



RADIO TEST REPORT

Test Report No. : 11691426S-C-R1

Applicant : PIONEER CORPORATION
Type of Equipment : MAIN UNIT
Model No. : D172G
FCC ID : AJDK102
Test regulation : FCC Part 15 Subpart C: 2017
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)
7. This report is a revised version of 11691426S-C.

Date of test: May 31 to June 5, 2017

Representative test engineer:

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Engineer
Consumer Technology Division

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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".

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13-EM-F0429

REVISION HISTORY

Original Test Report No.: 11691426S-C

[illegible]

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SECTION 1: Customer information

Company Name	:	PIONEER CORPORATION
Address	:	25-1, Yamada, Kawagoe-shi, Saitama-ken 350-8555, JAPAN
Telephone Number	:	+81-49-228-7787
Facsimile Number	:	+81-49-228-6493
Contact Person	:	Tomoyuki Tanaka

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

2.1 Identification of E.U.T.

Type of Equipment	:	MAIN UNIT
Model No.	:	D172G
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 12.0 V
Receipt Date of Sample	:	May 31, 2017
Country of Mass-production	:	Mexico
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: D172G (referred to as the EUT in this report) is a MAIN UNIT.

Clock frequency(ies) in the system	:	Oscillator	(Module) 0.032768 MHz
		Internal Communication	(Module) 195 MHz

Radio Specification

WLAN

Radio Type	:	Transceiver
Frequency of Operation	:	2412 MHz- 2462 MHz
Modulation	:	DSSS, OFDM
Power Supply (inner)	:	DC 3.3 V / 1.8 V
Antenna type	:	Pattern inverted F type
Antenna Gain	:	2.94 dBi
Operating Temperature	:	-30 deg. C - +65 deg. C

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
FCC Part 15 final revised on June 14, 2017 and effective July 14, 2017

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 June 14, 2017, 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	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: Section 15.247(d) IC: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	2.2 dB 9748.000 MHz, AV, Hori. Tx 11g 2437 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 does not have AC ports.

*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)

This 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 this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

The EUT has a unique coupling/antenna connector (U.FL). 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
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	2.6 dB	2.5 dB	2.6 dB	2.5 dB	2.5 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.1 dB	3.1 dB	3.1 dB	-	-
	30 MHz-200 MHz	4.6 dB	4.4 dB	4.6 dB	-	-
	200 MHz-1 GHz	5.8 dB	5.7 dB	5.8 dB	-	-
	1 GHz-13 GHz	4.9 dB	4.9 dB	4.9 dB	-	-
Radiated emission (Measurement distance: 1 m)	13 GHz-18 GHz	4.6 dB	4.6 dB	4.6 dB	-	-
	18 GHz-40 GHz	4.9 dB	4.9 dB	4.9 dB	-	-

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector)_SPM-06	0.72 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-06	0.85 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.74 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-07	0.91 dB
Spurious emission (Conducted) below 1GHz	1.6 dB
Spurious emission (Conducted) 1 GHz-3 GHz	1.3 dB
Spurious emission (Conducted) 3 GHz-18 GHz	2.2 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.3 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.4 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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Telephone: +81 463 50 6400, Facsimile: +81 463 50 6401
JAB Accreditation No. RTL02610

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

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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

4.1 Operating Mode(s)

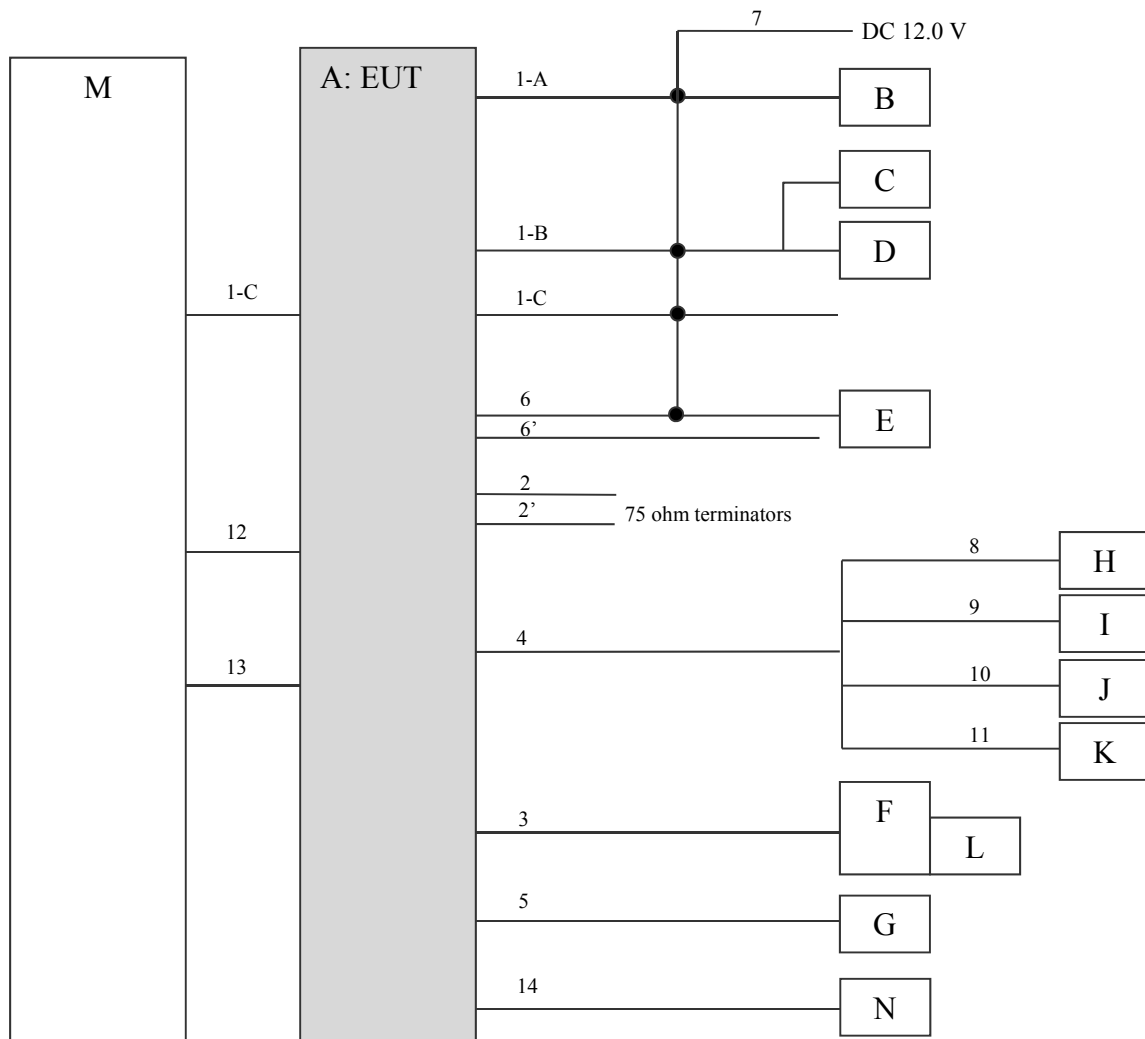
Test operating mode was determined as follows according to “Section 1 of 6 802.11 a/b/g/n testing - Managing Complex Regulatory Approvals - ” of TCB Council Workshop October 2009 and also was judged the necessity of 802.11ac mode by the pre-test.

Mode	Remarks*
IEEE 802.11b (11b)	11 Mbps, PN9
IEEE 802.11g (11g)	48 Mbps, PN9
IEEE 802.11n MIMO 20 MHz BW (11n-20)	MCS 4, 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: IEEE 802.11b: 15 IEEE 802.11g: 11 IEEE 802.11n: 10 Software: WLAN: A115 *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 (above 1 GHz)	11b Tx	2412 MHz
6dB Bandwidth	11g Tx	2437 MHz
Maximum Peak Output Power	11n-20 Tx	2462 MHz
Power Density		
99% Occupied Bandwidth		
Restricted Band Edges	11b Tx	2412 MHz
	11g Tx	2462 MHz
	11n-20 Tx	
Spurious Emission (below 1 GHz)	11g Tx	2412 MHz

4.2 Configuration and peripherals



* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	MAIN UNIT	D172G	AABB999997US *1) AABB999996US *2)	PIONEER	EUT
B	Steering SW	75E921LH/RH	8P11533479-002A-7	-	-
C	Mic	-	-	-	-
D	Rear Camera	-	-	-	-
E	Air-con ECU	-	-	DENSO	-
F	USB	-	-	-	-
G	GPS Antenna	86860-71011	-	AISIN	-
H	Speaker	TS-F1030	V44QAH2	PIONEER	-
I	Speaker	TS-F1030	V44QAH2	PIONEER	-
J	Speaker	TS-F1030	V44QBA1	PIONEER	-
K	Speaker	TS-F1030	V44QBA1	PIONEER	-
L	USB Memory	-	-	-	-
M	Display	-	-	PIONEER	-
N	XM Antenna	-	-	-	-

*1) Used for Antenna Terminal conducted test

*2) Used for Radiated Emission test

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1-A	Wire Harness Set	1.0	Unshielded	Unshielded	-
1-B	Wire Harness	1.0	Unshielded	Unshielded	-
1-C	Wire Harness	1.0 + 1.0	Unshielded	Unshielded	-
2, 2'	Radio antenna	1.5	Shielded	Shielded	-
3	USB connector	1.1	Shielded	Shielded	-
4	Speaker	1.1	Unshielded	Unshielded	-
5	GPS antenna connector	1.3	Shielded	Shielded	-
6, 6'	Wire Harness (Air-con ECU)	1.9	Unshielded	Unshielded	-
7	DC	1.2	Shielded	Unshielded	-
8	Speaker	2.0	Unshielded	Unshielded	-
9	Speaker	2.0	Unshielded	Unshielded	-
10	Speaker	2.0	Unshielded	Unshielded	-
11	Speaker	2.0	Unshielded	Unshielded	-
12	Flat cable	0.5	Unshielded	Unshielded	-
13	Flat cable	0.5	Unshielded	Unshielded	-
14	XM Antenna	1.3	Shielded	Shielded	-

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SECTION 5: Radiated Spurious Emission

Test Procedure

It was measured based on "11.0 Emissions in non-restricted frequency bands" of "558074 D01 DTS Meas Guidance 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, 0.25 m by 0.25 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	12.2.5.2 RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (Linear voltage) Trace: 100 traces Duty factor was added to the results.	RBW: 100 kHz VBW: 300 kHz
Test Distance	3 m	3.87 m *2) (1 GHz – 13 GHz), 1 m *3) (13 GHz – 26.5 GHz)		3.87 m *2) (1 GHz – 13 GHz), 1 m *3) (13 GHz – 26.5 GHz)

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

*2) Distance Factor: $20 \times \log(3.87 \text{ m} / 3.0 \text{ m}) = 2.22 \text{ dB}$

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

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The carrier level and noise levels were confirmed at 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 - 18 GHz	18 GHz – 26.5 GHz
Horizontal	0 deg.	30 deg.	0 deg.	30 deg.
Vertical	0 deg.	30 deg.	0 deg.	30 deg.

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
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	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 6dB Bandwidth	3 kHz	9.1 kHz	Auto	Peak	Max Hold	Spectrum Analyzer *3)
Conducted Spurious Emission *4)	9kHz to 150kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150kHz to 30MHz	10 kHz	30 kHz				
*1) Peak hold was applied as Worst-case measurement. *2) Reference data *3) Section 10.2 Method PKPSD (peak PSD) of "KDB 558074 D01 DTS Meas Guidance v04". *4) In the frequency range below 30MHz, 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. (9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 10 kHz)							

