RADIO TEST REPORT

Test Report No. : 11274192S-B-R1

Applicant	:	**Alpine Electronics, Inc.**
Type of Equipment	:	**Entry Evo**
Model No.	:	**EE0001**
FCC ID	:	**A269ZUA149**
Test regulation	:	**FCC Part 15 Subpart C: 2016**
Test Result	:	**Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. 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)
7. This report is a revised version of 11274192S-B. 11274192S-B is replaced with this report.

Date of test: July 19 to 26, 2016

Representative test engineer:
S. Takano
Shinichi Takano
Engineer
Consumer Technology Division

Approved by:
A. Hayashi
Akio Hayashi
Leader
Consumer Technology Division

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

RTL02610

UL Japan, Inc.
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN
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REVISION HISTORY

Original Test Report No.: 11274192S-B

Revision	Test report No.	Date	Page revised	Contents
- (Original)	11274192S-B	August 24, 2016	-	-
1	11274192S-B-R1	December 8, 2016	5, 10, 21	Update of Section 3 Correction of List of cable used Addition of data

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SECTION 1: Customer information

Company Name	:	Alpine Electronics, Inc.
Address	:	20-1 Yoshima-Kogyodanchi, Iwaki-shi, Fukushima, 970-1192 Japan
Telephone Number	:	+81-246-36-4111
Facsimile Number	:	+81-246-36-6492
Contact Person	:	Mitsuru Yoshida

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

2.1 Identification of E.U.T.

Type of Equipment	:	Entry Evo
Model No.	:	EE0001
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 14 V
Receipt Date of Sample	:	March 10, 2016
Country of Mass-production	:	Hungary, China
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: EE0001 (referred to as the EUT in this report) is a Entry Evo.

General Specification

Clock frequency(ies) in the system	:	26 MHz, 32.768 kHz

Radio Specification

[WLAN]

Radio Type	:	Transceiver
Frequency of Operation	:	2412 - 2462 MHz
Modulation	:	DSSS, OFDM
Power Supply (radio part input)	:	DC 3.3 V/ 1.8 V
Antenna type	:	λ/4 Monopole antenna
Antenna Gain	:	-3 dBi

SECTION 3: Test specification, procedures & results

3.1 Test Specification

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

* The revision on November 14, 2016, 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 C63.10-2013 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 v03r05 **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 v03r05 **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 v03r05 **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 v03r05 **IC:** RSS-Gen 6.13	**FCC:** Section15.247(d) **IC:** RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	2.1 dB 2483.500 MHz, AV, Hori. Tx 11n-20 2462 MHz	Complied	Conducted (below 30 MHz)/ Radiated (above 30 MHz) *2)

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420.
*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 v03r05 12.2.7.

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

FCC Part 15.31 (e)
The EUT provides stable voltage (DC 3.3 V/ 1.8 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
The EUT has a unique coupling/antenna connector. Therefore, the equipment complies with the antenna requirement of Section 15.203.

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 $k = 2$.

Shonan EMC Lab.

Item	Frequency range	Uncertainty (+/-)			
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR	No. 4 SAC / SR
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	2.1 dB	2.1 dB	2.6 dB	2.2 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	2.7 dB	2.7 dB	3.1 dB	-
	30 MHz-300 MHz	4.4 dB	4.4 dB	4.6 dB	-
	300 MHz-1 GHz	5.6 dB	5.5 dB	5.3 dB	-
	1 GHz-13 GHz	5.2 dB	5.2 dB	5.2 dB	-
Radiated emission (Measurement distance: 1 m)	13 GHz-18 GHz	4.9 dB	4.9 dB	4.9 dB	-
	18 GHz-40 GHz	4.9 dB	4.9 dB	4.9 dB	-

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

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

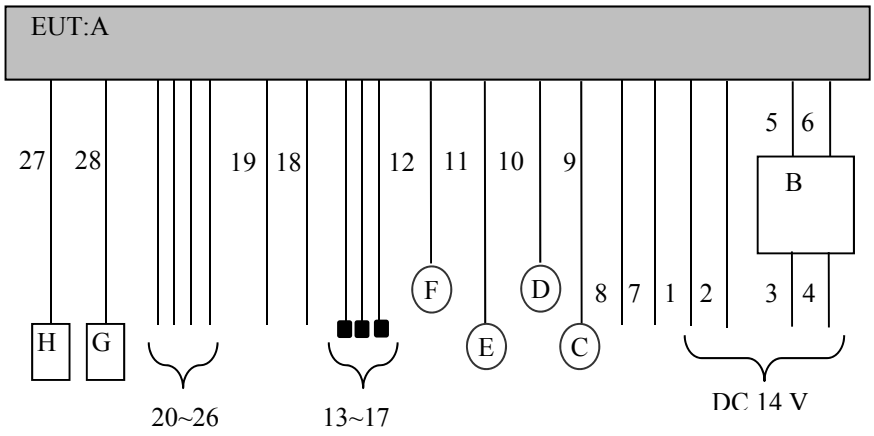
4.1 Operating Mode(s)

Mode	Remarks*
IEEE 802.11b (11b)	1 Mbps, PN9
IEEE 802.11g (11g)	54 Mbps, PN9
IEEE 802.11n (11n-20)	MCS 6 (GI long), 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 Software: Tera Term Ver. 4.88 *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	11b Tx 11g Tx	2412 MHz 2437 MHz 2462 MHz
	11n-20 Tx	2412 MHz 2437 MHz 2462 MHz
6dB Bandwidth Maximum Peak Output Power Power Density 99% Occupied Bandwidth	11b Tx 11g Tx	2412 MHz 2437 MHz 2462 MHz
	11n-20 Tx	2412 MHz 2437 MHz 2462 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

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Entry Evo	EE0001	AL07FFF0910407	Alpine Electronics, Inc.	EUT
B	CAN-BOX	NEW CAN-BOX HS	G0032437	Harman/Backer Automotive Systems	-
C	Speaker	LV-002	S11014200775	L&V	-
D	Speaker	LV-002	S11014200775	L&V	-
E	Speaker	LV-002	S11014200773	L&V	-
F	Speaker	LV-002	S11014200773	L&V	-
G	BT ANT	-	-	-	-
H	WLAN ANT	-	-	-	EUT

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC (+)	0.3+2.0	Unshielded	Unshielded	-
2	DC (-)	0.3+2.0	Unshielded	Unshielded	-
3	DC (+)	0.3+2.0	Unshielded	Unshielded	-
4	DC (-)	0.3+2.0	Unshielded	Unshielded	-
5	B-CAN+	0.3+0.3	Unshielded	Unshielded	-
6	B-CAN-	0.3+0.3	Unshielded	Unshielded	-
7	LAN	0.3+1.5+1.0	Unshielded	Unshielded	-
8	RS232C	0.3+1.0	Shielded	Shielded	-
9	Speaker	0.3+2.0	Unshielded	Unshielded	-
10	Speaker	0.3+2.0	Unshielded	Unshielded	-
11	Speaker	0.3+2.0	Unshielded	Unshielded	-
12	Speaker	0.3+2.0	Unshielded	Unshielded	-
13	Signal	0.3+1.0	Shielded	Shielded	-
14	Signal	0.3+1.0	Shielded	Shielded	-
15	Signal	0.3+1.0	Shielded	Shielded	-
16	Signal	0.3+1.0	Shielded	Shielded	-
17	Signal	0.3+1.0	Shielded	Shielded	-
18	USB	5.3	Shielded	Shielded	-
19	USB	5.3	Shielded	Shielded	-
20	Signal	5.3	Shielded	Shielded	-
21	Signal	5.3	Shielded	Shielded	-
22	Signal	5.3	Shielded	Shielded	-
23	Signal	5.3	Shielded	Shielded	-
24	Signal	5.3	Shielded	Shielded	-
25	Signal	5.3	Shielded	Shielded	-
26	Signal	5.3	Shielded	Shielded	-
27	ANT	2.0	Shielded	Shielded	-
28	ANT	2.0	Shielded	Shielded	-

SECTION 5: Radiated Spurious Emission

Test Procedure

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

[For below 1 GHz]
EUT was placed on a urethane platform of nominal size, 0.5 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;

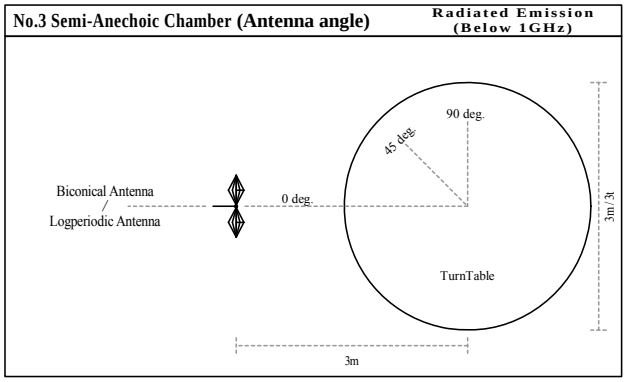
Frequency	30 MHz to 300 MHz	300 MHz to 1 GHz	Above 1 GHz
Antenna Type	Biconical	Logperiodic	Horn

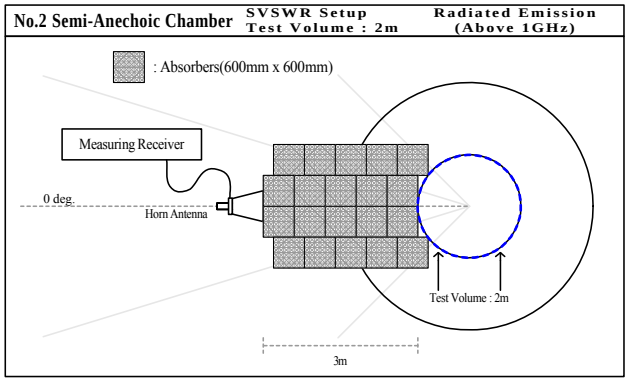
In any 100 kHz bandwidth outside the restricted band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired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

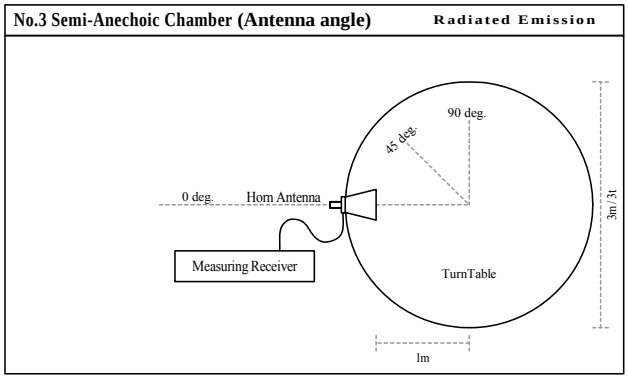
20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9(IC) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (IC).

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV *3)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	Average Power Method: 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: 300 kHz
Test Distance	3 m	3 m *1) (1 GHz – 13 GHz), 1 m *2) (13 GHz – 26.5 GHz)		3 m *1) (1 GHz – 13 GHz), 1 m *2) (10 GHz – 26.5 GHz)

*1) Distance Factor: 20 x log (3.8 m / 3.0 m) = 2.05 dB
*2) Distance Factor: 20 x log (1.0 m / 3.0 m) = -9.54 dB
*3) Average Power Measurement was performed based on 6. 0 & 12.2.5 of "KDB 558074 D01 DTS Meas Guidance v03r05"







- The carrier level and noise levels were confirmed at angle of -90 to 30 deg of EUT and at each position of X and Y axis of antenna to see the position of maximum noise, and the test was made at the position (0 deg. and X axis) that has the maximum noise.

