RADIO TEST REPORT

Test Report No. : 11925091S-A-R1

Applicant	:	**Fujifilm Corporation**
Type of Equipment	:	**DIGITAL CAMERA**
Model No.	:	**FF170001**
FCC ID	:	**W2Z-02000004**
Test regulation	:	**FCC Part 15 Subpart C: 2017**
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 11925091S-A.

Date of test: August 11 to September 6, 2017

Representative test engineer:
Yosuke Ishikawa
Engineer
Consumer Technology Division

Approved by:
Akio Hayashi
Leader
Consumer Technology Division

RTL02610

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

REVISION HISTORY

Original Test Report No.: 11925091S-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	11925091S-A	August 31, 2017	-	-
1	11925091S-A-R1	September 7, 2017	5, 6, 10, 15 - 17, 60, 61	Update the title of Test Specification, Correction of worst margin, Update the comment of power source, Correction of configuration and peripherals, Replace of conducted emission test data, Correction of test equipment, Replace of photographs.

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SECTION 1: Customer information

Company Name	:	Fujifilm Corporation
Address	:	9-7-3 Akasaka Minato-ku, Tokyo, 107-0052 Japan
Telephone Number	:	+81-3-6271-1654
Facsimile Number	:	+81-3-6271-1189
Contact Person	:	Takao Ozaki

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

2.1 Identification of E.U.T.

Type of Equipment	:	DIGITAL CAMERA
Model No.	:	FF170001
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 7.2 V (Battery)
Receipt Date of Sample	:	August 11, 2017
Country of Mass-production	:	China
Condition of EUT	:	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No Modification by the test lab

2.2 Product Description

Model: FF170001 (referred to as the EUT in this report) is a DIGITAL CAMERA.

Radio Specification

[Wireless LAN Part]

Radio Type	:	Transceiver
Frequency of Operation	:	2412 MHz - 2462 MHz
Modulation	:	DBPSK, DQPSK, CCK, OFDM
Power Supply (radio part input)	:	DC 3.3 V
Antenna type	:	PCB
Antenna Gain	:	-4.14 dBi
Clock frequency	:	26 MHz

[Bluetooth Low Energy Part]

Radio Type	:	Transceiver
Frequency of Operation	:	2402 MHz - 2480 MHz
Modulation	:	GFSK
Power Supply (radio part input)	:	DC 3.6 V
Antenna type	:	Chip Antenna
Antenna Gain	:	3.68 dBi
Clock frequency (Maximum)	:	37.4 MHz

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C FCC Part 15 final revised on September 1, 2017 and effective October 2, 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 September 1, 2017, does not affect the test specification applied to the EUT.

* Also the EUT complies with FCC Part 15 Subpart B / ICES-003 Issue 6: 2016.

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	11.0 dB 15.38392 MHz, AV, L1 Tx BLE 2480 MHz	Complied	-
6dB Bandwidth	**FCC:** KDB 558074 D01 DTS Meas Guidance v04 **IC:** -	**FCC:** Section 15.247(a)(2) **IC:** RSS-247 5.2(a)	See data.	Complied	Conducted
Maximum Peak Output Power	**FCC:** KDB 558074 D01 DTS Meas Guidance v04 **IC:** RSS-Gen 6.12	**FCC:** Section 15.247(b)(3) **IC:** RSS-247 5.4(d)		Complied	Conducted
Power Density	**FCC:** KDB 558074 D01 DTS Meas Guidance v04 **IC:** -	**FCC:** Section 15.247(e) **IC:** RSS-247 5.2(b)		Complied	Conducted
Spurious Emission Restricted Band Edges	**FCC:** KDB 558074 D01 DTS Meas Guidance v04 **IC:** RSS-Gen 6.13	**FCC:** Section15.247(d) **IC:** RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	3.0 dB 71.589 MHz, QP, Hori. Tx 11n-20 2412 MHz	Complied	Conducted (below 30 MHz)/ Radiated (above 30 MHz) *1)

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.
*1) 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 and DC 3.6 V) constantly to RF Module regardless of input voltage. When the EUT is a battery-operated, the test was performed with the full-charged battery and the stable voltage was supplied to the EUT during the tests.
Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

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

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	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 %

Conducted Emission test

The data listed in this test report has enough margin, more than the site margin.

Radiated emission test

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

3.5 Test Location

UL Japan, Inc. Shonan EMC Lab.
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Telephone: +81 463 50 6400, Facsimile: +81 463 50 6401
JAB Accreditation No. RTL02610

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

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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

4.1 Operating Mode(s)

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

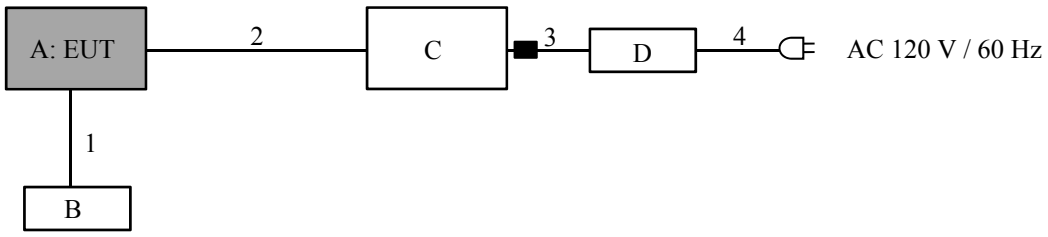
Mode	Remarks*
IEEE 802.11b (11b)	2 Mbps, PN9
IEEE 802.11g (11g)	54 Mbps, PN9
IEEE 802.11n-20 (11n-20)	MCS 2, PN9
Bluetooth Low Energy	PRBS9
*The worst condition was determined based on the test result of Maximum Peak Output Power and Pre-test of Radiated Emission (Low Channel).	
*Power of the EUT was set by the software as follows; (IEEE 802.11b / 11g / 11n) Power settings: Fixed Software: HyperFFW main application Ver. 1. 9. 1. 1 (Bluetooth Low Energy) Power settings: Fixed Software: HyperFFW main application Ver. 2. 0. 0. 1 *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)

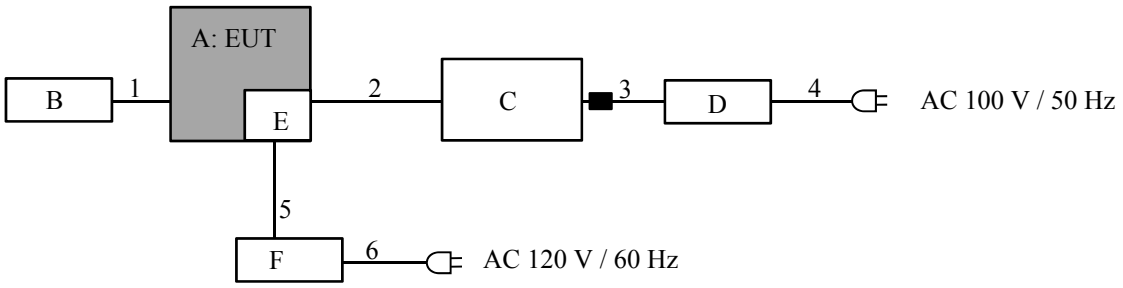
Test Item	Operating Mode	Tested frequency
Conducted Emission	11n-20 Tx	2412 MHz
	BT LE Tx	2402 MHz 2440 MHz 2480 MHz
Spurious Emission	11b Tx 11g Tx 11n-20 Tx	2412 MHz 2437 MHz 2462 MHz
	BT LE Tx	2402 MHz 2440 MHz 2480 MHz
6dB Bandwidth Maximum Peak Output Power Power Density 99% Occupied Bandwidth	11b Tx 11g Tx 11n-20 Tx	2412 MHz 2437 MHz 2462 MHz
	BT LE	2402 MHz 2440 MHz 2480 MHz

4.2 Configuration and peripherals

[Radiated Emission test and Antenna Terminal conducted test]



[Conducted Emission test]



■ : Standard Ferrite Core

* 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	Digital Camera	FF170001	RJSV0130 *1) P2000102 *2)	FUJIFILM Corporation	EUT
B	Remote Controller	TWIN1 R3-UT	-	SECULINE Co., Ltd.	
C	Lap Top Computer	7666-77J	LV-B8PZ8 08/05	Lenovo	-
D	AC Adapter	92P1213	11S92P1213Z1ZDDZ92C2B0	Lenovo	-
E	DC Coupler	CP-W126	22	FUJIFILM Corporation	-
F	AC Power Adapter	AC-9V	120502872	FUJIFILM Corporation	-

*1) Used for Conducted Emission test and Radiated Emission test
*2) Used for Antenna Terminal conducted test

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Remote Control	1.0	Shielded	Shielded	-
2	USB	2.0	Shielded	Shielded	*1)
3	DC	1.8	Unshielded	Unshielded	-
4	AC	1.0	Unshielded	Unshielded	-
5	DC	1.8	Unshielded	Unshielded	-
6	AC	1.5	Unshielded	Unshielded	-

*1) Although the EUT has a HDMI port, the test was applied without HDMI since the EUT cannot connect simultaneously USB and HDMI due to specification and physical condition of the EUT. The USB cable was selected due to pre-test.

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane. The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80 cm from a Line Impedance Stabilization Network (LISN) / Artificial mains Network (AMN) and excess AC cable was bundled in center.

I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a shielded room
The EUT was connected to a LISN (AMN).
An overview sweep with peak detection has been performed.

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

Detector	**: QP and CISPR AV**
Measurement range	**: 0.15 MHz – 30 MHz**
Test data	**: APPENDIX**
Test result	**: Pass**

SECTION 6: Radiated Spurious Emission

Test Procedure

It was measured based on "11.0 Emissions in non-restricted frequency bands" of "KDB 558074 D01 DTS Meas Guidance v04".

[For below 1 GHz]
EUT was placed on a platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]
EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane.
The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane.

The height of the measuring antenna varied between 1 and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.
The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.
The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).
The test was made with the detector (RBW/VBW) in the following table.
When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

Test Antennas are used as below;

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

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

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

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV *1)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	Average Power Method: 12.2.5.2 RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (Linear voltage) Trace: 100 traces Duty factor was added to the results.	RBW: 100 kHz VBW: 300 kHz
Test Distance	3 m	3.94 m *2) (1 GHz – 13 GHz), 1 m *3) (13 GHz – 26.5 GHz)		3.94 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 x log (3.94 m / 3.0 m) = 2.37 dB
*3) Distance Factor: 20 x log (1.0 m / 3.0 m) = -9.5 dB

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

(Wireless LAN)

Frequency / Antenna polarization	Carrier *4)	Spurious				
		30 MHz - 200 MHz	200 MHz - 1000 MHz	1 GHz - 2.8 GHz	2.8 GHz - 13 GHz	13 GHz - 26 GHz
Horizontal	Y	Z	Z	Y	Y	X
Vertical	X	Y	Z	X	X	X

(Bluetooth Low Energy)

Frequency / Antenna polarization	Carrier *4)	Spurious			
		Below 1 GHz	1 GHz - 2.8 GHz	2.8 GHz - 13 GHz	13-26 GHz
Horizontal	Y	Z	Y	Y	X
Vertical	X	Z	X	X	X

*4) with spurious emissions near carrier frequency.

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 7: 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 or 10 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth *1)	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Sample	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak/ Average *2)	-	Power Meter (Sensor: 50 MHz BW)
Peak Power Density	1.5 times the 6dB Bandwidth	3 kHz	9.1 kHz	Auto	Peak	Max Hold	Spectrum Analyzer *3)
Conducted Spurious Emission *4)	9kHz to 150kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150kHz to 30MHz	10 kHz	30 kHz				

*1) Peak hold was applied as Worst-case measurement.
*2) Reference data
*3) Section 10.2 Method PKPSD (peak PSD) of "KDB 558074 D01 DTS Meas Guidance 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.

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

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.1 Shielded Room
Date : 2017/09/06

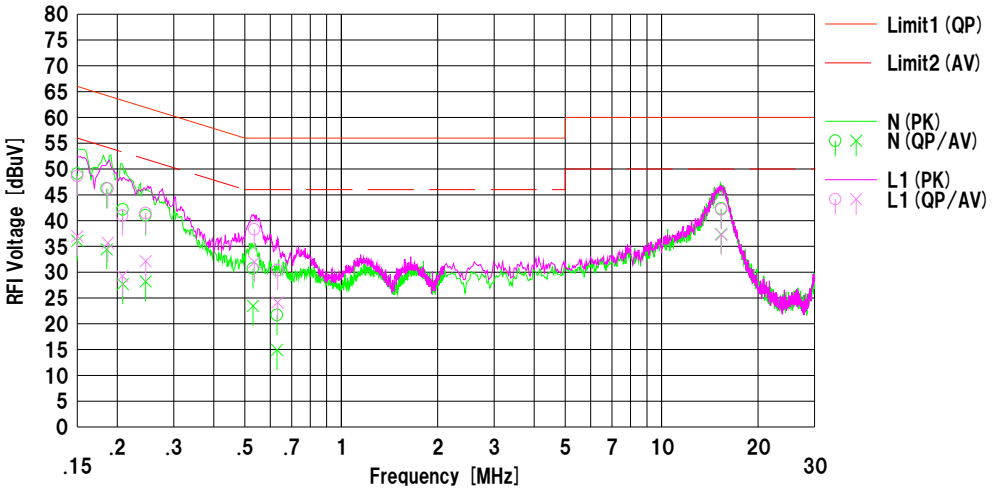
Mode : Tx_11n-20_2412 MHz

Power : AC 120 V / 60 Hz
Temp./Humi. : 27 deg.C. / 59 %RH

Remarks : -

Limit1 : FCC 15C(15.207) QP
Limit2 : FCC 15C(15.207) AV

Engineer : Hikaru Shirasawa



No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP>	<AV>		<QP>	<AV>	<QP>	<AV>	<QP>	<AV>		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	36.69	23.70	12.40	49.09	36.10	66.00	56.00	16.9	19.9	N	
2	0.18530	33.83	22.02	12.40	46.23	34.42	64.24	54.24	18.0	19.8	N	
3	0.20794	29.73	15.28	12.42	42.15	27.70	63.29	53.29	21.1	25.5	N	
4	0.24501	28.63	15.82	12.40	41.03	28.22	61.92	51.92	20.8	23.7	N	
5	0.52998	18.28	11.02	12.44	30.72	23.46	56.00	46.00	25.2	22.5	N	
6	0.63062	9.25	2.49	12.45	21.70	14.94	56.00	46.00	34.3	31.0	N	
7	15.33715	29.06	24.08	13.29	42.35	37.37	60.00	50.00	17.6	12.6	N	
8	0.15000	36.23	24.56	12.40	48.63	36.96	66.00	56.00	17.3	19.0	L1	
9	0.18673	33.77	23.29	12.40	46.17	35.69	64.18	54.18	18.0	18.4	L1	
10	0.20740	28.53	16.84	12.42	40.95	29.26	63.31	53.31	22.3	24.0	L1	
11	0.24525	29.06	19.73	12.40	41.46	32.13	61.92	51.92	20.4	19.7	L1	
12	0.53541	25.86	19.54	12.44	38.30	31.98	56.00	46.00	17.7	14.0	L1	
13	0.63266	17.93	11.68	12.45	30.38	24.13	56.00	46.00	25.6	21.8	L1	
14	15.35927	28.88	23.99	13.29	42.17	37.28	60.00	50.00	17.8	12.7	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable+ATT) [dB]
LISN:SLS-01

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.1 Shielded Room
Date : 2017/09/06

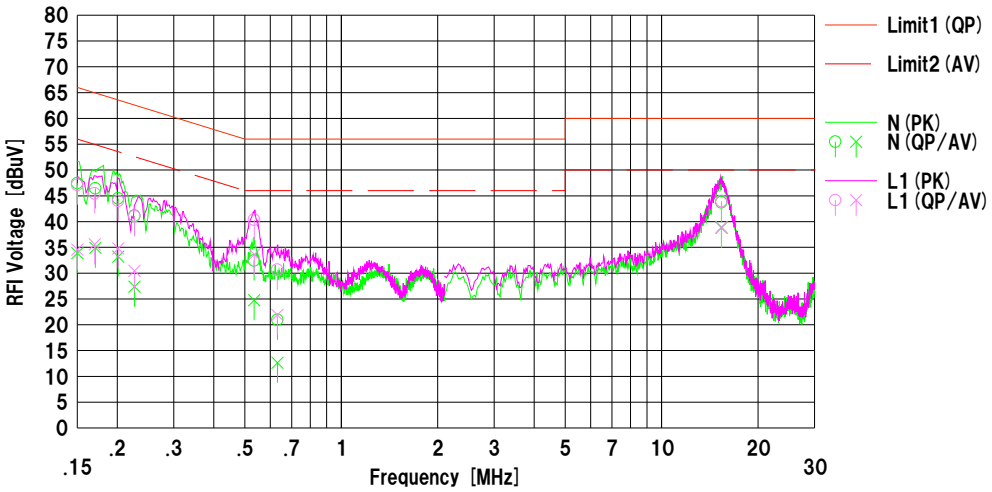
Mode : Tx_BLE_2480 MHz

Power : AC 120 V / 60 Hz
Temp./Humi. : 27 deg.C. / 59 %RH

Remarks : -

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Hikaru Shirasawa



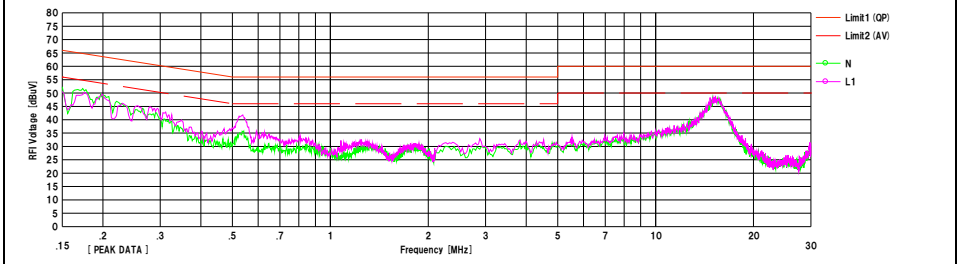
No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP>	<AV>		<QP>	<AV>	<QP>	<AV>	<QP>	<AV>		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	35.04	21.48	12.40	47.44	33.88	66.00	56.00	18.5	22.1	N	
2	0.17088	34.04	22.55	12.39	46.43	34.94	64.92	54.92	18.4	19.9	N	
3	0.20134	32.06	20.79	12.42	44.48	33.21	63.55	53.55	19.0	20.3	N	
4	0.22622	28.73	14.96	12.41	41.14	27.37	62.59	52.59	21.4	25.2	N	
5	0.53455	20.00	12.31	12.44	32.44	24.75	56.00	46.00	23.5	21.2	N	
6	0.63222	8.51	0.19	12.45	20.96	12.64	56.00	46.00	35.0	33.3	N	
7	15.37695	30.42	25.49	13.29	43.71	38.78	60.00	50.00	16.2	11.2	N	
8	0.15000	34.70	22.16	12.40	47.10	34.56	66.00	56.00	18.9	21.4	L1	
9	0.16996	33.07	23.19	12.39	45.46	35.58	64.96	54.96	19.5	19.3	L1	
10	0.20130	31.59	22.37	12.42	44.01	34.79	63.56	53.56	19.5	18.7	L1	
11	0.22629	28.62	18.06	12.41	41.03	30.47	62.58	52.58	21.5	22.1	L1	
12	0.53516	27.93	21.19	12.44	40.37	33.63	56.00	46.00	15.6	12.3	L1	
13	0.63181	18.21	9.46	12.45	30.66	21.91	56.00	46.00	25.3	24.0	L1	
14	15.38392	30.67	25.66	13.29	43.96	38.95	60.00	50.00	16.0	11.0	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable+ATT) [dB]
LISN:SLS-01