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

Test data	: APPENDIX
Test result	: Pass

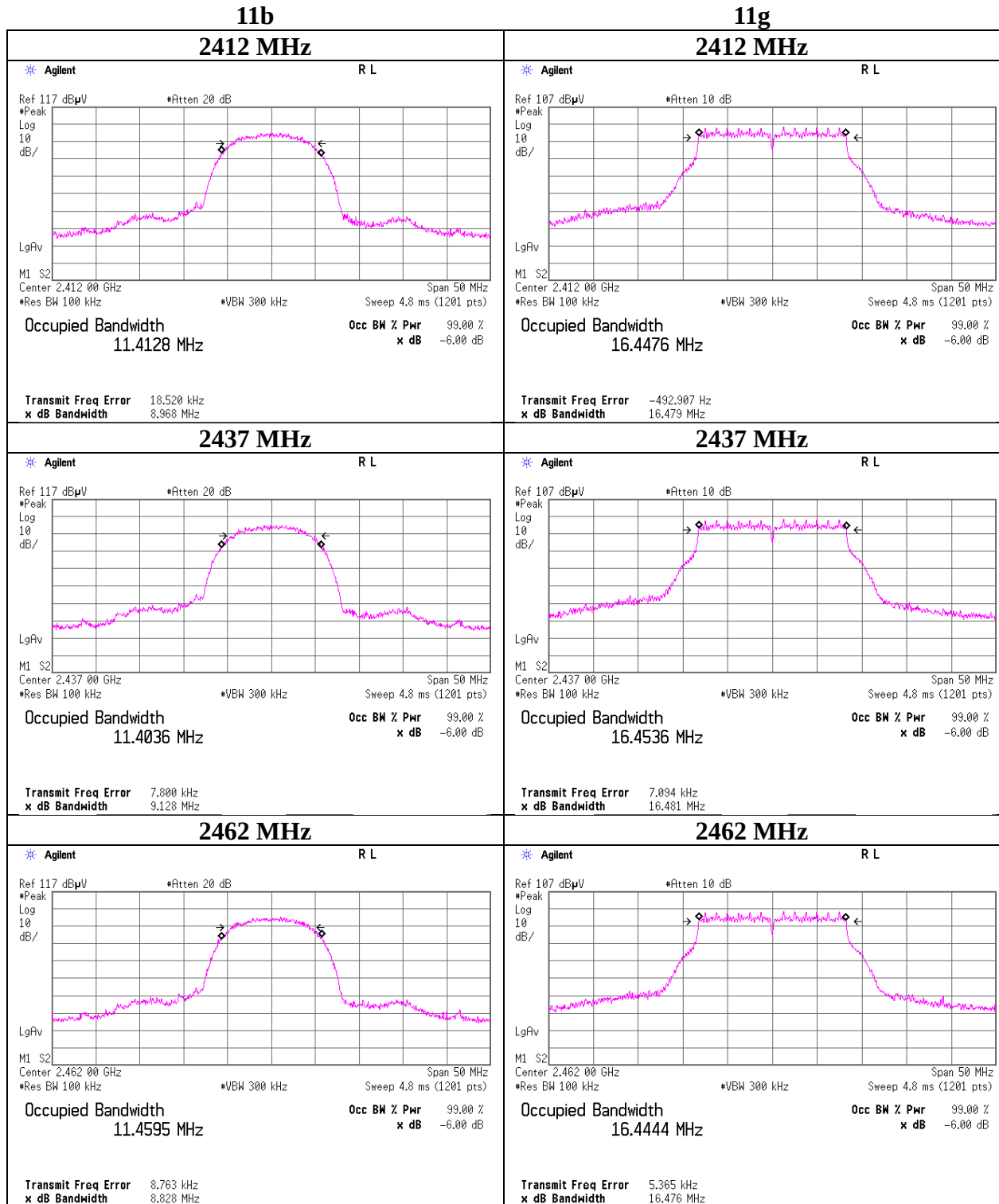
APPENDIX 1: Test data

6dB Bandwidth

Test place	Shonan No.5 Shielded Room
Report No.	11691426S-C-R1
Date	June 1, 2017
Temperature / Humidity	25 deg. C / 55 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx

Mode	Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
11b	2412	8.968	> 500
	2437	9.128	> 500
	2462	8.828	> 500
11g	2412	16.479	> 500
	2437	16.481	> 500
	2462	16.476	> 500
11n-20	2412	17.727	> 500
	2437	17.708	> 500
	2462	17.732	> 500

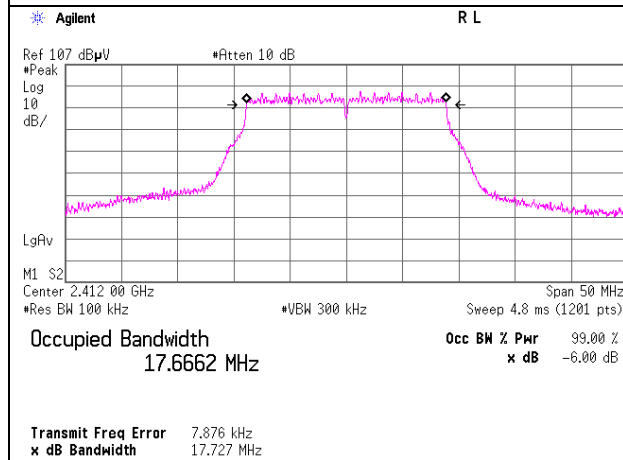
6dB Bandwidth



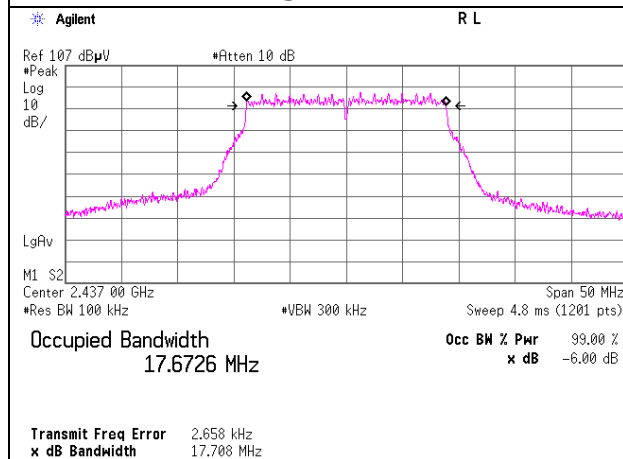
6dB Bandwidth

11n-20

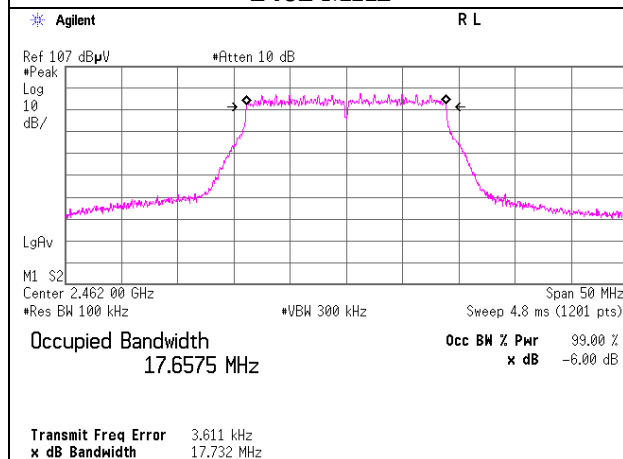
2412 MHz



2437 MHz



2462 MHz



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Maximum Peak Output Power

Test place	Shonan No.1 Measurement Room
Report No.	11691426S-C-R1
Date	May 31, 2017
Temperature / Humidity	27 deg. C / 42 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx 11b

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	7.37	1.31	9.64	18.32	67.92	30.00	1000	11.68
2437	7.44	1.31	9.64	18.39	69.02	30.00	1000	11.61
2462	7.31	1.32	9.65	18.28	67.30	30.00	1000	11.72

Sample Calculation:

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

2437MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
1	7.08	
2	7.15	
5.5	7.10	
11	7.44	*

*: Worst Rate

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

Maximum Peak Output Power

Test place	Shonan No.1 Measurement Room
Report No.	11691426S-C-R1
Date	May 31, 2017
Temperature / Humidity	27 deg. C / 42 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx 11g

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	9.40	1.31	9.64	20.35	108.39	30.00	1000	9.65
2437	9.19	1.31	9.64	20.14	103.28	30.00	1000	9.86
2462	9.10	1.32	9.65	20.07	101.62	30.00	1000	9.93

Sample Calculation:

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

2437 MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
6	6.80	
9	6.64	
12	6.67	
18	6.41	
24	8.76	
36	8.83	
48	9.19	*
54	8.38	

*: Worst Rate

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

Maximum Peak Output Power

Test place : Shonan No.1 Measurement Room
Report No. : 11691426S-C-R1
Date : May 31, 2017
Temperature / Humidity : 27 deg. C / 42 % RH
Engineer : Hiroyuki Morikawa
Mode : Tx 11n-20

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	8.84	1.31	9.64	19.79	95.28	30.00	1000	10.21
2437	8.87	1.31	9.64	19.82	95.94	30.00	1000	10.18
2462	8.61	1.32	9.65	19.58	90.78	30.00	1000	10.42

Sample Calculation:

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

2437 MHz

MCS Number	Reading [dBm]	Remark
0	6.10	
1	6.72	
2	6.40	
3	8.44	
4	8.87	*
5	8.35	
6	8.69	
7	8.23	

* Worst MCS

* Worst Condition

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

Average Output Power
(Reference data for RF Exposure)

Test place : Shonan No.1 Measurement Room
Report No. : 11691426S-C-R1
Date : May 31, 2017
Temperature / Humidity : 27 deg. C / 42 % RH
Engineer : Hiroyuki Morikawa
Mode : Tx

11b 1 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	3.18	1.31	9.64	14.13	25.88	0.04	14.17	26.12
2437	3.36	1.31	9.64	14.31	26.98	0.04	14.35	27.23
2462	3.22	1.32	9.65	14.19	26.24	0.04	14.23	26.49

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	-1.21	1.31	9.64	9.74	9.42	0.28	10.02	10.05
2437	-1.07	1.31	9.64	9.88	9.73	0.28	10.16	10.38
2462	-1.09	1.32	9.65	9.88	9.73	0.28	10.16	10.38

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	-2.41	1.31	9.64	8.54	7.14	0.30	8.84	7.66
2437	-2.40	1.31	9.64	8.55	7.16	0.30	8.85	7.67
2462	-2.39	1.32	9.65	8.58	7.21	0.30	8.88	7.73

Sample Calculation:

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

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

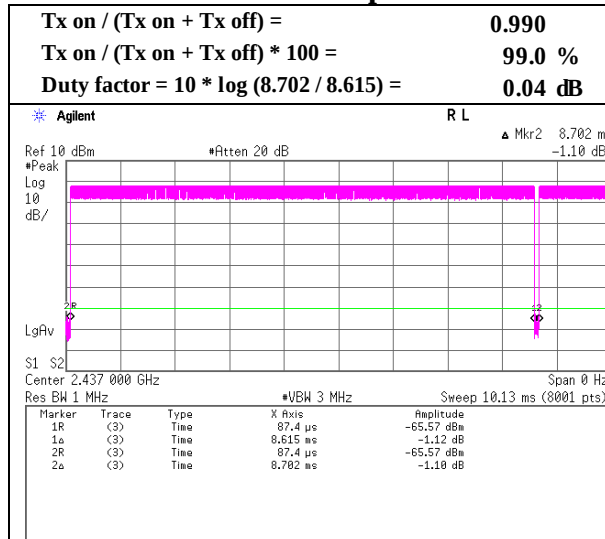
The average output power was measured with the lowest order modulation and lowest data rate configuration in each IEEE 802.11 mode based on KDB 248227 D01.

Burst rate confirmation

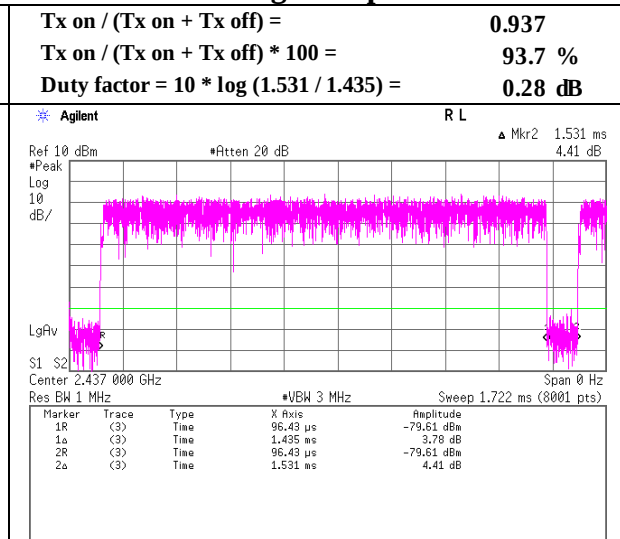
Test place : Shonan No.1 Measurement Room
Report No. : 11691426S-C-R1
Date : May 31, 2017
Temperature / Humidity : 27 deg. C / 42 % RH
Engineer : Hiroyuki Morikawa
Mode : Tx