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

Measurement range : 30 MHz - 26.5 GHz
Test data : APPENDIX
Test result : Pass

SECTION 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
6 dB 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	Sample	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak/ Average *2)	-	Power Meter (Sensor: 160 MHz BW)
Peak Power Density	1.5 times the 6 dB Bandwidth	3 kHz	9.1 kHz	Auto	Peak	Max Hold	Spectrum Analyzer *3)
Conducted Spurious Emission *5)	9 kHz to 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz to 30 MHz	10 kHz	27 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 v03r05".
*5) 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

6dB Bandwidth

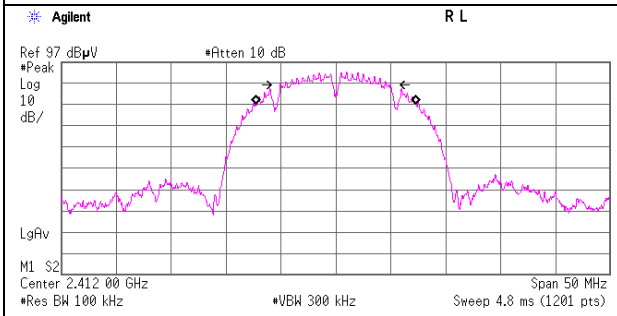
Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 11274192S-B-R1
Date July 26, 2016
Temperature / Humidity 25 deg. C / 50 % RH
Engineer Kazutaka Takeyema
Mode Tx

	[MHz]	[MHz]	[kHz]
11b	2412	10.069	> 500
	2437	10.045	> 500
	2462	10.103	> 500
11g	2412	15.594	> 500
	2437	15.107	> 500
	2462	15.156	> 500
11n-20	2412	16.408	> 500
	2437	15.128	> 500
	2462	15.154	> 500

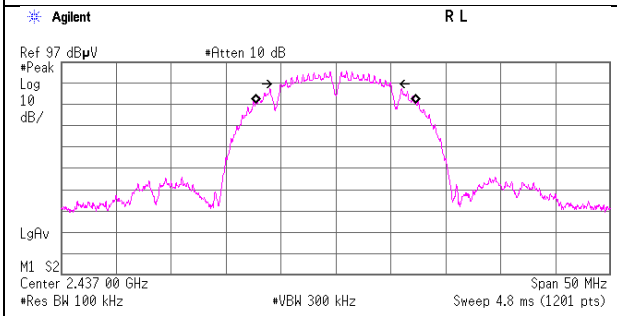
6dB Bandwidth

11b

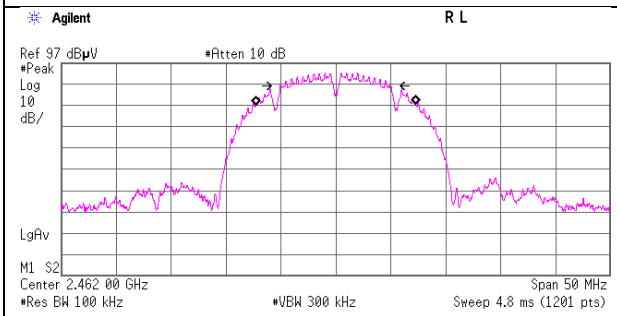
2412 MHz



2437 MHz

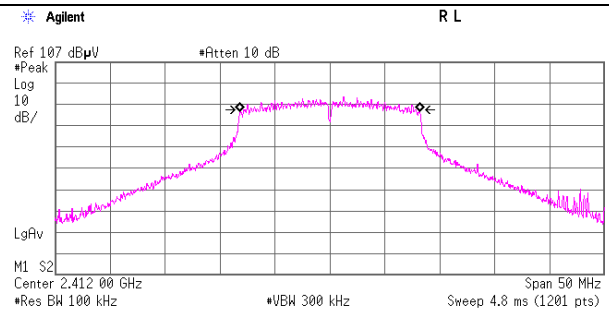


2462 MHz

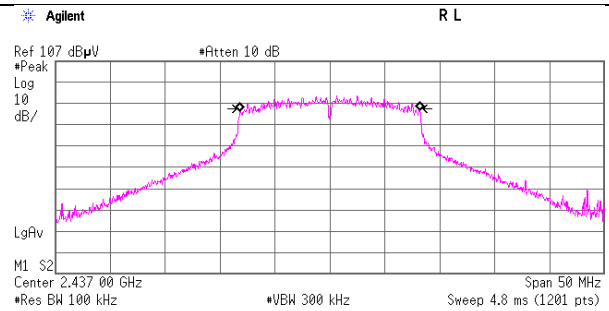


11g

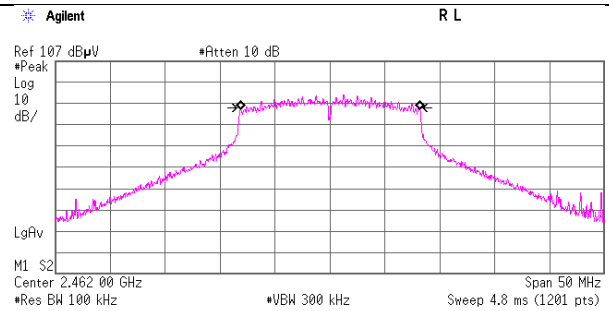
2412 MHz



2437 MHz



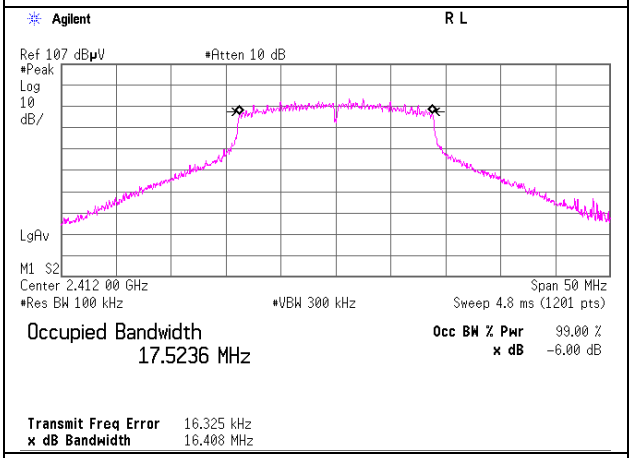
2462 MHz



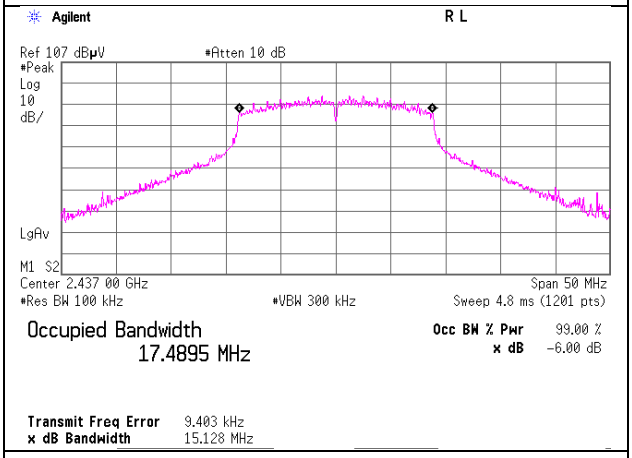
6dB Bandwidth

11n-20

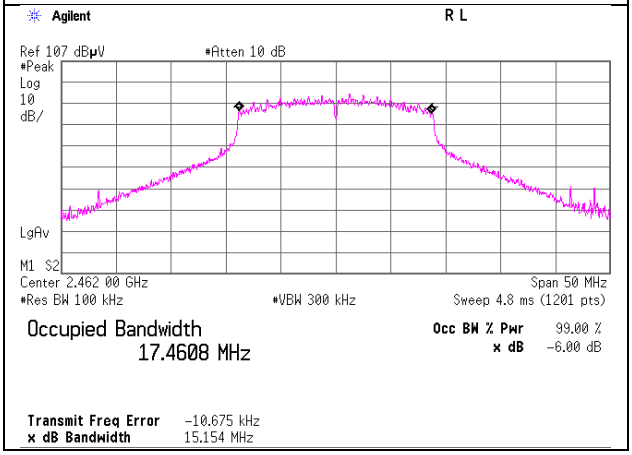
2412 MHz



2437 MHz



2462 MHz



Maximum Peak Output Power

Test place	Shonan EMC Lab. No.1 Measurement Room
Report No.	11274192S-B-R1
Date	July 19, 2016
Temperature / Humidity	25 deg. C / 52 % RH
Engineer	Shinichi Takano
Mode	Tx

11b

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	-3.62	1.98	9.67	8.03	6.35	30.00	1000	21.97
2437	-3.50	1.98	9.67	8.15	6.53	30.00	1000	21.85
2462	-3.64	1.99	9.67	8.02	6.34	30.00	1000	21.98

11g

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	4.26	1.98	9.67	15.91	38.99	30.00	1000	14.09
2437	4.23	1.98	9.67	15.88	38.73	30.00	1000	14.12
2462	4.14	1.99	9.67	15.80	38.02	30.00	1000	14.20

11n-20

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	4.21	1.98	9.67	15.86	38.55	30.00	1000	14.14
2437	4.28	1.98	9.67	15.93	39.17	30.00	1000	14.07
2462	4.17	1.99	9.67	15.83	38.28	30.00	1000	14.17

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.

Maximum Peak Output Power

Test place	Shonan EMC Lab. No.1 Measurement Room
Report No.	11274192S-B-R1
Date	July 19, 2016
Temperature / Humidity	25 deg. C / 52 % RH
Engineer	Shinichi Takano
Mode	Tx

11b, 2437MHz

Rate [Mbps]	Reading [dBm]	Remark
1	-3.50	*
2	-3.59	
5.5	-3.55	
11	-3.53	

11g, 2437MHz

Rate [Mbps]	Reading [dBm]	Remark
6	2.40	
9	2.42	
12	2.36	
18	2.57	
24	2.64	
36	3.50	
48	3.73	
54	4.23	*

11n-20 (GI long), 2437MHz

Rate [MCS]	Reading [dBm]	Remark
0	2.55	
1	2.43	
2	2.42	
3	3.01	
4	3.72	
5	3.82	
6	4.28	*
7	4.25	

11n-20 (GI short), 2437MHz

Rate [MCS]	Reading [dBm]	Remark
0	2.17	
1	2.44	
2	2.63	
3	3.04	
4	3.84	
5	3.69	
6	4.24	
7	4.23	

*: 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.1 Measurement Room
Report No.	11274192S-B-R1
Date	July 19, 2016
Temperature / Humidity	25 deg. C / 52 % RH
Engineer	Shinichi Takano
Mode	Tx

11b **1 Mbps**

Freq.	Reading	Cable Loss	Atten. Loss	Result (Time average)		Duty factor	Result (Burst power average)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2412	-5.74	1.98	9.67	5.91	3.90	0.06	5.97	3.95
2437	-5.73	1.98	9.67	5.92	3.91	0.06	5.98	3.96
2462	-5.79	1.99	9.67	5.87	3.86	0.06	5.93	3.92

11g **18 Mbps**

Freq.	Reading	Cable Loss	Atten. Loss	Result (Time average)		Duty factor	Result (Burst power average)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2412	-6.75	1.98	9.67	4.90	3.09	1.02	5.92	3.91
2437	-6.78	1.98	9.67	4.87	3.07	1.02	5.89	3.88
2462	-6.73	1.99	9.67	4.93	3.11	1.02	5.95	3.94

11n-20 **MCS 3 (GI long)**

Freq.	Reading	Cable Loss	Atten. Loss	Result (Time average)		Duty factor	Result (Burst power average)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2412	-7.03	1.98	9.67	4.62	2.90	1.41	6.03	4.01
2437	-6.87	1.98	9.67	4.78	3.01	1.41	6.19	4.16
2462	-6.95	1.99	9.67	4.71	2.96	1.41	6.12	4.09

Sample Calculation:
Result (Time average) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator
Result (Burst power average) = Frame power + Duty factor

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

The test was performed with condition that obtained the maximum frame power in pre-check.

Average Output Power
(Reference data for RF Exposure)

Test place	Shonan EMC Lab. No.1 Measurement Room
Report No.	11274192S-B-R1
Date	July 19, 2016
Temperature / Humidity	25 deg. C / 52 % RH
Engineer	Shinichi Takano
Mode	Tx

2437 MHz

Mode	Rate Mbps	Reading [dBm]	Duty factor [dB]	Burst power [dBm]	Remarks
11b	1	-5.73	0.06	-5.67	*
	2	-5.81	0.12	-5.69	
	5.5	-6.04	0.33	-5.71	
	11	-6.34	0.63	-5.71	
11g	6	-6.18	0.37	-5.81	
	9	-6.33	0.55	-5.78	
	12	-6.51	0.71	-5.80	
	18	-6.78	1.02	-5.76	*
	24	-7.34	1.33	-6.01	
	36	-7.80	1.85	-5.95	
	48	-8.15	2.28	-5.87	
	54	-8.29	2.49	-5.80	

* Worst rate

Sample Calculation:

Burst power = Reading (timed average) + Duty factor

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

11n-20, 2437 MHz

Mode	Rate MCS	Reading [dBm]	Duty factor [dB]	Burst power [dBm]	Remarks
GI long	0	-6.09	0.40	-5.69	
	1	-6.36	0.76	-5.60	
	2	-6.72	1.08	-5.64	
	3	-6.87	1.41	-5.46	*
	4	-7.65	1.94	-5.71	
	5	-8.07	2.38	-5.69	
	6	-8.37	2.61	-5.76	
	7	-8.58	2.77	-5.81	
GI short	0	-6.16	0.44	-5.72	
	1	-6.38	0.83	-5.55	
	2	-6.80	1.19	-5.61	
	3	-7.04	1.51	-5.53	
	4	-7.90	2.08	-5.82	
	5	-8.29	2.60	-5.69	
	6	-8.57	2.81	-5.76	
	7	-8.74	3.01	-5.73	

* Worst rate

Sample Calculation:

Burst power = Reading (timed average) + Duty factor

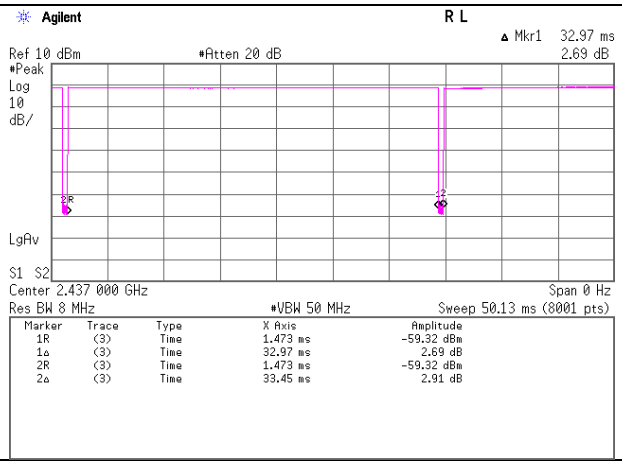
All comparison were carried out on same frequency and measurement factors.