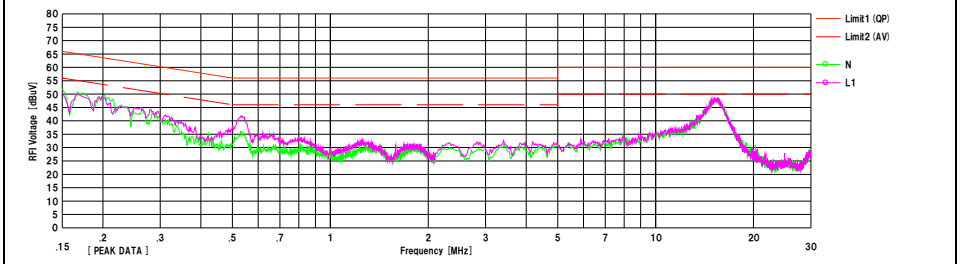
Conducted Emission

Test place	Shonan EMC Lab. No.1 Shielded room
Report No.	11925091S-A-R1
Date	September 6, 2017
Temperature / Humidity	27 deg. C / 59 % RH
Engineer	Hikaru Shirasawa
Mode	Tx BT LE

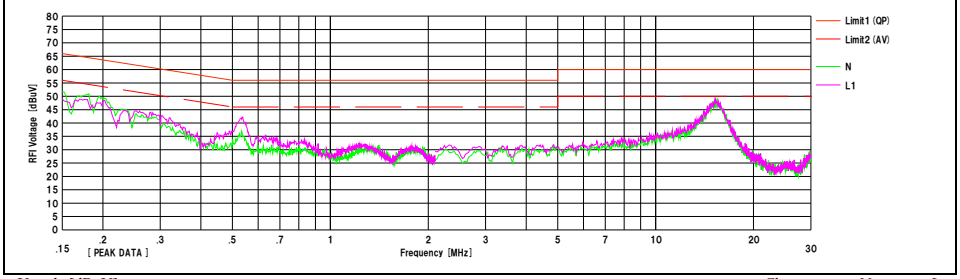
2402 MHz



2440 MHz



2480 MHz



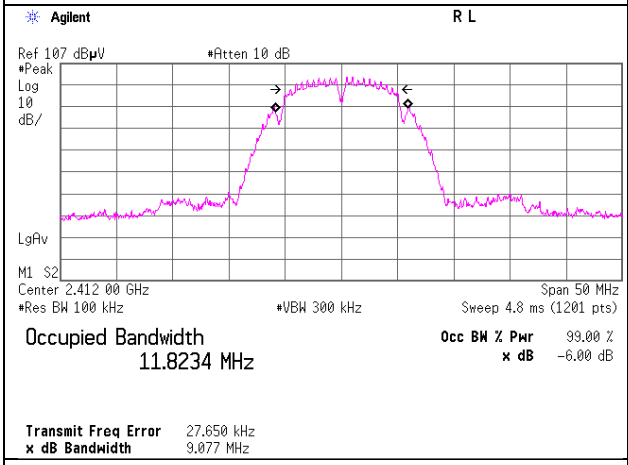
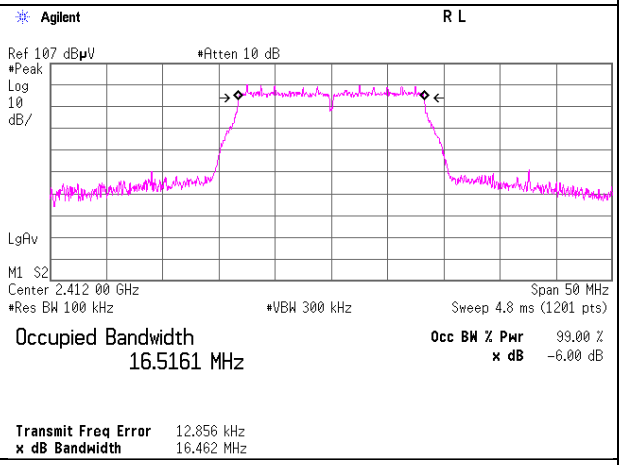
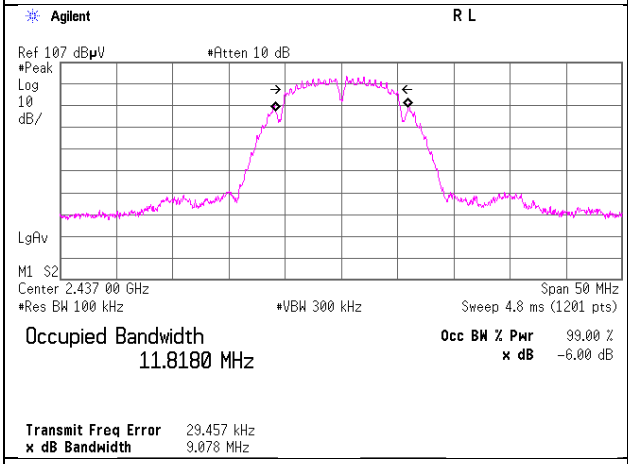
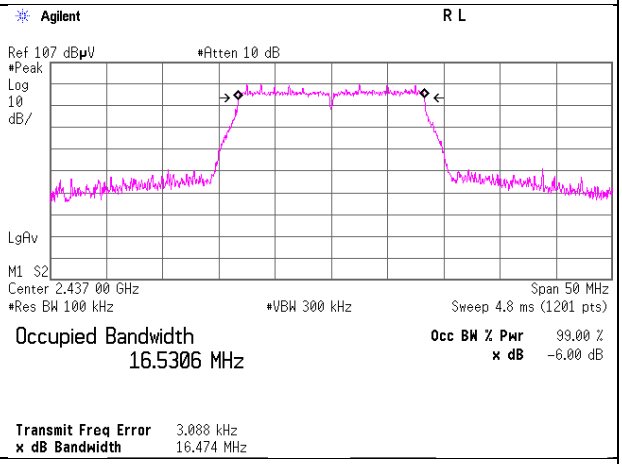
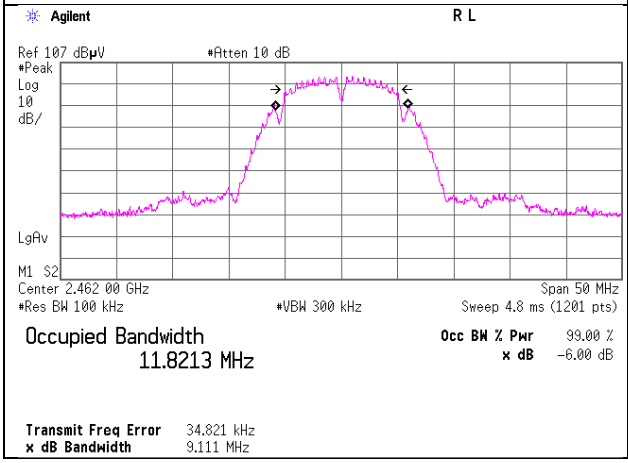
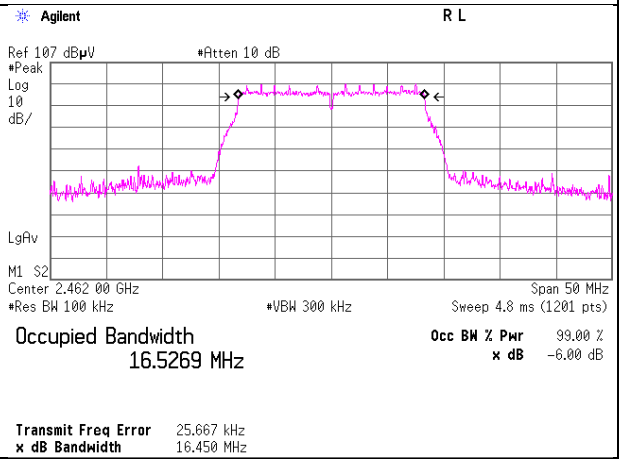
Y scale [dBuV] Chart N L

6dB Bandwidth

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11925091S-A-R1
Date	August 21, 2017
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Yosuke Ishikawa
Mode	Tx

Mode	Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
11b	2412	9.077	> 500
	2437	9.078	> 500
	2462	9.111	> 500
11g	2412	16.462	> 500
	2437	16.474	> 500
	2462	16.450	> 500
11n-20	2412	17.673	> 500
	2437	17.692	> 500
	2462	17.651	> 500
BLE	2402	1.921	> 500
	2440	1.933	> 500
	2480	1.934	> 500

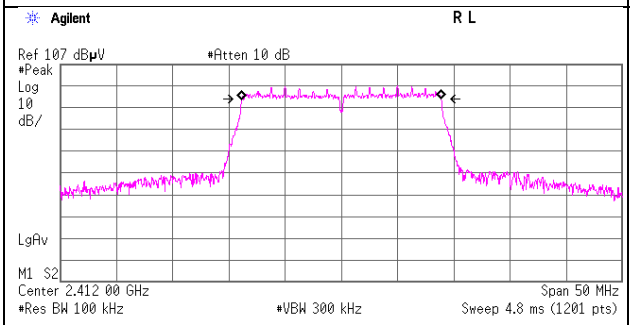
6dB Bandwidth

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

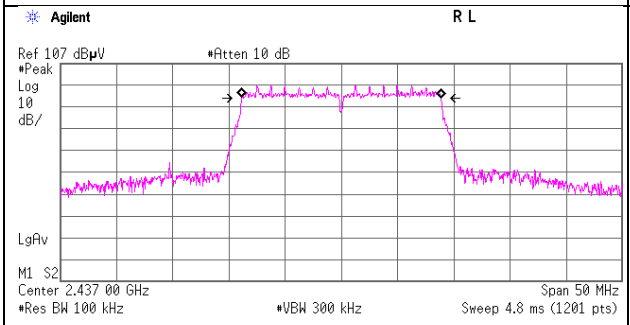
6dB Bandwidth

11n-20

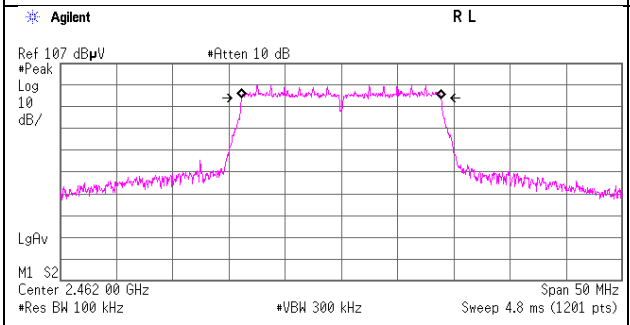
2412 MHz



2437 MHz

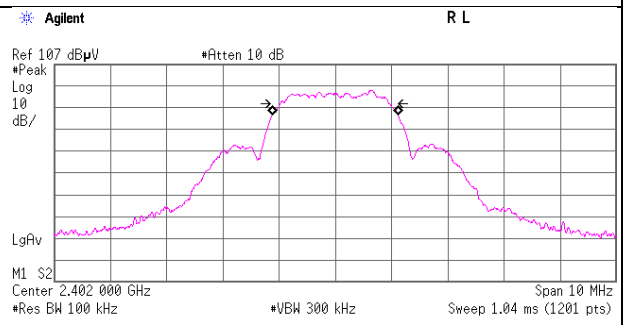


2462 MHz

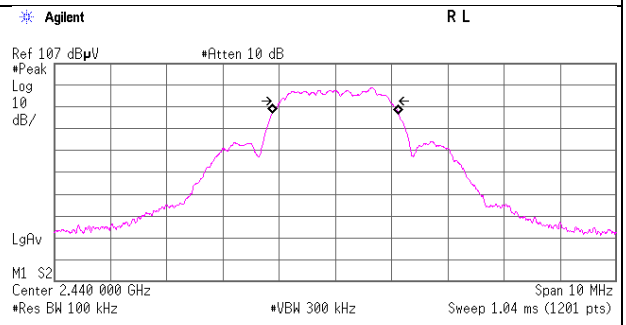


BLE

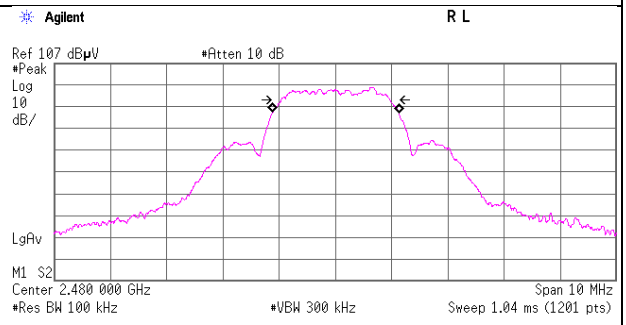
2402 MHz



2440 MHz



2480 MHz



Maximum Peak Output Power

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11925091S-A-R1
Date	August 21, 2017
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Yosuke Ishikawa
Mode	Tx 11b

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	6.43	1.99	9.64	18.06	63.97	30.00	1000	11.94
2437	6.60	2.00	9.64	18.24	66.68	30.00	1000	11.76
2462	6.71	2.00	9.65	18.36	68.55	30.00	1000	11.64

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.

2412MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
1	6.34	
2	6.43	*
5.5	6.20	
11	6.02	

*: Worst Rate
All comparison were carried out on same frequency and measurement factors.

Maximum Peak Output Power

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11925091S-A-R1
Date	August 21, 2017
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Yosuke Ishikawa
Mode	Tx 11g

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	11.47	1.99	9.64	23.10	204.17	30.00	1000	6.90
2437	11.28	2.00	9.64	22.92	195.88	30.00	1000	7.08
2462	11.29	2.00	9.65	22.94	196.79	30.00	1000	7.06

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.

2412 MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
6	11.36	
9	11.38	
12	11.04	
18	11.39	
24	11.03	
36	11.46	
48	11.33	
54	11.47	*

*: Worst Rate
All comparison were carried out on same frequency and measurement factors.

Maximum Peak Output Power

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11925091S-A-R1
Date	August 21, 2017
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Yosuke Ishikawa
Mode	Tx 11n-20

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	11.52	1.99	9.64	23.15	206.54	30.00	1000	6.85
2437	11.45	2.00	9.64	23.09	203.70	30.00	1000	6.91
2462	11.24	2.00	9.65	22.89	194.54	30.00	1000	7.11

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.

2412 MHz

MCS	Reading [dBm]	Remark
0	11.48	
1	11.38	
2	11.52	*
3	11.27	
4	11.17	
5	11.14	
6	11.07	
7	11.14	

*: Worst Rate
All comparison were carried out on same frequency and measurement factors.

Maximum Peak Output Power

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11925091S-A-R1
Date	August 22, 2017
Temperature / Humidity	24 deg. C / 41% RH
Engineer	Yosuke Ishikawa
Mode	Tx BT LE

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2402	-7.18	1.64	9.64	4.10	2.57	30.00	1000	25.90
2440	-7.16	1.69	9.64	4.17	2.61	30.00	1000	25.83
2480	-6.79	1.68	9.65	4.54	2.84	30.00	1000	25.46

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.

Average Output Power
(Reference data for SAR testing)

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11925091S-A-R1
Date	August 21, 2017
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Yosuke Ishikawa
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	2.72	1.99	9.64	14.35	27.24	0.05	14.40	27.55
2437	2.70	2.00	9.64	14.34	27.15	0.05	14.39	27.46
2462	2.85	2.00	9.65	14.50	28.21	0.05	14.55	28.54

11g **6 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	0.55	1.99	9.64	12.18	16.53	0.31	12.49	17.75
2437	0.49	2.00	9.64	12.13	16.32	0.31	12.44	17.53
2462	0.67	2.00	9.65	12.32	17.08	0.31	12.63	18.34

11n-20 **MCS 0**

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	0.55	1.99	9.64	12.18	16.53	0.33	12.51	17.83
2437	0.53	2.00	9.64	12.17	16.47	0.33	12.50	17.77
2462	0.67	2.00	9.65	12.32	17.08	0.33	12.65	18.42

BLE

Freq.	Reading	Cable Loss	Atten. Loss	Result (Time average)		Duty factor	Result (Burst power average)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2402	-7.55	1.64	9.64	3.73	2.36	0.00	3.73	2.36
2440	-7.53	1.69	9.64	3.80	2.40	0.00	3.80	2.40
2480	-7.21	1.68	9.65	4.12	2.58	0.00	4.12	2.58

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

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

Average Output Power
(Reference data for SAR testing)

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11925091S-A-R1
Date	August 21, 2017
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Yosuke Ishikawa
Mode	Tx

2412 MHz

Mode	Rate Mbps	Reading [dBm]	Duty factor [dB]	Burst power [dBm]	Remarks
11b	1	2.72	0.05	2.77	*
	2	2.60	0.10	2.70	
	5.5	2.49	0.25	2.74	
	11	2.32	0.43	2.75	
11g	6	0.55	0.32	0.87	*
	9	0.38	0.46	0.84	
	12	0.17	0.60	0.77	
	18	-0.04	0.85	0.81	
	24	-0.34	1.08	0.74	
	36	-0.71	1.46	0.75	
	48	-1.13	1.85	0.72	
	54	-1.22	1.97	0.75	

* Worst rate

Sample Calculation:

Burst power = Reading (timed average) + Duty factor

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

2412 MHz

Mode	Rate MCS	Reading [dBm]	Duty factor [dB]	Burst power [dBm]	Remarks
11n-20	0	0.55	0.33	0.88	*
	1	0.18	0.63	0.81	
	2	-0.07	0.88	0.81	
	3	-0.30	1.11	0.81	
	4	-0.68	1.50	0.82	
	5	-1.06	1.81	0.75	
	6	-1.15	1.92	0.77	
	7	-1.27	2.07	0.80	

* Worst rate

Sample Calculation:

Burst power = Reading (timed average) + Duty factor

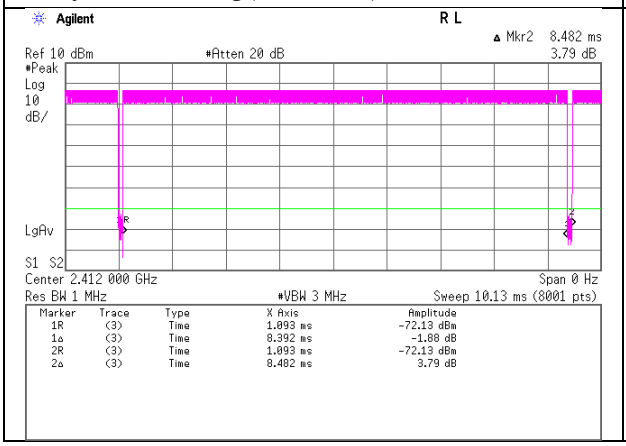
All comparison were carried out on same frequency and measurement factors.