Lowest Rate

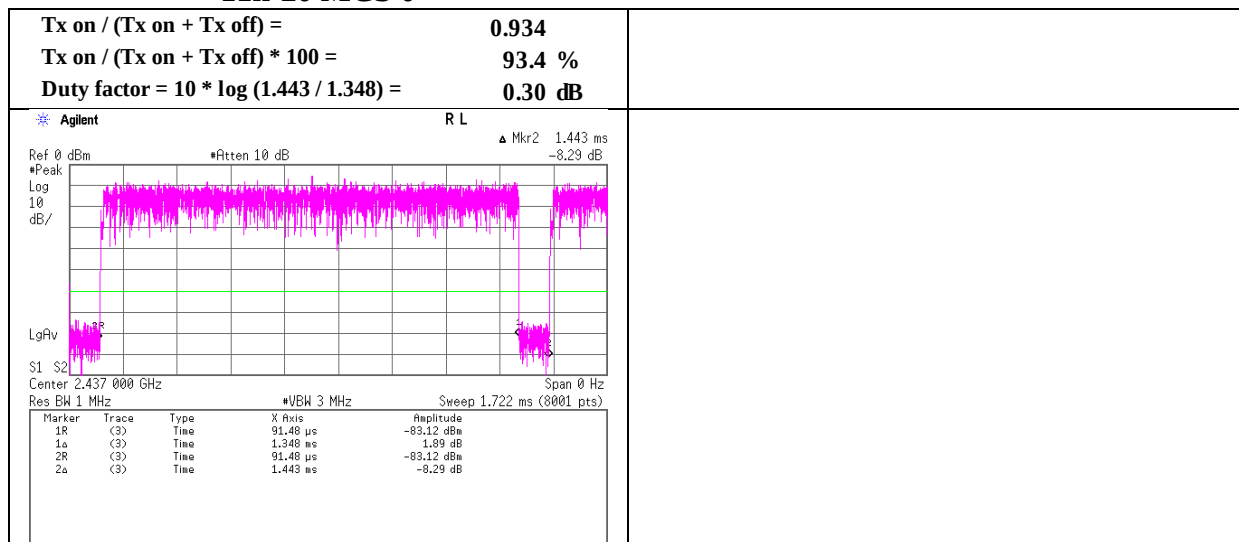
11b 1 Mbps



11g 6 Mbps



11n-20 MCS 0



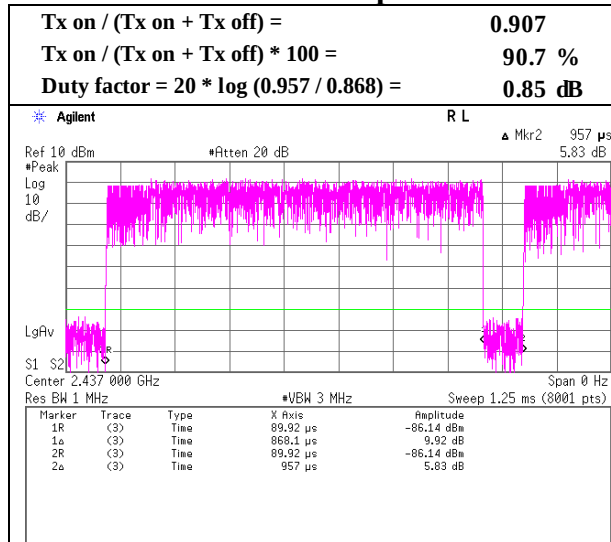
* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

Burst rate confirmation

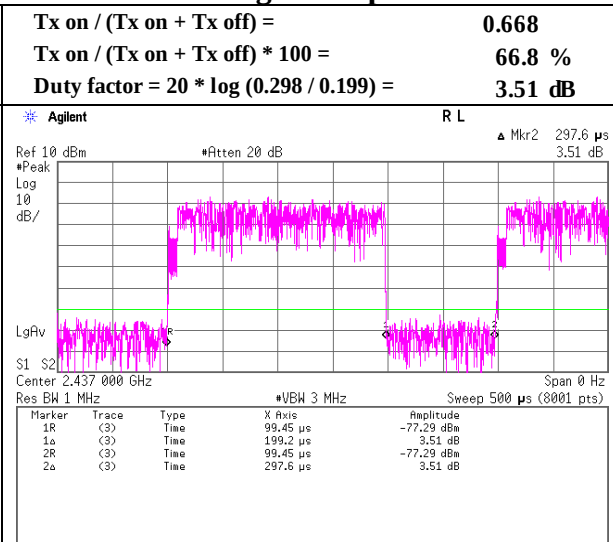
Test place	Shonan No.1 Measurement Room
Report No.	11691426S-C-R1
Date	May 31, 2017
Temperature / Humidity	27 deg. C / 42 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx

Worst peak power Rate

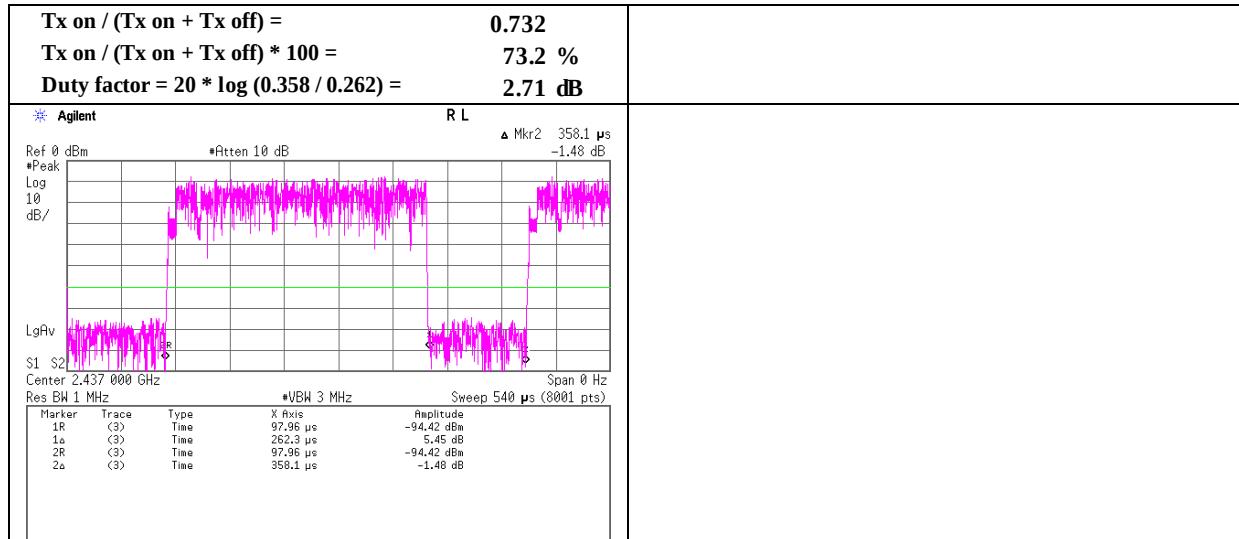
11b 11 Mbps



11g 48 Mbps



11n-20 MCS 4



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

Radiated Spurious Emission

Test place (AC No.) 3 1
Report No. 11691426S-C-R1
Date May 31, 2017 June 1, 2017
Temperature / Humidity 23 deg. C / 48 % RH 25 deg. C / 51 % RH
Engineer Makoto Hosaka Makoto Hosaka
(1 GHz -13 GHz) (13 GHz -26.5 GHz)
Mode Tx 11b 2412 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	53.16	27.41	14.20	36.83	2.22	60.16	73.90	13.7	182	42	Floor Noise
Hori.	4824.000	PK	43.07	31.17	6.61	37.00	2.22	46.07	73.90	27.8	154	11	
Hori.	7236.000	PK	44.28	36.52	8.36	37.83	2.22	53.55	73.90	20.3	150	0	
Hori.	9648.000	PK	44.95	38.66	9.38	38.53	2.22	56.68	73.90	17.2	150	0	
Vert.	2390.000	PK	53.62	27.41	14.20	36.83	2.22	60.62	73.90	13.2	135	94	
Vert.	4824.000	PK	43.70	31.17	6.61	37.00	2.22	46.70	73.90	27.2	133	20	
Vert.	7236.000	PK	44.58	36.52	8.36	37.83	2.22	53.85	73.90	20.0	150	0	
Vert.	9648.000	PK	44.79	38.66	9.38	38.53	2.22	56.52	73.90	17.3	150	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.87\text{ m} / 3.0\text{ m}) = 2.22\text{ dB}$

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	39.71	27.41	14.20	36.83	0.85	2.22	47.56	53.90	6.3	*1)
Hori.	4824.000	AV	33.13	31.17	6.61	37.00	0.85	2.22	36.98	53.90	16.9	Floor Noise
Hori.	7236.000	AV	35.08	36.52	8.36	37.83	0.85	2.22	45.20	53.90	8.7	
Hori.	9648.000	AV	36.08	38.66	9.38	38.53	0.85	2.22	48.66	53.90	5.2	
Vert.	2390.000	AV	39.91	27.41	14.20	36.83	0.85	2.22	47.76	53.90	6.1	
Vert.	4824.000	AV	33.15	31.17	6.61	37.00	0.85	2.22	37.00	53.90	16.9	
Vert.	7236.000	AV	34.98	36.52	8.36	37.83	0.85	2.22	45.10	53.90	8.8	
Vert.	9648.000	AV	35.92	38.66	9.38	38.53	0.85	2.22	48.50	53.90	5.4	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.87\text{ m} / 3.0\text{ m}) = 2.22\text{ dB}$

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	96.74	27.50	14.22	36.82	2.22	103.86	-	-	Carrier
Hori.	2400.000	PK	50.30	27.45	14.21	36.83	2.22	57.35	83.86	26.5	Carrier
Vert.	2412.000	PK	95.62	27.50	14.22	36.82	2.22	102.74	-	-	
Vert.	2400.000	PK	50.33	27.45	14.21	36.83	2.22	57.38	82.74	25.4	

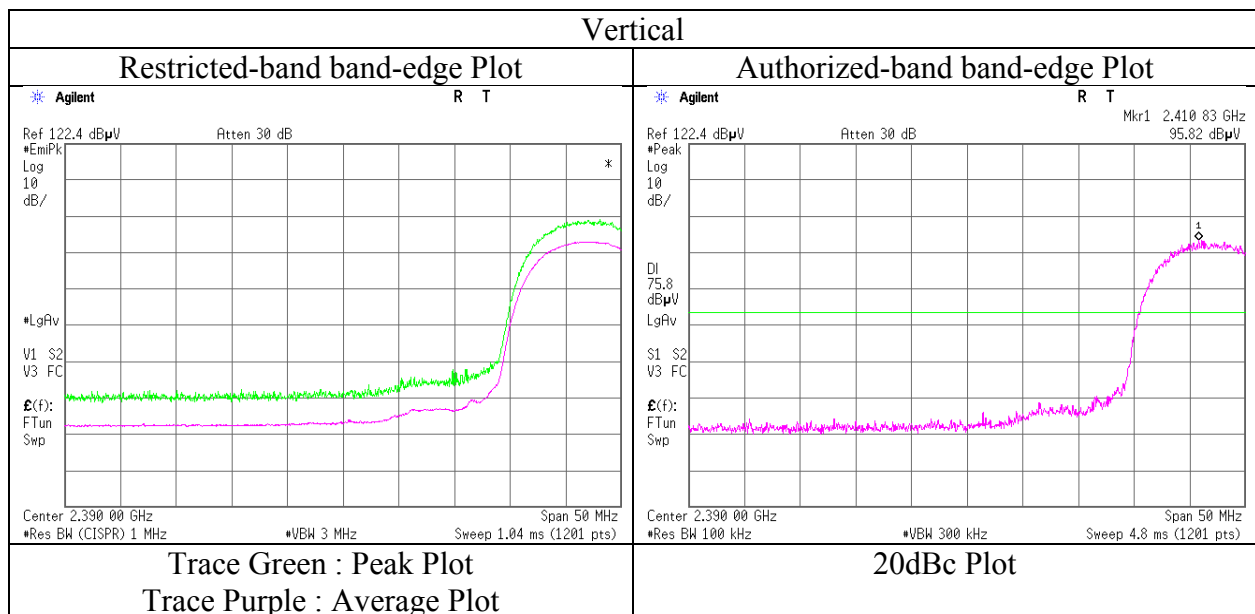
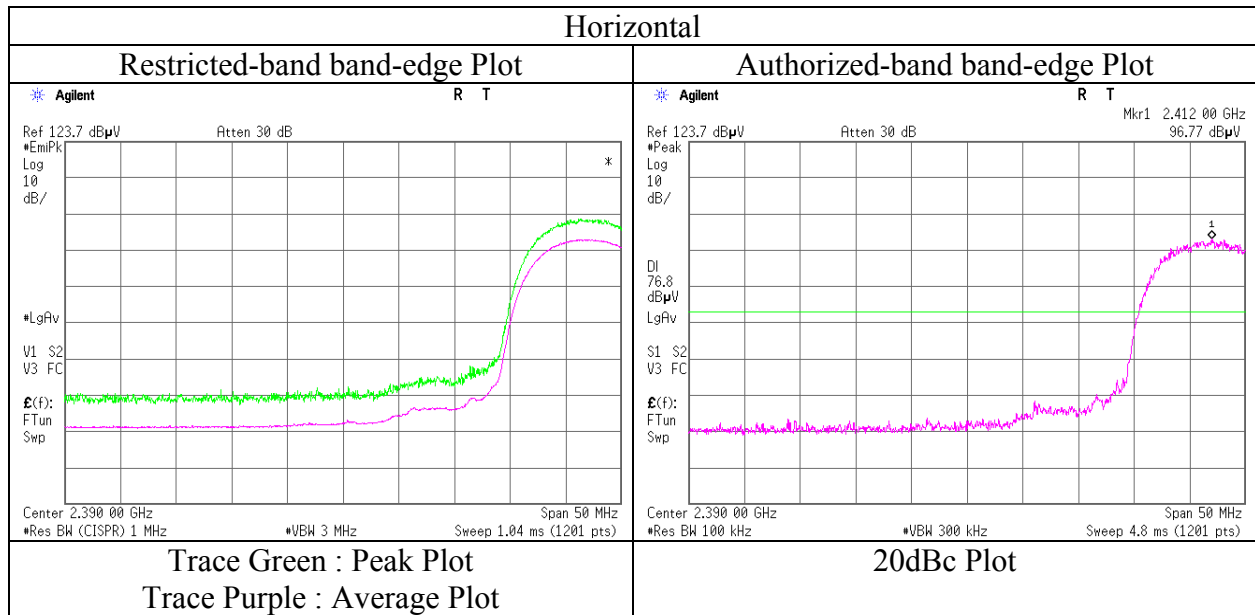
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.87\text{ m} / 3.0\text{ m}) = 2.22\text{ dB}$

