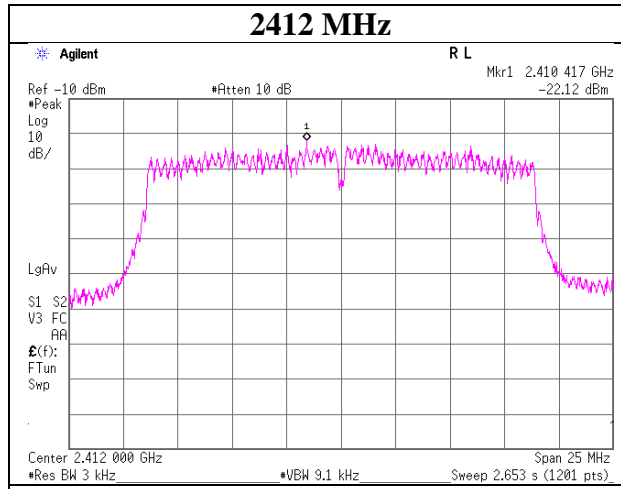
Power Density



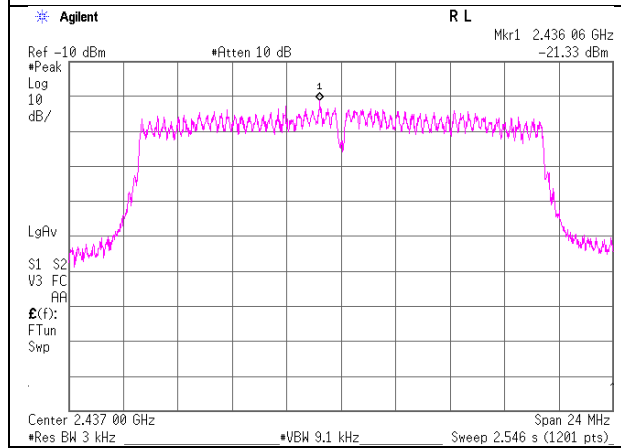
Power Density

11n-20

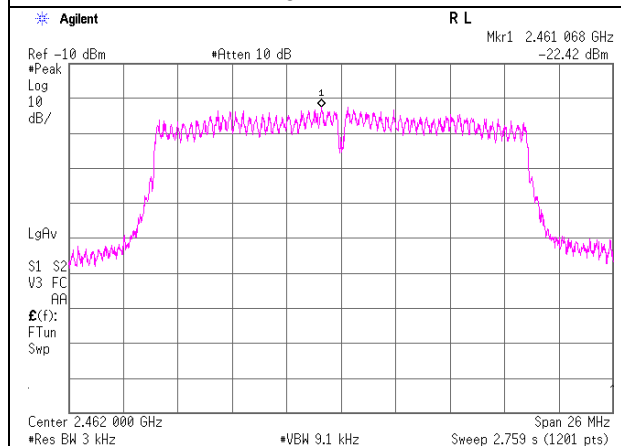
2412 MHz



2437 MHz



2462 MHz



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APPENDIX 2: Test instruments

Test Instruments

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	AT	2017/08/20 * 12
SCC-G32	Coaxial Cable	Junkosha	MWX241-02000KM SKMS	OCT-09-13-005	AT	2017/11/22 * 12
SAT10-12	Attenuator	Weinschel Corp.	54A-10	81601	AT	2017/03/23 * 12
SPM-07	Power Meter	Agilent	8990B	MY5100272	AT	2017/05/01 * 12
SPSS-05	Power sensor	Agilent	N1923A	MY5349008	AT	2017/05/01 * 12
SOS-10	Humidity Indicator	A&D	AD-5681	4064561	AT	2017/10/30 * 12
KTS-07	Digital Tester	SANWA	PC500	7019232	AT	2017/10/11 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	2046104	RE	2017/09/22 * 12
SCC-G05	Coaxial Cable	Junkosha	J12J102207-00	APR-30-15-037	RE	2017/01/08 * 12
SCC-G22	Coaxial Cable	Suhner	SUCOFLEX 104	296199/4	RE	2017/05/08 * 12
SCC-G40	Coaxial Cable	Junkosha	MWX221-01000NF SNMS/B	1612S005	RE	2017/01/08 * 12
SHA-01	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-725	RE	2017/08/14 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2017/10/30 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	RE	2017/10/10 * 12
KJM-09	Measure	KOMELON	KMC-36	-	RE	-
SAEC-01 (SVSW R)	Semi-Anechoic Chamber	TDK	SAEC-01(SVSWR)	1	RE	2017/07/20 * 12
COTS-SEMI -1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFI,MF)	-	RE	-
STS-01	Digital Hitester	Hioki	3805-50	080997812	RE	2017/10/16 * 12
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2017/11/22 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2017/11/16 * 12
SAF-02	Pre Amplifier	SONOMA	310N	290212	RE	2017/02/09 * 12
SAT6-02	Attenuator	JFW	50HF-006N	-	RE	2017/02/09 * 12
SAT3-11	Attenuator	JFW	50HF-003N	-	RE	2017/02/23 * 12
SBA-02	Biconical Antenna	Schwarzbeck	BBA9106	91032665	RE	2017/11/23 * 12
SCC-B1/B3/B5/B7/B8/B13/S RSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2017/04/07 * 12
SCC-B2/B4/B6/B7/B8/B13/S RSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2017/04/07 * 12
SLA-06	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	195	RE	2017/01/05 * 12
SOS-03	Humidity Indicator	A&D	AD-5681	4063325	RE	2017/10/30 * 12
STR-07	Test Receiver	Rohde & Schwarz	ESU26	100484	RE	2017/09/26 * 12
SJM-09	Measure	PROMART	SEN1935	-	RE	-
SAEC-02 (NSA)	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	RE	2017/06/08 * 12
STS-02	Digital Hitester	Hioki	3805-50	080997819	RE	2017/03/08 * 12
SAEC-03 (NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2017/06/11 * 12
SCC-G19	Coaxial Cable	Suhner	SUCOFLEX 102A	1188/2A	RE	2017/03/23 * 12
SCC-G33	Coaxial Cable	Junkosha	MWX241-01000KM SKMS	-	RE	2017/04/20 * 12
SHA-06	Horn Antenna	ETS LINDGREN	3160-10	LM3459	RE	2017/03/15 * 12
SAF-10	Pre Amplifier	TOYO Corporation	HAP26-40W	00000010	RE	2017/03/17 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2017/10/30 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2017/03/07 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE	-
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE	2017/10/16 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2017/08/23 * 12
SAF-09	Pre Amplifier	TOYO Corporation	HAP18-26W	00000018	RE	2017/09/22 * 12
SHA-05	Horn Antenna	ETS LINDGREN	3160-09	LM4210	RE	2017/03/15 * 12
SCC-G41	Coaxial Cable	Junkosha	MWX221-01000NF SNMS/B	1612S006	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
AT: Antenna Terminal Conducted test

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