Burst rate confirmation
(for Average output power)

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11925091S-A-R1
Date	August 21, 2017
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Yosuke Ishikawa
Mode	Tx

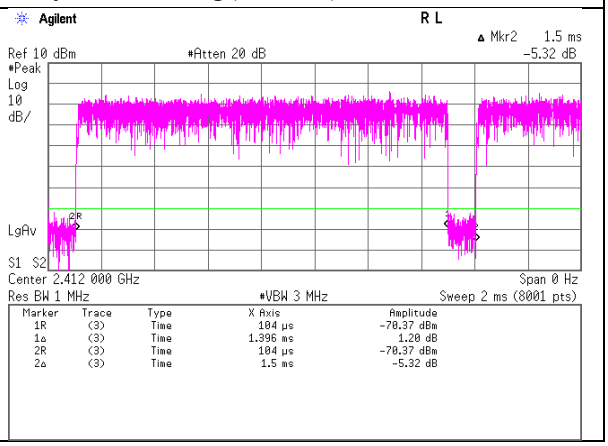
11b 1 Mbps

Tx on / (Tx on + Tx off) = 0.989
Tx on / (Tx on + Tx off) * 100 = 98.9 %
Duty factor = 10 * log (8.482 / 8.392) = 0.05 dB



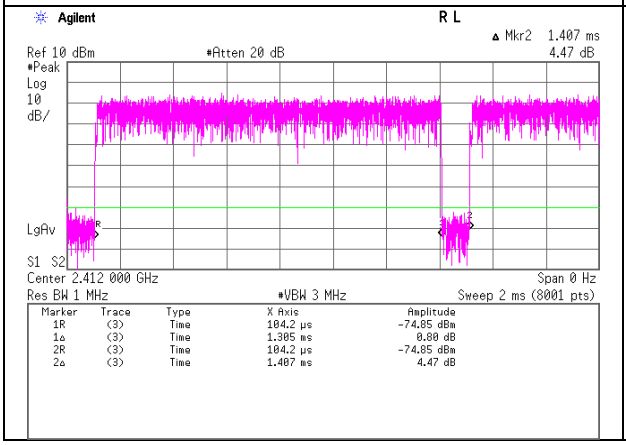
11g 6 Mbps

Tx on / (Tx on + Tx off) = 0.931
Tx on / (Tx on + Tx off) * 100 = 93.1 %
Duty factor = 10 * log (1.5 / 1.396) = 0.31 dB



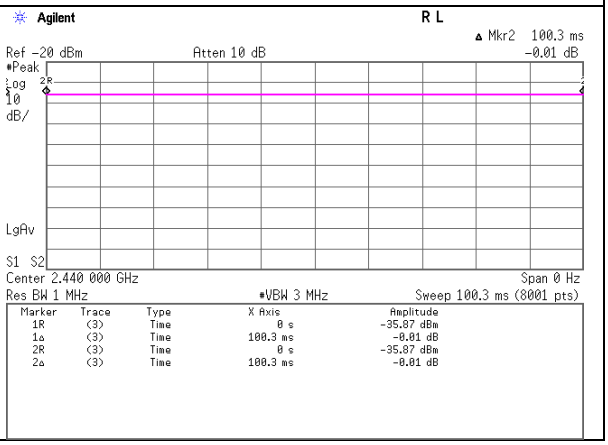
11n-20 MCS 0

Tx on / (Tx on + Tx off) = 0.928
Tx on / (Tx on + Tx off) * 100 = 92.8 %
Duty factor = 10 * log (1.407 / 1.305) = 0.33 dB



BT LE

Duty 100 %



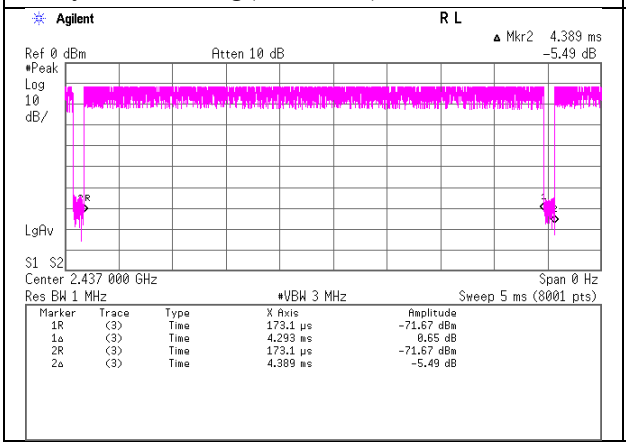
* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

Burst rate confirmation
(for Spurious emissions)

Test place	Shonan EMC Lab. No.3 Shielded Room
Report No.	11925091S-A-R1
Date	August 13, 2017
Temperature / Humidity	25 deg. C / 55 % RH
Engineer	Hikaru Shirasawa
Mode	Tx

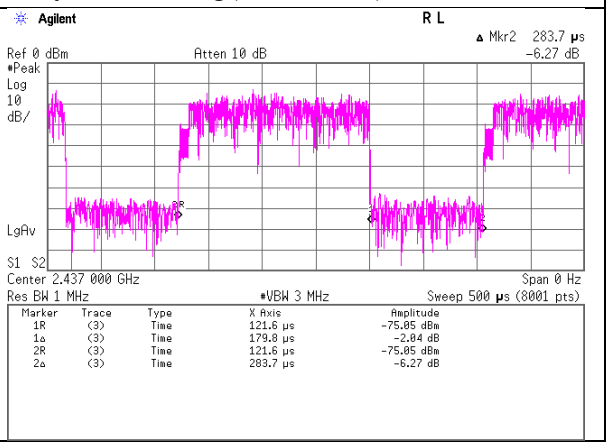
11b 2 Mbps

Tx on / (Tx on + Tx off) = 0.978
Tx on / (Tx on + Tx off) * 100 = 97.8 %
Duty factor = 20 * log (4.389 / 4.293) = 0.2 dB



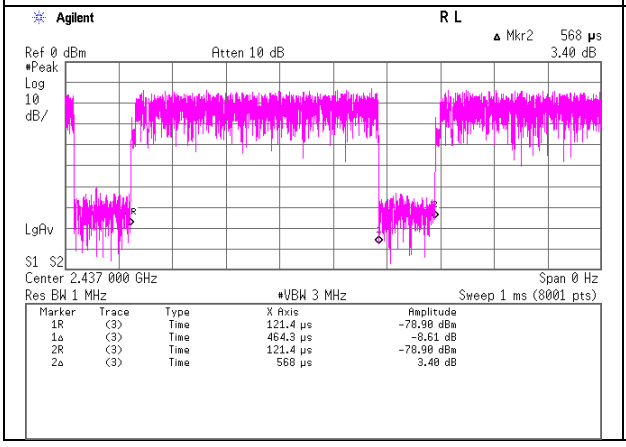
11g 54 Mbps

Tx on / (Tx on + Tx off) = 0.634
Tx on / (Tx on + Tx off) * 100 = 63.4 %
Duty factor = 20 * log (0.2837 / 0.1798) = 4.0 dB



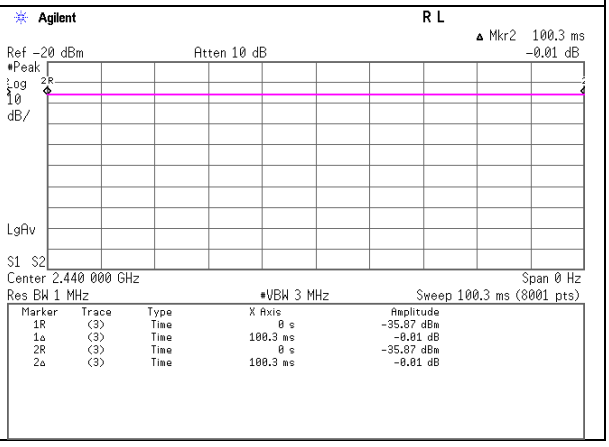
11n-20 MCS 2

Tx on / (Tx on + Tx off) = 0.817
Tx on / (Tx on + Tx off) * 100 = 81.7 %
Duty factor = 20 * log (0.568 / 0.4643) = 1.8 dB



BT LE

Duty 100 %



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

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	11925091S-A-R1	
Date	August 12, 2017	August 13, 2017
Temperature / Humidity	23 deg. C / 56 % RH	25 deg. C / 55 % RH
Engineer	Hiroyuki Morikawa (1 GHz -13 GHz)	Hikaru Shirasawa (13 GHz -26 GHz)
Mode	Tx 11b 2412 MHz	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	47.58	27.41	13.48	40.85	2.37	49.99	73.90	23.9	215	269	
Hori.	4824.000	PK	49.69	31.17	5.67	41.84	2.37	47.06	73.90	26.8	249	296	
Hori.	6432.042	PK	49.50	34.44	6.40	41.28	2.37	51.43	73.90	22.4	264	273	
Hori.	7236.000	PK	46.54	36.52	6.85	41.20	2.37	51.08	73.90	22.8	150	0	
Hori.	9648.000	PK	45.06	38.66	7.76	40.60	2.37	53.25	73.90	20.6	150	0	
Hori.	12060.000	PK	44.32	39.29	8.78	40.19	2.37	54.57	73.90	19.3	150	0	
Hori.	6432.042	AV	43.17	34.44	6.40	41.28	2.37	45.10	53.90	8.8	264	273	
Vert.	2390.000	PK	47.80	27.41	13.48	40.85	2.37	50.21	73.90	23.6	167	275	
Vert.	4824.000	PK	50.11	31.17	5.67	41.84	2.37	47.48	73.90	26.4	105	323	
Vert.	6431.949	PK	50.65	34.44	6.40	41.28	2.37	52.58	73.90	21.3	109	342	
Vert.	7236.000	PK	46.94	36.52	6.85	41.20	2.37	51.48	73.90	22.4	150	0	
Vert.	9648.000	PK	45.00	38.66	7.76	40.60	2.37	53.19	73.90	20.7	150	0	
Vert.	12060.000	PK	44.29	39.29	8.78	40.19	2.37	54.54	73.90	19.3	150	0	
Vert.	6431.949	AV	45.92	34.44	6.40	41.28	2.37	47.85	53.90	**6.0**	109	342	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.94 m / 3.0 m) = 2.37 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	38.83	27.41	13.48	40.85	0.20	2.37	41.44	53.90	12.5	*1)
Hori.	4824.000	AV	42.59	31.17	5.67	41.84	0.20	2.37	40.16	53.90	13.7	
Hori.	7236.000	AV	37.39	36.52	6.85	41.20	0.20	2.37	42.13	53.90	11.8	
Hori.	9648.000	AV	36.34	38.66	7.76	40.60	0.20	2.37	44.73	53.90	9.2	
Hori.	12060.000	AV	36.18	39.29	8.78	40.19	0.20	2.37	46.63	53.90	**7.3**	
Vert.	2390.000	AV	39.05	27.41	13.48	40.85	0.20	2.37	41.66	53.90	12.2	*1)
Vert.	4824.000	AV	43.70	31.17	5.67	41.84	0.20	2.37	41.27	53.90	12.6	
Vert.	7236.000	AV	37.62	36.52	6.85	41.20	0.20	2.37	42.36	53.90	11.5	
Vert.	9648.000	AV	36.44	38.66	7.76	40.60	0.20	2.37	44.83	53.90	9.1	
Vert.	12060.000	AV	35.88	39.29	8.78	40.19	0.20	2.37	46.33	53.90	7.6	

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 (3.94 m / 3.0 m) = 2.37 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)**

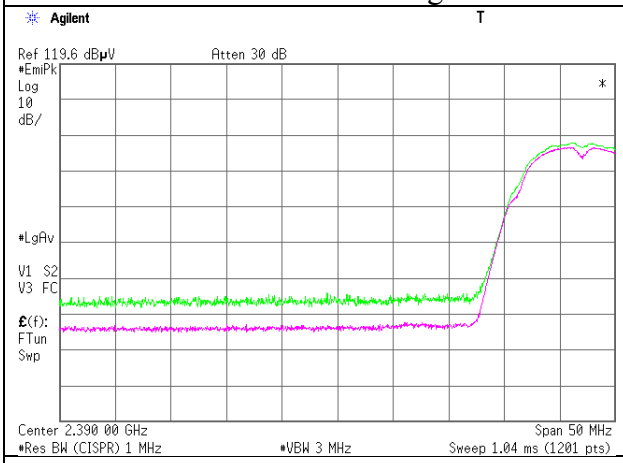
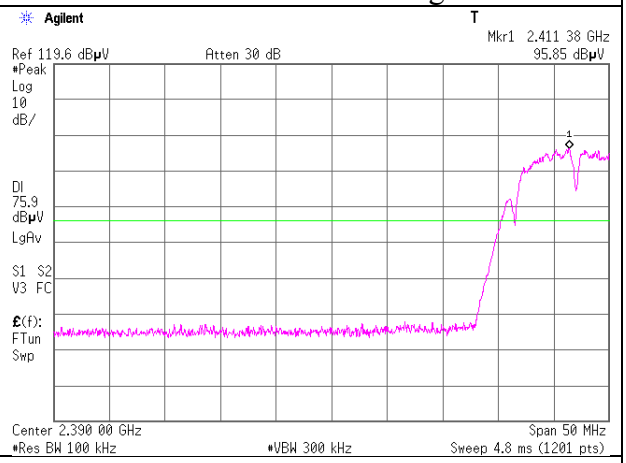
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	95.88	27.50	13.50	40.84	2.37	98.41	-	-	Carrier
Hori.	2400.000	PK	40.66	27.45	13.49	40.84	2.37	43.13	78.41	35.3	
Vert.	2412.000	PK	95.23	27.50	13.50	40.84	2.37	97.76	-	-	Carrier
Vert.	2400.000	PK	40.72	27.45	13.49	40.84	2.37	43.19	77.76	34.6	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.94 m / 3.0 m) = 2.37 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

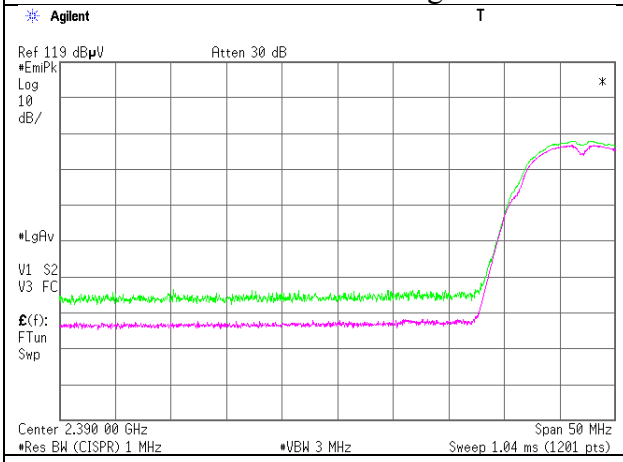
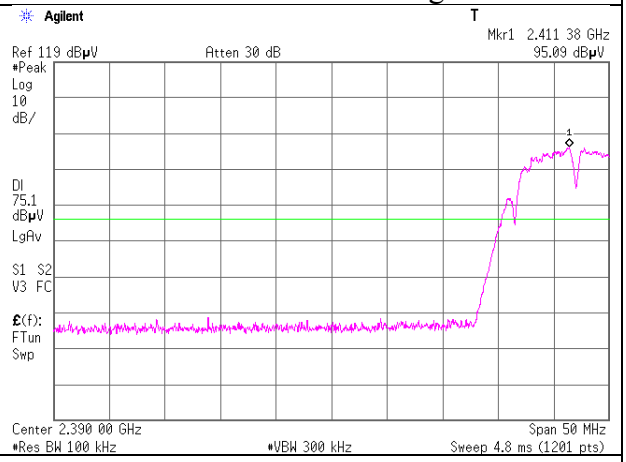
Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11925091S-A-R1
Date	August 12, 2017
Temperature / Humidity	23 deg. C / 56 % RH
Engineer	Hiroyuki Morikawa (1 GHz -13 GHz)
Mode	Tx 11b 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.3 Semi Anechoic Chamber	
Report No.	11925091S-A-R1	
Date	August 12, 2017	August 13, 2017
Temperature / Humidity	23 deg. C / 56 % RH	25 deg. C / 55 % RH
Engineer	Hiroyuki Morikawa (1 GHz -13 GHz)	Hikaru Shirasawa (13 GHz -26 GHz)
Mode	Tx 11b 2437 MHz	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4874.000	PK	48.68	31.28	5.67	41.77	2.37	46.23	73.90	27.6	363	282	
Hori.	6498.705	PK	49.95	34.70	6.42	41.32	2.37	52.12	73.90	21.7	298	278	
Hori.	7311.000	PK	46.32	36.74	6.85	41.26	2.37	51.02	73.90	22.8	150	0	
Hori.	9748.000	PK	42.74	38.74	7.78	40.62	2.37	51.01	73.90	22.8	150	0	
Hori.	12185.000	PK	42.61	39.30	8.76	40.17	2.37	52.87	73.90	21.0	150	0	
Hori.	6498.705	AV	43.69	34.70	6.42	41.32	2.37	45.86	53.90	8.0	298	278	
Vert.	4874.000	PK	49.72	31.28	5.67	41.77	2.37	47.27	73.90	26.6	118	305	
Vert.	6498.673	PK	50.94	34.70	6.42	41.32	2.37	53.11	73.90	20.7	100	331	
Vert.	7311.000	PK	45.72	36.74	6.85	41.26	2.37	50.42	73.90	23.4	150	0	
Vert.	9748.000	PK	43.53	38.74	7.78	40.62	2.37	51.80	73.90	22.1	150	0	
Vert.	12185.000	PK	42.97	39.30	8.76	40.17	2.37	53.23	73.90	20.6	150	0	
Vert.	6498.673	AV	45.50	34.70	6.42	41.32	2.37	47.67	53.90	**6.2**	100	331	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.94 m / 3.0 m) = 2.37 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.	4874.000	AV	42.68	31.28	5.67	41.77	0.20	2.37	40.43	53.90	13.5	
Hori.	7311.000	AV	37.23	36.74	6.85	41.26	0.20	2.37	42.13	53.90	11.8	
Hori.	9748.000	AV	34.74	38.74	7.78	40.62	0.20	2.37	43.21	53.90	10.7	
Hori.	12185.000	AV	34.11	39.30	8.76	40.17	0.20	2.37	44.57	53.90	9.3	
Vert.	4874.000	AV	44.08	31.28	5.67	41.77	0.20	2.37	41.83	53.90	12.1	
Vert.	7311.000	AV	36.91	36.74	6.85	41.26	0.20	2.37	41.81	53.90	12.1	
Vert.	9748.000	AV	35.02	38.74	7.78	40.62	0.20	2.37	43.49	53.90	10.4	
Vert.	12185.000	AV	34.40	39.30	8.76	40.17	0.20	2.37	44.86	53.90	**9.0**	

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 (3.94 m / 3.0 m) = 2.37 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	11925091S-A-R1	
Date	August 12, 2017	August 13, 2017
Temperature / Humidity	23 deg. C / 56 % RH	25 deg. C / 55 % RH
Engineer	Hiroyuki Morikawa (1 GHz -13 GHz)	Hikaru Shirasawa (13 GHz -26 GHz)
Mode	Tx 11b 2462 MHz	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	48.62	27.79	13.55	40.81	2.37	51.52	73.90	22.3	174	276	
Hori.	4924.000	PK	50.71	31.38	5.67	41.70	2.37	48.43	73.90	25.4	271	273	
Hori.	6565.330	PK	49.81	34.85	6.47	41.28	2.37	52.22	73.90	21.6	344	277	
Hori.	7386.000	PK	45.03	36.95	6.86	41.32	2.37	49.89	73.90	24.0	150	0	
Hori.	9848.000	PK	43.24	38.81	7.80	40.64	2.37	51.58	73.90	22.3	150	0	
Hori.	12310.000	PK	41.20	39.31	8.76	40.16	2.37	51.48	73.90	22.4	150	0	
Hori.	6565.330	AV	44.04	34.85	6.47	41.28	2.37	46.45	53.90	7.4	344	277	
Vert.	2483.500	PK	48.49	27.79	13.55	40.81	2.37	51.39	73.90	22.5	230	270	
Vert.	4924.000	PK	50.63	31.38	5.67	41.70	2.37	48.35	73.90	25.5	120	298	
Vert.	6565.380	PK	49.53	34.85	6.47	41.28	2.37	51.94	73.90	21.9	106	293	
Vert.	7386.000	PK	45.28	36.95	6.86	41.32	2.37	50.14	73.90	23.7	150	0	
Vert.	9848.000	PK	42.90	38.81	7.80	40.64	2.37	51.24	73.90	22.6	150	0	
Vert.	12310.000	PK	40.01	39.31	8.76	40.16	2.37	50.29	73.90	23.6	150	0	
Vert.	6565.380	AV	44.44	34.85	6.47	41.28	2.37	46.85	53.90	**7.0**	106	293	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.94 m / 3.0 m) = 2.37 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	40.90	27.79	13.55	40.81	0.20	2.37	44.00	53.90	**9.9**	*1)
Hori.	4924.000	AV	42.82	31.38	5.67	41.70	0.20	2.37	40.74	53.90	13.2	
Hori.	7386.000	AV	36.49	36.95	6.86	41.32	0.20	2.37	41.55	53.90	12.4	
Hori.	9848.000	AV	34.25	38.81	7.80	40.64	0.20	2.37	42.79	53.90	11.1	
Hori.	12310.000	AV	32.25	39.31	8.76	40.16	0.20	2.37	42.73	53.90	11.2	
Vert.	2483.500	AV	40.49	27.79	13.55	40.81	0.20	2.37	43.59	53.90	10.3	*1)
Vert.	4924.000	AV	43.97	31.38	5.67	41.70	0.20	2.37	41.89	53.90	12.0	
Vert.	7386.000	AV	36.80	36.95	6.86	41.32	0.20	2.37	41.86	53.90	12.0	
Vert.	9848.000	AV	34.42	38.81	7.80	40.64	0.20	2.37	42.96	53.90	10.9	
Vert.	12310.000	AV	32.13	39.31	8.76	40.16	0.20	2.37	42.61	53.90	11.3	