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

Radiated Spurious Emission (Reference Plot for band-edge)

Test place 3
Report No. 11691426S-C-R1
Date May 31, 2017
Temperature / Humidity 23 deg. C / 48 % RH
Engineer Makoto Hosaka
(1 GHz -13 GHz)
Mode Tx 11b 2412 MHz



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

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Radiated Spurious Emission

Test place (AC No.)	3	1
Report No.	11691426S-C-R1	
Date	May 31, 2017	June 1, 2017
Temperature / Humidity	23 deg. C / 48 % RH	25 deg. C / 51 % RH
Engineer	Makoto Hosaka	Makoto Hosaka
	(1 GHz -13 GHz)	(13 GHz -26.5 GHz)
Mode	Tx 11b 2437 MHz	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4874.000	PK	43.35	31.28	6.62	37.03	2.22	46.44	73.90	27.4	152	8	Floor Noise
Hori.	7311.000	PK	44.24	36.74	8.46	37.87	2.22	53.79	73.90	20.1	150	0	
Hori.	9748.000	PK	45.09	38.74	9.45	38.65	2.22	56.85	73.90	17.0	150	0	
Vert.	4874.000	PK	42.89	31.28	6.62	37.03	2.22	45.98	73.90	27.9	133	25	
Vert.	7311.000	PK	43.71	36.74	8.46	37.87	2.22	53.26	73.90	20.6	150	0	
Vert.	9748.000	PK	44.27	38.74	9.45	38.65	2.22	56.03	73.90	17.8	150	0	Floor Noise

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.87\text{ m} / 3.0\text{ m}) = 2.22\text{ dB}$

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	33.62	31.28	6.62	37.03	0.85	2.22	37.56	53.90	16.3	Floor Noise
Hori.	7311.000	AV	34.99	36.74	8.46	37.87	0.85	2.22	45.39	53.90	8.5	
Hori.	9748.000	AV	35.94	38.74	9.45	38.65	0.85	2.22	48.55	53.90	5.3	
Vert.	4874.000	AV	33.65	31.28	6.62	37.03	0.85	2.22	37.59	53.90	16.3	
Vert.	7311.000	AV	34.48	36.74	8.46	37.87	0.85	2.22	44.88	53.90	9.0	
Vert.	9748.000	AV	35.65	38.74	9.45	38.65	0.85	2.22	48.26	53.90	5.6	Floor Noise

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.87\text{ m} / 3.0\text{ m}) = 2.22\text{ dB}$

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

Test place (AC No.)	3	1
Report No.	11691426S-C-R1	
Date	May 31, 2017	June 1, 2017
Temperature / Humidity	23 deg. C / 48 % RH	25 deg. C / 51 % RH
Engineer	Makoto Hosaka (1 GHz -13 GHz)	Makoto Hosaka (13 GHz -26.5 GHz)
Mode	Tx 11b 2462 MHz	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	55.20	27.79	14.30	36.79	2.22	62.72	73.90	11.1	184	38	Floor Noise
Hori.	4924.000	PK	42.88	31.38	6.65	37.05	2.22	46.08	73.90	27.8	154	16	
Hori.	7386.000	PK	43.90	36.95	8.54	37.92	2.22	53.69	73.90	20.2	150	0	
Hori.	9848.000	PK	44.46	38.81	9.55	38.78	2.22	56.26	73.90	17.6	150	0	
Vert.	2483.500	PK	54.10	27.79	14.30	36.79	2.22	61.62	73.90	12.2	131	94	
Vert.	4924.000	PK	43.23	31.38	6.65	37.05	2.22	46.43	73.90	27.4	135	21	
Vert.	7386.000	PK	43.03	36.95	8.54	37.92	2.22	52.82	73.90	21.0	150	0	Floor Noise
Vert.	9848.000	PK	43.98	38.81	9.55	38.78	2.22	55.78	73.90	18.1	150	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.87\text{ m} / 3.0\text{ m}) = 2.22\text{ dB}$

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	42.41	27.79	14.30	36.79	0.85	2.22	50.78	53.90	3.1	*1)
Hori.	4924.000	AV	33.63	31.38	6.65	37.05	0.85	2.22	37.68	53.90	16.2	Floor Noise
Hori.	7386.000	AV	34.22	36.95	8.54	37.92	0.85	2.22	44.86	53.90	9.0	
Hori.	9848.000	AV	35.66	38.81	9.55	38.78	0.85	2.22	48.31	53.90	5.6	
Vert.	2483.500	AV	39.48	27.79	14.30	36.79	0.85	2.22	47.85	53.90	6.0	*1)
Vert.	4924.000	AV	33.62	31.38	6.65	37.05	0.85	2.22	37.67	53.90	16.2	Floor Noise
Vert.	7386.000	AV	34.06	36.95	8.54	37.92	0.85	2.22	44.70	53.90	9.2	
Vert.	9848.000	AV	35.59	38.81	9.55	38.78	0.85	2.22	48.24	53.90	5.7	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.87\text{ m} / 3.0\text{ m}) = 2.22\text{ dB}$

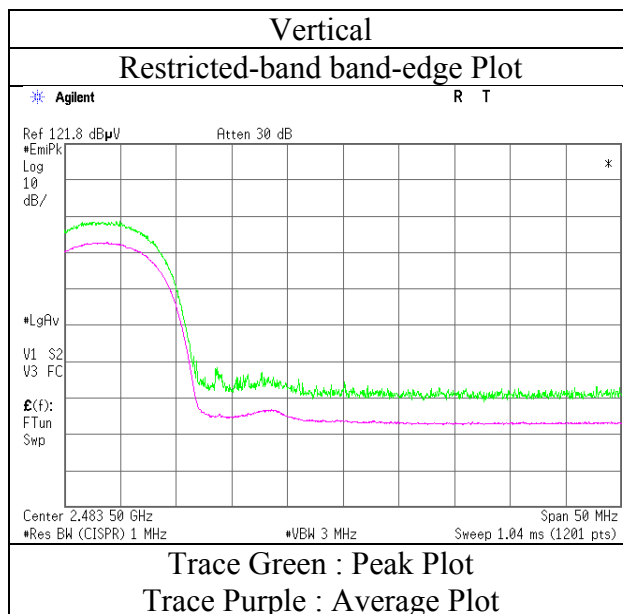
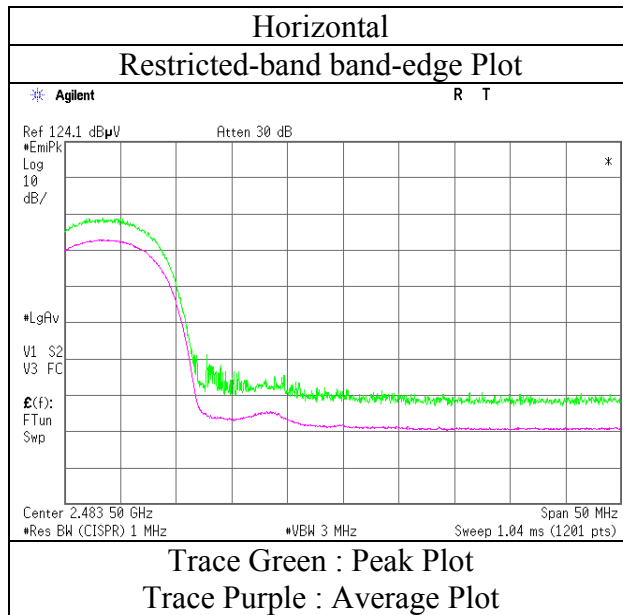
13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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)

Test place	3
Report No.	11691426S-C-R1
Date	May 31, 2017
Temperature / Humidity	23 deg. C / 48 % RH
Engineer	Makoto Hosaka (1 GHz -13 GHz)
Mode	Tx 11b 2462 MHz



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

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Radiated Spurious Emission

Test place (AC No.)	2	3	1
Report No.	11691426S-C-R1		
Date	June 5, 2017	May 31, 2017	June 1, 2017
Temperature / Humidity	23 deg. C / 39 % RH	23 deg. C / 48 % RH	25 deg. C / 51 % RH
Engineer	Yasumasa Owaki (30 MHz -1 GHz)	Makoto Hosaka (1 GHz -13 GHz)	Makoto Hosaka (13 GHz -26.5 GHz)
Mode	Tx 11g 2412 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	68.763	QP	37.10	6.46	7.24	31.87	0.00	18.93	40.00	21.0	278	61	
Hori.	71.161	QP	32.50	6.27	7.42	31.87	0.00	14.32	40.00	25.6	266	53	
Hori.	72.487	QP	33.40	6.27	7.54	31.87	0.00	15.34	40.00	24.6	253	54	
Hori.	74.016	QP	46.30	6.26	7.68	31.87	0.00	28.37	40.00	11.6	266	58	
Hori.	185.040	QP	27.00	16.19	8.81	31.78	0.00	20.22	43.50	23.2	167	191	
Hori.	916.000	QP	20.70	22.37	9.92	30.72	0.00	22.27	46.00	23.7	150	108	
Hori.	959.981	QP	27.10	22.54	10.12	30.40	0.00	29.36	46.00	16.6	100	252	
Hori.	2390.000	PK	50.22	27.41	14.20	36.83	2.22	57.22	73.90	16.6	186	37	
Hori.	4824.000	PK	43.82	31.17	6.61	37.00	2.22	46.82	73.90	27.0	148	14	
Hori.	7236.000	PK	44.14	36.52	8.36	37.83	2.22	53.41	73.90	20.4	150	0	
Hori.	9648.000	PK	45.31	38.66	9.38	38.53	2.22	57.04	73.90	16.8	150	0	Floor Noise
Vert.	64.769	QP	43.30	7.07	7.01	31.88	0.00	25.50	40.00	14.5	100	245	
Vert.	68.751	QP	35.00	6.46	7.24	31.88	0.00	16.82	40.00	23.1	100	212	
Vert.	74.016	QP	43.80	6.26	7.68	31.87	0.00	25.87	40.00	14.1	100	30	
Vert.	2390.000	PK	48.03	27.41	14.20	36.83	2.22	55.03	73.90	18.8	138	93	
Vert.	4824.000	PK	43.56	31.17	6.61	37.00	2.22	46.56	73.90	27.3	130	15	
Vert.	7236.000	PK	44.14	36.52	8.36	37.83	2.22	53.41	73.90	20.4	150	0	
Vert.	9648.000	PK	45.28	38.66	9.38	38.53	2.22	57.01	73.90	16.8	150	0	Floor Noise

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

Distance factor : 1 GHz - 13 GHz : 20log (3.87 m / 3.0 m) = 2.22 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	36.27	27.41	14.20	36.83	3.51	2.22	46.78	53.90	7.1	*1)
Hori.	4824.000	AV	34.00	31.17	6.61	37.00	3.51	2.22	40.51	53.90	13.4	
Hori.	7236.000	AV	35.02	36.52	8.36	37.83	3.51	2.22	47.80	53.90	6.1	
Hori.	9648.000	AV	35.71	38.66	9.38	38.53	3.51	2.22	50.95	53.90	2.9	Floor Noise
Vert.	2390.000	AV	36.69	27.41	14.20	36.83	3.51	2.22	47.20	53.90	6.7	*1)
Vert.	4824.000	AV	33.76	31.17	6.61	37.00	3.51	2.22	40.27	53.90	13.6	
Vert.	7236.000	AV	35.02	36.52	8.36	37.83	3.51	2.22	47.80	53.90	6.1	
Vert.	9648.000	AV	35.89	38.66	9.38	38.53	3.51	2.22	51.13	53.90	2.8	Floor Noise

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 (3.87 m / 3.0 m) = 2.22 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	89.80	27.50	14.22	36.82	2.22	96.92	-	-	Carrier
Hori.	2400.000	PK	47.09	27.45	14.21	36.83	2.22	54.14	76.92	22.8	
Vert.	2412.000	PK	88.02	27.50	14.22	36.82	2.22	95.14	-	-	Carrier
Vert.	2400.000	PK	45.07	27.45	14.21	36.83	2.22	52.12	75.14	23.0	

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

Distance factor : 1 GHz - 13 GHz : 20log (3.87 m / 3.0 m) = 2.22 dB

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

UL Japan, Inc.