Burst rate confirmation
(for Average output power)

Test place	Shonan EMC Lab. No.1 Measurement Room
Report No.	11274192S-B-R1
Date	July 19, 2016
Temperature / Humidity	25 deg. C / 52 % RH
Engineer	Shinichi Takano
Mode	Tx

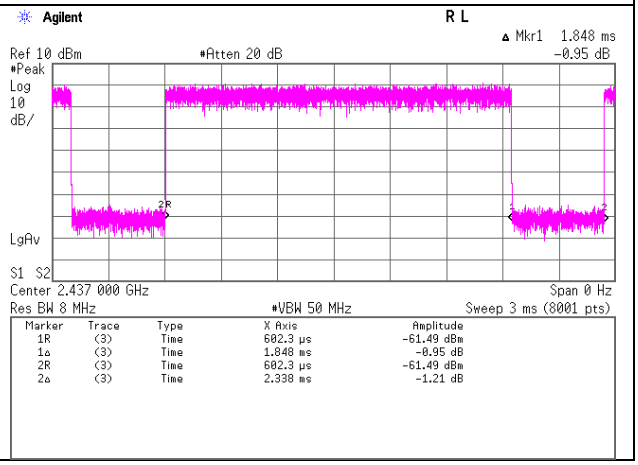
11b, 1 Mbps

Tx on / (Tx on + Tx off) =	**0.986**
Tx on / (Tx on + Tx off) * 100 =	**98.6 %**
Duty factor = 10 * log (33.45 / 32.97) =	**0.06 dB**



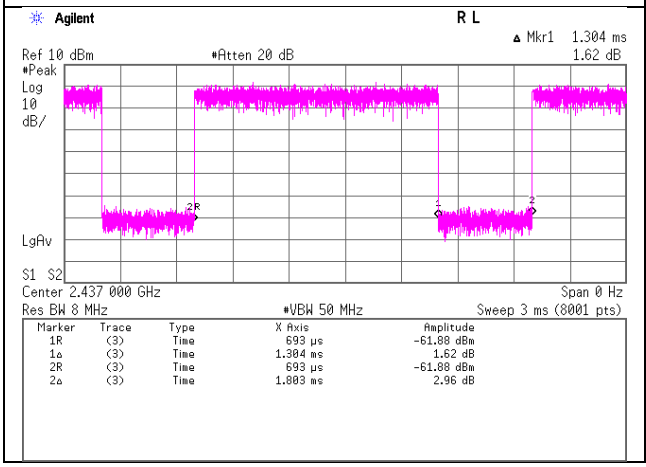
11g, 18 Mbps

Tx on / (Tx on + Tx off) =	**0.790**
Tx on / (Tx on + Tx off) * 100 =	**79.0 %**
Duty factor = 10 * log (2.34 / 1.85) =	**1.02 dB**



11n-20, GI long, MCS3

Tx on / (Tx on + Tx off) =	**0.723**
Tx on / (Tx on + Tx off) * 100 =	**72.3 %**
Duty factor = 10 * log (1.8 / 1.3) =	**1.41 dB**



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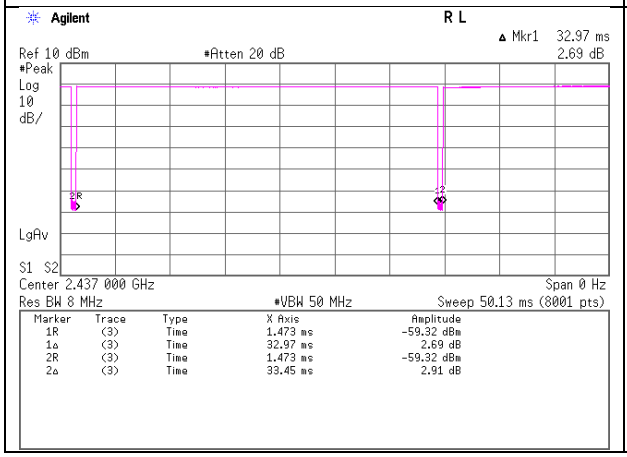
Burst rate confirmation

Test place	Shonan EMC Lab. No.1 Measurement Room
Report No.	11274192S-B-R1
Date	July 19, 2016
Temperature / Humidity	25 deg. C / 52 % RH
Engineer	Shinichi Takano
Mode	Tx

11b 1 Mbps

Tx on / (Tx on + Tx off) = 0.986

Tx on / (Tx on + Tx off) * 100 = 98.6 %

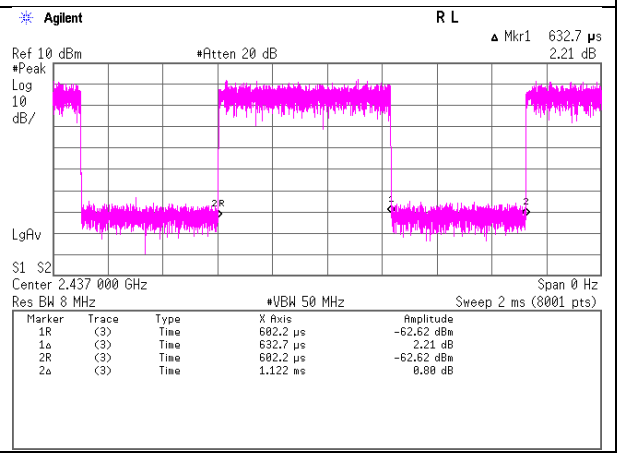


11g 54 Mbps

Tx on / (Tx on + Tx off) = 0.564

Tx on / (Tx on + Tx off) * 100 = 56.4 %

Duty factor = 20 * log (1.122 / 0.633) = 4.97 dB

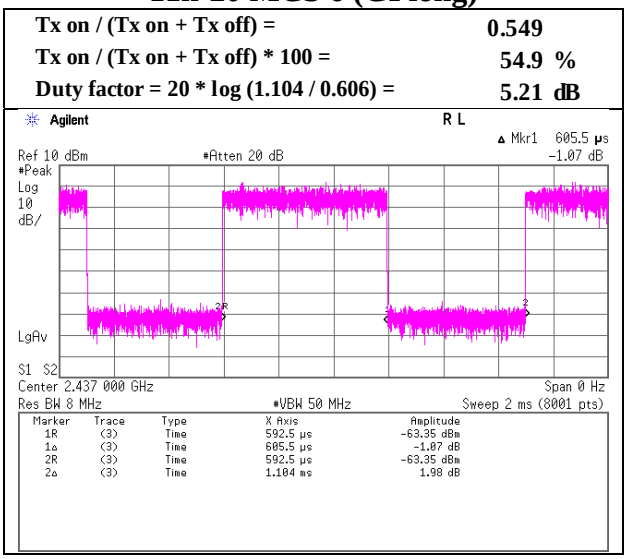


11n-20 MCS 6 (GI long)

Tx on / (Tx on + Tx off) = 0.549

Tx on / (Tx on + Tx off) * 100 = 54.9 %

Duty factor = 20 * log (1.104 / 0.606) = 5.21 dB



Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber		
Report No.	11274192S-B-R1		
Date	July 19, 2016	July 20, 2016	July 21, 2016
Temperature / Humidity	23 deg. C / 60 % RH	25 deg. C / 62 % RH	26 deg. C / 67 % RH
Engineer	Kazutaka Takeyama (1 -2.8 GHz, No.2 SAC)	Kazutaka Takeyama (2.8 - 13 GHz, No.2 SAC)	Shinichi Takano (13 -26.5 GHz, No.2 SAC)
Mode	Tx 11b 2412 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	46.42	27.72	13.70	34.33	2.05	55.56	73.90	18.3	154	131	
Hori.	3000.000	PK	52.72	28.24	5.38	40.96	2.05	47.43	73.90	26.4	180	245	
Hori.	4824.000	PK	50.53	31.44	5.99	41.50	2.05	48.51	73.90	25.3	176	193	
Hori.	7236.000	PK	47.00	36.86	7.44	41.16	2.05	52.19	73.90	21.7	155	0	
Hori.	2390.000	AV	37.33	27.72	13.70	34.33	2.05	46.47	53.90	**7.4**	154	131	
Hori.	3000.000	AV	47.22	28.24	5.38	40.96	2.05	41.93	53.90	11.9	180	245	
Hori.	4824.000	AV	45.42	31.44	5.99	41.50	2.05	43.40	53.90	10.5	176	193	
Hori.	7236.000	AV	37.56	36.86	7.44	41.16	2.05	42.75	53.90	11.1	155	0	
Vert.	2390.000	PK	43.13	27.72	13.70	34.33	2.05	52.27	73.90	21.6	166	191	
Vert.	3000.000	PK	51.23	28.24	5.38	40.96	2.05	45.94	73.90	27.9	171	244	
Vert.	4824.000	PK	50.12	31.44	5.99	41.50	2.05	48.10	73.90	25.8	151	205	
Vert.	7236.000	PK	47.42	36.86	7.44	41.16	2.05	52.61	73.90	21.2	155	0	
Vert.	2390.000	AV	33.61	27.72	13.70	34.33	2.05	42.75	53.90	11.1	166	191	
Vert.	3000.000	AV	45.85	28.24	5.38	40.96	2.05	40.56	53.90	13.3	171	244	
Vert.	4824.000	AV	43.46	31.44	5.99	41.50	2.05	41.44	53.90	12.4	151	205	
Vert.	7236.000	AV	38.11	36.86	7.44	41.16	2.05	43.30	53.90	10.6	155	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.80 m / 3.0 m) = 2.05 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	80.00	27.76	13.72	34.32	2.05	89.21	-	-	Carrier
Hori.	2400.000	PK	37.12	27.74	13.71	34.32	2.05	46.30	69.21	22.9	
Vert.	2412.000	PK	79.53	27.76	13.72	34.32	2.05	88.74	-	-	Carrier
Vert.	2400.000	PK	36.11	27.74	13.71	34.32	2.05	45.29	68.74	23.5	

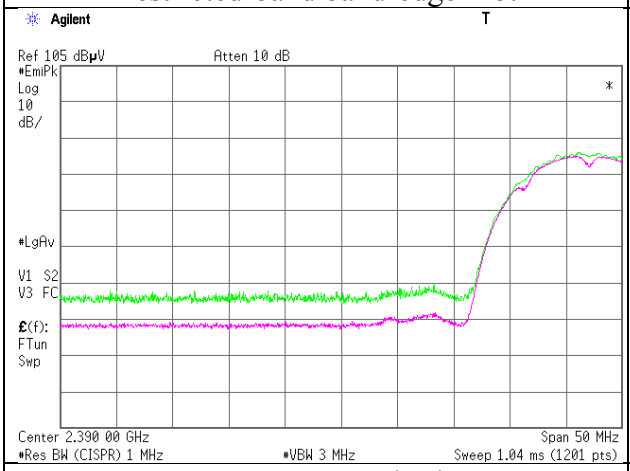
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.80 m / 3.0 m) = 2.05 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11274192S-B-R1
Date	July 19, 2016
Temperature / Humidity	23 deg. C / 60 % RH
Engineer	Kazutaka Takeyama
Mode	Tx 11b 2412 MHz