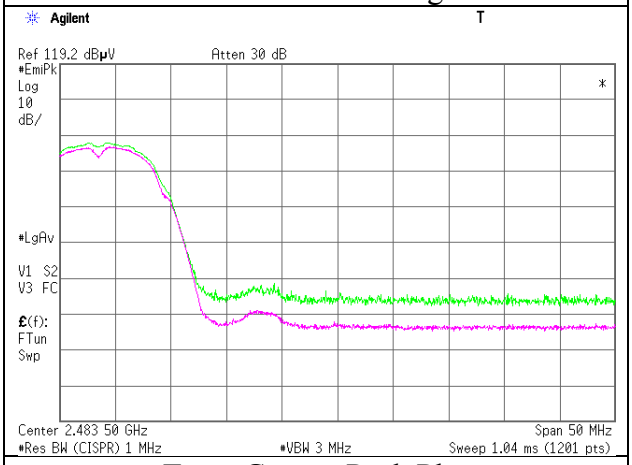
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.94 m / 3.0 m) = 2.37 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11925091S-A-R1
Date	August 12, 2017
Temperature / Humidity	23 deg. C / 56 % RH
Engineer	Hiroyuki Morikawa (1 GHz -13 GHz)
Mode	Tx 11b 2462 MHz

Horizontal

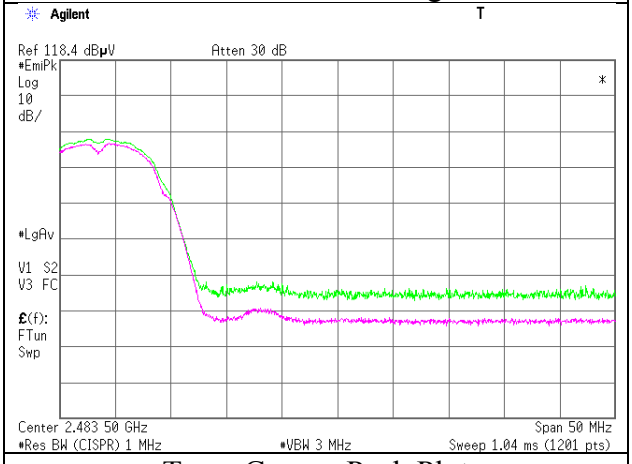
Restricted-band band-edge Plot



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.3 Semi Anechoic Chamber	
Report No.	11925091S-A-R1	
Date	August 12, 2017	August 13, 2017
Temperature / Humidity	23 deg. C / 56 % RH	25 deg. C / 55 % RH
Engineer	Hiroyuki Morikawa (1 GHz -13 GHz)	Hikaru Shirasawa (13 GHz -26 GHz)
Mode	Tx 11g 2412 MHz	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	51.10	27.41	13.48	40.85	2.37	53.51	73.90	20.3	143	287	
Hori.	4824.000	PK	50.00	31.17	5.67	41.84	2.37	47.37	73.90	26.5	257	264	
Hori.	6431.996	PK	49.58	34.44	6.40	41.28	2.37	51.51	73.90	22.3	360	273	
Hori.	7236.000	PK	46.05	36.52	6.85	41.20	2.37	50.59	73.90	23.3	150	0	
Hori.	9648.000	PK	45.51	38.66	7.76	40.60	2.37	53.70	73.90	20.2	150	0	
Hori.	12060.000	PK	43.99	39.29	8.78	40.19	2.37	54.24	73.90	19.6	150	0	
Hori.	6431.996	AV	43.18	34.44	6.40	41.28	2.37	45.11	53.90	8.7	360	273	
Vert.	2390.000	PK	52.84	27.41	13.48	40.85	2.37	55.25	73.90	18.6	153	274	
Vert.	4824.000	PK	50.38	31.17	5.67	41.84	2.37	47.75	73.90	26.1	134	297	
Vert.	6432.007	PK	49.73	34.44	6.40	41.28	2.37	51.66	73.90	22.2	100	326	
Vert.	7236.000	PK	45.62	36.52	6.85	41.20	2.37	50.16	73.90	23.7	150	0	
Vert.	9648.000	PK	45.57	38.66	7.76	40.60	2.37	53.76	73.90	20.1	150	0	
Vert.	12060.000	PK	43.58	39.29	8.78	40.19	2.37	53.83	73.90	20.0	150	0	
Vert.	6432.007	AV	44.67	34.44	6.40	41.28	2.37	46.60	53.90	**7.3**	100	326	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.94 m / 3.0 m) = 2.37 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	39.11	27.41	13.48	40.85	4.00	2.37	45.52	53.90	8.4	*1)
Hori.	4824.000	AV	43.25	31.17	5.67	41.84	4.00	2.37	44.62	53.90	9.3	
Hori.	7236.000	AV	37.66	36.52	6.85	41.20	4.00	2.37	46.20	53.90	7.7	
Hori.	9648.000	AV	36.38	38.66	7.76	40.60	4.00	2.37	48.57	53.90	5.3	
Hori.	12060.000	AV	35.81	39.29	8.78	40.19	4.00	2.37	50.06	53.90	**3.8**	
Vert.	2390.000	AV	40.02	27.41	13.48	40.85	4.00	2.37	46.43	53.90	7.5	*1)
Vert.	4824.000	AV	43.82	31.17	5.67	41.84	4.00	2.37	45.19	53.90	8.7	
Vert.	7236.000	AV	37.02	36.52	6.85	41.20	4.00	2.37	45.56	53.90	8.3	
Vert.	9648.000	AV	36.50	38.66	7.76	40.60	4.00	2.37	48.69	53.90	5.2	
Vert.	12060.000	AV	35.71	39.29	8.78	40.19	4.00	2.37	49.96	53.90	3.9	

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 (3.94 m / 3.0 m) = 2.37 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)**

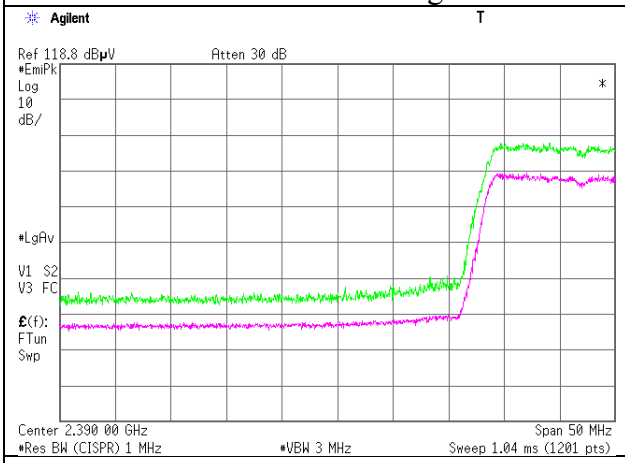
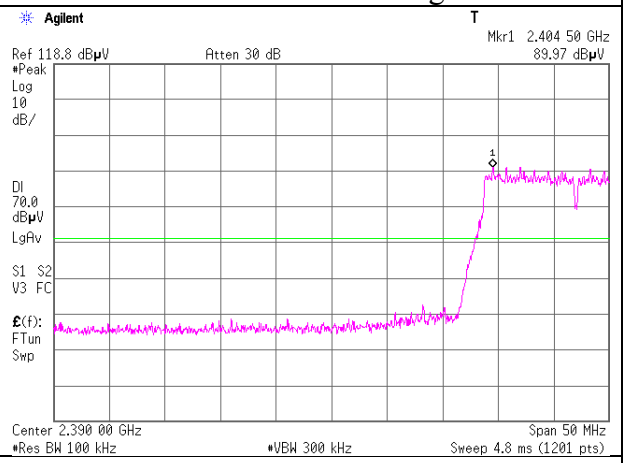
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	89.69	27.50	13.50	40.84	2.37	92.22	-	-	Carrier
Hori.	2398.283	PK	48.10	27.44	13.49	40.84	2.37	50.56	72.22	21.7	
Hori.	2400.000	PK	47.08	27.45	13.49	40.84	2.37	49.55	72.22	22.7	
Vert.	2412.000	PK	89.91	27.50	13.50	40.84	2.37	92.44	-	-	Carrier
Vert.	2398.220	PK	50.07	27.44	13.49	40.84	2.37	52.53	72.44	19.9	
Vert.	2400.000	PK	48.27	27.45	13.49	40.84	2.37	50.74	72.44	21.7	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.94 m / 3.0 m) = 2.37 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

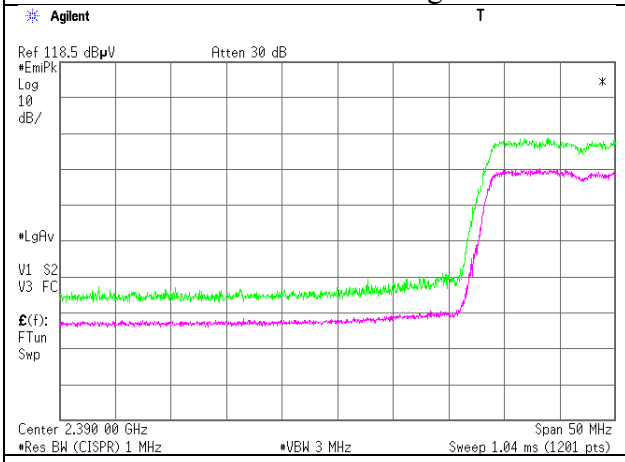
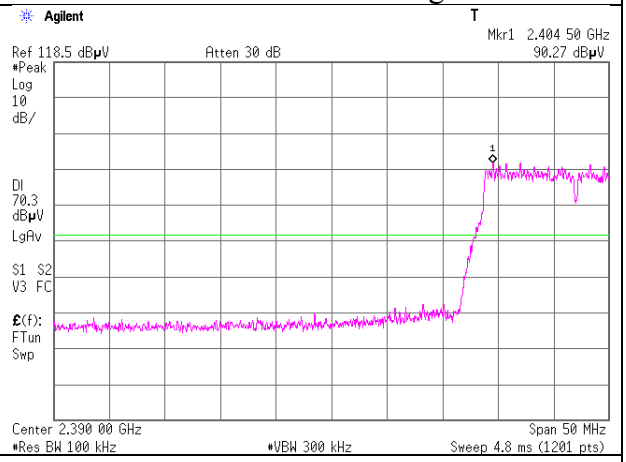
Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11925091S-A-R1
Date	August 12, 2017
Temperature / Humidity	23 deg. C / 56 % RH
Engineer	Hiroyuki Morikawa (1 GHz -13 GHz)
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.3 Semi Anechoic Chamber	
Report No.	11925091S-A-R1	
Date	August 12, 2017	August 13, 2017
Temperature / Humidity	23 deg. C / 56 % RH	25 deg. C / 55 % RH
Engineer	Hiroyuki Morikawa	Hikaru Shirasawa
	(1 GHz -13 GHz)	(13 GHz -26 GHz)
Mode	Tx 11g 2437 MHz	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4874.000	PK	48.70	31.28	5.67	41.77	2.37	46.25	73.90	27.6	277	262	
Hori.	6498.684	PK	49.90	34.70	6.42	41.32	2.37	52.07	73.90	21.8	333	269	
Hori.	7311.000	PK	46.07	36.74	6.85	41.26	2.37	50.77	73.90	23.1	150	0	
Hori.	9748.000	PK	43.23	38.74	7.78	40.62	2.37	51.50	73.90	22.4	150	0	
Hori.	12185.000	PK	42.96	39.30	8.76	40.17	2.37	53.22	73.90	20.6	150	0	
Hori.	6498.684	AV	44.21	34.70	6.42	41.32	2.37	46.38	53.90	**7.5**	333	269	
Vert.	4874.000	PK	49.14	31.28	5.67	41.77	2.37	46.69	73.90	27.2	103	291	
Vert.	6498.681	PK	49.29	34.70	6.42	41.32	2.37	51.46	73.90	22.4	125	296	
Vert.	7311.000	PK	45.85	36.74	6.85	41.26	2.37	50.55	73.90	23.3	150	0	
Vert.	9748.000	PK	42.88	38.74	7.78	40.62	2.37	51.15	73.90	22.7	150	0	
Vert.	12185.000	PK	44.19	39.30	8.76	40.17	2.37	54.45	73.90	19.4	150	0	
Vert.	6498.681	AV	44.21	34.70	6.42	41.32	2.37	46.38	53.90	**7.5**	125	296	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.94 m / 3.0 m) = 2.37 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.	4874.000	AV	41.95	31.28	5.67	41.77	4.00	2.37	43.50	53.90	10.4	
Hori.	7311.000	AV	37.00	36.74	6.85	41.26	4.00	2.37	45.70	53.90	8.2	
Hori.	9748.000	AV	34.96	38.74	7.78	40.62	4.00	2.37	47.23	53.90	6.7	
Hori.	12185.000	AV	34.15	39.30	8.76	40.17	4.00	2.37	48.41	53.90	5.5	
Vert.	4874.000	AV	42.49	31.28	5.67	41.77	4.00	2.37	44.04	53.90	9.9	
Vert.	7311.000	AV	36.92	36.74	6.85	41.26	4.00	2.37	45.62	53.90	8.3	
Vert.	9748.000	AV	35.07	38.74	7.78	40.62	4.00	2.37	47.34	53.90	6.6	
Vert.	12185.000	AV	34.54	39.30	8.76	40.17	4.00	2.37	48.80	53.90	**5.1**	

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 (3.94 m / 3.0 m) = 2.37 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	11925091S-A-R1	
Date	August 12, 2017	August 13, 2017
Temperature / Humidity	23 deg. C / 56 % RH	25 deg. C / 55 % RH
Engineer	Hiroyuki Morikawa	Hikaru Shirasawa
	(1 GHz -13 GHz)	(13 GHz -26 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	55.02	27.79	13.55	40.81	2.37	57.92	73.90	15.9	141	252	
Hori.	4924.000	PK	48.96	31.38	5.67	41.70	2.37	46.68	73.90	27.2	317	259	
Hori.	6565.308	PK	50.11	34.85	6.47	41.28	2.37	52.52	73.90	21.3	371	275	
Hori.	7386.000	PK	45.92	36.95	6.86	41.32	2.37	50.78	73.90	23.1	150	0	
Hori.	9848.000	PK	42.80	38.81	7.80	40.64	2.37	51.14	73.90	22.7	150	0	
Hori.	12310.000	PK	40.92	39.31	8.76	40.16	2.37	51.20	73.90	22.7	150	0	
Hori.	6565.308	AV	44.76	34.85	6.47	41.28	2.37	47.17	53.90	**6.7**	371	275	
Vert.	2483.500	PK	53.52	27.79	13.55	40.81	2.37	56.42	73.90	17.4	230	265	
Vert.	4924.000	PK	49.44	31.38	5.67	41.70	2.37	47.16	73.90	26.7	121	299	
Vert.	6565.323	PK	49.43	34.85	6.47	41.28	2.37	51.84	73.90	22.0	129	283	
Vert.	7386.000	PK	45.27	36.95	6.86	41.32	2.37	50.13	73.90	23.7	150	0	
Vert.	9848.000	PK	43.04	38.81	7.80	40.64	2.37	51.38	73.90	22.5	150	0	
Vert.	12310.000	PK	40.86	39.31	8.76	40.16	2.37	51.14	73.90	22.7	150	0	
Vert.	6565.323	AV	44.45	34.85	6.47	41.28	2.37	46.86	53.90	7.0	129	283	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.94 m / 3.0 m) = 2.37 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	41.77	27.79	13.55	40.81	4.00	2.37	48.67	53.90	**5.2**	*1)
Hori.	4924.000	AV	41.73	31.38	5.67	41.70	4.00	2.37	43.45	53.90	10.4	
Hori.	7386.000	AV	36.82	36.95	6.86	41.32	4.00	2.37	45.68	53.90	8.2	
Hori.	9848.000	AV	34.35	38.81	7.80	40.64	4.00	2.37	46.69	53.90	7.2	
Hori.	12310.000	AV	32.22	39.31	8.76	40.16	4.00	2.37	46.50	53.90	7.4	
Vert.	2483.500	AV	41.52	27.79	13.55	40.81	4.00	2.37	48.42	53.90	5.5	*1)
Vert.	4924.000	AV	42.85	31.38	5.67	41.70	4.00	2.37	44.57	53.90	9.3	
Vert.	7386.000	AV	36.66	36.95	6.86	41.32	4.00	2.37	45.52	53.90	8.4	
Vert.	9848.000	AV	34.45	38.81	7.80	40.64	4.00	2.37	46.79	53.90	7.1	
Vert.	12310.000	AV	32.54	39.31	8.76	40.16	4.00	2.37	46.82	53.90	7.1	

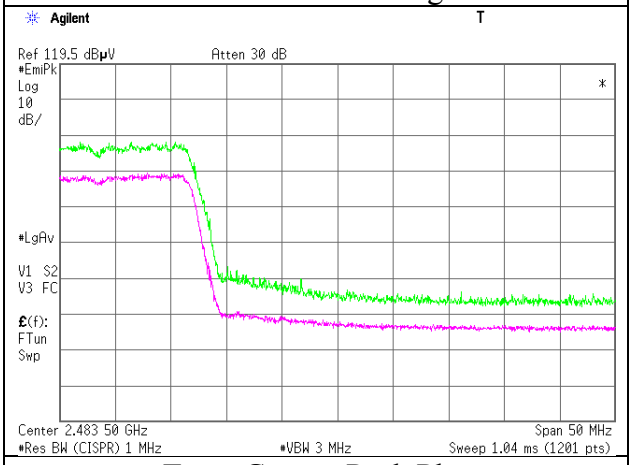
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.94 m / 3.0 m) = 2.37 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11925091S-A-R1
Date	August 12, 2017
Temperature / Humidity	23 deg. C / 56 % RH
Engineer	Hiroyuki Morikawa
	(1 GHz -13 GHz)
Mode	Tx 11g 2462 MHz