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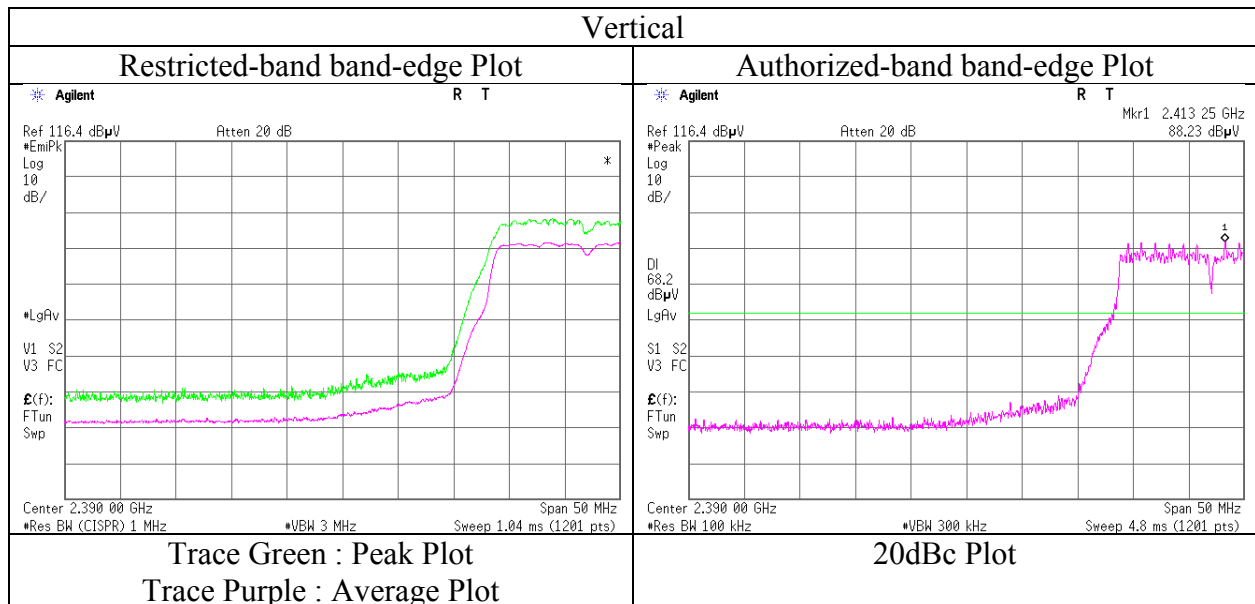
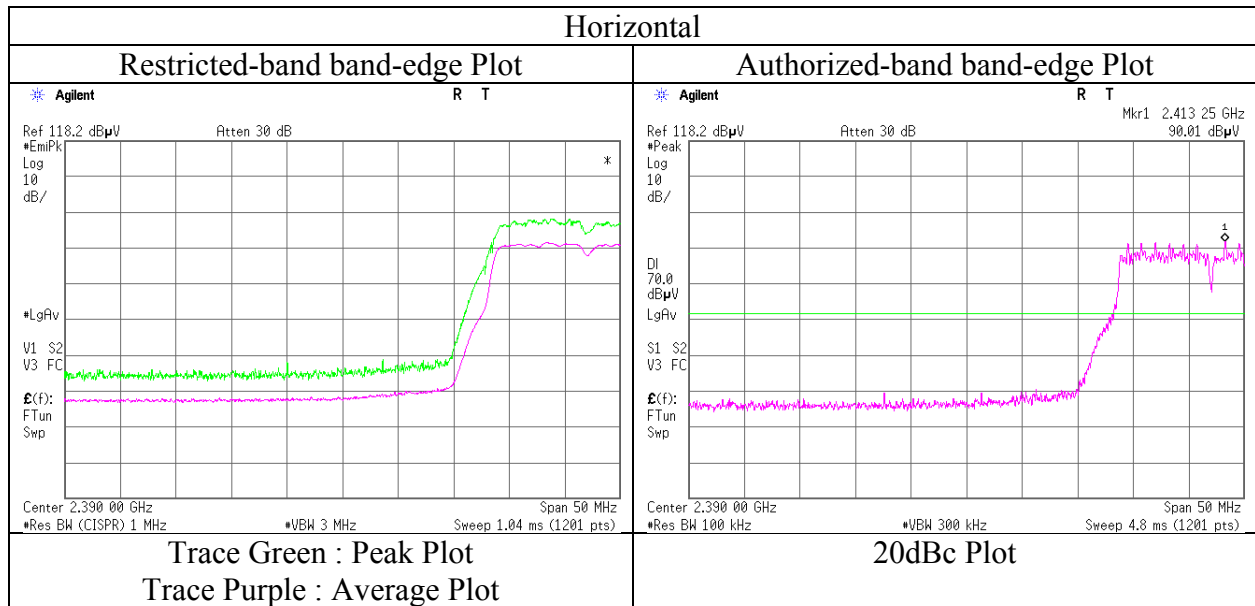
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	3
Report No.	11691426S-C-R1
Date	May 31, 2017
Temperature / Humidity	23 deg. C / 48 % RH
Engineer	Makoto Hosaka (1 GHz -13 GHz)
Mode	Tx 11g 2412 MHz



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

UL Japan, Inc.

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Radiated Spurious Emission

Test place (AC No.) 3 1
Report No. 11691426S-C-R1
Date May 31, 2017 June 1, 2017
Temperature / Humidity 23 deg. C / 48 % RH 25 deg. C / 51 % RH
Engineer Makoto Hosaka Makoto Hosaka
(1 GHz -13 GHz) (13 GHz -26.5 GHz)
Mode Tx 11g 2437 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4874.000	PK	43.06	31.28	6.62	37.03	2.22	46.15	73.90	27.7	154	14	
Hori.	7311.000	PK	43.59	36.74	8.46	37.87	2.22	53.14	73.90	20.7	150	0	
Hori.	9748.000	PK	45.39	38.74	9.45	38.65	2.22	57.15	73.90	16.7	150	0	Floor Noise
Vert.	4874.000	PK	43.20	31.28	6.62	37.03	2.22	46.29	73.90	27.6	131	26	
Vert.	7311.000	PK	44.01	36.74	8.46	37.87	2.22	53.56	73.90	20.3	150	0	
Vert.	9748.000	PK	45.33	38.74	9.45	38.65	2.22	57.09	73.90	16.8	150	0	Floor Noise

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.87\text{ m} / 3.0\text{ m}) = 2.22\text{ dB}$

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	34.62	31.28	6.62	37.03	3.51	2.22	41.22	53.90	12.7	
Hori.	7311.000	AV	35.58	36.74	8.46	37.87	3.51	2.22	48.64	53.90	5.3	
Hori.	9748.000	AV	36.42	38.74	9.45	38.65	3.51	2.22	51.69	53.90	2.2	Floor Noise
Vert.	4874.000	AV	34.67	31.28	6.62	37.03	3.51	2.22	41.27	53.90	12.6	
Vert.	7311.000	AV	35.53	36.74	8.46	37.87	3.51	2.22	48.59	53.90	5.3	
Vert.	9748.000	AV	36.21	38.74	9.45	38.65	3.51	2.22	51.48	53.90	2.4	Floor Noise

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.87\text{ m} / 3.0\text{ m}) = 2.22\text{ dB}$

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

Test place (AC No.)	3	1
Report No.	11691426S-C-R1	
Date	May 31, 2017	June 1, 2017
Temperature / Humidity	23 deg. C / 48 % RH	25 deg. C / 51 % RH
Engineer	Makoto Hosaka (1 GHz -13 GHz)	Makoto Hosaka (13 GHz -26.5 GHz)
Mode	Tx 11g 2462 MHz	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	49.40	27.79	14.30	36.79	2.22	56.92	73.90	16.9	184	42	Floor Noise
Hori.	4924.000	PK	43.37	31.38	6.65	37.05	2.22	46.57	73.90	27.3	156	14	
Hori.	7386.000	PK	43.06	36.95	8.54	37.92	2.22	52.85	73.90	21.0	150	0	
Hori.	9848.000	PK	45.17	38.81	9.55	38.78	2.22	56.97	73.90	16.9	150	0	
Vert.	2483.500	PK	47.45	27.79	14.30	36.79	2.22	54.97	73.90	18.9	135	93	
Vert.	4924.000	PK	43.46	31.38	6.65	37.05	2.22	46.66	73.90	27.2	141	37	
Vert.	7386.000	PK	43.23	36.95	8.54	37.92	2.22	53.02	73.90	20.8	150	0	
Vert.	9848.000	PK	45.24	38.81	9.55	38.78	2.22	57.04	73.90	16.8	150	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.87\text{ m} / 3.0\text{ m}) = 2.22\text{ dB}$

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	37.31	27.79	14.30	36.79	3.51	2.22	48.34	53.90	5.6	*1)
Hori.	4924.000	AV	33.64	31.38	6.65	37.05	3.51	2.22	40.35	53.90	13.5	
Hori.	7386.000	AV	34.30	36.95	8.54	37.92	3.51	2.22	47.60	53.90	6.3	
Hori.	9848.000	AV	35.62	38.81	9.55	38.78	3.51	2.22	50.93	53.90	3.0	Floor Noise
Vert.	2483.500	AV	36.74	27.79	14.30	36.79	3.51	2.22	47.77	53.90	6.1	*1)
Vert.	4924.000	AV	33.14	31.38	6.65	37.05	3.51	2.22	39.85	53.90	14.0	
Vert.	7386.000	AV	34.10	36.95	8.54	37.92	3.51	2.22	47.40	53.90	6.5	
Vert.	9848.000	AV	35.82	38.81	9.55	38.78	3.51	2.22	51.13	53.90	2.8	Floor Noise

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.87\text{ m} / 3.0\text{ m}) = 2.22\text{ dB}$

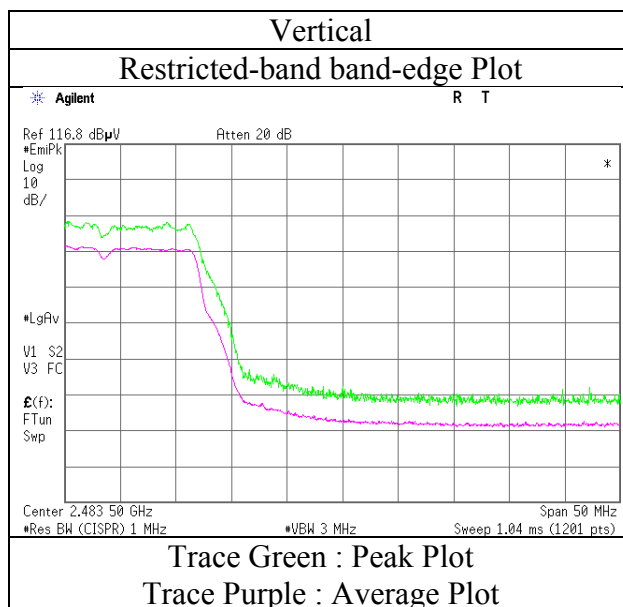
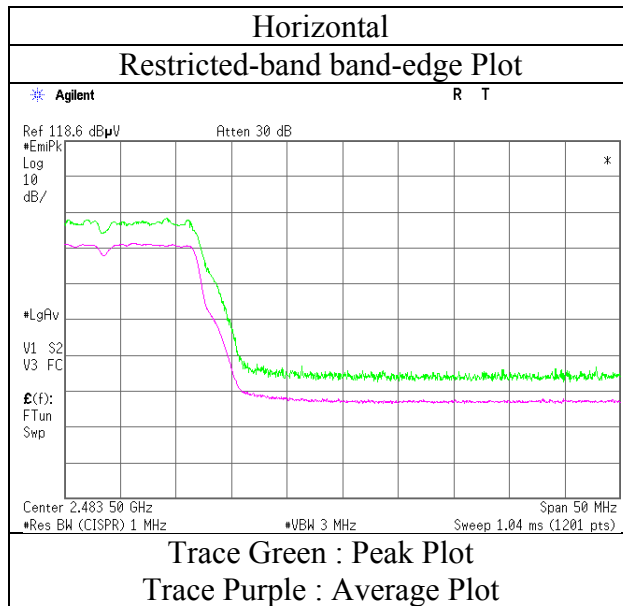
13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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)

Test place	3
Report No.	11691426S-C-R1
Date	May 31, 2017
Temperature / Humidity	23 deg. C / 48 % RH
Engineer	Makoto Hosaka (1 GHz -13 GHz)
Mode	Tx 11g 2462 MHz



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

UL Japan, Inc.