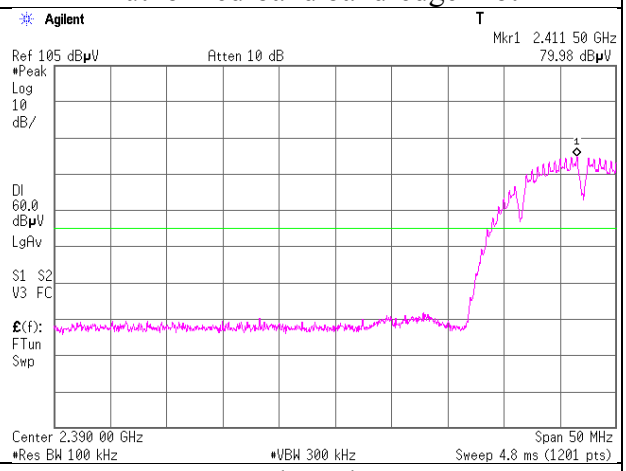
Horizontal

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

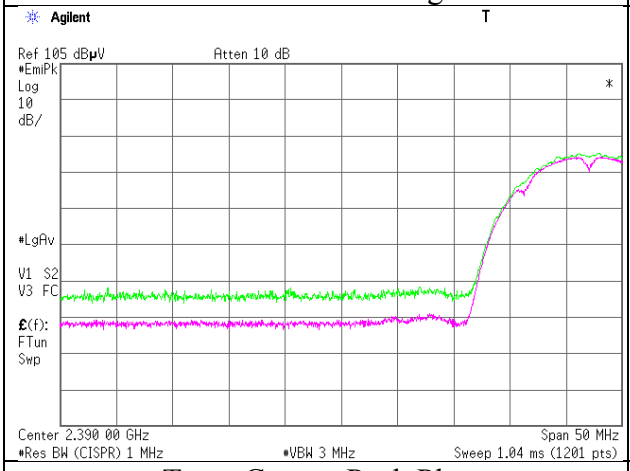
Authorized-band band-edge Plot



20dBc Plot

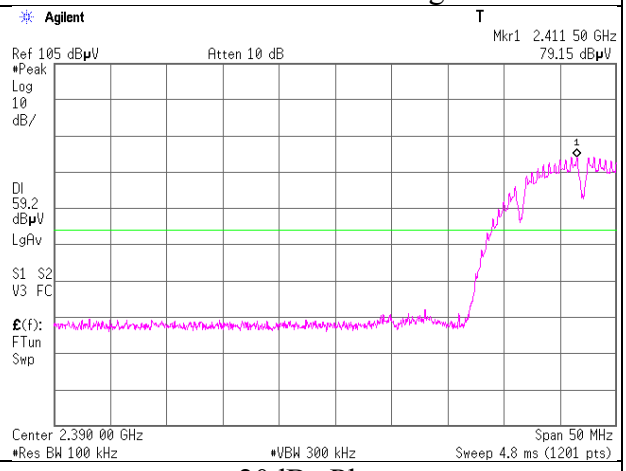
Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Authorized-band band-edge Plot



20dBc Plot

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

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber		
Report No.	11274192S-B-R1		
Date	July 19, 2016	July 20, 2016	July 21, 2016
Temperature / Humidity	23 deg. C / 60 % RH	25 deg. C / 62 % RH	26 deg. C / 67 % RH
Engineer	Kazutaka Takeyama (1 -2.8 GHz, No.2 SAC)	Kazutaka Takeyama (2.8 - 13 GHz, No.2 SAC)	Shinichi Takano (13 -26.5 GHz, No.2 SAC)
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.	3000.000	PK	54.00	28.24	5.38	40.96	2.05	48.71	73.90	25.1	161	234	
Hori.	4874.000	PK	48.77	31.61	6.02	41.40	2.05	47.05	73.90	26.8	184	206	
Hori.	7311.000	PK	46.11	36.89	7.54	41.23	2.05	51.36	73.90	22.5	155	0	
Hori.	3000.000	AV	49.88	28.24	5.38	40.96	2.05	44.59	53.90	**9.3**	161	234	
Hori.	4874.000	AV	41.00	31.61	6.02	41.40	2.05	39.28	53.90	14.6	184	206	
Hori.	7311.000	AV	37.13	36.89	7.54	41.23	2.05	42.38	53.90	11.5	155	0	
Vert.	3000.000	PK	52.03	28.24	5.38	40.96	2.05	46.74	73.90	27.1	224	239	
Vert.	4874.000	PK	48.30	31.61	6.02	41.40	2.05	46.58	73.90	27.3	168	187	
Vert.	7311.000	PK	46.71	36.89	7.54	41.23	2.05	51.96	73.90	21.9	155	0	
Vert.	3000.000	AV	47.62	28.24	5.38	40.96	2.05	42.33	53.90	11.5	224	239	
Vert.	4874.000	AV	40.38	31.61	6.02	41.40	2.05	38.66	53.90	15.2	168	187	
Vert.	7311.000	AV	37.62	36.89	7.54	41.23	2.05	42.87	53.90	11.0	155	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.80 m / 3.0 m) = 2.05 dB

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber		
Report No.	11274192S-B-R1		
Date	July 19, 2016	July 20, 2016	July 21, 2016
Temperature / Humidity	23 deg. C / 60 % RH	25 deg. C / 62 % RH	26 deg. C / 67 % RH
Engineer	Kazutaka Takeyama (1 -2.8 GHz, No.2 SAC)	Kazutaka Takeyama (2.8 - 13 GHz, No.2 SAC)	Shinichi Takano (13 -26.5 GHz, No.2 SAC)
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	46.82	27.90	13.79	34.28	2.05	56.28	73.90	17.6	140	211	
Hori.	3000.000	PK	53.21	28.24	5.38	40.96	2.05	47.92	73.90	25.9	152	221	
Hori.	4924.000	PK	50.87	31.79	6.06	41.30	2.05	49.47	73.90	24.4	159	195	
Hori.	7386.000	PK	45.62	36.92	7.63	41.31	2.05	50.91	73.90	22.9	155	0	
Hori.	2483.500	AV	37.25	27.90	13.79	34.28	2.05	46.71	53.90	**7.1**	140	211	
Hori.	3000.000	AV	48.52	28.24	5.38	40.96	2.05	43.23	53.90	10.6	152	221	
Hori.	4924.000	AV	45.21	31.79	6.06	41.30	2.05	43.81	53.90	10.0	159	195	
Hori.	7386.000	AV	37.48	36.92	7.63	41.31	2.05	42.77	53.90	11.1	155	0	
Vert.	2483.500	PK	42.52	27.90	13.79	34.28	2.05	51.98	73.90	21.9	153	200	
Vert.	3000.000	PK	52.62	28.24	5.38	40.96	2.05	47.33	73.90	26.5	165	311	
Vert.	4924.000	PK	49.83	31.79	6.06	41.30	2.05	48.43	73.90	25.4	164	2	
Vert.	7386.000	PK	46.82	36.92	7.63	41.31	2.05	52.11	73.90	21.7	155	0	
Vert.	2483.500	AV	34.11	27.90	13.79	34.28	2.05	43.57	53.90	10.3	153	200	
Vert.	3000.000	AV	47.12	28.24	5.38	40.96	2.05	41.83	53.90	12.0	165	311	
Vert.	4924.000	AV	43.38	31.79	6.06	41.30	2.05	41.98	53.90	11.9	164	2	
Vert.	7386.000	AV	37.12	36.92	7.63	41.31	2.05	42.41	53.90	11.4	155	0	

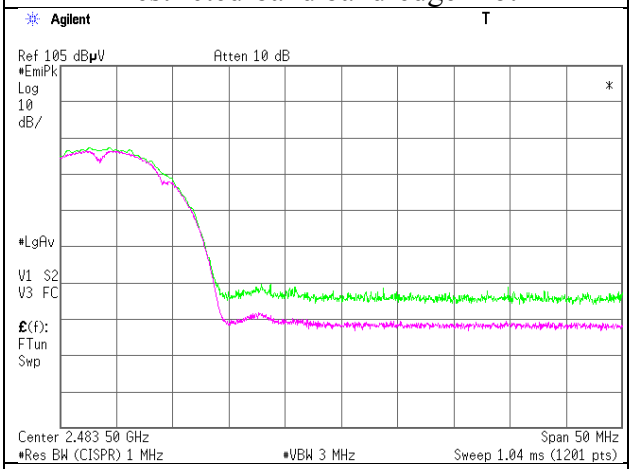
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.80 m / 3.0 m) = 2.05 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11274192S-B-R1
Date	July 19, 2016
Temperature / Humidity	23 deg. C / 60 % RH
Engineer	Kazutaka Takeyama
Mode	Tx 11b 2462 MHz

Horizontal

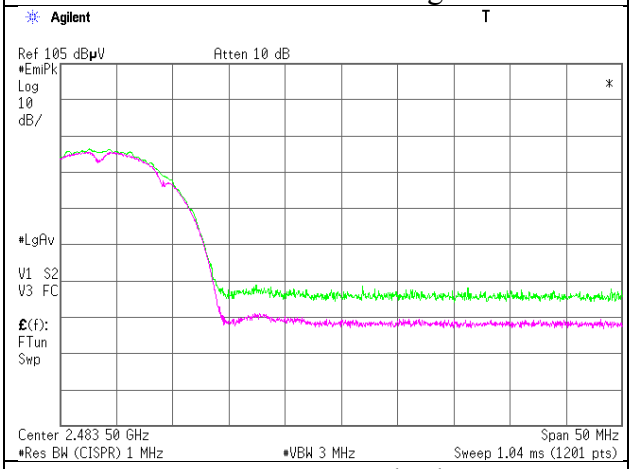
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber		
Report No.	11274192S-B-R1		
Date	July 19, 2016	July 20, 2016	July 21, 2016
Temperature / Humidity	23 deg. C / 60 % RH	25 deg. C / 62 % RH	26 deg. C / 67 % RH
Engineer	Kazutaka Takeyama (1 -2.8 GHz, No.2 SAC)	Kazutaka Takeyama (2.8 - 13 GHz, No.2 SAC)	Shinichi Takano (13 -26.5 GHz, No.2 SAC)
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	46.21	27.72	13.70	34.33	2.05	55.35	73.90	18.5	155	130	
Hori.	3000.000	PK	53.51	28.24	5.38	40.96	2.05	48.22	73.90	25.6	158	224	
Hori.	4824.000	PK	48.86	31.44	5.99	41.50	2.05	46.84	73.90	27.0	156	202	
Hori.	7236.000	PK	47.38	36.86	7.44	41.16	2.05	52.57	73.90	21.3	155	0	
Hori.	3000.000	AV	49.61	28.24	5.38	40.96	2.05	44.32	53.90	**9.5**	158	224	
Vert.	2390.000	PK	45.23	27.72	13.70	34.33	2.05	54.37	73.90	19.5	155	152	
Vert.	3000.000	PK	51.00	28.24	5.38	40.96	2.05	45.71	73.90	28.1	154	133	
Vert.	4824.000	PK	48.25	31.44	5.99	41.50	2.05	46.23	73.90	27.6	167	349	
Vert.	7236.000	PK	46.63	36.86	7.44	41.16	2.05	51.82	73.90	22.0	155	0	
Vert.	3000.000	AV	44.01	28.24	5.38	40.96	2.05	38.72	53.90	15.1	154	133	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.80 m / 3.0 m) = 2.05 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	37.48	27.72	13.70	34.33	4.97	2.05	51.59	53.90	**2.3**	*1)
Hori.	4824.000	AV	38.87	31.44	5.99	41.50	4.97	2.05	41.82	53.90	12.1	
Hori.	7236.000	AV	37.82	36.86	7.44	41.16	4.97	2.05	47.98	53.90	5.9	
Vert.	2390.000	AV	34.15	27.72	13.70	34.33	4.97	2.05	48.26	53.90	5.6	*1)
Vert.	4824.000	AV	38.58	31.44	5.99	41.50	4.97	2.05	41.53	53.90	12.4	
Vert.	7236.000	AV	37.82	36.86	7.44	41.16	4.97	2.05	47.98	53.90	5.9	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.80 m / 3.0 m) = 2.05 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)**

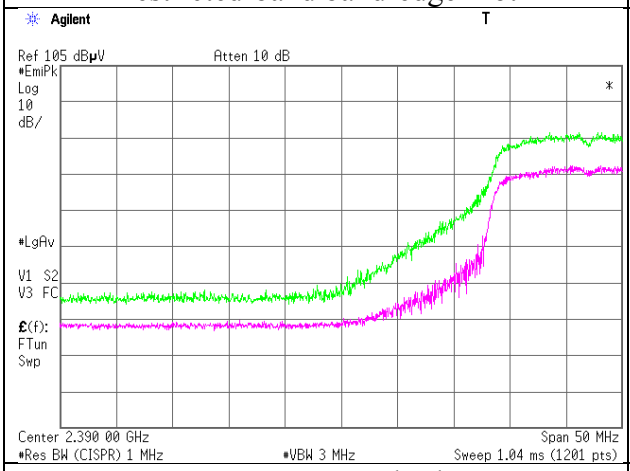
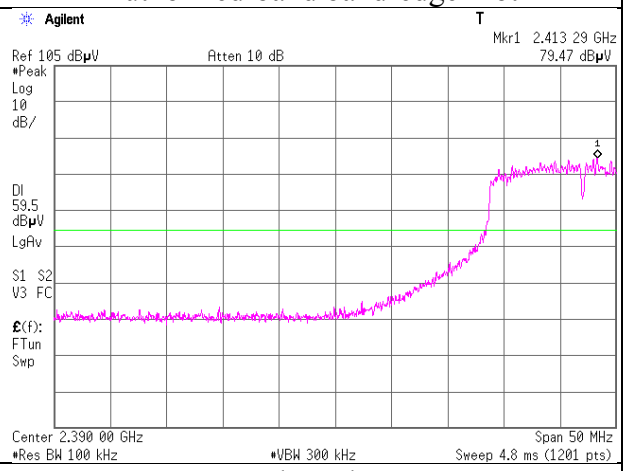
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	79.47	27.76	13.72	34.32	2.05	88.68	-	-	
Hori.	2400.000	PK	48.42	27.74	13.71	34.32	2.05	57.60	68.68	11.1	
Vert.	2412.000	PK	78.61	27.76	13.72	34.32	2.05	87.82	-	-	
Vert.	2400.000	PK	47.55	27.74	13.71	34.32	2.05	56.73	67.82	11.1	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.80 m / 3.0 m) = 2.05 dB

