RADIO TEST REPORT

Test Report No. : 12423101S-A-R1

Applicant	:	**Nintendo Co., Ltd.**
Type of Equipment	:	**Game Console**
Model No.	:	**HAC-001(-01)**
FCC ID	:	**BKEHAC001**
Test regulation	:	**FCC Part 15 Subpart C: 2019** **For Permissive Change** **(Radiated Spurious Emission tests only)** * Wireless LAN (2.4 GHz bands) and Bluetooth low energy part
Test Result	:	**Complied (Refer to SECTION 3.2)**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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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. The all test items in this test report are conducted by UL Japan, Inc. Shonan EMC Lab.
8. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
9. The information provided from the customer for this report is identified in SECTION 1.
10. This report is a revised version of 12423101S-A. 12423101S-A is replaced with this report.

Date of test: July 24 to September 8, 2018

Representative test engineer:
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Consumer Technology Division

RTL02610

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

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REVISION HISTORY

Original Test Report No.: 12423101S-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	12423101S-A	June 25, 2019	-	-
1	12423101S-A-R1	July 9, 2019	14, 15	Updated to a new waveform
			49, 51	Change in duty factor (3.48 dB => 3.47 dB)

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SECTION 1: Customer information

Company Name	:	Nintendo Co., Ltd.
Address	:	11-1 Hokotate-cho, Kamitoba, Minami-ku, Kyoto 601-8501, Japan
Telephone Number	:	+81 75 662 9600
Facsimile Number	:	+81 75 662 9624
Contact Person	:	Kazuya Kuramoto

The information provided from the customer is as follows;
- Applicant, Type of Equipment, Model No., FCC ID on the cover and other relevant pages
- SECTION 1: Customer information
- SECTION 2: Equipment under test (E.U.T.)
- SECTION 4: Operation of E.U.T. during testing

* The laboratory is exempted from liability of any test results affected from the above information in SECTION 2 and 4.

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

2.1 Identification of E.U.T.

Type of Equipment	:	Game Console
Model No.	:	HAC-001(-01)
Serial No.	:	Refer to SECTION 4.2
Rating	:	AC 100 V – 240 V, 50 Hz/60 Hz AC Adapter output: 15 V, 2.6 A Internal battery: 3.7 V
Receipt Date of Sample (Information from test lab.)	:	July 19, 2018
Country of Mass-production	:	China
Condition of EUT	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No Modification by the test lab.

2.2 Product Description

Model: HAC-001(-01) (referred to as the EUT in this report) is a Game Console.

General Specification

Clock frequency(ies) in the system	:	37.4 MHz

Radio Specification

Radio Type	:	Transceiver
Frequency of Operation	:	Wireless LAN part: 2412 MHz - 2472 MHz, W52: 5180 MHz -5240 MHz, W53: 5260 MHz -5320 MHz, W56: 5500 MHz -5700 MHz *, W58: 5745 MHz -5825 MHz *, Bluetooth part: 2402 MHz - 2480 MHz
Modulation	:	Wireless LAN part: 2.4 GHz bands: DBPSK, DQPSK, CCK, OFDM 5 GHz bands: OFDM Bluetooth part: BDR (Baisc Data Rate): GFSK EDR (Enhanced Data Rate): π/4-DQPSK, 8DPSK LE (Low Energy mode): GFSK
Antenna type	:	PCB Antenna (Dipole)
Antenna connector	:	(Ant: 0): MHF 4L, (Ant: 1): MHF II
Antenna Gain	:	2.4 GHz band: -0.70 dBi max (ANT0: Wireless LAN & Bluetooth), -8.38 dBi max (ANT1: Wireless LAN) 5 GHz band: +3.31 dBi max (ANT0: Wireless LAN), -0.96 dBi max (ANT1: Wireless LAN)
Operation temperature	:	+5 deg.C to +35 deg.C

Remarks: This Wireless Module consists of 1 chip each of 5 GHz band and 2.4 GHz band.

*This model does not have 40MHz Bandwidth mode on W56 and W58.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C FCC Part 15 final revised on June 4, 2019 and effective July 5, 2019 except 15.258
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted limits Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

* The revision on June 4, 2019, does not affect the test specification applied to the EUT.

* Also the EUT complies with FCC Part 15 Subpart B.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Spurious Emission Restricted Band Edges	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05r02	**FCC:** Section15.247(d)	2.7 dB 7311 MHz, AV, Horizontal Tx 11n-40, MIMO 2437 MHz	Complied# a)	Radiated (above 30 MHz) *1)
	IC: RSS-Gen 6.13	**IC:** RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10			
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 15.247 Meas Guidance v05r02 8.5 and 8.6. a) Refer to APPENDIX 1 (data of Radiated Spurious Emission)					
Symbols: Complied — The data of this test item has enough margin, more than the measurement uncertainty. Complied# — The data of this test item meets the limits unless the measurement uncertainty is taken into consideration.					