Shonan

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Facsimile : +81 463 50 6401

Radiated Spurious Emission

Test place (AC No.) 3 1
Report No. 11691426S-C-R1
Date May 31, 2017 June 1, 2017
Temperature / Humidity 23 deg. C / 48 % RH 25 deg. C / 51 % RH
Engineer Makoto Hosaka Makoto Hosaka
(1 GHz -13 GHz) (13 GHz -26.5 GHz)
Mode Tx 11n-20 2412 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	49.99	27.41	14.20	36.83	2.22	56.99	73.90	16.9	188	42	Floor Noise
Hori.	4824.000	PK	42.97	31.17	6.61	37.00	2.22	45.97	73.90	27.9	156	7	
Hori.	7236.000	PK	44.39	36.52	8.36	37.83	2.22	53.66	73.90	20.2	150	0	
Hori.	9648.000	PK	44.95	38.66	9.38	38.53	2.22	56.68	73.90	17.2	150	0	
Vert.	2390.000	PK	48.65	27.41	14.20	36.83	2.22	55.65	73.90	18.2	139	94	
Vert.	4824.000	PK	43.45	31.17	6.61	37.00	2.22	46.45	73.90	27.4	131	24	
Vert.	7236.000	PK	44.13	36.52	8.36	37.83	2.22	53.40	73.90	20.5	150	0	
Vert.	9648.000	PK	44.79	38.66	9.38	38.53	2.22	56.52	73.90	17.3	150	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.87\text{ m} / 3.0\text{ m}) = 2.22\text{ dB}$

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	39.43	27.41	14.20	36.83	2.71	2.22	49.14	53.90	4.8	*1)
Hori.	4824.000	AV	33.19	31.17	6.61	37.00	2.71	2.22	38.90	53.90	15.0	Floor Noise
Hori.	7236.000	AV	35.14	36.52	8.36	37.83	2.71	2.22	47.12	53.90	6.8	
Hori.	9648.000	AV	36.17	38.66	9.38	38.53	2.71	2.22	50.61	53.90	3.3	
Vert.	2390.000	AV	36.63	27.41	14.20	36.83	2.71	2.22	46.34	53.90	7.6	
Vert.	4824.000	AV	33.25	31.17	6.61	37.00	2.71	2.22	38.96	53.90	14.9	
Vert.	7236.000	AV	35.20	36.52	8.36	37.83	2.71	2.22	47.18	53.90	6.7	
Vert.	9648.000	AV	36.41	38.66	9.38	38.53	2.71	2.22	50.85	53.90	3.0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.87\text{ m} / 3.0\text{ m}) = 2.22\text{ dB}$

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	88.46	27.50	14.22	36.82	2.22	95.58	-	-	Carrier
Hori.	2400.000	PK	48.29	27.45	14.21	36.83	2.22	55.34	75.58	20.2	Carrier
Vert.	2412.000	PK	86.82	27.50	14.22	36.82	2.22	93.94	-	-	
Vert.	2400.000	PK	45.32	27.45	14.21	36.83	2.22	52.37	73.94	21.6	

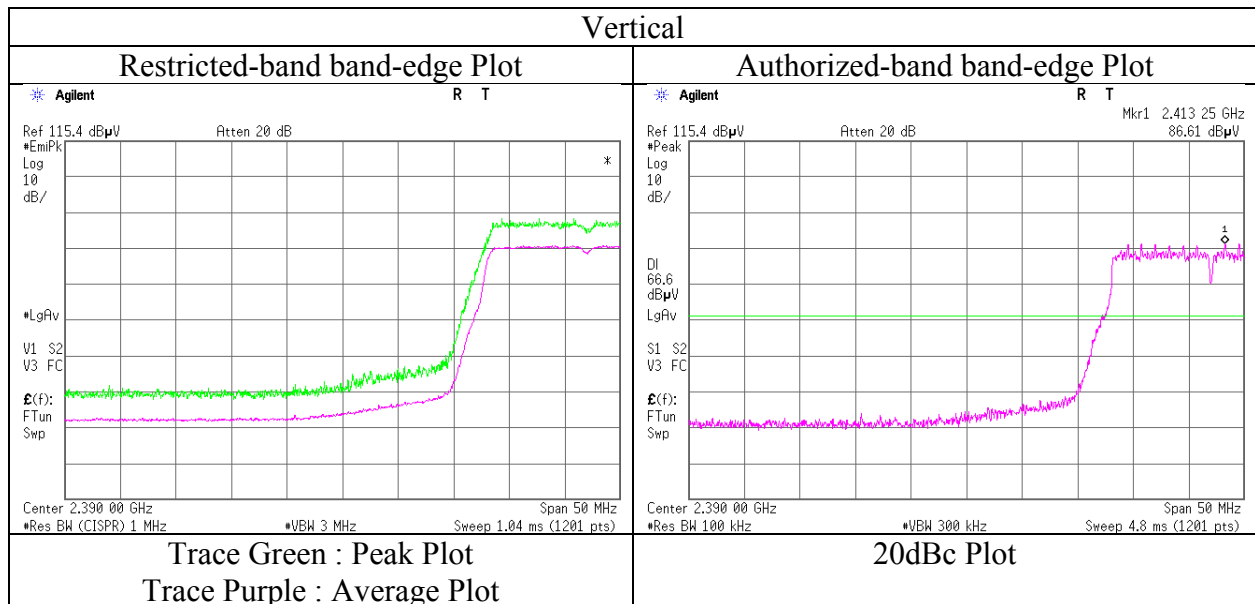
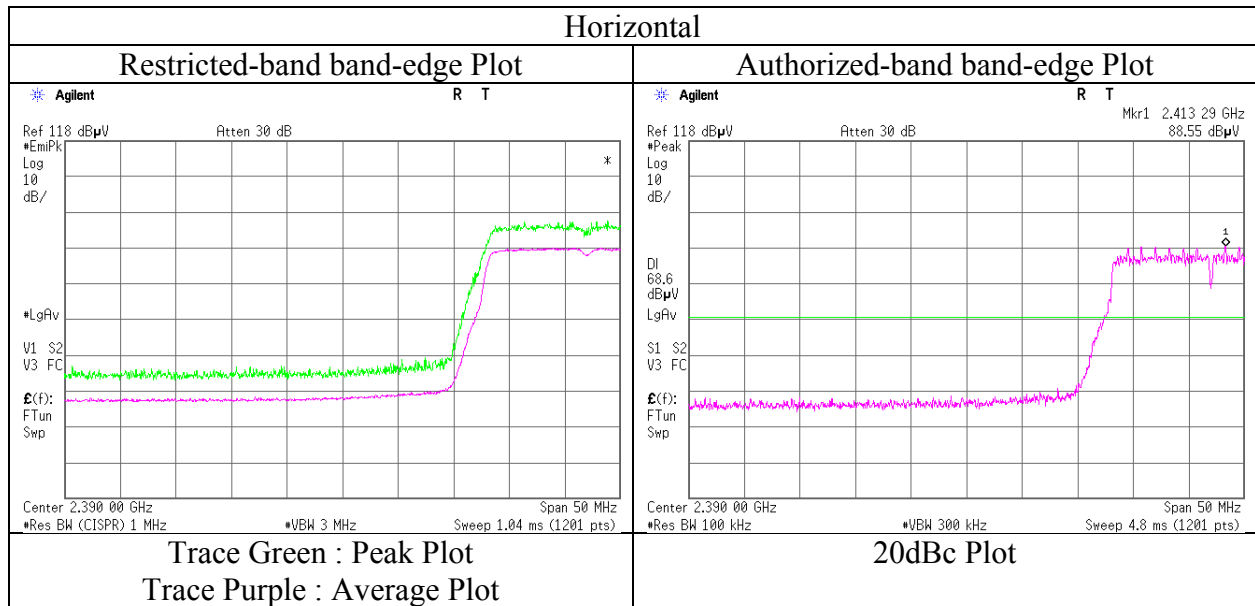
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.87\text{ m} / 3.0\text{ m}) = 2.22\text{ dB}$

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

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	3
Report No.	11691426S-C-R1
Date	May 31, 2017
Temperature / Humidity	23 deg. C / 48 % RH
Engineer	Makoto Hosaka (1 GHz -13 GHz)
Mode	Tx 11n-20 2412 MHz



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

UL Japan, Inc.

Shonan

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Radiated Spurious Emission

Test place (AC No.) 3 1
Report No. 11691426S-C-R1
Date May 31, 2017 June 1, 2017
Temperature / Humidity 23 deg. C / 48 % RH 25 deg. C / 51 % RH
Engineer Makoto Hosaka Makoto Hosaka
(1 GHz -13 GHz) (13 GHz -26.5 GHz)
Mode Tx 11n-20 2437 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4874.000	PK	42.68	31.28	6.62	37.03	2.22	45.77	73.90	28.1	155	16	
Hori.	7311.000	PK	43.31	36.74	8.46	37.87	2.22	52.86	73.90	21.0	150	0	
Hori.	9748.000	PK	44.41	38.74	9.45	38.65	2.22	56.17	73.90	17.7	150	0	Floor Noise
Vert.	4874.000	PK	42.39	31.28	6.62	37.03	2.22	45.48	73.90	28.4	129	21	
Vert.	7311.000	PK	43.13	36.74	8.46	37.87	2.22	52.68	73.90	21.2	150	0	
Vert.	9748.000	PK	44.37	38.74	9.45	38.65	2.22	56.13	73.90	17.7	150	0	Floor Noise

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.87\text{ m} / 3.0\text{ m}) = 2.22\text{ dB}$

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	33.47	31.28	6.62	37.03	2.71	2.22	39.27	53.90	14.6	
Hori.	7311.000	AV	34.89	36.74	8.46	37.87	2.71	2.22	47.15	53.90	6.7	
Hori.	9748.000	AV	35.99	38.74	9.45	38.65	2.71	2.22	50.46	53.90	3.4	Floor Noise
Vert.	4874.000	AV	33.48	31.28	6.62	37.03	2.71	2.22	39.28	53.90	14.6	
Vert.	7311.000	AV	34.74	36.74	8.46	37.87	2.71	2.22	47.00	53.90	6.9	
Vert.	9748.000	AV	35.82	38.74	9.45	38.65	2.71	2.22	50.29	53.90	3.6	Floor Noise

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.87\text{ m} / 3.0\text{ m}) = 2.22\text{ dB}$

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

Test place (AC No.)	3	1
Report No.	11691426S-C-R1	
Date	May 31, 2017	June 1, 2017
Temperature / Humidity	23 deg. C / 48 % RH	25 deg. C / 51 % RH
Engineer	Makoto Hosaka	Makoto Hosaka
	(1 GHz -13 GHz)	(13 GHz -26.5 GHz)
Mode	Tx 11n-20 2462 MHz	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	46.89	27.79	14.30	36.79	2.22	54.41	73.90	19.4	187	41	Floor Noise
Hori.	4924.000	PK	43.61	31.38	6.65	37.05	2.22	46.81	73.90	27.0	151	19	
Hori.	7386.000	PK	44.33	36.95	8.54	37.92	2.22	54.12	73.90	19.7	150	0	
Hori.	9848.000	PK	46.03	38.81	9.55	38.78	2.22	57.83	73.90	16.0	150	0	
Vert.	2483.500	PK	46.01	27.79	14.30	36.79	2.22	53.53	73.90	20.3	132	95	
Vert.	4924.000	PK	43.52	31.38	6.65	37.05	2.22	46.72	73.90	27.1	135	22	
Vert.	7386.000	PK	44.18	36.95	8.54	37.92	2.22	53.97	73.90	19.9	150	0	Floor Noise
Vert.	9848.000	PK	45.71	38.81	9.55	38.78	2.22	57.51	73.90	16.3	150	0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.87\text{ m} / 3.0\text{ m}) = 2.22\text{ dB}$

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	36.84	27.79	14.30	36.79	2.71	2.22	47.07	53.90	6.8	*1)
Hori.	4924.000	AV	33.75	31.38	6.65	37.05	2.71	2.22	39.66	53.90	14.2	
Hori.	7386.000	AV	34.60	36.95	8.54	37.92	2.71	2.22	47.10	53.90	6.8	
Hori.	9848.000	AV	35.83	38.81	9.55	38.78	2.71	2.22	50.34	53.90	3.6	Floor Noise
Vert.	2483.500	AV	35.92	27.79	14.30	36.79	2.71	2.22	46.15	53.90	7.7	*1)
Vert.	4924.000	AV	33.61	31.38	6.65	37.05	2.71	2.22	39.52	53.90	14.4	
Vert.	7386.000	AV	34.09	36.95	8.54	37.92	2.71	2.22	46.59	53.90	7.3	
Vert.	9848.000	AV	35.52	38.81	9.55	38.78	2.71	2.22	50.03	53.90	3.9	Floor Noise

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.87\text{ m} / 3.0\text{ m}) = 2.22\text{ dB}$