Horizontal

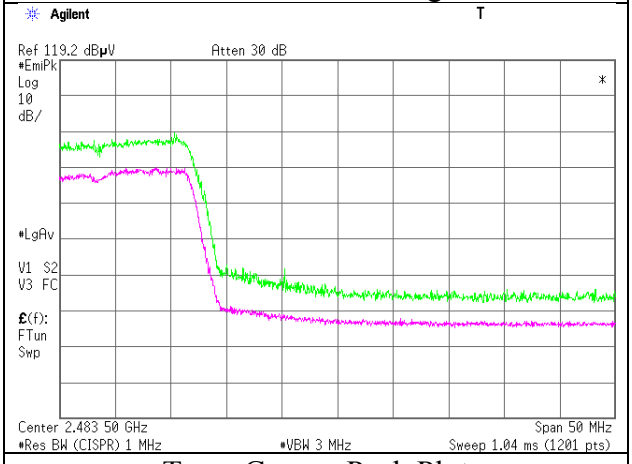
Restricted-band band-edge Plot



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.3 Semi Anechoic Chamber		
Report No.	11925091S-A-R1		
Date	August 12, 2017	August 13, 2017	August 15, 2017
Temperature / Humidity	23 deg. C / 56 % RH	25 deg. C / 55 % RH	24 deg. C / 61 % RH
Engineer	Hiroyuki Morikawa (1 GHz -13 GHz)	Hikaru Shirasawa (13 GHz -26 GHz)	Hiroyuki Morikawa (30 MHz -1 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.	68.009	QP	51.70	6.59	6.82	32.11	0.00	33.00	40.00	7.0	400	254	
Hori.	71.589	QP	55.70	6.27	7.07	32.10	0.00	36.94	40.00	**3.0**	261	260	
Hori.	100.225	QP	48.80	10.01	7.52	32.08	0.00	34.25	43.50	9.2	313	279	
Hori.	144.001	QP	41.90	14.52	7.83	32.04	0.00	32.21	43.50	11.2	230	297	
Hori.	212.491	QP	39.40	11.47	8.22	31.98	0.00	27.11	43.50	16.3	168	317	
Hori.	306.550	QP	42.50	13.54	8.75	31.91	0.00	32.88	46.00	13.1	100	47	
Hori.	2390.000	PK	52.71	27.41	13.48	40.85	2.37	55.12	73.90	18.7	121	238	
Hori.	4824.000	PK	50.91	31.17	5.67	41.84	2.37	48.28	73.90	25.6	320	263	
Hori.	6431.978	PK	48.97	34.44	6.40	41.28	2.37	50.90	73.90	23.0	360	273	
Hori.	7236.000	PK	47.02	36.52	6.85	41.20	2.37	51.56	73.90	22.3	150	0	
Hori.	9648.000	PK	44.95	38.66	7.76	40.60	2.37	53.14	73.90	20.7	150	0	
Hori.	12060.000	PK	44.35	39.29	8.78	40.19	2.37	54.60	73.90	19.3	150	0	
Hori.	6431.978	AV	43.42	34.44	6.40	41.28	2.37	45.35	53.90	8.5	360	273	
Vert.	60.551	QP	53.80	7.72	6.71	32.11	0.00	36.12	40.00	3.8	100	348	
Vert.	71.591	QP	40.60	6.27	7.07	32.10	0.00	21.84	40.00	18.1	100	0	
Vert.	100.229	QP	46.50	10.01	7.51	32.08	0.00	31.94	43.50	11.5	100	215	
Vert.	144.005	QP	38.60	14.52	7.83	32.04	0.00	28.91	43.50	14.5	100	246	
Vert.	212.045	QP	37.30	11.47	8.22	31.98	0.00	25.01	43.50	18.4	100	148	
Vert.	306.437	QP	35.70	13.53	8.75	31.91	0.00	26.07	46.00	19.9	117	348	
Vert.	2390.000	PK	54.30	27.41	13.48	40.85	2.37	56.71	73.90	17.1	166	272	
Vert.	4824.000	PK	50.29	31.17	5.67	41.84	2.37	47.66	73.90	26.2	151	293	
Vert.	6432.004	PK	50.40	34.44	6.40	41.28	2.37	52.33	73.90	21.5	100	332	
Vert.	7236.000	PK	46.61	36.52	6.85	41.20	2.37	51.15	73.90	22.7	150	0	
Vert.	9648.000	PK	44.95	38.66	7.76	40.60	2.37	53.14	73.90	20.7	150	0	
Vert.	12060.000	PK	44.23	39.29	8.78	40.19	2.37	54.48	73.90	19.4	150	0	
Vert.	6432.004	AV	45.45	34.44	6.40	41.28	2.37	47.38	53.90	6.5	100	332	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.94 m / 3.0 m) = 2.37 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	41.01	27.41	13.48	40.85	1.80	2.37	45.22	53.90	8.7	*1)
Hori.	4824.000	AV	43.17	31.17	5.67	41.84	1.80	2.37	42.34	53.90	11.6	
Hori.	7236.000	AV	37.73	36.52	6.85	41.20	1.80	2.37	44.07	53.90	9.8	
Hori.	9648.000	AV	36.41	38.66	7.76	40.60	1.80	2.37	46.40	53.90	7.5	
Hori.	12060.000	AV	36.08	39.29	8.78	40.19	1.80	2.37	48.13	53.90	**5.8**	
Vert.	2390.000	AV	41.79	27.41	13.48	40.85	1.80	2.37	46.00	53.90	7.9	*1)
Vert.	4824.000	AV	43.76	31.17	5.67	41.84	1.80	2.37	42.93	53.90	11.0	
Vert.	7236.000	AV	37.55	36.52	6.85	41.20	1.80	2.37	43.89	53.90	10.0	
Vert.	9648.000	AV	36.52	38.66	7.76	40.60	1.80	2.37	46.51	53.90	7.4	
Vert.	12060.000	AV	35.85	39.29	8.78	40.19	1.80	2.37	47.90	53.90	6.0	

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 (3.94 m / 3.0 m) = 2.37 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)**

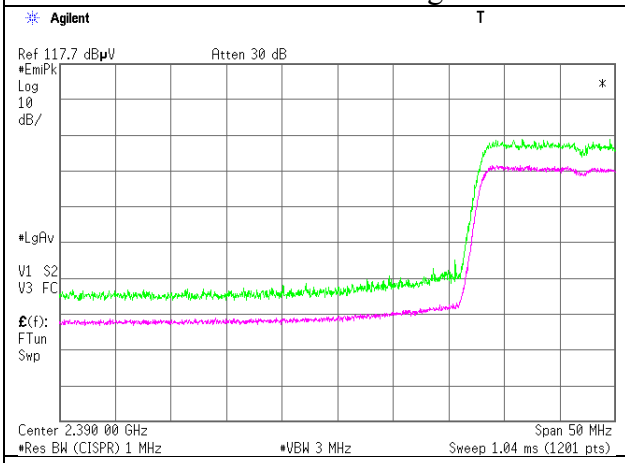
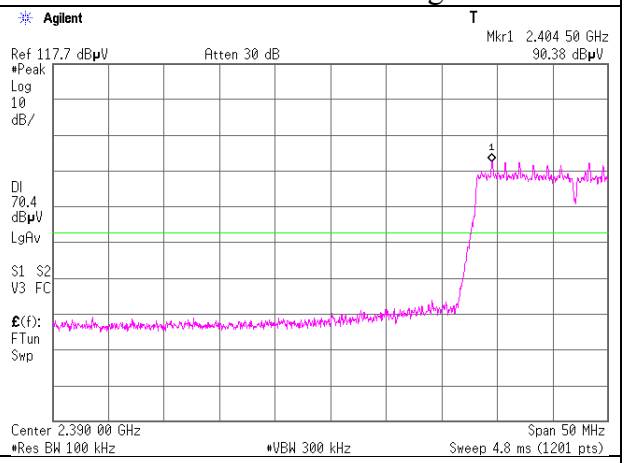
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	90.07	27.50	13.50	40.84	2.37	92.60	-	-	Carrier
Hori.	2400.000	PK	48.55	27.45	13.49	40.84	2.37	51.02	72.60	21.6	
Vert.	2412.000	PK	89.95	27.50	13.50	40.84	2.37	92.48	-	-	Carrier
Vert.	2400.000	PK	48.26	27.45	13.49	40.84	2.37	50.73	72.48	21.8	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.94 m / 3.0 m) = 2.37 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

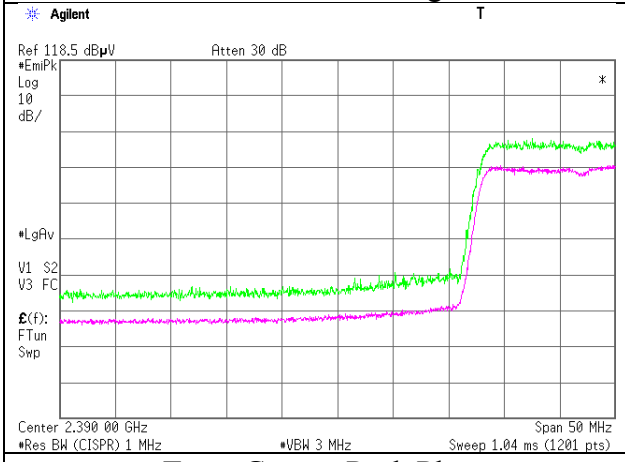
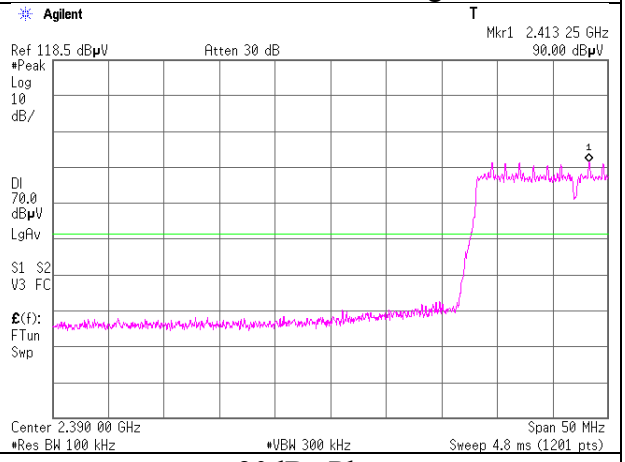
Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11925091S-A-R1
Date	August 12, 2017
Temperature / Humidity	23 deg. C / 56 % RH
Engineer	Hiroyuki Morikawa (1 GHz -13 GHz)
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.3 Semi Anechoic Chamber	
Report No.	11925091S-A-R1	
Date	August 12, 2017	August 13, 2017
Temperature / Humidity	23 deg. C / 56 % RH	25 deg. C / 55 % RH
Engineer	Hiroyuki Morikawa	Hikaru Shirasawa
	(1 GHz -13 GHz)	(13 GHz -26 GHz)
Mode	Tx 11n-20 2437 MHz	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4874.000	PK	48.68	31.28	5.67	41.77	2.37	46.23	73.90	27.6	324	264	
Hori.	6498.699	PK	49.72	34.70	6.42	41.32	2.37	51.89	73.90	22.0	338	278	
Hori.	7311.000	PK	46.43	36.74	6.85	41.26	2.37	51.13	73.90	22.7	150	0	
Hori.	9748.000	PK	44.41	38.74	7.78	40.62	2.37	52.68	73.90	21.2	150	0	
Hori.	12185.000	PK	42.68	39.30	8.76	40.17	2.37	52.94	73.90	20.9	150	0	
Hori.	6498.699	AV	43.79	34.70	6.42	41.32	2.37	45.96	53.90	7.9	338	278	
Vert.	4874.000	PK	49.10	31.28	5.67	41.77	2.37	46.65	73.90	27.2	100	305	
Vert.	6498.668	PK	50.26	34.69	6.42	41.32	2.37	52.42	73.90	21.4	100	330	
Vert.	7311.000	PK	45.61	36.74	6.85	41.26	2.37	50.31	73.90	23.5	150	0	
Vert.	9748.000	PK	44.53	38.74	7.78	40.62	2.37	52.80	73.90	21.1	150	0	
Vert.	12185.000	PK	43.03	39.30	8.76	40.17	2.37	53.29	73.90	20.6	150	0	
Vert.	6498.668	AV	45.61	34.69	6.42	41.32	2.37	47.77	53.90	**6.1**	100	330	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.94 m / 3.0 m) = 2.37 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.	4874.000	AV	42.07	31.28	5.67	41.77	1.80	2.37	41.42	53.90	12.5	
Hori.	7311.000	AV	36.86	36.74	6.85	41.26	1.80	2.37	43.36	53.90	10.5	
Hori.	9748.000	AV	34.88	38.74	7.78	40.62	1.80	2.37	44.95	53.90	8.9	
Hori.	12185.000	AV	34.49	39.30	8.76	40.17	1.80	2.37	46.55	53.90	7.4	
Vert.	4874.000	AV	42.94	31.28	5.67	41.77	1.80	2.37	42.29	53.90	11.6	
Vert.	7311.000	AV	37.18	36.74	6.85	41.26	1.80	2.37	43.68	53.90	10.2	
Vert.	9748.000	AV	35.13	38.74	7.78	40.62	1.80	2.37	45.20	53.90	8.7	
Vert.	12185.000	AV	34.75	39.30	8.76	40.17	1.80	2.37	46.81	53.90	**7.1**	

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 (3.94 m / 3.0 m) = 2.37 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	11925091S-A-R1	
Date	August 12, 2017	August 13, 2017
Temperature / Humidity	23 deg. C / 56 % RH	25 deg. C / 55 % RH
Engineer	Hiroyuki Morikawa	Hikaru Shirasawa
	(1 GHz -13 GHz)	(13 GHz -26 GHz)
Mode	Tx 11n-20 2462 MHz	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	56.98	27.79	13.55	40.81	2.37	59.88	73.90	14.0	176	274	
Hori.	4924.000	PK	48.68	31.38	5.67	41.70	2.37	46.40	73.90	27.5	315	261	
Hori.	6565.323	PK	49.84	34.85	6.47	41.28	2.37	52.25	73.90	21.6	370	275	
Hori.	7386.000	PK	44.68	36.95	6.86	41.32	2.37	49.54	73.90	24.3	150	0	
Hori.	9848.000	PK	42.67	38.81	7.80	40.64	2.37	51.01	73.90	22.8	150	0	
Hori.	12310.000	PK	41.28	39.31	8.76	40.16	2.37	51.56	73.90	22.3	150	0	
Hori.	6565.323	AV	44.72	34.85	6.47	41.28	2.37	47.13	53.90	**6.7**	370	275	
Vert.	2483.500	PK	55.26	27.79	13.55	40.81	2.37	58.16	73.90	15.7	223	270	
Vert.	4924.000	PK	49.25	31.38	5.67	41.70	2.37	46.97	73.90	26.9	102	304	
Vert.	6565.367	PK	49.77	34.85	6.47	41.28	2.37	52.18	73.90	21.7	143	283	
Vert.	7386.000	PK	45.56	36.95	6.86	41.32	2.37	50.42	73.90	23.4	150	0	
Vert.	9848.000	PK	43.79	38.81	7.80	40.64	2.37	52.13	73.90	21.7	150	0	
Vert.	12310.000	PK	41.55	39.31	8.76	40.16	2.37	51.83	73.90	22.0	150	0	
Vert.	6565.367	AV	44.79	34.85	6.47	41.28	2.37	47.20	53.90	**6.7**	143	283	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.94 m / 3.0 m) = 2.37 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	44.73	27.79	13.55	40.81	1.80	2.37	49.43	53.90	**4.5**	*1)
Hori.	4924.000	AV	41.79	31.38	5.67	41.70	1.80	2.37	41.31	53.90	12.6	
Hori.	7386.000	AV	36.64	36.95	6.86	41.32	1.80	2.37	43.30	53.90	10.6	
Hori.	9848.000	AV	34.52	38.81	7.80	40.64	1.80	2.37	44.66	53.90	9.2	
Hori.	12310.000	AV	33.14	39.31	8.76	40.16	1.80	2.37	45.22	53.90	8.7	
Vert.	2483.500	AV	43.84	27.79	13.55	40.81	1.80	2.37	48.54	53.90	5.4	*1)
Vert.	4924.000	AV	42.95	31.38	5.67	41.70	1.80	2.37	42.47	53.90	11.4	
Vert.	7386.000	AV	36.55	36.95	6.86	41.32	1.80	2.37	43.21	53.90	10.7	
Vert.	9848.000	AV	34.62	38.81	7.80	40.64	1.80	2.37	44.76	53.90	9.1	
Vert.	12310.000	AV	32.79	39.31	8.76	40.16	1.80	2.37	44.87	53.90	9.0	

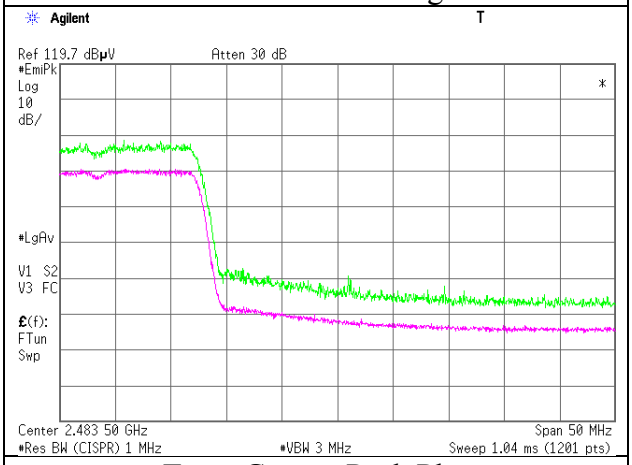
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.94 m / 3.0 m) = 2.37 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11925091S-A-R1
Date	August 12, 2017
Temperature / Humidity	23 deg. C / 56 % RH
Engineer	Hiroyuki Morikawa
	(1 GHz -13 GHz)
Mode	Tx 11n-20 2462 MHz