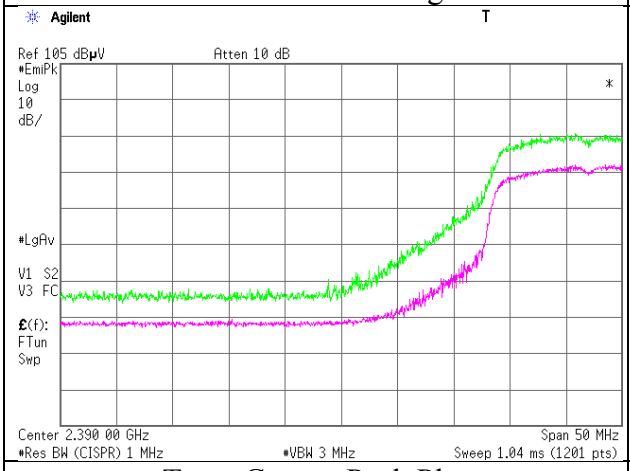
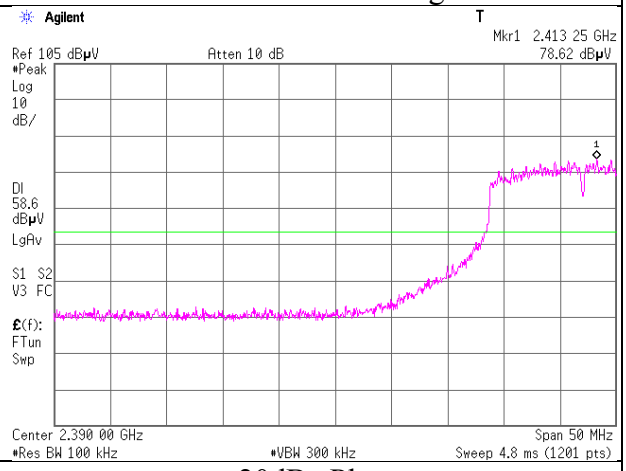
Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11274192S-B-R1
Date	July 19, 2016
Temperature / Humidity	23 deg. C / 60 % RH
Engineer	Kazutaka Takeyama
Mode	Tx 11g 2412 MHz

Horizontal

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

Vertical

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

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

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber		
Report No.	11274192S-B-R1		
Date	July 19, 2016	July 20, 2016	July 21, 2016
Temperature / Humidity	23 deg. C / 60 % RH	25 deg. C / 62 % RH	26 deg. C / 67 % RH
Engineer	Kazutaka Takeyama (1 -2.8 GHz, No.2 SAC)	Kazutaka Takeyama (2.8 - 13 GHz, No.2 SAC)	Shinichi Takano (13 -26.5 GHz, No.2 SAC)
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.	3000.000	PK	52.53	28.24	5.38	40.96	2.05	47.24	73.90	26.6	151	234	
Hori.	4874.000	PK	48.47	31.61	6.02	41.40	2.05	46.75	73.90	27.1	162	202	
Hori.	7311.000	PK	46.58	36.89	7.54	41.23	2.05	51.83	73.90	22.0	155	0	
Hori.	3000.000	AV	48.12	28.24	5.38	40.96	2.05	42.83	53.90	**11.0**	151	234	
Vert.	3000.000	PK	50.22	28.24	5.38	40.96	2.05	44.93	73.90	28.9	157	226	
Vert.	4874.000	PK	47.57	31.61	6.02	41.40	2.05	45.85	73.90	28.0	156	200	
Vert.	7311.000	PK	45.72	36.89	7.54	41.23	2.05	50.97	73.90	22.9	155	0	
Vert.	3000.000	AV	43.33	28.24	5.38	40.96	2.05	38.04	53.90	15.8	157	226	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.80 m / 3.0 m) = 2.05 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	38.78	31.61	6.02	41.40	4.97	2.05	42.03	53.90	11.9	
Hori.	7311.000	AV	37.33	36.89	7.54	41.23	4.97	2.05	47.55	53.90	**6.4**	
Vert.	4874.000	AV	38.36	31.61	6.02	41.40	4.97	2.05	41.61	53.90	12.3	
Vert.	7311.000	AV	37.24	36.89	7.54	41.23	4.97	2.05	47.46	53.90	**6.4**	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.80 m / 3.0 m) = 2.05 dB
Duty factor refer to "Duty factor Calculation chart" sheet.

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber		
Report No.	11274192S-B-R1		
Date	July 19, 2016	July 20, 2016	July 21, 2016
Temperature / Humidity	23 deg. C / 60 % RH	25 deg. C / 62 % RH	26 deg. C / 67 % RH
Engineer	Kazutaka Takeyama (1 -2.8 GHz, No.2 SAC)	Kazutaka Takeyama (2.8 - 13 GHz, No.2 SAC)	Shinichi Takano (13 -26.5 GHz, No.2 SAC)
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	50.00	27.90	13.79	34.28	2.05	59.46	73.90	14.4	147	209	
Hori.	3000.000	PK	53.43	28.24	5.38	40.96	2.05	48.14	73.90	25.7	155	236	
Hori.	4924.000	PK	47.57	31.79	6.06	41.30	2.05	46.17	73.90	27.7	169	175	
Hori.	7386.000	PK	47.12	36.92	7.63	41.31	2.05	52.41	73.90	21.4	155	0	
Hori.	3000.000	AV	49.00	28.24	5.38	40.96	2.05	43.71	53.90	**10.1**	155	236	
Vert.	2483.500	PK	45.93	27.90	13.79	34.28	2.05	55.39	73.90	18.5	151	200	
Vert.	3000.000	PK	51.00	28.24	5.38	40.96	2.05	45.71	73.90	28.1	161	250	
Vert.	4924.000	PK	48.11	31.79	6.06	41.30	2.05	46.71	73.90	27.1	151	186	
Vert.	7386.000	PK	47.33	36.92	7.63	41.31	2.05	52.62	73.90	21.2	155	0	
Vert.	3000.000	AV	45.12	28.24	5.38	40.96	2.05	39.83	53.90	14.0	161	250	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.80 m / 3.0 m) = 2.05 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	37.12	27.90	13.79	34.28	4.97	2.05	51.55	53.90	**2.4**	*1)
Hori.	4924.000	AV	38.26	31.79	6.06	41.30	4.97	2.05	41.83	53.90	12.1	
Hori.	7386.000	AV	36.88	36.92	7.63	41.31	4.97	2.05	47.14	53.90	6.8	
Vert.	2483.500	AV	34.22	27.90	13.79	34.28	4.97	2.05	48.65	53.90	5.3	*1)
Vert.	4924.000	AV	38.88	31.79	6.06	41.30	4.97	2.05	42.45	53.90	11.4	
Vert.	7386.000	AV	37.22	36.92	7.63	41.31	4.97	2.05	47.48	53.90	6.4	

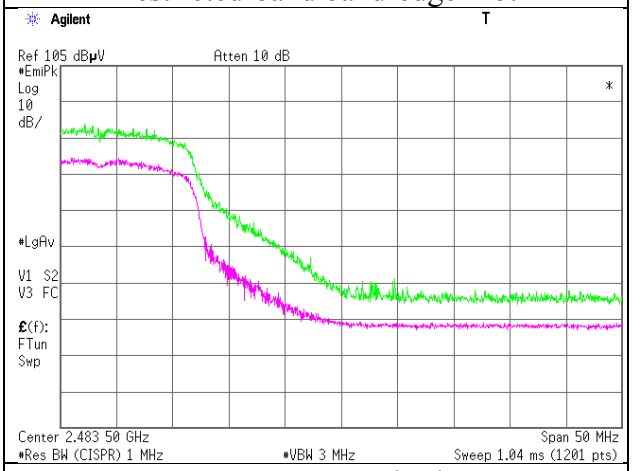
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.80 m / 3.0 m) = 2.05 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11274192S-B-R1
Date	July 19, 2016
Temperature / Humidity	23 deg. C / 60 % RH
Engineer	Kazutaka Takeyama
Mode	Tx 11g 2462 MHz

Horizontal

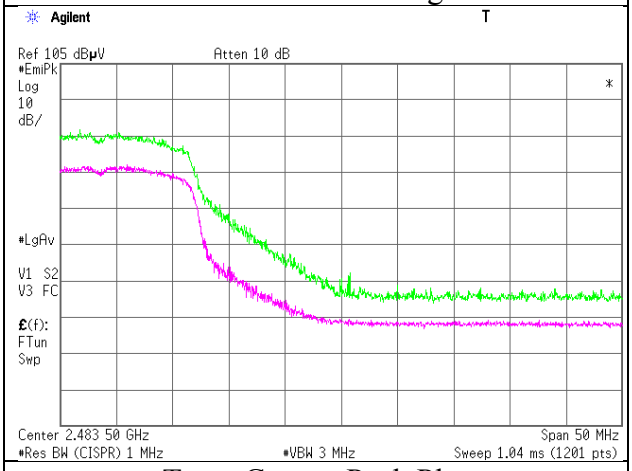
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber		
Report No.	11274192S-B-R1		
Date	July 19, 2016	July 20, 2016	July 21, 2016
Temperature / Humidity	23 deg. C / 60 % RH	25 deg. C / 62 % RH	26 deg. C / 67 % RH
Engineer	Kazutaka Takeyama (1 -2.8 GHz, No.2 SAC)	Kazutaka Takeyama (2.8 - 13 GHz, No.2 SAC)	Shinichi Takano (13 -26.5 GHz, No.2 SAC)
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	47.77	27.72	13.70	34.33	2.05	56.91	73.90	16.9	149	124	
Hori.	3000.000	PK	54.40	28.24	5.38	40.96	2.05	49.11	73.90	24.7	157	237	
Hori.	4824.000	PK	47.65	31.44	5.99	41.50	2.05	45.63	73.90	28.2	162	209	
Hori.	7236.000	PK	47.60	36.86	7.44	41.16	2.05	52.79	73.90	21.1	155	0	
Hori.	3000.000	AV	50.46	28.24	5.38	40.96	2.05	45.17	53.90	**8.7**	157	237	
Vert.	2390.000	PK	44.86	27.72	13.70	34.33	2.05	54.00	73.90	19.9	151	130	
Vert.	3000.000	PK	50.35	28.24	5.38	40.96	2.05	45.06	73.90	28.8	166	243	
Vert.	4824.000	PK	47.86	31.44	5.99	41.50	2.05	45.84	73.90	28.0	157	203	
Vert.	7236.000	PK	47.14	36.86	7.44	41.16	2.05	52.33	73.90	21.5	155	0	
Vert.	3000.000	AV	44.42	28.24	5.38	40.96	2.05	39.13	53.90	14.7	166	243	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.80 m / 3.0 m) = 2.05 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	37.32	27.72	13.70	34.33	5.21	2.05	51.67	53.90	**2.2**	*1)
Hori.	4824.000	AV	37.76	31.44	5.99	41.50	5.21	2.05	40.95	53.90	12.9	
Hori.	7236.000	AV	37.48	36.86	7.44	41.16	5.21	2.05	47.88	53.90	6.0	
Vert.	2390.000	AV	34.26	27.72	13.70	34.33	5.21	2.05	48.61	53.90	5.3	*1)
Vert.	4824.000	AV	37.26	31.44	5.99	41.50	5.21	2.05	40.45	53.90	13.4	
Vert.	7236.000	AV	37.21	36.86	7.44	41.16	5.21	2.05	47.61	53.90	6.3	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.80 m / 3.0 m) = 2.05 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)**