* 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 constantly to RF Part regardless of input voltage. Therefore, the EUT complies with the requirement.

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

3.3 Addition to standard

No addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

There is no applicable rule of uncertainty in this applied standard. Therefore, the results are derived depending on whether or not laboratory uncertainty is applied.

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor *k*=2.

Shonan EMC Lab.

Item	Frequency range	Uncertainty (+/-)			
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR	No. 4 SAC / SR
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	2.9 dB	2.8 dB	2.9 dB	2.9 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.0 dB	3.0 dB	3.1 dB	-
	30 MHz-200 MHz	4.6 dB	4.6 dB	4.7 dB	-
	200 MHz-1 GHz	6.0 dB	6.0 dB	6.1 dB	-
	1 GHz-6 GHz	4.8 dB	4.8 dB	4.8 dB	-
	6 GHz-18 GHz	5.4 dB	5.4 dB	5.4 dB	-
	18 GHz-40 GHz	5.6 dB	5.6 dB	5.6 dB	-
Radiated emission (Measurement distance: 1 m)	1 GHz-18 GHz	5.7 dB	5.7 dB	5.7 dB	-
	18 GHz-40 GHz	5.9 dB	5.9 dB	5.9 dB	-

SAC=Semi-Anechoic Chamber
SR= Shielded Room is applied besides radiated emission

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 (FCC Test Firm Registration Number: 839876, ISED Lab Company Number: 2973D)

Test site	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Semi-anechoic chamber	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.2 Semi-anechoic chamber	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.3 Semi-anechoic chamber	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)

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

Test item	Mode	Tested frequency	Worst data rate *2)	Antenna *2)
Radiated emission (below 1 GHz) *1)	Transmitting (Tx), OFDM VHT20, MIMO	2437 MHz	MCS 3, PN9	0 & 1
	Transmitting (Tx), Bluetooth Low energy (BT LE)	2402 MHz, 2440 MHz, 2480 MHz	PRBS9	0
Radiated emission (above 1 GHz) *3)	Transmitting (Tx), IEEE 802.11b (11b)	2412 MHz, 2437 MHz, 2462 MHz, 2467 MHz, 2472 MHz *5)	11 Mbps, PN9	0
	Transmitting (Tx), OFDM VHT20, MIMO	2412 MHz, 2437 MHz, 2462 MHz, 2467 MHz, 2472 MHz *5)	MCS 3, PN9	0 & 1
	Transmitting (Tx), IEEE 802.11n HT20 (11n-20), SISO *4)	2412 MHz, 2462 MHz, 2467 MHz, 2472 MHz *5)	MCS 3, PN9	1
	Transmitting (Tx), IEEE 802.11n HT40 (11n-40), MIMO	2422 MHz, 2437 MHz, 2457 MHz, 2462 MHz *7)	MCS 11, PN9	0 & 1
	Transmitting (Tx), IEEE 802.11n HT40 (11n-40), SISO *4)	2422 MHz, 2462 MHz	MCS 3, PN9	0
	Transmitting (Tx), Bluetooth Low energy (BT LE)	2402 MHz, 2440 MHz, 2480 MHz	PRBS9	0

*Power of the EUT was set by the software as follows;
Power settings: (Wireless LAN): Fixed (refer to power setting table)
(Bluetooth low energy): Fixed
Software: (Wireless LAN): cmd.exe, Ver. 6.3.9600.17415,
(Bluetooth low energy): Bluetool.exe, Ver.1.9.3.0

*This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.

*1) Test operating mode was determined as follows according to "Section 1 of 6 802.11 a/b/g/n testing - Managing Complex Regulatory Approvals - " of TCB Council Workshop October 2009 and also was judged the necessity of OFDM VHT mode by the pre-test.
*2) The worst condition was determined based on the test result of Maximum Peak Output Power.
*3) Since 11g, 11n-20 and OFDM VHT mode have the same modulation method and no differences in transmitting specification, test was performed on the representative mode that had the highest peak output power.
*4) This mode wasn't worst, but only band edge of spurious emissions were measured for confirmation.
*5) The channel on 2462 MHz and 2467 MHz were measured, since the power setting of the channel on 2462 MHz and 2467 MHz were higher than the channel on 2472 MHz.
*6) The channel on 2452 MHz and 2457 MHz were measured, since the power setting of the channel on 2452 MHz and 2457 MHz were higher than the channel on 2462 MHz.
*7) The channel on 2457 MHz were measured, since the power setting of the channel on 2457 MHz were higher than the channel on 2462 MHz.