Horizontal

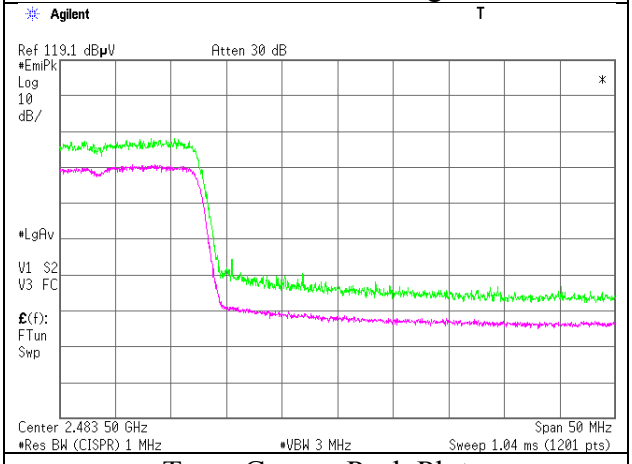
Restricted-band band-edge Plot



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

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11925091S-A-R1		
Date	August 11, 2017	August 13, 2017	August 15, 2017
Temperature / Humidity	27 deg. C / 49 % RH	25 deg. C / 55 % RH	24 deg. C / 61 % RH
Engineer	Hikaru Shirasawa (1 GHz -13 GHz)	Hikaru Shirasawa (13 GHz -26 GHz)	Hiroyuki Morikawa (30 MHz -1 GHz)
Mode	Tx BT LE 2402 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.	71.091	QP	52.00	6.28	7.03	32.10	0.00	33.21	40.00	**6.7**	400	261	
Hori.	71.588	QP	49.00	6.27	7.07	32.10	0.00	30.24	40.00	9.7	252	79	
Hori.	100.223	QP	44.50	10.01	7.52	32.08	0.00	29.95	43.50	13.5	298	108	
Hori.	140.784	QP	39.50	14.34	7.77	32.04	0.00	29.57	43.50	13.9	200	101	
Hori.	143.990	QP	41.90	14.52	7.83	32.04	0.00	32.21	43.50	11.2	231	288	
Hori.	199.198	QP	37.50	16.23	7.99	31.99	0.00	29.73	43.50	13.7	166	304	
Hori.	300.056	QP	30.40	13.39	8.72	31.92	0.00	20.59	46.00	25.4	100	50	
Hori.	2390.000	PK	45.90	27.41	13.48	40.85	2.37	48.31	73.90	25.5	142	32	
Hori.	4804.000	PK	47.69	31.13	5.65	41.86	2.37	44.98	73.90	28.9	150	359	
Hori.	7206.000	PK	46.55	36.44	6.83	41.18	2.37	51.01	73.90	22.8	150	0	
Hori.	9608.000	PK	45.24	38.63	7.75	40.59	2.37	53.40	73.90	20.5	100	359	
Hori.	12010.000	PK	45.98	39.28	8.79	40.20	2.37	56.22	73.90	17.6	100	0	
Hori.	2390.000	AV	36.98	27.41	13.48	40.85	2.37	39.39	53.90	14.5	142	32	
Hori.	4804.000	AV	37.67	31.13	5.65	41.86	2.37	34.96	53.90	18.9	150	359	
Hori.	7206.000	AV	36.19	36.44	6.83	41.18	2.37	40.65	53.90	13.2	150	0	
Hori.	9608.000	AV	35.29	38.63	7.75	40.59	2.37	43.45	53.90	10.4	100	359	
Hori.	12010.000	AV	35.65	39.28	8.79	40.20	2.37	45.89	53.90	8.0	100	0	
Vert.	68.206	QP	42.30	6.56	6.83	32.11	0.00	23.58	40.00	16.4	100	166	
Vert.	71.591	QP	45.80	6.27	7.07	32.10	0.00	27.04	40.00	12.9	189	174	
Vert.	100.225	QP	46.60	10.01	7.52	32.08	0.00	32.05	43.50	11.4	100	228	
Vert.	143.270	QP	42.90	14.48	7.81	32.04	0.00	33.15	43.50	10.3	100	252	
Vert.	199.502	QP	35.50	16.23	8.00	31.99	0.00	27.74	43.50	15.7	100	296	
Vert.	269.885	QP	34.80	12.36	8.56	31.92	0.00	23.80	46.00	22.2	100	288	
Vert.	2390.000	PK	46.12	27.41	13.48	40.85	2.37	48.53	73.90	25.3	218	198	
Vert.	4804.000	PK	47.19	31.13	5.65	41.86	2.37	44.48	73.90	29.4	100	359	
Vert.	7206.000	PK	46.03	36.44	6.83	41.18	2.37	50.49	73.90	23.4	100	0	
Vert.	9608.000	PK	45.18	38.63	7.75	40.59	2.37	53.34	73.90	20.5	100	359	
Vert.	12010.000	PK	45.37	39.28	8.79	40.20	2.37	55.61	73.90	18.2	100	0	
Vert.	2390.000	AV	36.86	27.41	13.48	40.85	2.37	39.27	53.90	14.6	218	198	
Vert.	4804.000	AV	37.72	31.13	5.65	41.86	2.37	35.01	53.90	18.9	100	359	
Vert.	7206.000	AV	36.39	36.44	6.83	41.18	2.37	40.85	53.90	13.0	100	0	
Vert.	9608.000	AV	35.25	38.63	7.75	40.59	2.37	43.41	53.90	10.5	100	359	
Vert.	12010.000	AV	36.05	39.28	8.79	40.20	2.37	46.29	53.90	7.6	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.94 m / 3.0 m) = 2.37 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

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

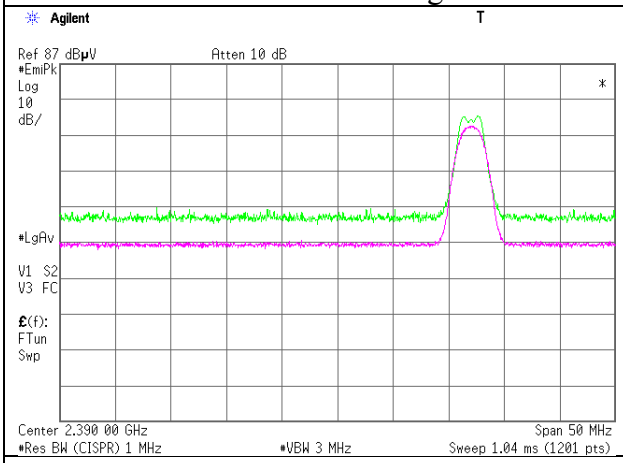
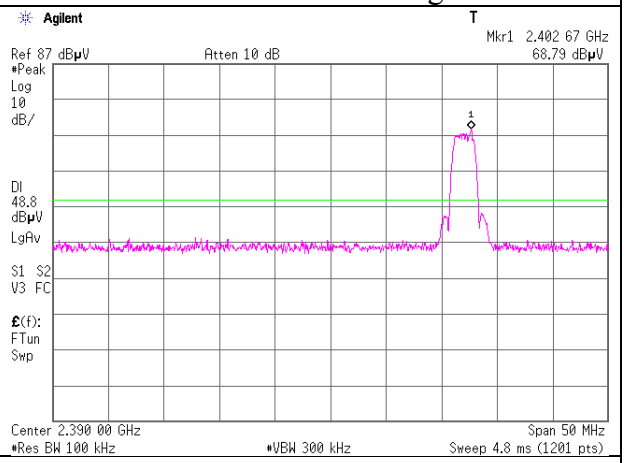
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	68.58	27.46	13.49	40.84	2.37	71.06	-	-	Carrier
Hori.	2400.000	PK	43.63	27.45	13.49	40.84	2.37	46.10	51.06	5.0	
Vert.	2402.000	PK	70.09	27.46	13.49	40.84	2.37	72.57	-	-	Carrier
Vert.	2400.000	PK	45.72	27.45	13.49	40.84	2.37	48.19	52.57	4.4	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.94 m / 3.0 m) = 2.37 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

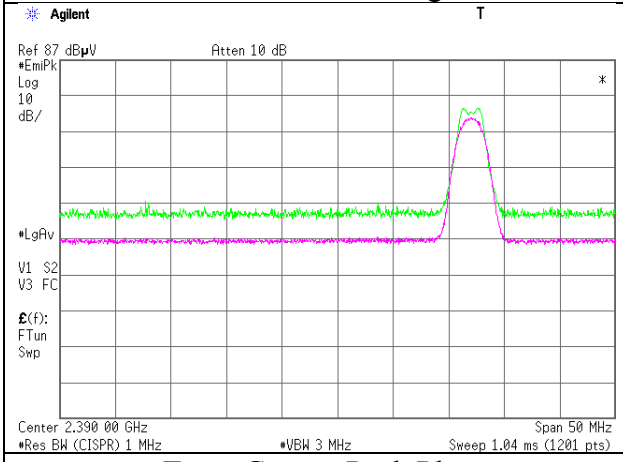
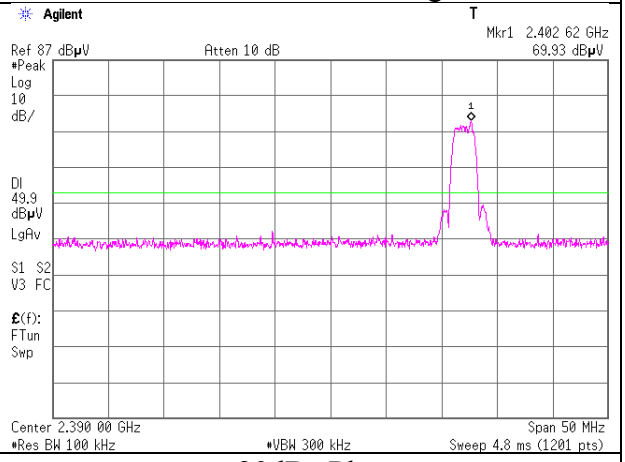
Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11925091S-A-R1
Date	August 11, 2017
Temperature / Humidity	27 deg. C / 49 % RH
Engineer	Hikaru Shirasawa
	(1 GHz -13 GHz)
Mode	Tx BT LE 2402 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.3 Semi Anechoic Chamber		
Report No.	11925091S-A-R1		
Date	August 11, 2017	August 13, 2017	August 15, 2017
Temperature / Humidity	27 deg. C / 49 % RH	25 deg. C / 55 % RH	24 deg. C / 61 % RH
Engineer	Hikaru Shirasawa (1 GHz -13 GHz)	Hikaru Shirasawa (13 GHz -26 GHz)	Hiroyuki Morikawa (30 MHz -1 GHz)
Mode	Tx BT LE 2440 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.	65.278	QP	51.60	7.00	6.66	32.11	0.00	33.15	40.00	**6.8**	400	254	
Hori.	71.586	QP	49.60	6.27	7.07	32.10	0.00	30.84	40.00	9.1	255	84	
Hori.	100.223	QP	45.30	10.01	7.52	32.08	0.00	30.75	43.50	12.7	305	109	
Hori.	144.003	QP	40.40	14.52	7.83	32.04	0.00	30.71	43.50	12.7	233	286	
Hori.	199.334	QP	35.30	16.23	8.00	31.99	0.00	27.54	43.50	15.9	158	304	
Hori.	305.454	QP	34.00	13.51	8.75	31.91	0.00	24.35	46.00	21.6	100	321	
Hori.	4880.000	PK	47.35	31.29	5.66	41.76	2.37	44.91	73.90	28.9	150	359	
Hori.	7320.000	PK	46.23	36.77	6.85	41.27	2.37	50.95	73.90	22.9	150	0	
Hori.	9760.000	PK	43.85	38.75	7.79	40.62	2.37	52.14	73.90	21.7	150	359	
Hori.	12200.000	PK	43.77	39.30	8.77	40.17	2.37	54.04	73.90	19.8	150	0	
Hori.	4880.000	AV	37.82	31.29	5.66	41.76	2.37	35.38	53.90	18.5	150	359	
Hori.	7320.000	AV	36.86	36.77	6.85	41.27	2.37	41.58	53.90	12.3	150	0	
Hori.	9760.000	AV	34.31	38.75	7.79	40.62	2.37	42.60	53.90	11.3	150	359	
Hori.	12200.000	AV	34.87	39.30	8.77	40.17	2.37	45.14	53.90	8.7	150	0	
Vert.	64.972	QP	48.60	7.05	6.64	32.11	0.00	30.18	40.00	9.8	100	152	
Vert.	71.595	QP	45.90	6.27	7.07	32.10	0.00	27.14	40.00	12.8	197	172	
Vert.	100.226	QP	47.10	10.01	7.52	32.08	0.00	32.55	43.50	10.9	100	230	
Vert.	143.994	QP	40.70	14.52	7.83	32.04	0.00	31.01	43.50	12.4	100	262	
Vert.	199.339	QP	31.60	16.23	8.00	31.99	0.00	23.84	43.50	19.6	100	295	
Vert.	239.983	QP	31.50	11.62	8.38	31.94	0.00	19.56	46.00	26.4	100	316	
Vert.	4880.000	PK	47.97	31.29	5.66	41.76	2.37	45.53	73.90	28.3	150	0	
Vert.	7320.000	PK	46.97	36.77	6.85	41.27	2.37	51.69	73.90	22.2	150	359	
Vert.	9760.000	PK	44.34	38.75	7.79	40.62	2.37	52.63	73.90	21.2	150	0	
Vert.	12200.000	PK	44.10	39.30	8.77	40.17	2.37	54.37	73.90	19.5	150	359	
Vert.	4880.000	AV	37.76	31.29	5.66	41.76	2.37	35.32	53.90	18.5	150	0	
Vert.	7320.000	AV	37.40	36.77	6.85	41.27	2.37	42.12	53.90	11.7	150	359	
Vert.	9760.000	AV	35.40	38.75	7.79	40.62	2.37	43.69	53.90	10.2	150	0	
Vert.	12200.000	AV	34.88	39.30	8.77	40.17	2.37	45.15	53.90	8.7	150	359	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.94 m / 3.0 m) = 2.37 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11925091S-A-R1		
Date	August 11, 2017	August 13, 2017	August 15, 2017
Temperature / Humidity	27 deg. C / 49 % RH	25 deg. C / 55 % RH	24 deg. C / 61 % RH
Engineer	Hikaru Shirasawa (1 GHz -13 GHz)	Hikaru Shirasawa (13 GHz -26 GHz)	Hiroyuki Morikawa (30 MHz -1 GHz)
Mode	Tx BT LE 2480 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.	64.725	QP	50.00	7.09	6.65	32.11	0.00	31.63	40.00	**8.3**	300	259	
Hori.	71.587	QP	49.50	6.27	7.07	32.10	0.00	30.74	40.00	9.2	253	88	
Hori.	100.223	QP	45.10	10.01	7.52	32.08	0.00	30.55	43.50	12.9	300	107	
Hori.	144.001	QP	40.30	14.52	7.83	32.04	0.00	30.61	43.50	12.8	232	287	
Hori.	199.336	QP	37.20	16.23	8.00	31.99	0.00	29.44	43.50	14.0	160	309	
Hori.	305.357	QP	34.00	13.51	8.75	31.91	0.00	24.35	46.00	21.6	100	316	
Hori.	2483.500	PK	46.00	27.79	13.55	40.81	2.37	48.90	73.90	25.0	155	34	
Hori.	4960.000	PK	46.83	31.45	5.68	41.65	2.37	44.68	73.90	29.2	150	359	
Hori.	7440.896	PK	45.03	37.11	6.86	41.36	2.37	50.01	73.90	23.8	150	0	
Hori.	9920.000	PK	42.93	38.87	7.83	40.66	2.37	51.34	73.90	22.5	150	359	
Hori.	12400.000	PK	42.42	39.32	8.74	40.14	2.37	52.71	73.90	21.1	150	0	
Hori.	2483.500	AV	37.16	27.79	13.55	40.81	2.37	40.06	53.90	13.8	155	34	
Hori.	4960.000	AV	37.24	31.45	5.68	41.65	2.37	35.09	53.90	18.8	150	359	
Hori.	7440.896	AV	35.83	37.11	6.86	41.36	2.37	40.81	53.90	13.0	150	0	
Hori.	9920.000	AV	33.92	38.87	7.83	40.66	2.37	42.33	53.90	11.5	150	359	
Hori.	12400.000	AV	32.89	39.32	8.74	40.14	2.37	43.18	53.90	10.7	150	0	
Vert.	64.901	QP	49.30	7.06	6.64	32.11	0.00	30.89	40.00	9.1	100	171	
Vert.	71.592	QP	45.70	6.27	7.07	32.10	0.00	26.94	40.00	13.0	190	173	
Vert.	100.225	QP	46.80	10.01	7.52	32.08	0.00	32.25	43.50	11.2	100	229	
Vert.	143.993	QP	41.20	14.52	7.83	32.04	0.00	31.51	43.50	11.9	100	260	
Vert.	199.340	QP	31.20	16.23	8.00	31.99	0.00	23.44	43.50	20.0	100	295	
Vert.	270.095	QP	31.90	12.37	8.56	31.92	0.00	20.91	46.00	25.0	100	246	
Vert.	2483.500	PK	47.04	27.79	13.55	40.81	2.37	49.94	73.90	23.9	225	203	
Vert.	4960.000	PK	46.99	31.45	5.68	41.65	2.37	44.84	73.90	29.0	150	0	
Vert.	7440.000	PK	45.54	37.11	6.86	41.36	2.37	50.52	73.90	23.3	150	359	
Vert.	9920.000	PK	44.07	38.87	7.83	40.66	2.37	52.48	73.90	21.4	150	0	
Vert.	12400.000	PK	42.37	39.32	8.74	40.14	2.37	52.66	73.90	21.2	150	359	
Vert.	2483.500	AV	37.14	27.79	13.55	40.81	2.37	40.04	53.90	13.8	225	203	
Vert.	4960.000	AV	37.56	31.45	5.68	41.65	2.37	35.41	53.90	18.4	150	0	
Vert.	7440.000	AV	36.24	37.11	6.86	41.36	2.37	41.22	53.90	12.6	150	359	
Vert.	9920.000	AV	34.29	38.87	7.83	40.66	2.37	42.70	53.90	11.2	150	0	
Vert.	12400.000	AV	33.04	39.32	8.74	40.14	2.37	43.33	53.90	10.5	150	359	

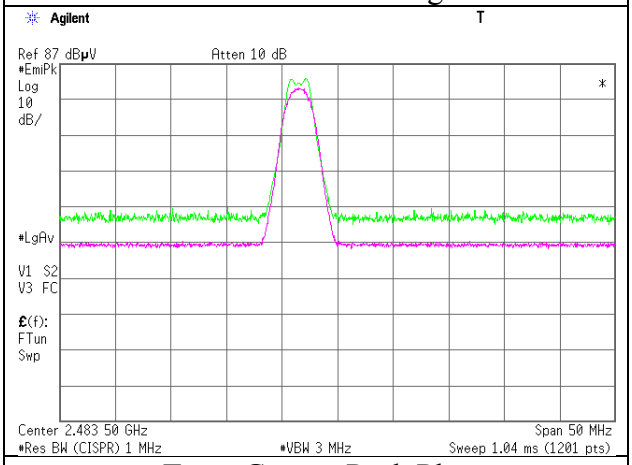
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.94 m / 3.0 m) = 2.37 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11925091S-A-R1
Date	August 11, 2017
Temperature / Humidity	27 deg. C / 49 % RH
Engineer	Hikaru Shirasawa
	(1 GHz -13 GHz)
Mode	Tx BT LE 2480 MHz

Horizontal

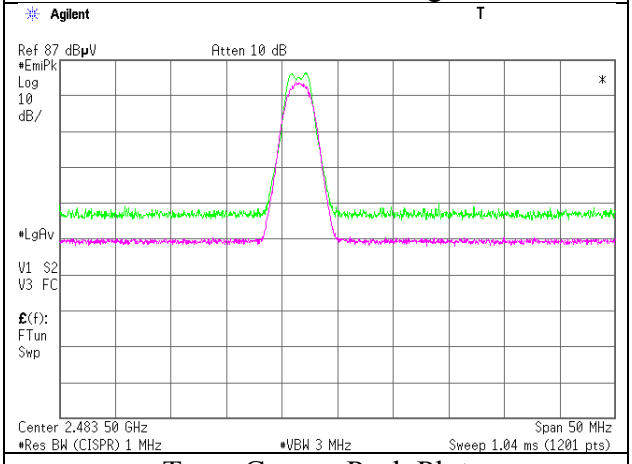
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot

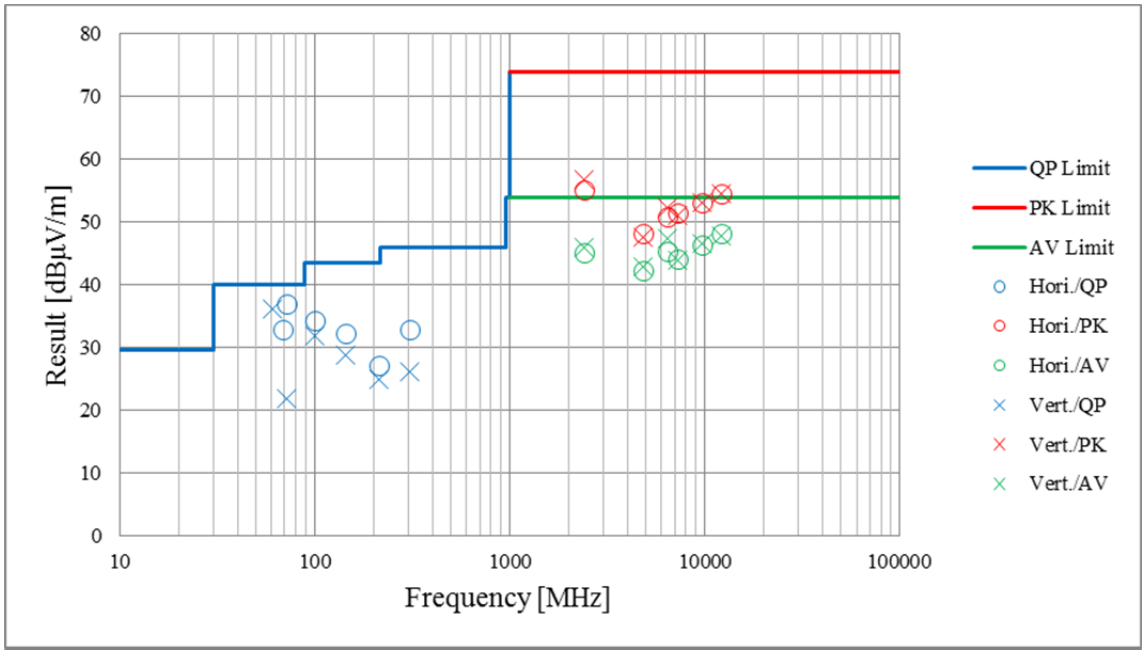


Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission
(Plot data, Worst case)