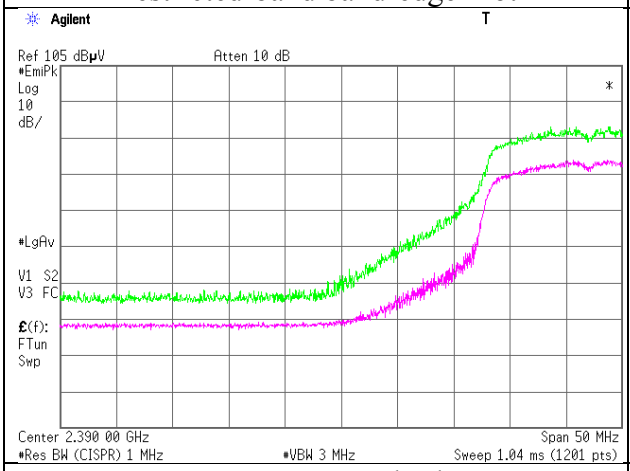
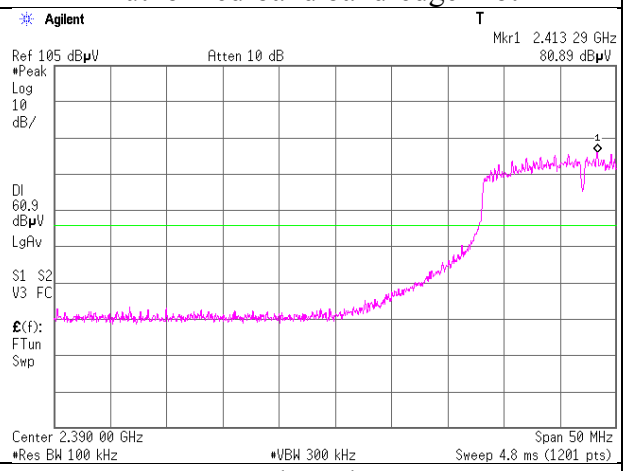
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	80.89	27.76	13.72	34.32	2.05	90.10	-	-	
Hori.	2400.000	PK	50.35	27.74	13.71	34.32	2.05	59.53	70.10	10.6	
Vert.	2412.000	PK	78.80	27.76	13.72	34.32	2.05	88.01	-	-	
Vert.	2400.000	PK	48.11	27.74	13.71	34.32	2.05	57.29	68.01	10.7	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.80 m / 3.0 m) = 2.05 dB

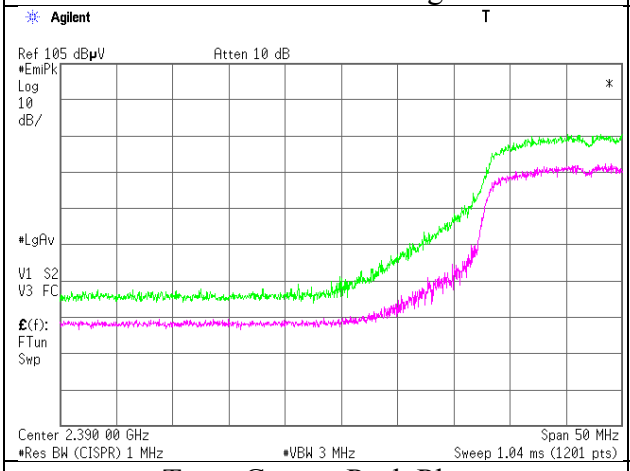
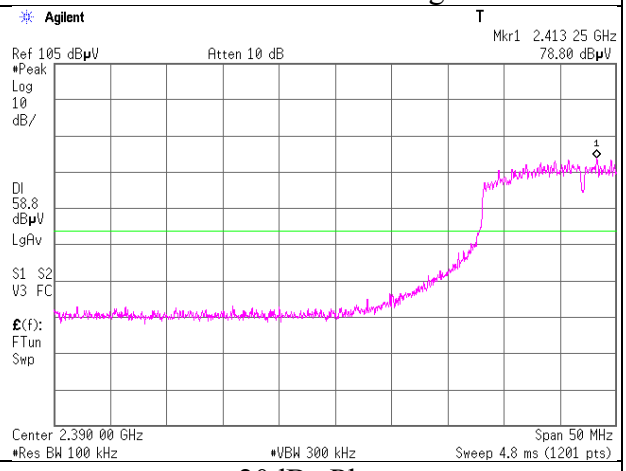
Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11274192S-B-R1
Date	July 19, 2016
Temperature / Humidity	23 deg. C / 60 % RH
Engineer	Kazutaka Takeyama
Mode	Tx 11n-20 2412 MHz

Horizontal

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

Vertical

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

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

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber		
Report No.	11274192S-B-R1		
Date	July 19, 2016	July 20, 2016	July 21, 2016
Temperature / Humidity	23 deg. C / 60 % RH	25 deg. C / 62 % RH	26 deg. C / 67 % RH
Engineer	Kazutaka Takeyama (1 -2.8 GHz, No.2 SAC)	Kazutaka Takeyama (2.8 - 13 GHz, No.2 SAC)	Shinichi Takano (30 M – 1 GHz and 13 -26.5 GHz, No.2 SAC)
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.	255.764	QP	38.44	17.35	8.44	31.99	0.00	32.24	46.00	13.7	136	301	
Hori.	329.925	QP	35.40	14.53	8.85	31.95	0.00	26.83	46.00	19.1	136	301	
Hori.	377.977	QP	39.21	15.53	9.07	31.94	0.00	31.87	46.00	14.1	131	282	
Hori.	499.194	QP	37.15	17.38	9.58	31.92	0.00	32.19	46.00	13.8	100	307	
Hori.	3000.000	PK	54.23	28.24	5.38	40.96	2.05	48.94	73.90	24.9	161	227	
Hori.	4874.000	PK	47.88	31.61	6.02	41.40	2.05	46.16	73.90	27.7	158	140	
Hori.	7311.000	PK	46.78	36.89	7.54	41.23	2.05	52.03	73.90	21.8	155	0	
Hori.	3000.000	AV	50.00	28.24	5.38	40.96	2.05	44.71	53.90	**9.1**	161	227	
Vert.	233.914	QP	26.11	16.82	8.32	32.01	0.00	19.24	46.00	26.7	100	234	
Vert.	249.993	QP	37.81	17.10	8.41	31.99	0.00	31.33	46.00	14.6	100	114	
Vert.	269.827	QP	30.52	17.94	8.52	31.99	0.00	24.99	46.00	21.0	100	251	
Vert.	499.193	QP	36.19	17.38	9.58	31.92	0.00	31.23	46.00	14.7	100	16	
Vert.	3000.000	PK	52.10	28.24	5.38	40.96	2.05	46.81	73.90	27.0	165	308	
Vert.	4874.000	PK	48.23	31.61	6.02	41.40	2.05	46.51	73.90	27.3	161	148	
Vert.	7311.000	PK	47.14	36.89	7.54	41.23	2.05	52.39	73.90	21.5	155	0	
Vert.	3000.000	AV	47.10	28.24	5.38	40.96	2.05	41.81	53.90	12.0	165	308	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.80 m / 3.0 m) = 2.05 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	38.26	31.61	6.02	41.40	5.21	2.05	41.75	53.90	12.2	
Hori.	7311.000	AV	37.26	36.89	7.54	41.23	5.21	2.05	47.72	53.90	6.2	
Vert.	4874.000	AV	38.36	31.61	6.02	41.40	5.21	2.05	41.85	53.90	12.1	
Vert.	7311.000	AV	37.38	36.89	7.54	41.23	5.21	2.05	47.84	53.90	**6.1**	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.80 m / 3.0 m) = 2.05 dB
Duty factor refer to "Duty factor Calculation chart" sheet.

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber		
Report No.	11274192S-B-R1		
Date	July 19, 2016	July 20, 2016	July 21, 2016
Temperature / Humidity	23 deg. C / 60 % RH	25 deg. C / 62 % RH	26 deg. C / 67 % RH
Engineer	Kazutaka Takeyama (1 -2.8 GHz, No.2 SAC)	Kazutaka Takeyama (2.8 - 13 GHz, No.2 SAC)	Shinichi Takano (13 -26.5 GHz, No.2 SAC)
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	47.63	27.90	13.79	34.28	2.05	57.09	73.90	16.8	145	183	
Hori.	3000.000	PK	54.24	28.24	5.38	40.96	2.05	48.95	73.90	24.9	155	241	
Hori.	4924.000	PK	48.58	31.79	6.06	41.30	2.05	47.18	73.90	26.7	160	204	
Hori.	7386.000	PK	46.66	36.92	7.63	41.31	2.05	51.95	73.90	21.9	155	0	
Hori.	3000.000	AV	49.24	28.24	5.38	40.96	2.05	43.95	53.90	**9.9**	155	241	
Vert.	2483.500	PK	44.41	27.90	13.79	34.28	2.05	53.87	73.90	20.0	150	180	
Vert.	3000.000	PK	51.58	28.24	5.38	40.96	2.05	46.29	73.90	27.6	162	304	
Vert.	4924.000	PK	48.36	31.79	6.06	41.30	2.05	46.96	73.90	26.9	173	236	
Vert.	7386.000	PK	46.21	36.92	7.63	41.31	2.05	51.50	73.90	22.4	155	0	
Vert.	3000.000	AV	46.31	28.24	5.38	40.96	2.05	41.02	53.90	12.8	162	304	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.80 m / 3.0 m) = 2.05 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	37.12	27.90	13.79	34.28	5.21	2.05	51.79	53.90	**2.1**	*1)
Hori.	4924.000	AV	38.87	31.79	6.06	41.30	5.21	2.05	42.68	53.90	11.2	
Hori.	7386.000	AV	36.84	36.92	7.63	41.31	5.21	2.05	47.34	53.90	6.6	
Vert.	2483.500	AV	34.18	27.90	13.79	34.28	5.21	2.05	48.85	53.90	5.1	*1)
Vert.	4924.000	AV	38.48	31.79	6.06	41.30	5.21	2.05	42.29	53.90	11.6	
Vert.	7386.000	AV	37.00	36.92	7.63	41.31	5.21	2.05	47.50	53.90	6.4	

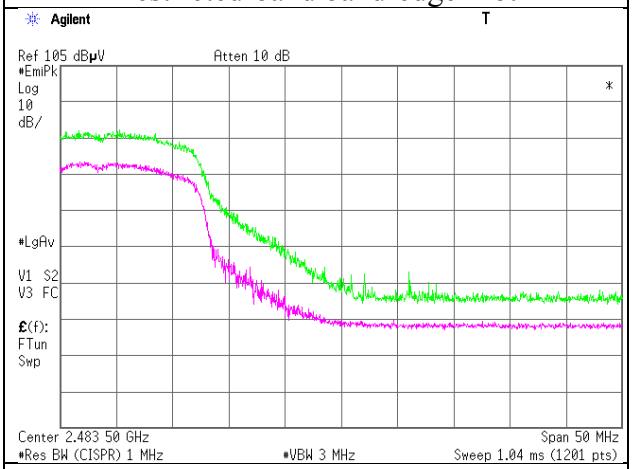
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.80 m / 3.0 m) = 2.05 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11274192S-B-R1
Date	July 19, 2016
Temperature / Humidity	23 deg. C / 60 % RH
Engineer	Kazutaka Takeyama
Mode	Tx 11n-20 2462 MHz

Horizontal

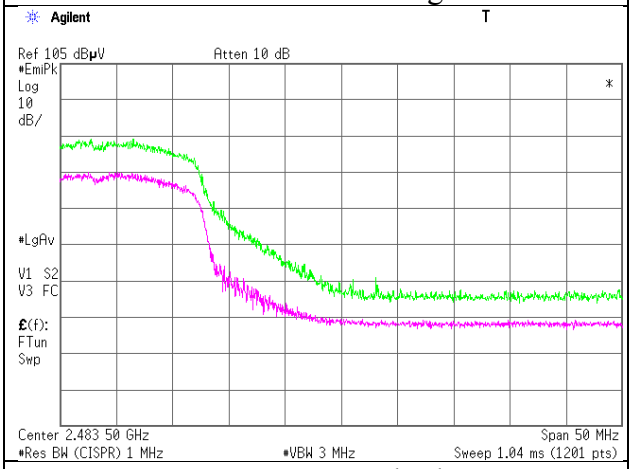
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot

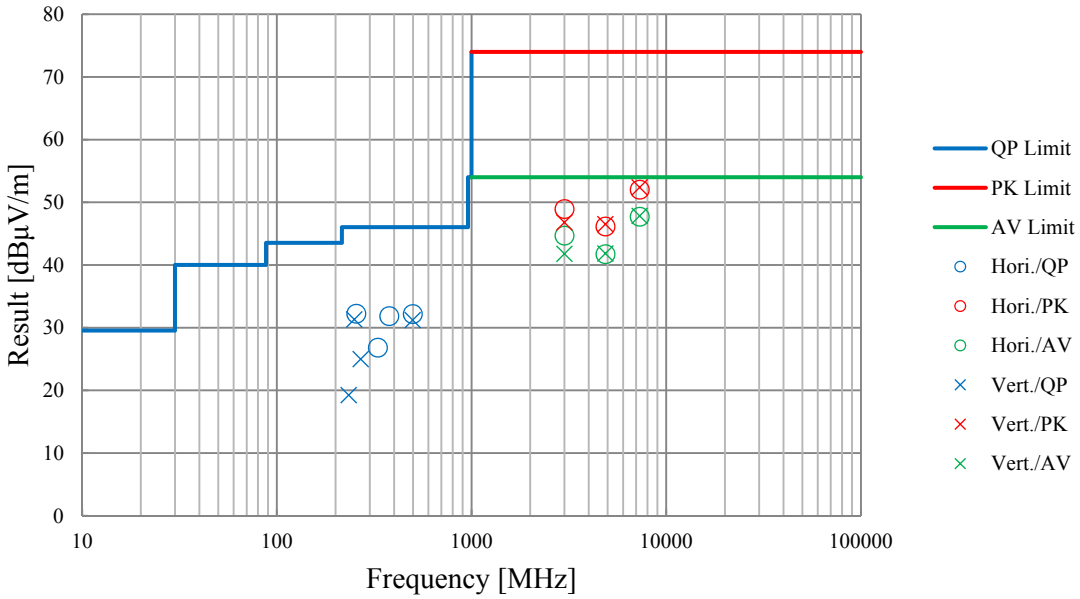


Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission
(Plot data, Worst case)