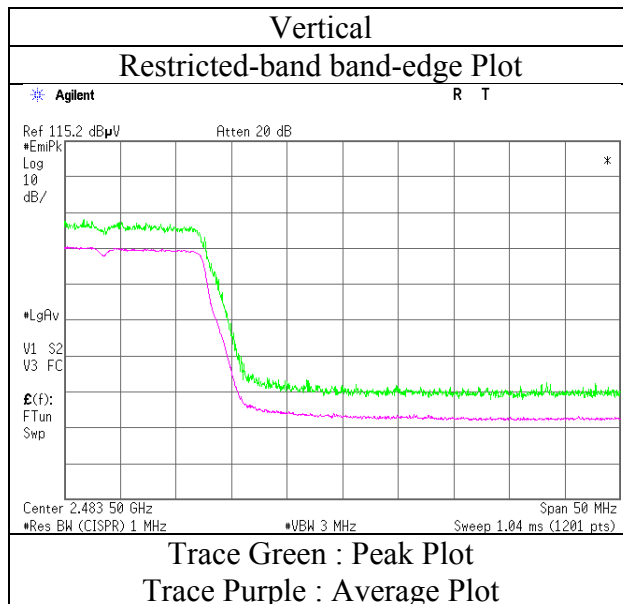
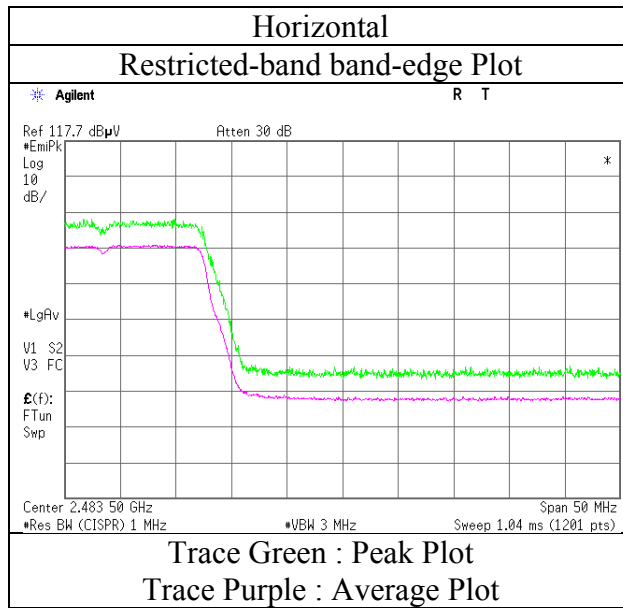
13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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)

Test place	3
Report No.	11691426S-C-R1
Date	May 31, 2017
Temperature / Humidity	23 deg. C / 48 % RH
Engineer	Makoto Hosaka (1 GHz -13 GHz)
Mode	Tx 11n-20 2462 MHz



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

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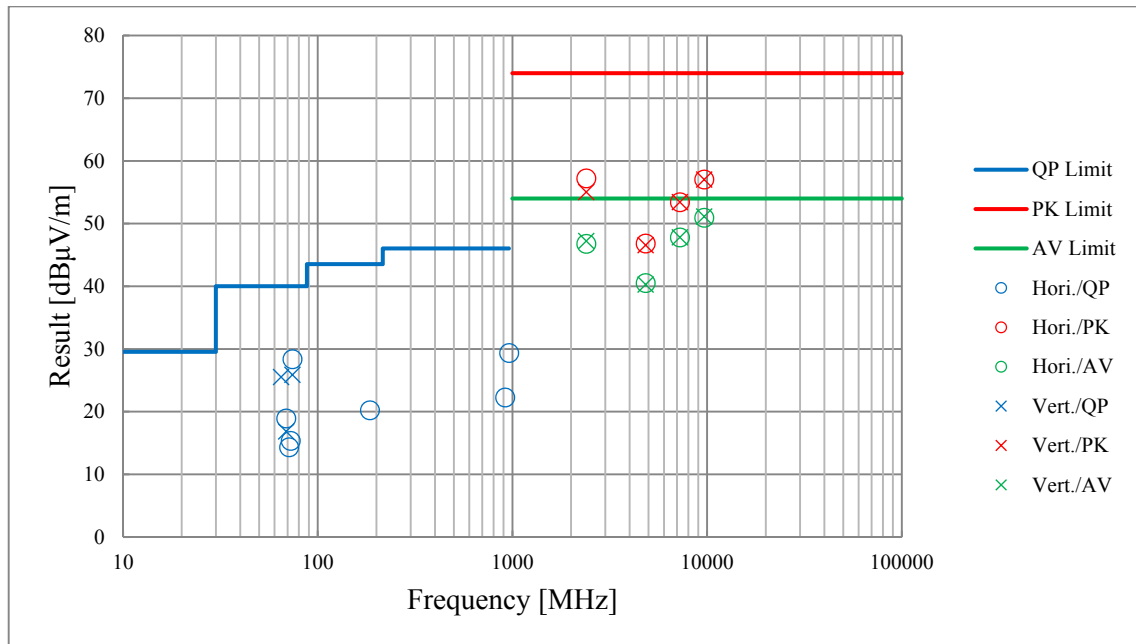
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Facsimile : +81 463 50 6401

Radiated Spurious Emission **(Plot data, Worst case)**

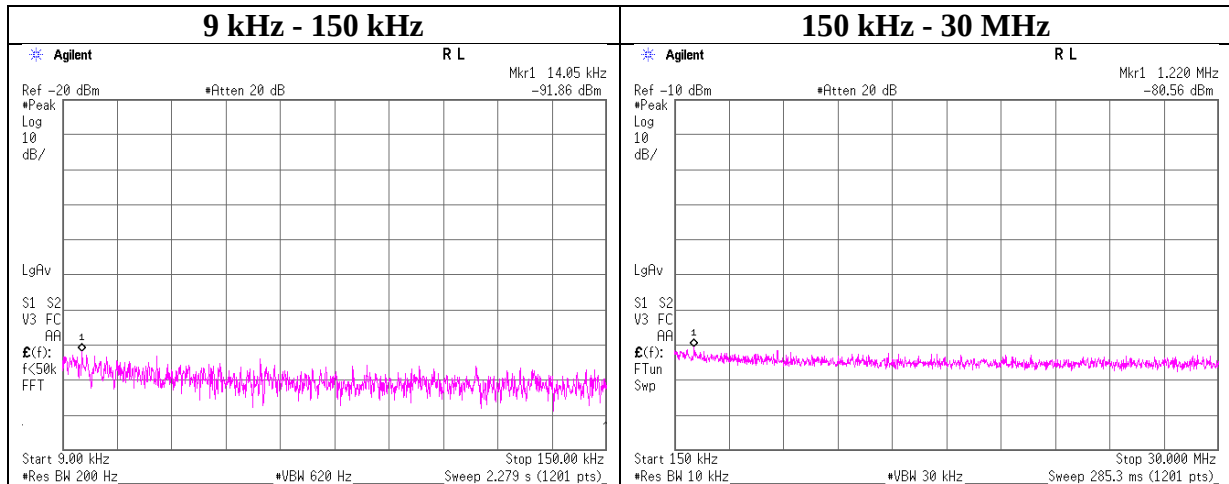
Test place (AC No.)	2	3	1
Report No.	11691426S-C-R1		
Date	June 5, 2017	May 31, 2017	June 1, 2017
Temperature / Humidity	23 deg. C / 39 % RH	23 deg. C / 48 % RH	25 deg. C / 51 % RH
Engineer	Yasumasa Owaki (30 MHz -1 GHz)	Makoto Hosaka (1 GHz -13 GHz)	Makoto Hosaka (13 GHz -26.5 GHz)
Mode	Tx 11g 2412 MHz		



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

Conducted Spurious Emission

Test place : Shonan No.5 Shielded Room
Report No. : 11691426S-C-R1
Date : June 1, 2017
Temperature / Humidity : 25 deg. C / 55 % RH
Engineer : Hiroyuki Morikawa
Mode : Tx 11g 2412 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
14.05	-91.9	0.01	9.5	2.9	1	-79.4	300	6.0	-18.1	44.6	62.7	
1220.00	-80.6	0.02	9.5	2.9	1	-68.1	30	6.0	13.2	25.8	12.6	

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

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

N: Number of output

Power Density

Test place Shonan No.5 Shielded Room
Report No. 11691426S-C-R1
Date June 1, 2017
Temperature / Humidity 25 deg. C / 55 % RH
Engineer Hiroyuki Morikawa
Mode Tx

11b

Freq.	Reading	Cable Loss	Atten. Loss	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-19.04	1.31	9.64	-8.09	8.00	16.09
2437.00	-18.53	1.31	9.64	-7.58	8.00	15.58
2462.00	-19.16	1.32	9.65	-8.19	8.00	16.19

11g

Freq.	Reading	Cable Loss	Atten. Loss	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-27.14	1.31	9.64	-16.19	8.00	24.19
2437.00	-27.06	1.31	9.64	-16.11	8.00	24.11
2462.00	-27.03	1.32	9.65	-16.06	8.00	24.06

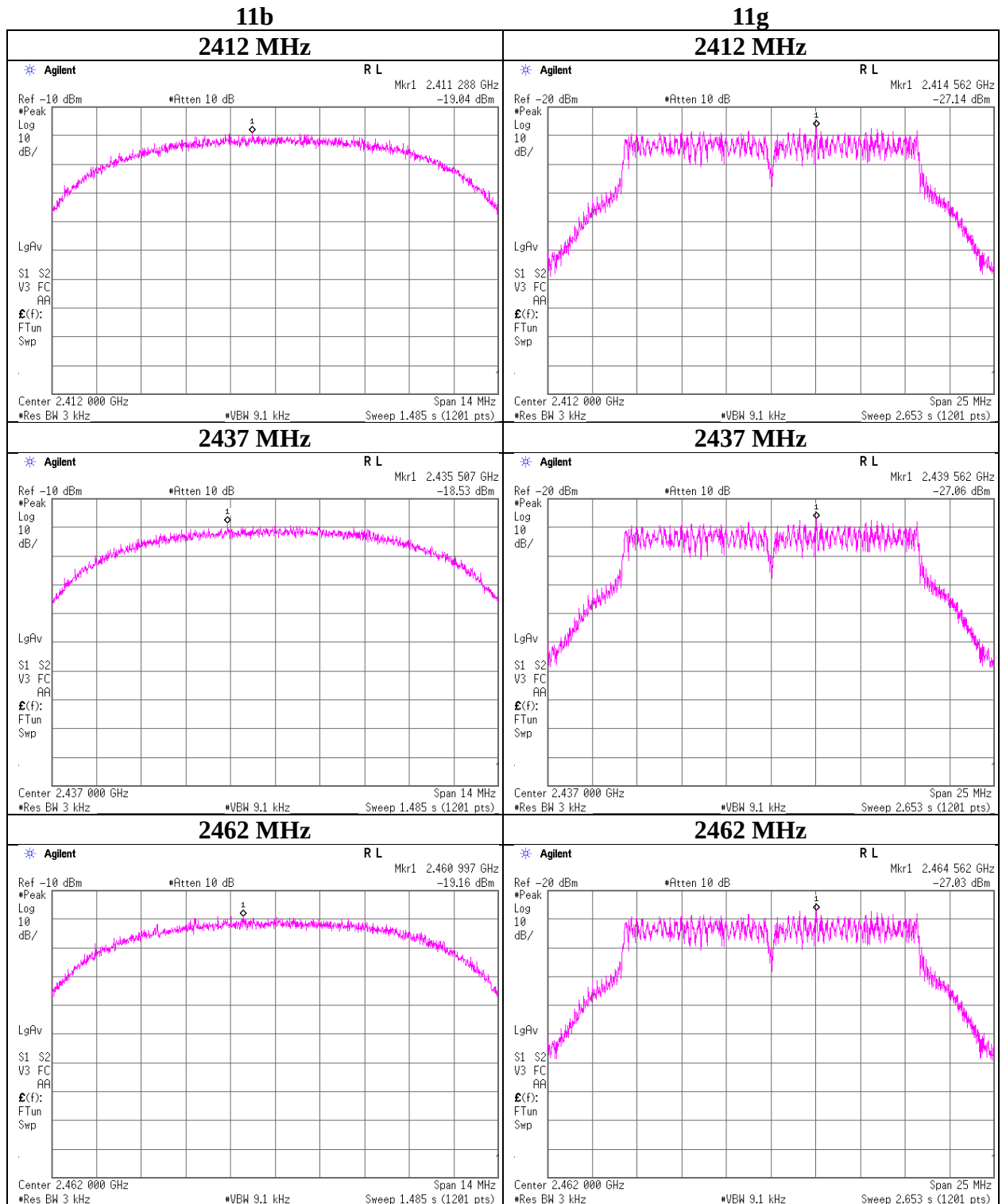
11n

Freq.	Reading	Cable Loss	Atten. Loss	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-27.35	1.31	9.64	-16.40	8.00	24.40
2437.00	-26.68	1.31	9.64	-15.73	8.00	23.73
2462.00	-25.94	1.32	9.65	-14.97	8.00	22.97

Sample Calculation:

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

Power Density



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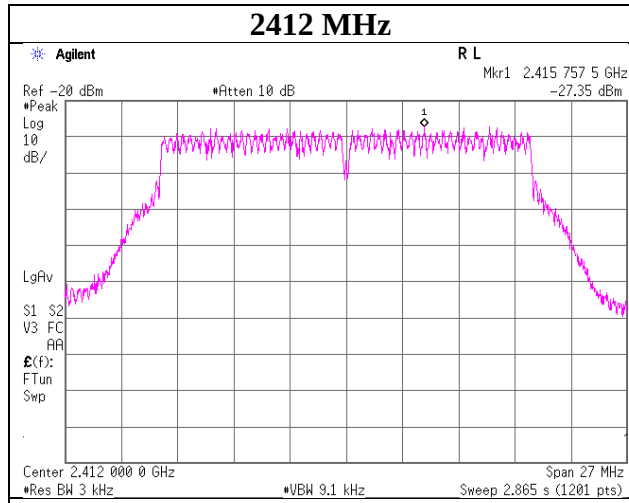
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