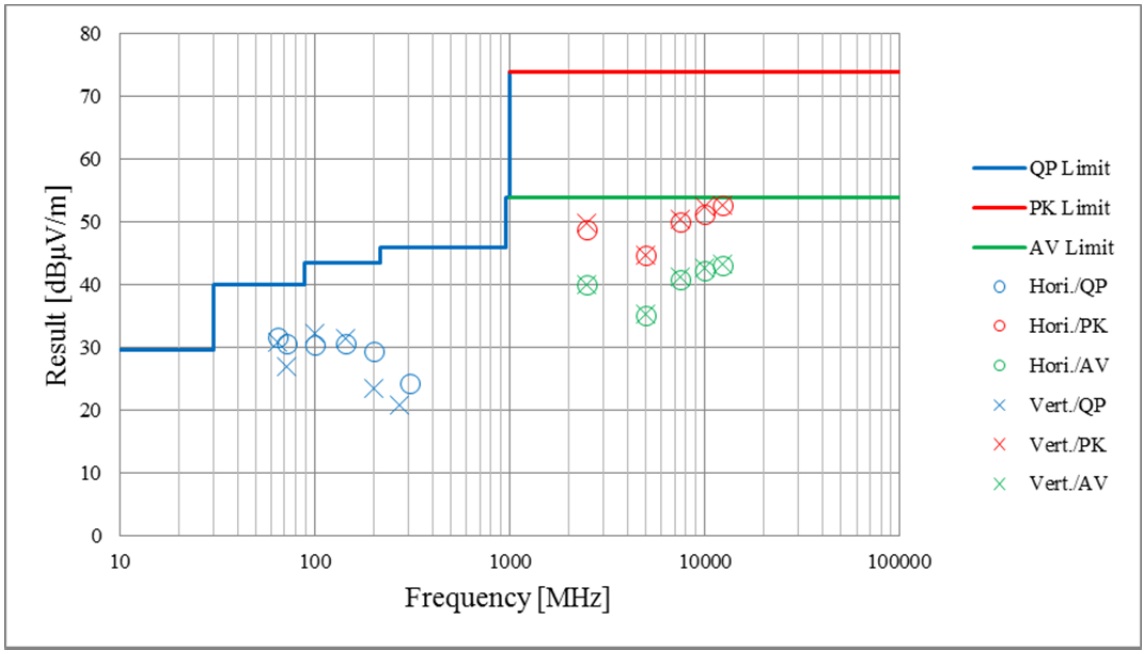
Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11925091S-A-R1		
Date	August 12, 2017	August 13, 2017	August 15, 2017
Temperature / Humidity	23 deg. C / 56 % RH	25 deg. C / 55 % RH	24 deg. C / 61 % RH
Engineer	Hiroyuki Morikawa (1 GHz -13 GHz)	Hikaru Shirasawa (13 GHz -26 GHz)	Hiroyuki Morikawa (30 GHz -1 GHz)
Mode	Tx 11n-20 2412 MHz		



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

Radiated Spurious Emission
(Plot data, Worst case)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11925091S-A-R1		
Date	August 11, 2017	August 13, 2017	August 15, 2017
Temperature / Humidity	27 deg. C / 49 % RH	25 deg. C / 55 % RH	24 deg. C / 61 % RH
Engineer	Hikaru Shirasawa (1 GHz -13 GHz)	Hikaru Shirasawa (13 GHz -26 GHz)	Hiroyuki Morikawa (30 MHz -1 GHz)
Mode	Tx BT LE 2480 MHz		

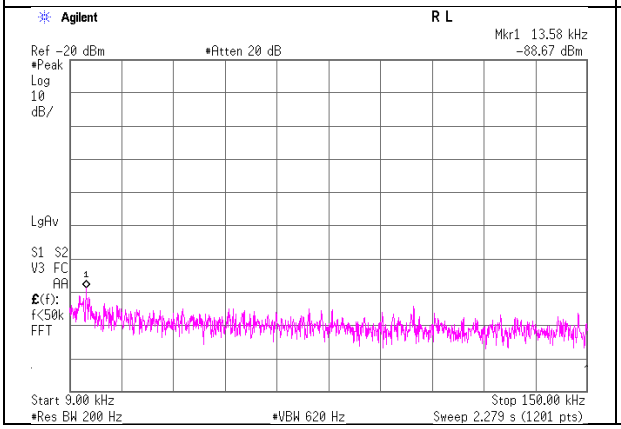


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

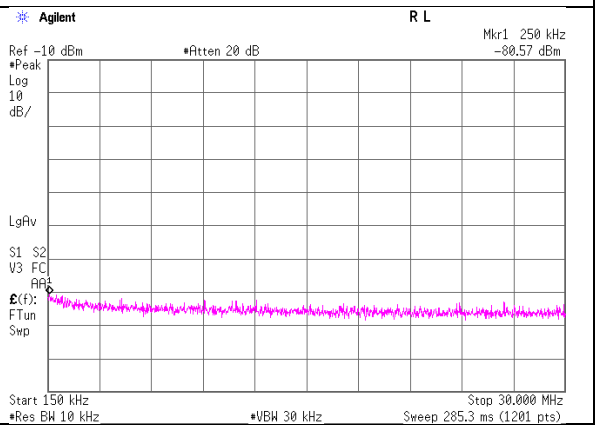
Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11925091S-A-R1
Date	August 21, 2017
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Yosuke Ishikawa
Mode	Tx 11n-20 2412 MHz

9 kHz - 150 kHz



150 kHz - 30 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
13.58	-88.67	0.01	9.5	3.7	1	-75.4	300	6.0	-14.2	44.9	59.1	
250.00	-80.57	0.02	9.5	3.7	1	-67.3	300	6.0	-6.1	19.6	25.7	

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

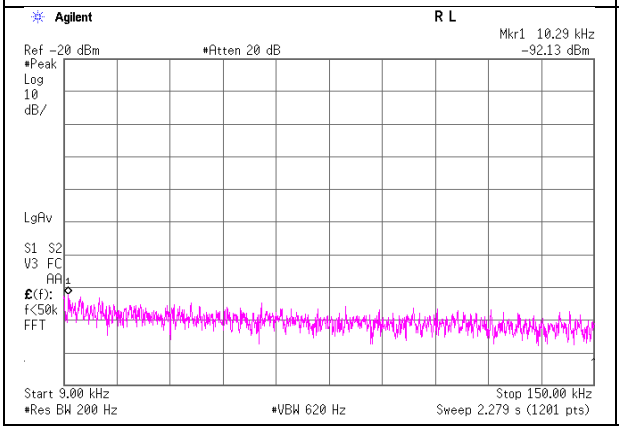
EIRP[dBm] = Reading [dBm] + Cable loss [dB] + Attenuator Loss [dB] + Antenna gain [dBi] + 10 * log (N)

N: Number of output

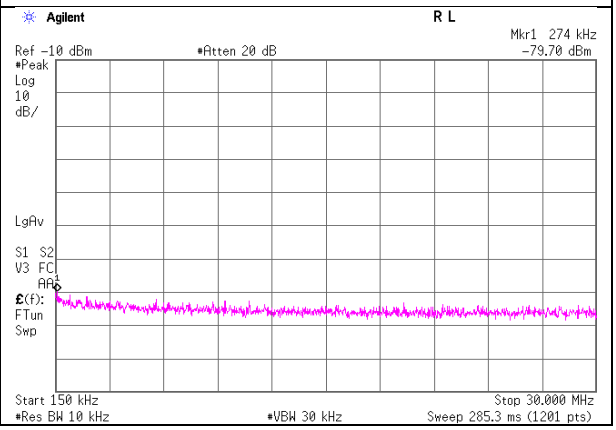
Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11925091S-A-R1
Date	August 22, 2017
Temperature / Humidity	24 deg. C / 41% RH
Engineer	Makoto Hosaka
Mode	Tx BT LE 2402 MHz

9 kHz - 150 kHz



150 kHz - 30 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
10.29	-92.13	0.01	9.5	3.7	1	-78.9	300	6.0	-17.6	47.3	64.9	
274.00	-79.70	0.02	9.5	3.7	1	-66.5	300	6.0	-5.2	18.8	24.0	

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

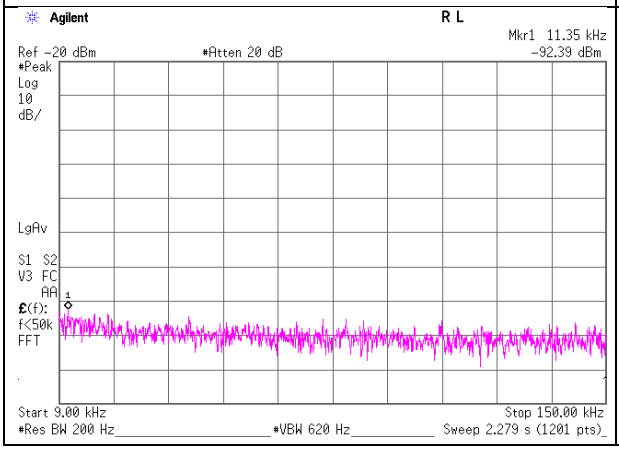
EIRP[dBm] = Reading [dBm] + Cable loss [dB] + Attenuator Loss [dB] + Antenna gain [dBi] + 10 * log (N)

N: Number of output

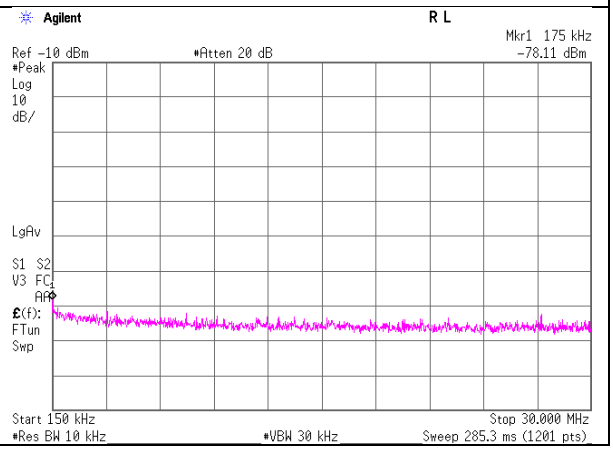
Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11925091S-A-R1
Date	August 22, 2017
Temperature / Humidity	24 deg. C / 41 % RH
Engineer	Makoto Hosaka
Mode	Tx BT LE 2440 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
11.35	-92.39	0.01	9.5	3.7	1	-79.2	300	6.0	-17.9	46.5	64.4	
175.00	-78.11	0.02	9.5	3.7	1	-64.9	300	6.0	-3.6	22.7	26.3	

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

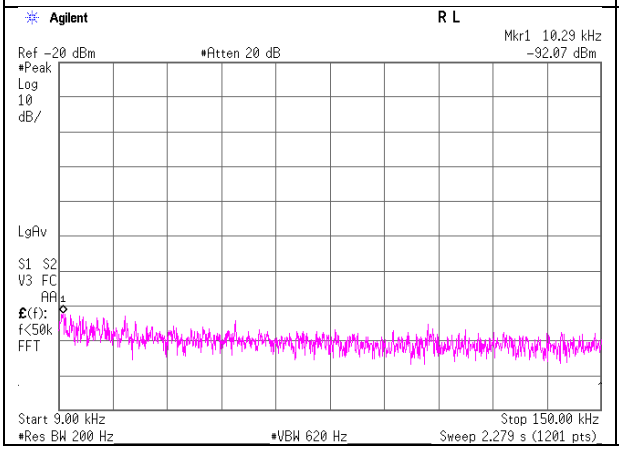
EIRP[dBm] = Reading [dBm] + Cable loss [dB] + Attenuator Loss [dB] + Antenna gain [dBi] + 10 * log (N)

N: Number of output

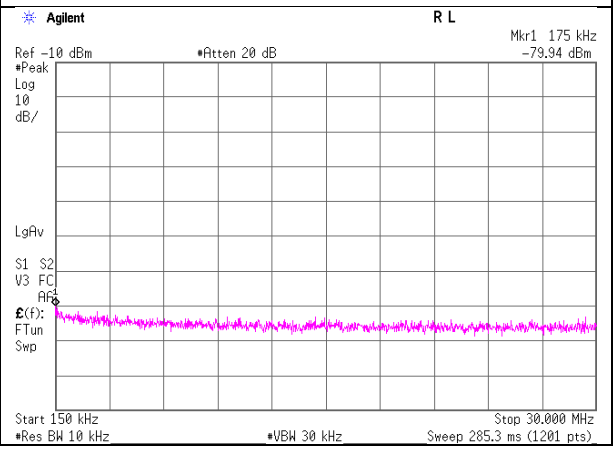
Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11925091S-A-R1
Date	August 22, 2017
Temperature / Humidity	24 deg. C / 41 % RH
Engineer	Makoto Hosaka
Mode	Tx BT LE 2480 MHz

9 kHz - 150 kHz



150 kHz - 30 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
10.29	-92.07	0.01	9.5	3.7	1	-78.8	300	6.0	-17.6	47.3	64.9	
175.00	-79.94	0.02	9.5	3.7	1	-66.7	300	6.0	-5.4	22.7	28.1	

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

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

N: Number of output

Power Density

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11925091S-A-R1
Date	August 21, 2017
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Yosuke Ishikawa
Mode	Tx

11b

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-19.60	1.99	9.64	-7.97	8.00	15.97
2437.00	-20.78	2.00	9.64	-9.14	8.00	17.14
2462.00	-19.42	2.00	9.65	-7.77	8.00	15.77

11g

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-23.08	1.99	9.64	-11.45	8.00	19.45
2437.00	-22.21	2.00	9.64	-10.57	8.00	18.57
2462.00	-23.38	2.00	9.65	-11.73	8.00	19.73

11n-20

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-24.02	1.99	9.64	-12.39	8.00	20.39
2437.00	-23.77	2.00	9.64	-12.13	8.00	20.13
2462.00	-24.24	2.00	9.65	-12.58	8.00	20.58

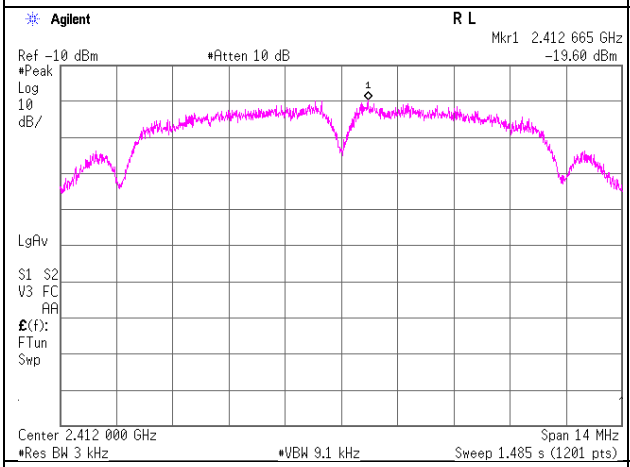
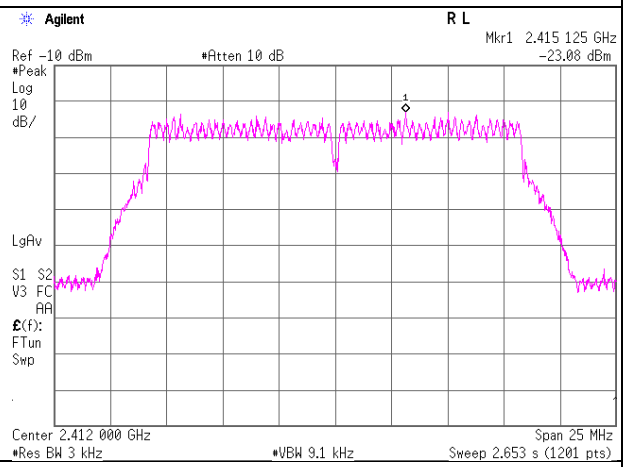
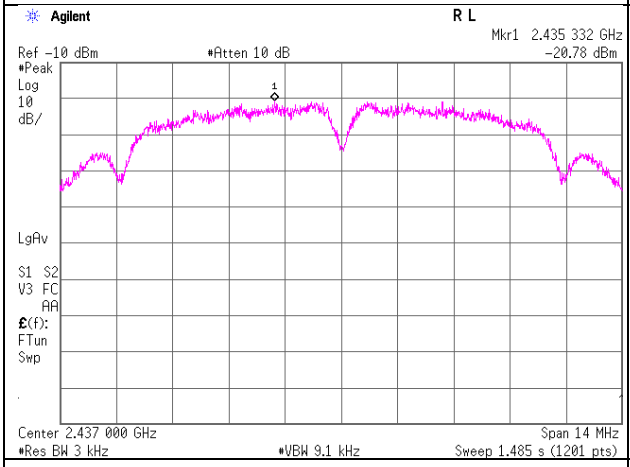
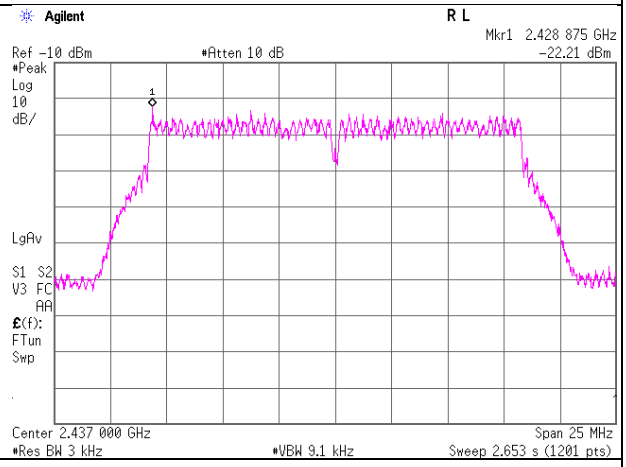
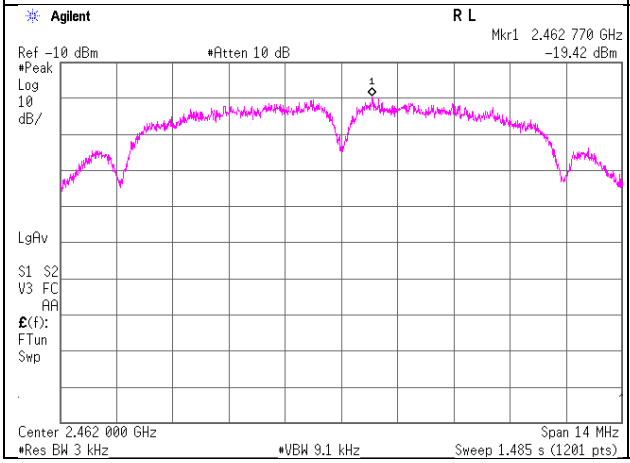
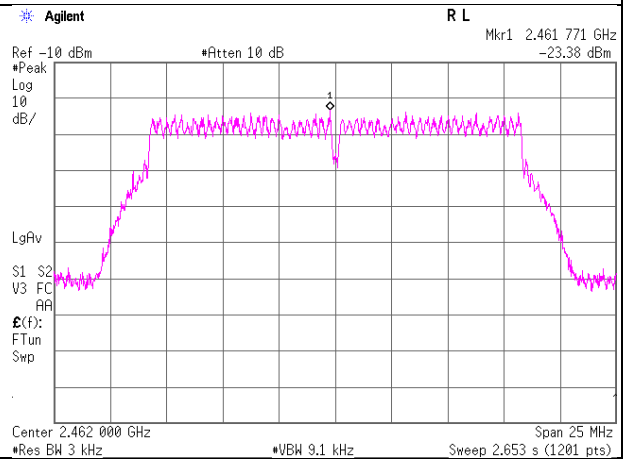
BLE

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2402.00	-26.26	1.77	9.64	-14.85	8.00	22.85
2440.00	-25.49	1.78	9.64	-14.07	8.00	22.07
2480.00	-25.30	1.79	9.65	-13.86	8.00	21.86

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.