Power setting (target power) table
(Wireless LAN)

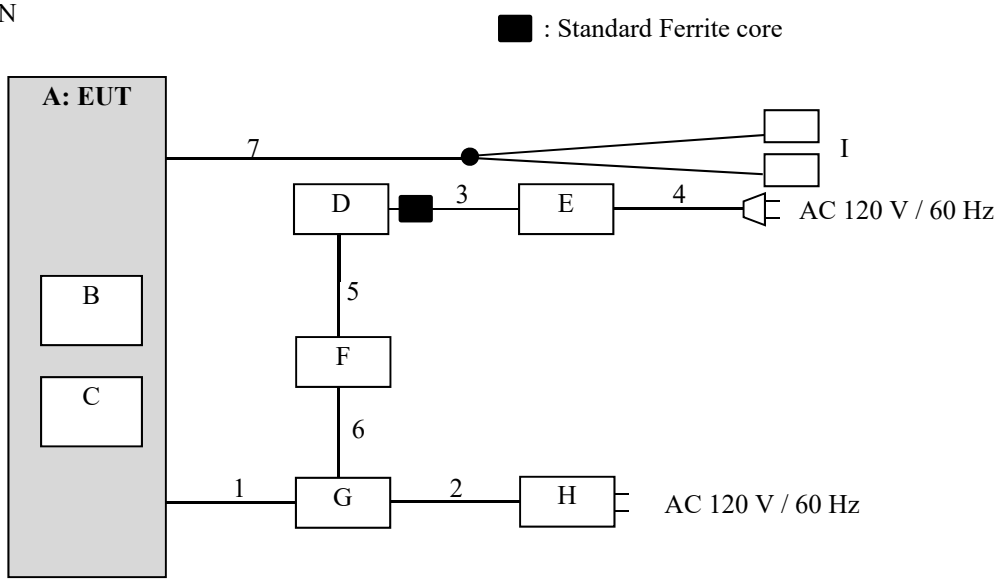
Bandwidth	Channel frequency	Mode	Rate / MCS mode [dBm]									
20 MHz			1 M	2 M	5.5 M	11 M						
	2412 MHz – 2462 MHz	11b	17.5	17.5	17.5	17.5						
			1 M	2 M	5.5 M	11 M						
	2467 MHz		8.5	8.5	8.5	8.5						
			1 M	2 M	5.5 M	11 M						
	2472 MHz		3.5	3.5	3.5	3.5						
			6 M	9 M	12 M	18 M	24 M	36 M	48 M	54 M		
	2412 MHz – 2462 MHz	11g	16.5	16.5	16.5	16.5	14.5	14.5	14.5	14.5		
			6 M	9 M	12 M	18 M	24 M	36 M	48 M	54 M		
	2467 MHz		8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5		
			6 M	9 M	12 M	18 M	24 M	36 M	48 M	54 M		
	2472 MHz		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		
			MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7		
	2412 MHz – 2462 MHz	11n-20 (SISO)	16.5	16.5	16.5	16.5	15.5	15.5	15.5	14.5		
			MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7		
	2467 MHz		8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5		
			MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7		
	2472 MHz		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		
			MCS 8	MCS 9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15		
	2412 MHz – 2462 MHz	11n-20 (MIMO)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0		
			MCS 8	MCS 9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15		
	2467 MHz		5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5		
			MCS 8	MCS 9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15		
	2472 MHz		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5		
			MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	
	2412 MHz – 2462 MHz	OFDM VHT20 (SISO)	16.5	16.5	16.5	16.5	15.5	15.5	15.5	14.5	13.0	
			MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	
	2467 MHz		8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	
			MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	
	2472 MHz		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
			MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	
	2412 MHz – 2462 MHz	OFDM VHT20 (MIMO)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
			MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	
	2467 MHz		5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	
			MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	
	2472 MHz		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
			MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7		
40 MHz	2422 MHz – 2452 MHz	11n-40 (SISO)	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5		
			MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7		
	2457 MHz		8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5		
			MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7		
	2462 MHz		8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5		
			MCS 8	MCS 9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15		
	2422 MHz – 2452 MHz	11n-40 (MIMO)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0		
			MCS 8	MCS 9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15		
	2457 MHz		8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0		
			MCS 8	MCS 9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15		
	2462 MHz		5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5		
			MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
	2422 MHz – 2452 MHz	OFDM VHT40 (SISO)	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
			MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
	2457 MHz		8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
			MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
	2462 MHz		8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
			MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
	2422 MHz – 2452 MHz	OFDM VHT40 (MIMO)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
			MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
	2457 MHz		8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
			MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
	2462 MHz		5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5