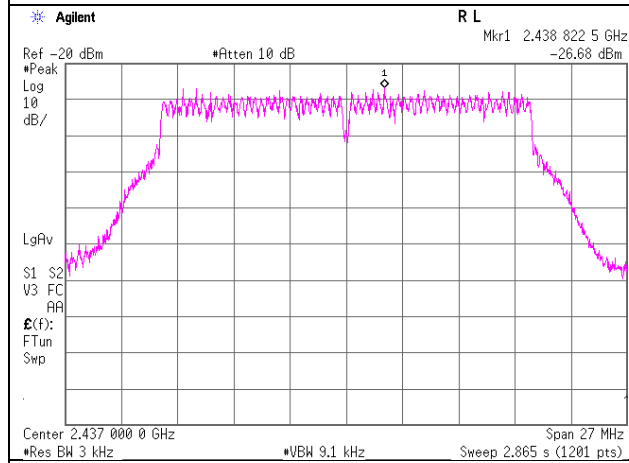
Power Density

11n-20

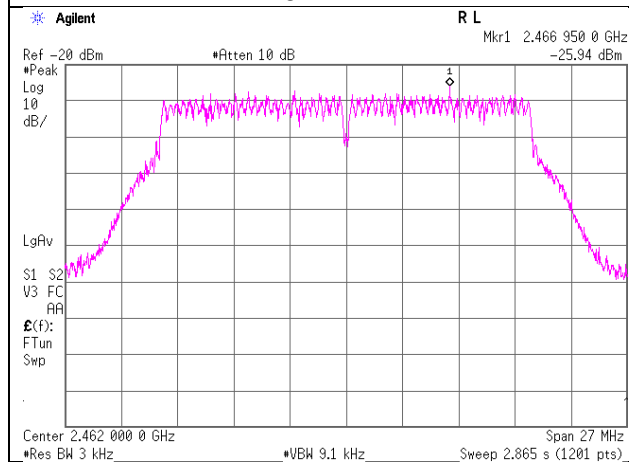
2412 MHz



2437 MHz



2462 MHz



UL Japan, Inc.

Shonan

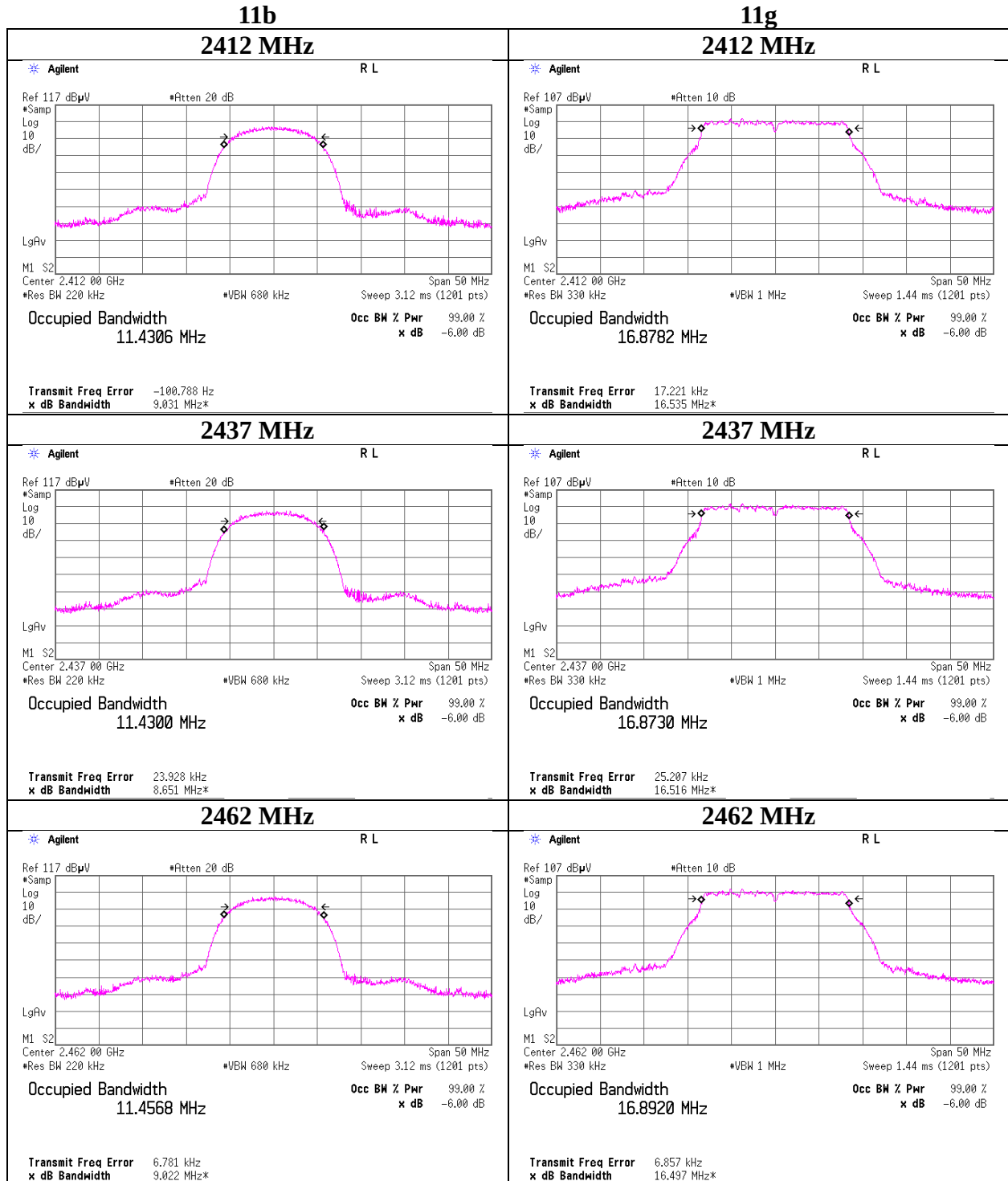
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Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

99% Occupied Bandwidth

Test place : Shonan No.5 Shielded Room
Report No. : 11691426S-C-R1
Date : June 1, 2017
Temperature / Humidity : 25 deg. C / 55 % RH
Engineer : Hiroyuki Morikawa
Mode : Tx



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Telephone : +81 463 50 6400

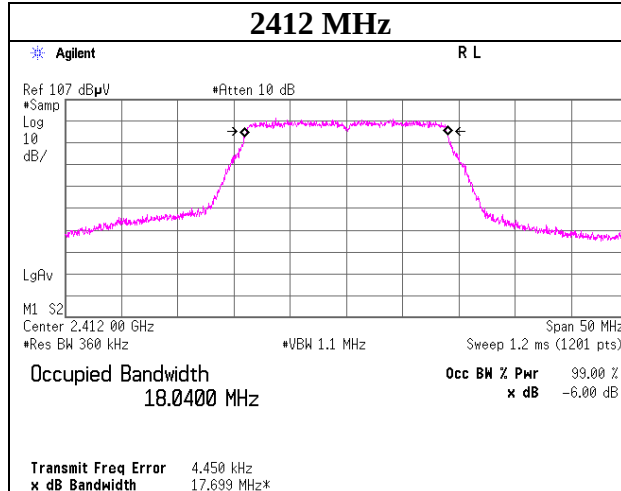
Facsimile : +81 463 50 6401

99% Occupied Bandwidth

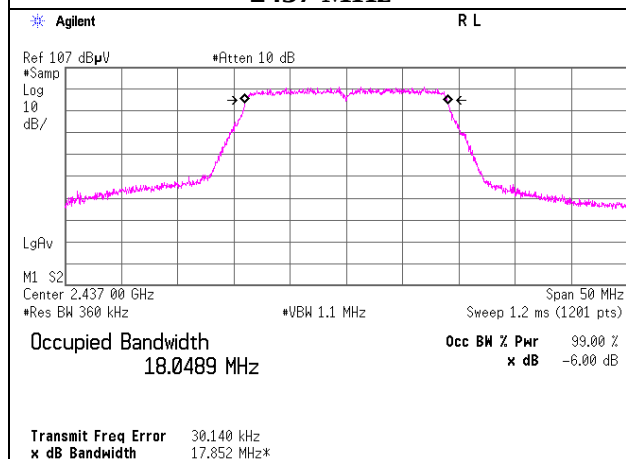
Test place Shonan No.5 Shielded Room
Report No. 11691426S-C-R1
Date June 1, 2017
Temperature / Humidity 25 deg. C / 55 % RH
Engineer Hiroyuki Morikawa
Mode Tx

11n-20

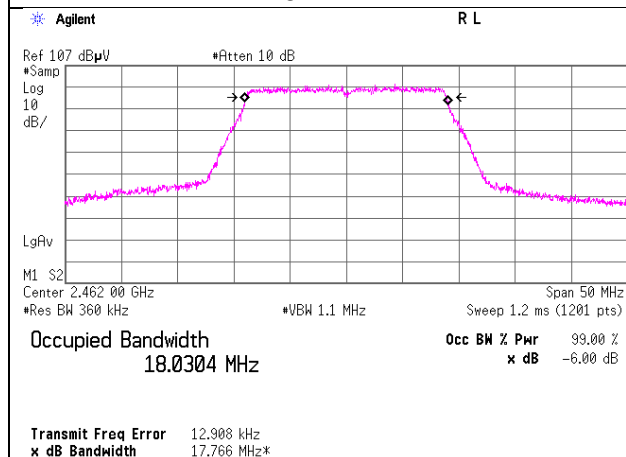
2412 MHz



2437 MHz



2462 MHz



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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	2016/11/04 * 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
SCC-G12	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	AT	2017/03/23 * 12
SAT10-13	Attenuator	Weinschel Corp.	54A-10	81626	AT	2017/03/23 * 12
KTS-08	Digital Tester	SANWA	PC500	7019224	AT	2017/03/08 * 12
SOS-13	Humidity Indicator	Custom	CTH-202	Q.C.17	AT	2016/12/13 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2016/07/15 * 12
SAF-05	Pre Amplifier	TOYO Corporation	TPA0118-36	1440490	RE	2017/02/17 * 12
SCC-G06	Coaxial Cable	Junkosha	J12J102207-00	MAY-23-16- 091	RE	2016/06/14 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2017/05/08 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2016/08/22 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2016/10/12 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2017/03/07 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE ,CE,RFI,MF)	-	RE	-
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE	2016/10/17 * 12
SCC-G40	Coaxial Cable	Junkosha	MWX221-0100 0NFSNMS/B	1612S005	RE	2017/01/08 * 12
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2016/11/07 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2016/11/29 * 12
SAEC-03(SVSW R)	Semi-Anechoic Chamber	TDK	SAEC-03(SVS WR)	3	RE	2016/07/25 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	AT	2016/10/11 * 12
STS-05	Digital Hitester	Hioki	3805-50	080997828	AT	2016/10/17 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2016/12/13 * 12
SCC-G41	Coaxial Cable	Junkosha	MWX221-0100 0NFSNMS/B	1612S006	RE	2017/01/08 * 12
SAEC-01(NSA)	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2016/07/14 * 12
SAF-04	Pre Amplifier	TOYO Corporation	TPA0118-36	1440489	RE	2017/03/17 * 12
SHA-01	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-725	RE	2016/08/09 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2016/10/12 * 12
KJM-09	Measure	KOMELON	KMC-36	-	RE	-
STS-01	Digital Hitester	Hioki	3805-50	080997812	RE	2016/10/17 * 12
SAF-09	Pre Amplifier	TOYO Corporation	HAP18-26W	00000018	RE	2016/09/27 * 12
SHA-05	Horn Antenna	ETS LINDGREN	3160-09	LM4210	RE	2017/03/15 * 12
SCC-G19	Coaxial Cable	Suhner	SUCOFLEX 102A	1188/2A	RE	2017/03/23 * 12
SCC-G33	Coaxial Cable	Junkosha	MWX241-0100 0KMSKMS	-	RE	2017/04/20 * 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

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Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAF-02	Pre Amplifier	SONOMA	310N	290212	RE	2017/02/09 * 12
SAT6-02	Attenuator	JFW	50HF-006N	-	RE	2017/02/09 * 12
KAT3-10	Attenuator	JFW IND. INC.	50HF-003N	-	RE	2016/07/26 * 12
SBA-02	Biconical Antenna	Schwarzbeck	BBA9106	91032665	RE	2016/11/23 * 12
SCC-B1/B3/B5/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/T OYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(R F Selector)	RE	2017/04/07 * 12
SCC-B2/B4/B6/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/T OYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(R F 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	2016/10/12 * 12
STR-07	Test Receiver	Rohde & Schwarz	ESU26	100484	RE	2016/09/28 * 12
SJM-09	Measure	PROMART	SEN1935	-	RE	-
SAEC-02(NSA)	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	RE	2016/07/13 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE	-
STS-02	Digital Hitester	Hioki	3805-50	080997819	RE	2017/03/08 * 12

The expiration date of the calibration is the end of the expired month.

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

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

Test Item: RE: Radiated Emission test