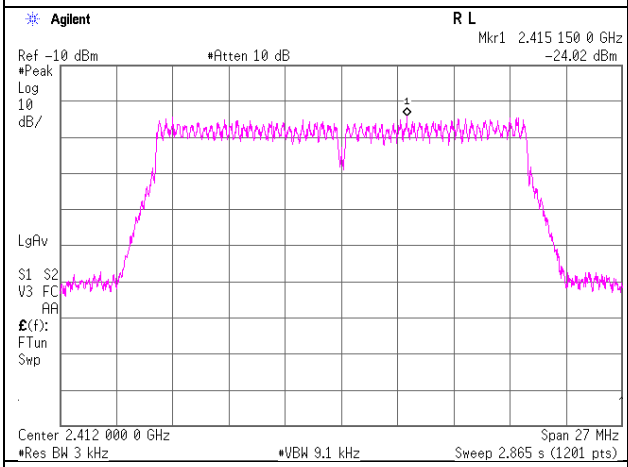
Power Density

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

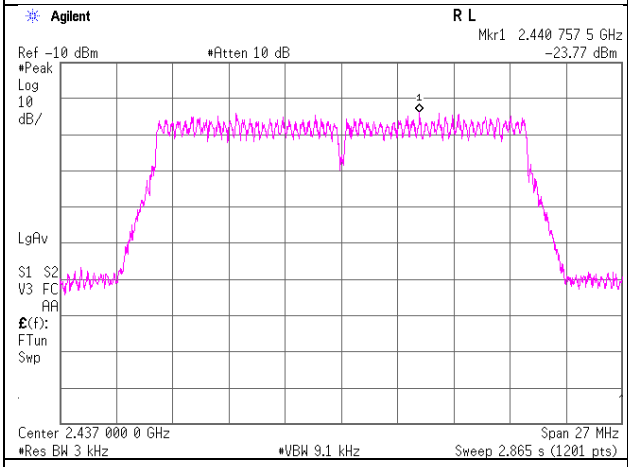
Power Density

11n-20

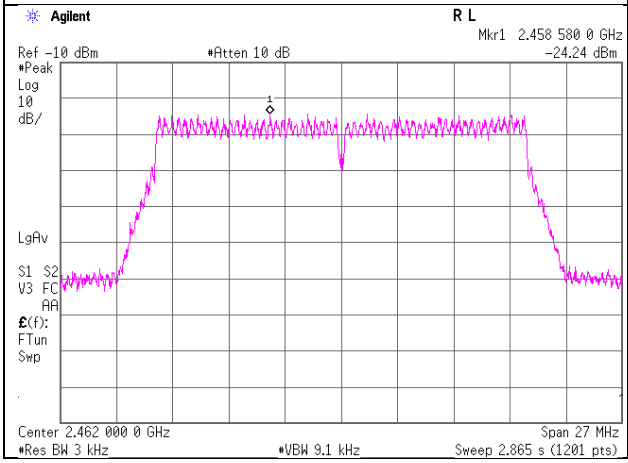
2412 MHz



2437 MHz

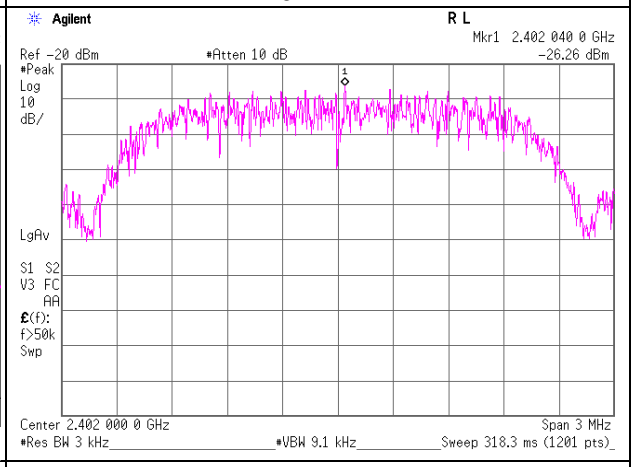


2462 MHz

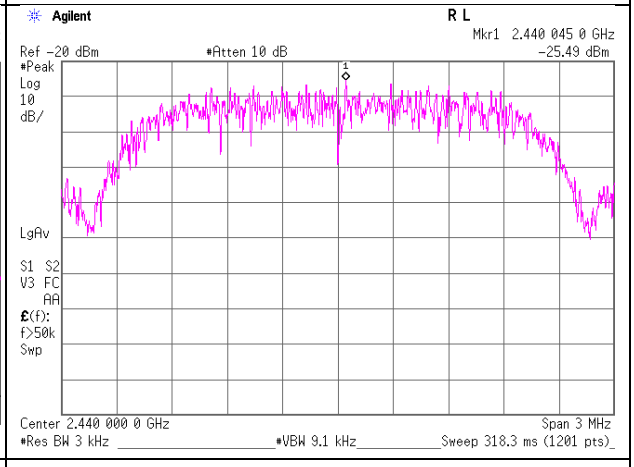


BLE

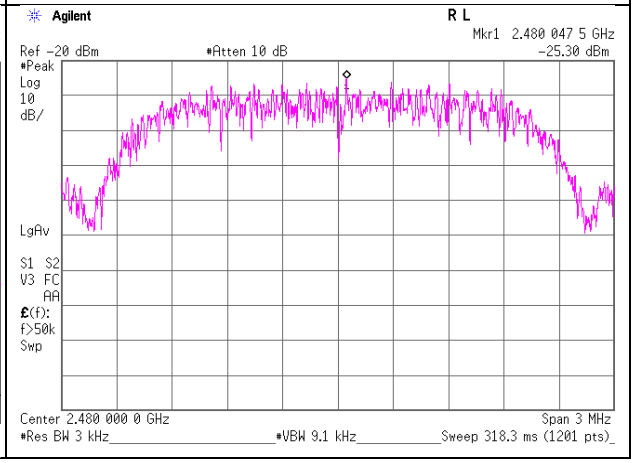
2402 MHz



2440 MHz

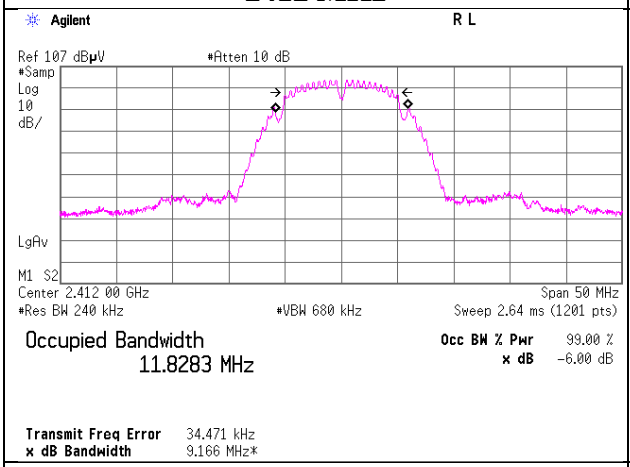
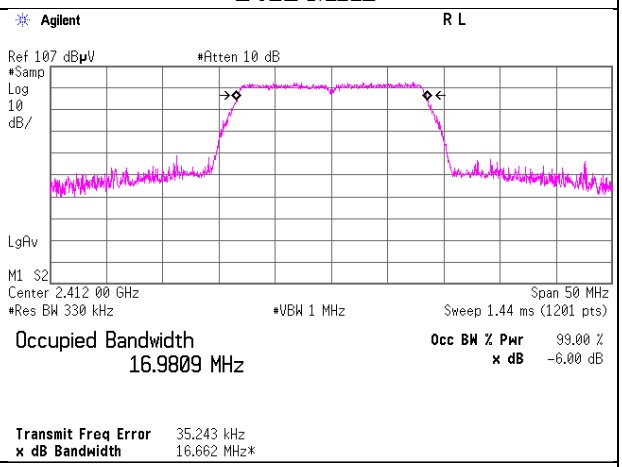
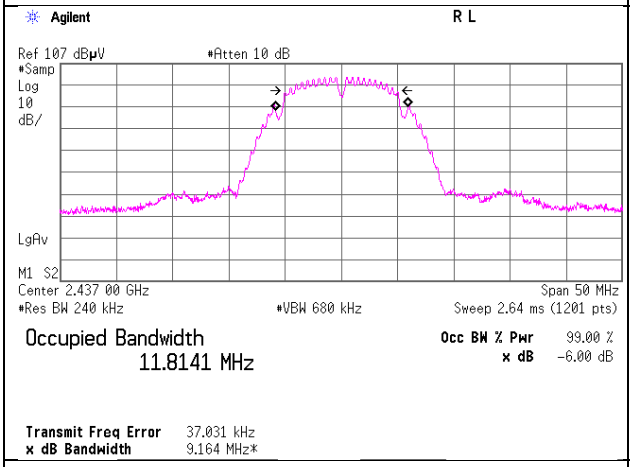
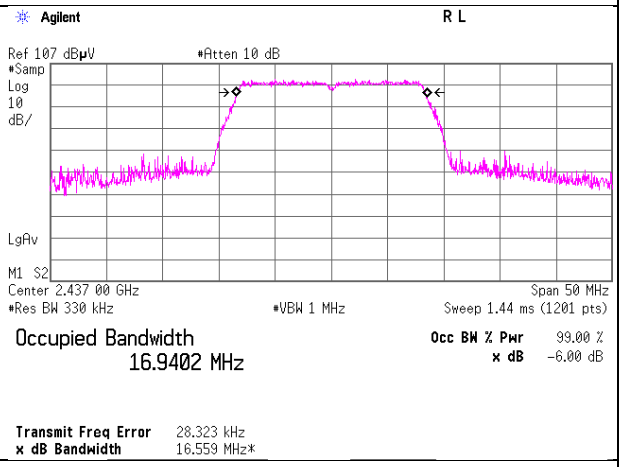
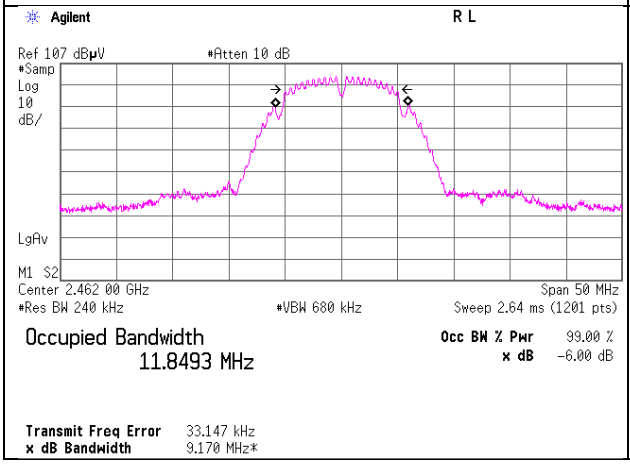
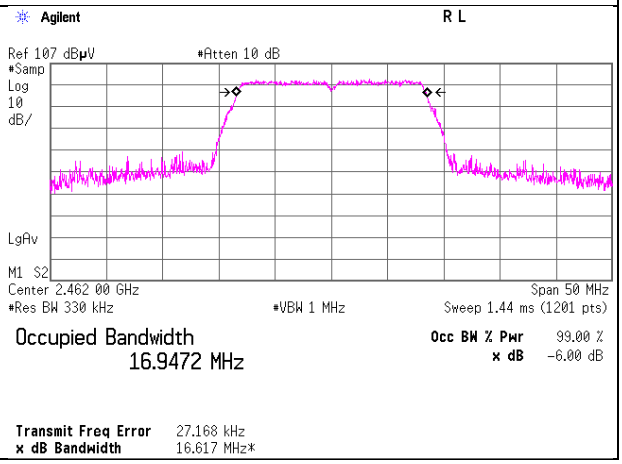


2480 MHz



99%Occupied Bandwidth

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11925091S-A-R1
Date	August 21, 2017
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Yosuke Ishikawa
Mode	Tx

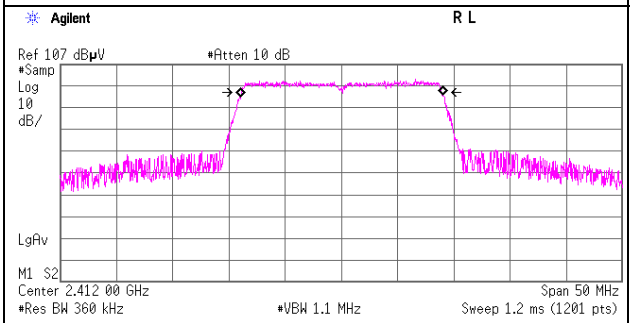
11b	11g
2412 MHz	**2412 MHz**
	
2437 MHz	**2437 MHz**
	
2462 MHz	**2462 MHz**
	

99% Occupied Bandwidth

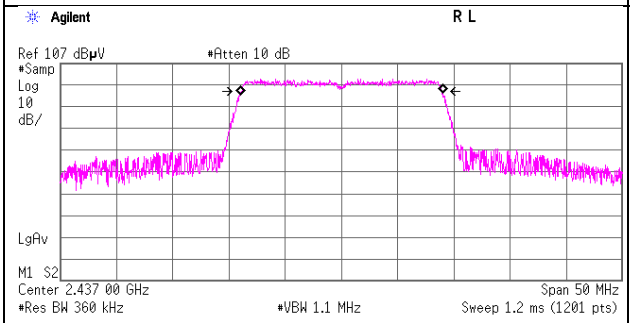
Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11925091S-A-R1
Date	August 21, 2017
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Yosuke Ishikawa
Mode	Tx

11n-20

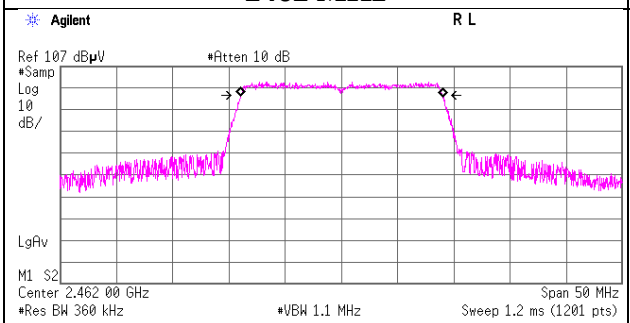
2412 MHz



2437 MHz

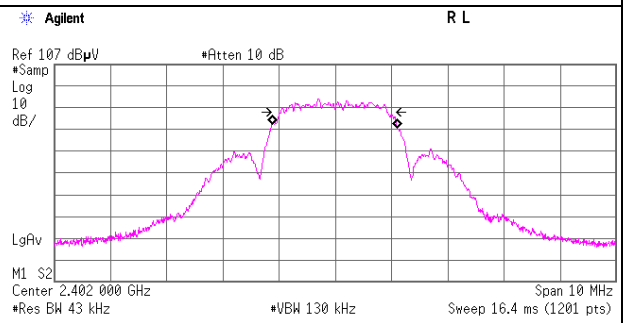


2462 MHz

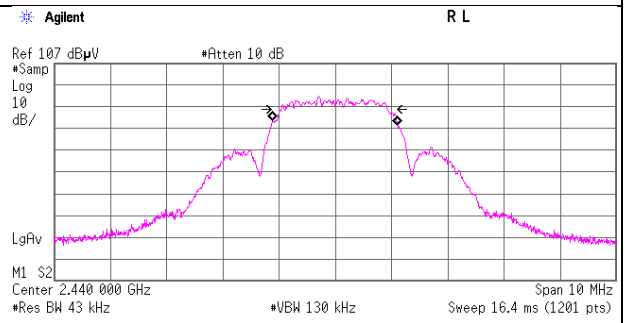


BLE

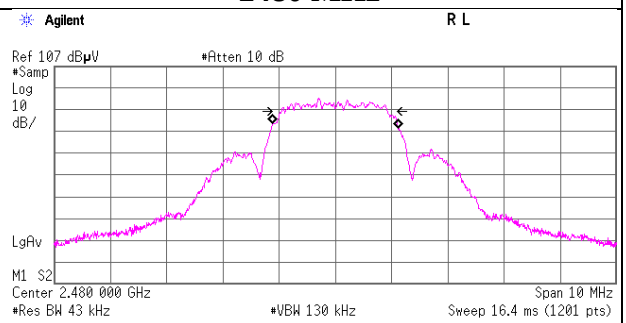
2402 MHz



2440 MHz



2480 MHz



APPENDIX 2: Test instruments

Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
STR-08	Test Receiver	Rohde & Schwarz	ESW44	101581	RE	2016/11/08 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE, CE,RFI,MF)	-	RE,CE	-
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE	2016/10/17 * 12
SAF-04	Pre Amplifier	TOYO Corporation	TPA0118-36	1440489	RE	2017/03/17 * 12
SCC-G07	Coaxial Cable	Junkosha	J12J103316-00	MAY-25-17-008	RE	2017/06/13 * 12
SCC-G43	Coaxial Cable	HUBER+SUHNER	SUCOFLEX_104_E	SN MY 13406/4E	RE	2017/07/10 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE *1)	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
SAEC-03(SVSWR)	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	RE	2017/07/17 * 12
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2016/11/07 * 12
SFL-18	Highpass Filter	MICRO-TRONICS	HPM50111	119	RE	2017/04/20 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM9861	RE	2017/07/11 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2017/03/17 * 12
SCC-G15	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	RE	2017/03/23 * 12
SCC-G33	Coaxial Cable	Junkosha	MWX241-01000 KMSKMS	-	RE	2017/04/20 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2017/06/11 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2016/10/18 * 12
SLA-07	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	196	RE	2017/01/26 * 12
SAT6-08	Attenuator	HIROSE ELECTRIC CO.,LTD.	AT-406(40)	-	RE *1)	2016/08/04 * 12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	RE	2017/04/07 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2017/02/09 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2017/04/25 * 12
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2017/04/25 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	AT	2017/03/07 * 12
SAT10-09	Attenuator	Weinschel Corp.	54A-10	W5692	AT	2016/11/07 * 12
SCC-G14	Coaxial Cable	Suhner	SUCOFLEX 102	31600/2	AT	2017/03/23 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2016/12/13 * 12
KTS-07	Digital Tester	SANWA	PC500	7019232	AT	2016/10/17 * 12
SCC-H17	Microwave cable	RS Pro	R-132G7210 100CO	-	AT	2017/06/13 * 12
SCC-A12/A13/SRSE-01	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4906	-/0901-269(RF Selector)	CE	2017/04/07 * 12
SLS-01	LISN	Rohde & Schwarz	ENV216	100511	CE	2017/02/10 * 12
SLS-02	LISN	Rohde & Schwarz	ENV216	100512	CE	2017/02/10 * 12
SAT3-10	Attenuator	JFW	50HF-003N	-	CE	2017/08/24 * 12
SOS-15	Humidity Indicator	A&D	AD-5681	7478311	CE	2017/02/21 * 12
STM-25	Terminator	TME	CT-01 BP	-	CE	2016/12/15 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	CE	2017/04/12 * 12
KJM-09	Measure	KOMELON	KMC-36	-	CE	-
STS-01	Digital Hitester	Hioki	3805-50	080997812	CE	2016/10/17 * 12

***1) This test equipment was used for the tests before the expiration date of the calibration.**

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

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

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

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