Test place	Shonan EMC Lab. No.2 and 3 Semi Anechoic Chamber		
Report No.	11274192S-B-R1		
Date	July 19, 2016	July 20, 2016	July 21, 2016
Temperature / Humidity	23 deg. C / 60 % RH	25 deg. C / 62 % RH	26 deg. C / 67 % RH
Engineer	Kazutaka Takeyama (1 -2.8 GHz, No.2 SAC)	Kazutaka Takeyama (2.8 - 13 GHz, No.2 SAC)	Shinichi Takano (30 M – 1 GHz and 13 -26.5 GHz, No.2 SAC)
Mode	Tx 11n-20 2437 MHz		

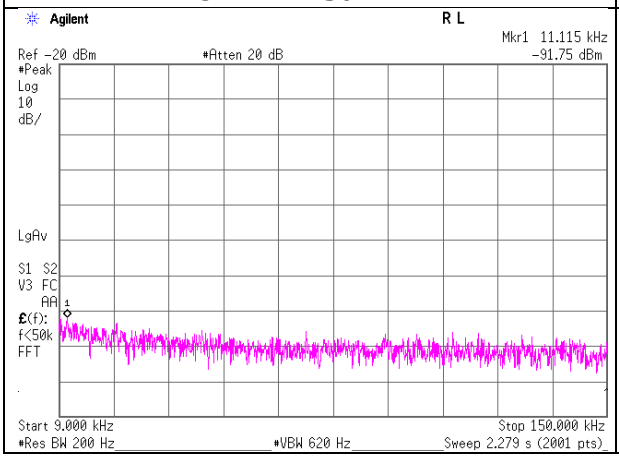


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

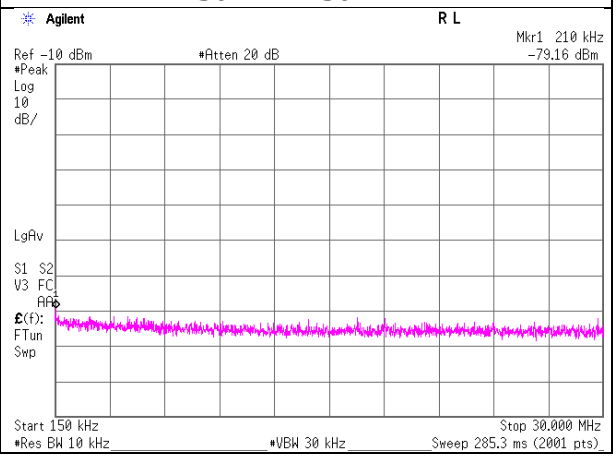
Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11274192S-B-R1
Date	July 26, 2016
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Kazutaka Takeyema
Mode	Tx 11n-20 2437 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenator 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
11.12	-91.8	0.03	9.5	2.0	1	-80.2	300	6.0	-18.9	46.6	65.5	
210.00	-79.2	0.39	9.6	2.0	1	-67.2	300	6.0	-6.0	21.1	27.1	

E = EIRP - 20 log (D) + Ground bounce + 104.8 [dBuV/m]

EIRP = Reading + Cable Loss + Attenator Loss + Antenna Gain + 10 * log (N)

*The antenna gain was set at 2dBi because the antenna gain is below 2 dBi. (Based on KDB558074 v03 r05, 12.2.6)

Power Density

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11274192S-B-R1
Date	July 26, 2016
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Kazutaka Takeyema
Mode	Tx

11b

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-27.85	1.98	9.67	-16.20	8.00	24.20
2437.00	-25.90	1.98	9.67	-14.25	8.00	22.25
2462.00	-28.21	1.99	9.67	-16.55	8.00	24.55

11g

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-31.20	1.98	9.67	-19.55	8.00	27.55
2437.00	-29.92	1.98	9.67	-18.27	8.00	26.27
2462.00	-30.31	1.99	9.67	-18.65	8.00	26.65

Sample Calculation:

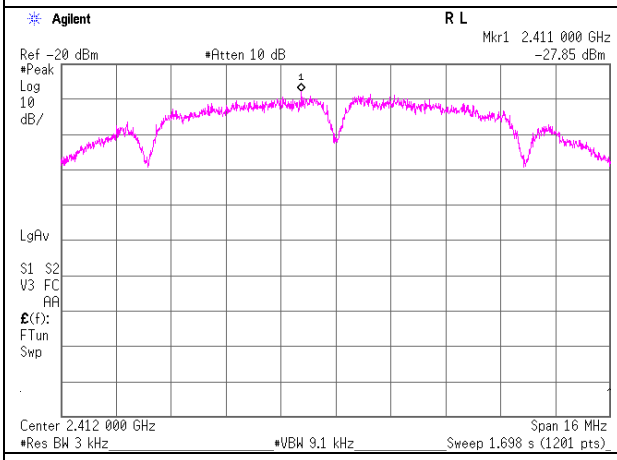
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

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

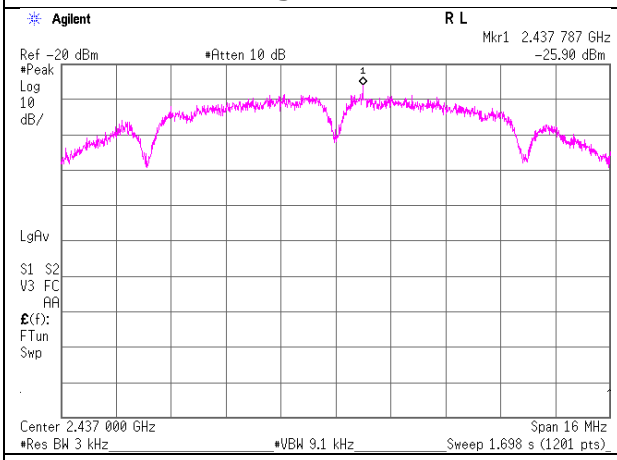
Power Density

11b

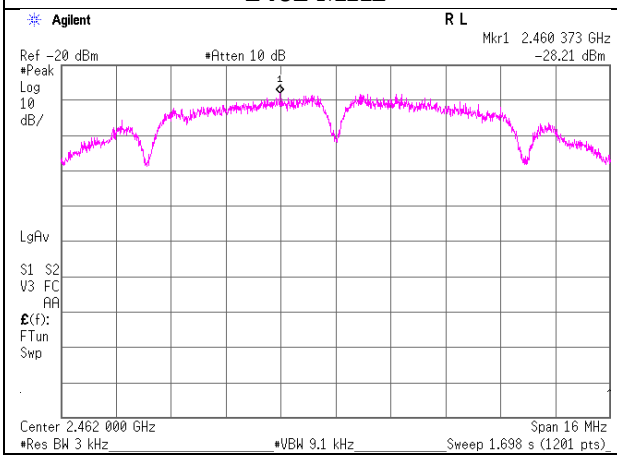
2412 MHz



2437 MHz

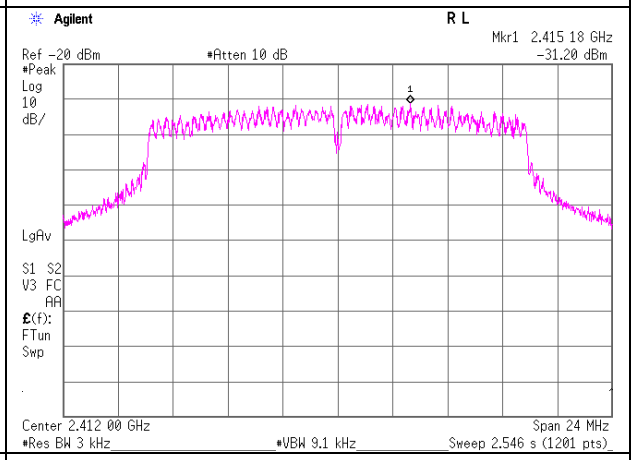


2462 MHz

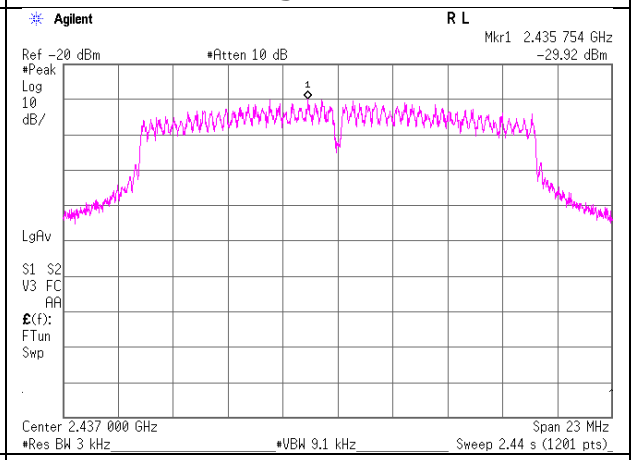


11g

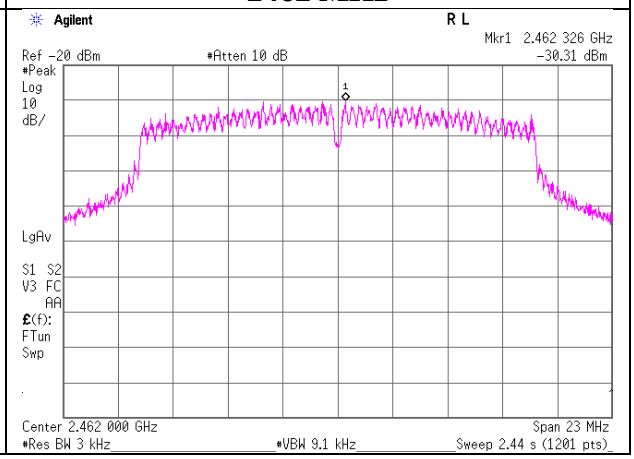
2412 MHz



2437 MHz



2462 MHz



Power Density

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11274192S-B-R1
Date	July 26, 2016
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Kazutaka Takeyema
Mode	Tx

11n

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
2412.00	-30.12	1.98	9.67	-18.47	0.01	8.00	26.47
2437.00	-30.24	1.98	9.67	-18.59	0.01	8.00	26.59
2462.00	-29.85	1.99	9.67	-18.19	0.02	8.00	26.19

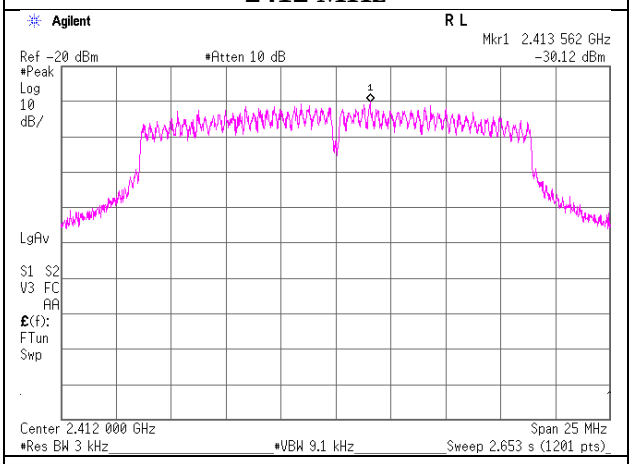
Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