(Bluetooth Low Energy)

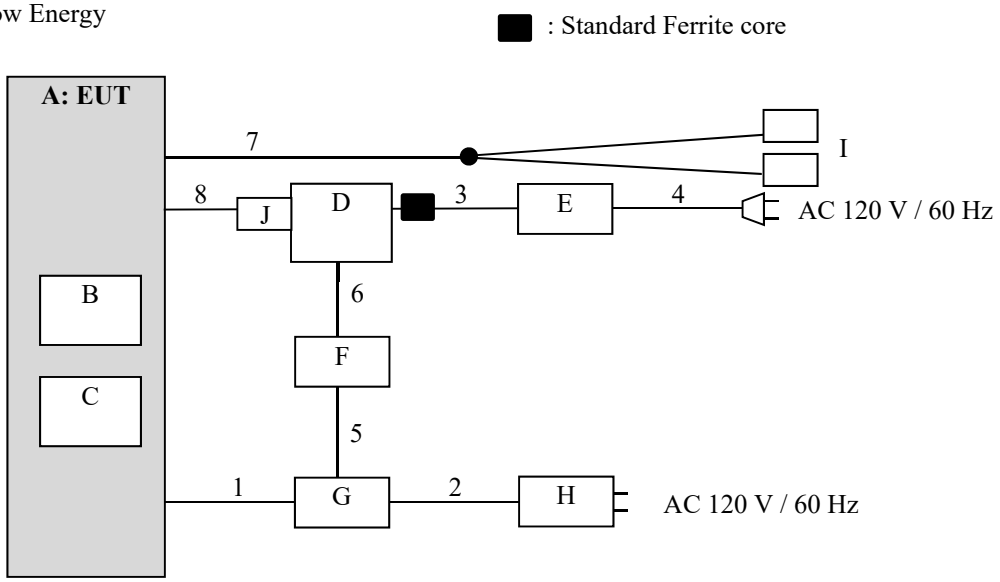
Channel frequency	Mode	-
2402 – 2480 MHz	BT LE	Fixed

4.2 Configuration and peripherals

Wireless LAN



Bluetooth Low Energy



* 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	Game Console	HAC-001(-01)	XKW01000004029	Nintendo	EUT
B	Game Card	HAC-008	NX32GB-00310	Nintendo	-
C	Micro SDHC Card	4GB	-	TDK	-
D	Laptop PC	CF-S10AWNDS	1EKSA54822	Panasonic	-
E	AC Adapter	CF-AA6402A M1	-	Panasonic	-
F	GIGA Ethernet Adapter	LAN-GTJU3	58L349601528	Logitec	-
G	SDEV Cradle	HAT-003	XZL01000079874	Nintendo	-
H	AC Adapter	HAC-002	08	Nintendo	-
I	Headphone	-	-	Nintendo	-
J	USB-UART adaptor	TTL-232RG	-	FTDI	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	USB	0.4	Shielded	Shielded	-
2	USB	1.8	Shielded	Shielded	-
3	DC	1.0	Unshielded	Unshielded	-
4	AC	0.8	Unshielded	Unshielded	-
5	USB	0.1	Shielded	Shielded	-
6	LAN	0.5	Unshielded	Unshielded	-
7	Headphone	0.5 + 0.3	Shielded	Shielded	-
8	USB	1.7	Shielded	Shielded	-

SECTION 5: Radiated Spurious Emission

Test Procedure

It was measured based on "8.5 and 8.6 of KDB 558074 D01 15.247 Meas Guidance v05r02".

[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 table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.
The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[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 m and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.
Test antenna was aimed at the EUT for receiving the maximum signal and always kept within the illumination area of the 3 dB beamwidth of the antenna.
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.

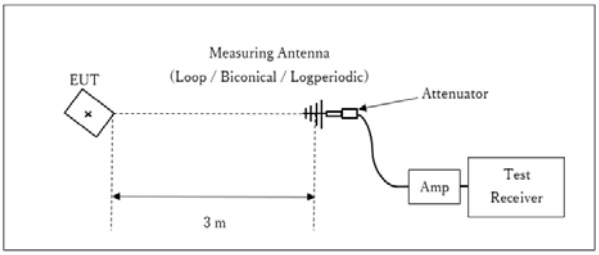
20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9(IC) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (IC).