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

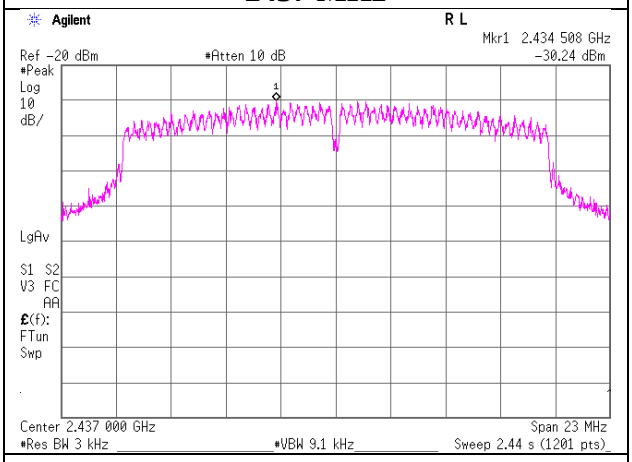
Power Density

11n-20

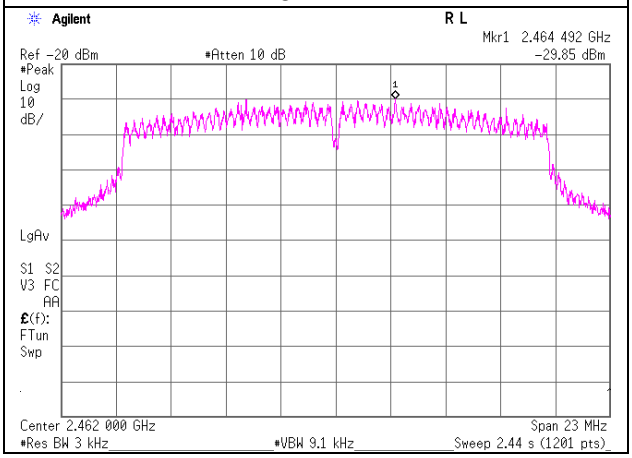
2412 MHz



2437 MHz

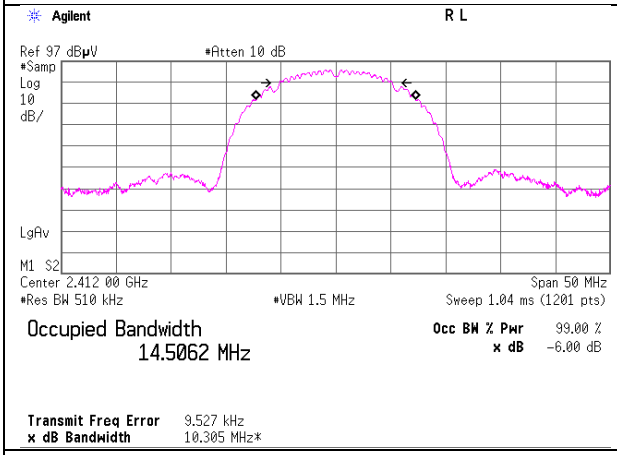
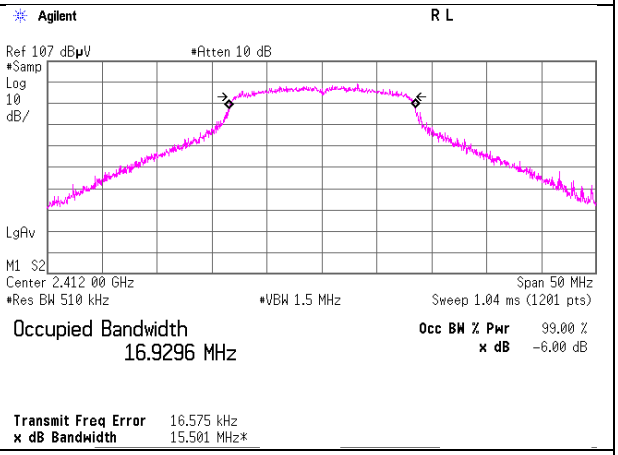
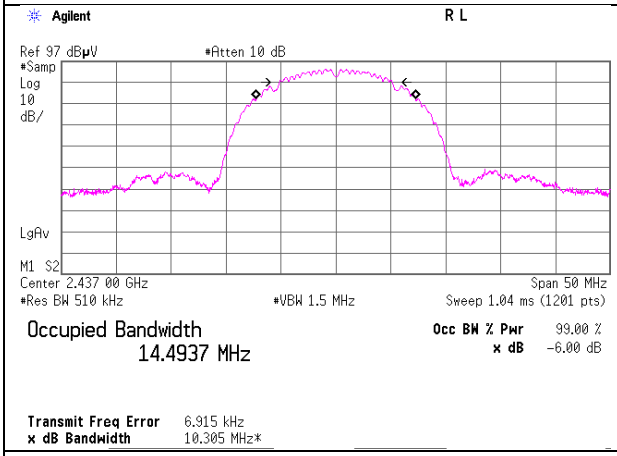
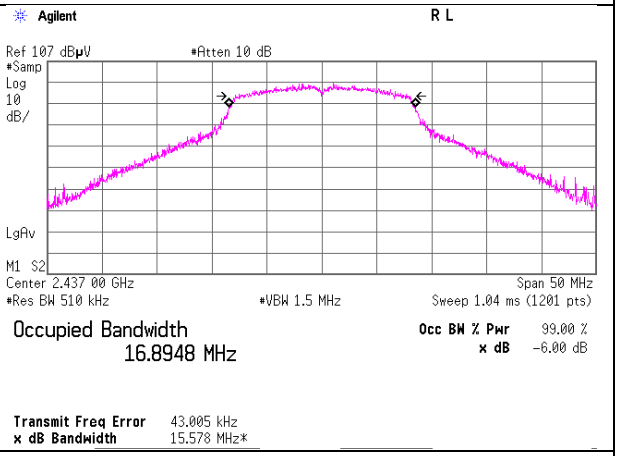
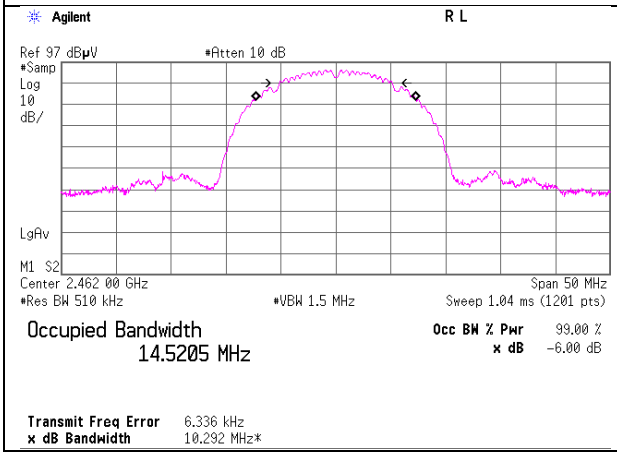
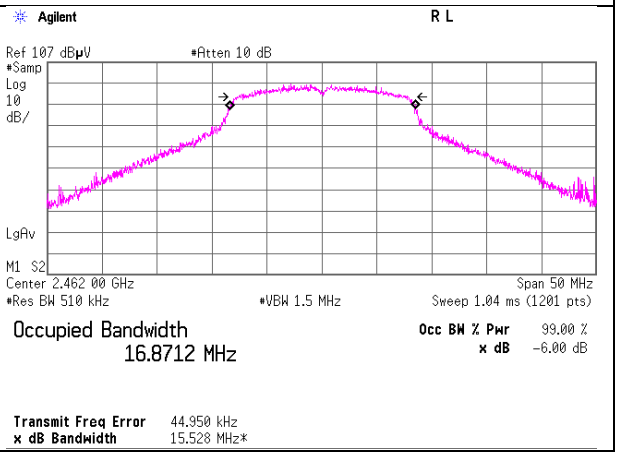


2462 MHz



99%Occupied Bandwidth

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11274192S-B-R1
Date	July 26, 2016
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Kazutaka Takeyema
Mode	Tx

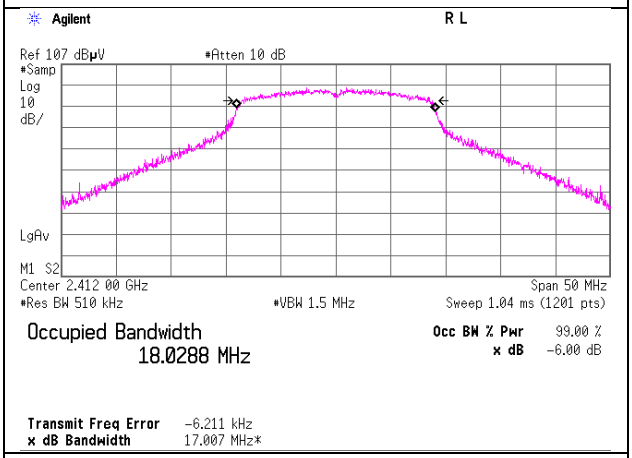
11b	11g
2412 MHz	**2412 MHz**
	
2437 MHz	**2437 MHz**
	
2462 MHz	**2462 MHz**
	

99% Occupied Bandwidth

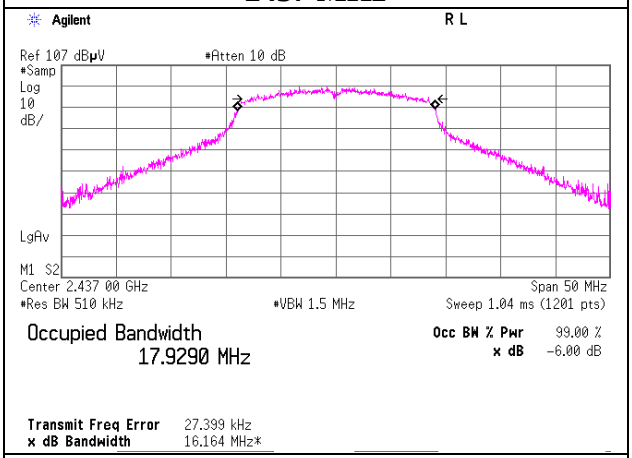
Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11274192S-B-R1
Date	July 26, 2016
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Kazutaka Takeyema
Mode	Tx

11n-20

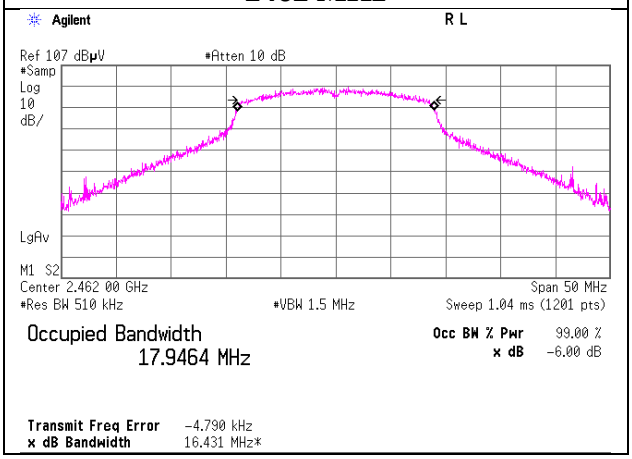
2412 MHz



2437 MHz



2462 MHz



APPENDIX 2: Test instruments

Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SRENT-05	Spectrum Analyzer	KEYSIGHT	E4440A	MY46187752	AT	2015/10/05 * 12
SCC-G13	Coaxial Cable	Suhner	SUCOFLEX 102	31599/2	AT	2016/03/23 * 12
SAT10-09	Attenuator	Weinschel Corp.	54A-10	W5692	AT	2015/11/04 * 12
SPM-07	Power Meter	Agilent	8990B	MY51002722	AT	2016/04/04 * 12
SPSS-04	Power sensor	Agilent	N1923A	MY53260009	AT	2016/04/04 * 12
SOS-13	Humidity Indicator	Custom	CTH-202	Q.C.17	AT	2015/12/07 * 12
KTS-08	Digital Tester	SANWA	PC500	7019224	AT	2016/03/15 * 12
KAF-04	Pre Amplifier	Agilent	8449B	3008A01600	RE	2016/04/22 * 12
SAF-04	Pre Amplifier	TOYO Corporation	TPA0118-36	1440489	RE	2016/03/22 * 12
SCC-G05	Coaxial Cable	Junkosha	J12J102207-00	APR-30-15-037	RE	2016/05/24 * 12
SCC-G22	Coaxial Cable	Suhner	SUCOFLEX 104	296199/4	RE	2016/05/11 * 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
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2016/03/23 * 12
SJM-09	Measure	PROMART	SEN1935	-	RE	-
SAEC-02(SVSWR)	Semi-Anechoic Chamber	TDK	SAEC-02(SVSWR)	2	RE	2015/07/09 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE	-
STS-02	Digital Hitester	Hioki	3805-50	080997819	RE	2016/03/22 * 12
SAT10-05	Attenuator(above1GHz)	Agilent	8493C-010	74864	RE	2015/11/04 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2015/11/16 * 12
SAJ-02	Antenna Tilt Jig	Intelligent System Engineering Co., Ltd	Antenna Tilt Jig	T-S002	RE	Pre Check
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2016/07/15 * 12
SCC-G04	Coaxial Cable	Junkosha	J12J102207-00	JUN-12-14-018	RE	2016/06/23 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2016/05/11 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2015/08/11 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2015/10/22 * 12
SSA-01	Spectrum Analyzer	Agilent	N9010A-526	MY48031482	RE	2016/04/28 * 12
SJM-15	Measure	ASKUL	-	-	RE	-
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE	2015/11/18 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2015/11/16 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2016/03/15 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2016/03/23 * 12
SCC-G15	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	RE	2016/03/08 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2015/10/11 * 12

SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108 A	UHALP 9108-A 0901	RE	2015/10/11 * 12
SAT6-08	Attenuator	HIROSE ELECTRIC CO.,LTD.	AT-406(40)	-	RE	2015/08/31 * 12
SCC-C1/C2/C3 /C4/C5/C10/SR SE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suh ner/Suhner/Suhner/Su hner/TOYO	8D2W/12DSF A/141PE/141 PE/141PE/14 1PE/NS4906	-/0901-271(RF Selector)	RE	2016/04/22 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2016/02/25 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	RE	2016/03/28 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2015/12/07 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY461805 25	AT	2016/03/28 * 12

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

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

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