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	11.12.2.5.2 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

*1) Average Power Measurement was performed based on ANSI C63.10-2013.

Figure 1: Test Setup

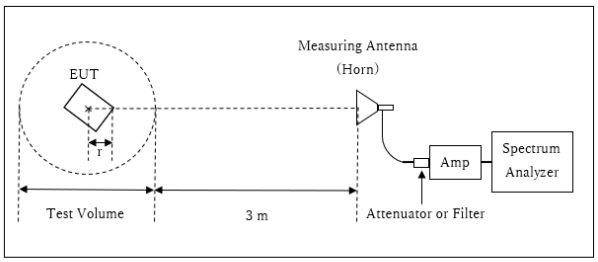
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz - 13 GHz

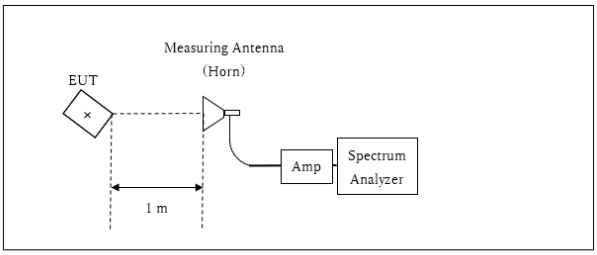


r : Radius of an outer periphery of EUT
× : Center of turn table

Distance Factor: 20 x log (3.9 m / 3.0 m) = 2.28 dB
* Test Distance: (3 + Test Volume /2) - r = 3.9 m

Test Volume : 2.0 m
(Test Volume has been calibrated based on CISPR 16-1-4.)
r = 0.1 m

13 GHz – 26.5 GHz



× : Center of turn table

Distance Factor: 20 x log (1.0 m / 3.0 m) = -9.5 dB
*Test Distance: 1 m

- 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.

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

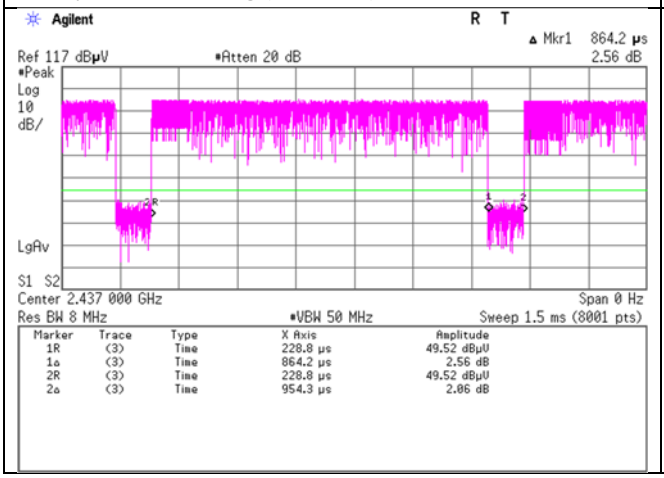
APPENDIX 1: Test data

Duty factor Calculation chart

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab. No.2 Semi Anechoic Chamber
Date	September 8, 2018
Temperature / Humidity	24 deg. C / 45 % RH
Engineer	Kazutaka Takeyama
Mode	Tx

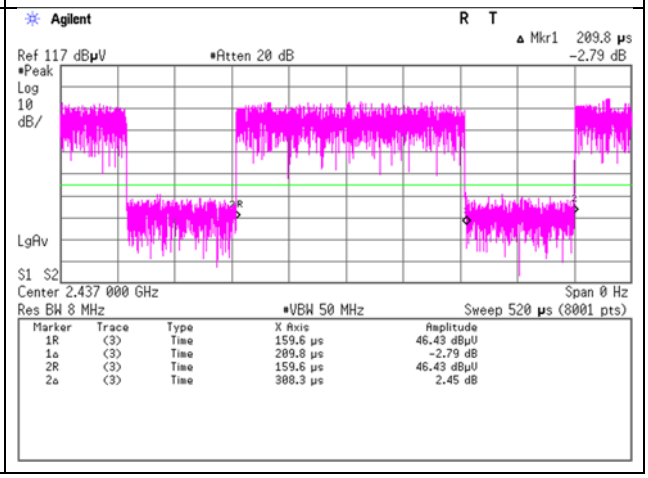
11b, 11 Mbps

Tx on / (Tx on + Tx off) =	0.906
Tx on / (Tx on + Tx off) * 100 =	90.6 %
Duty factor = 20 * log (0.95 / 0.86) =	0.86 dB



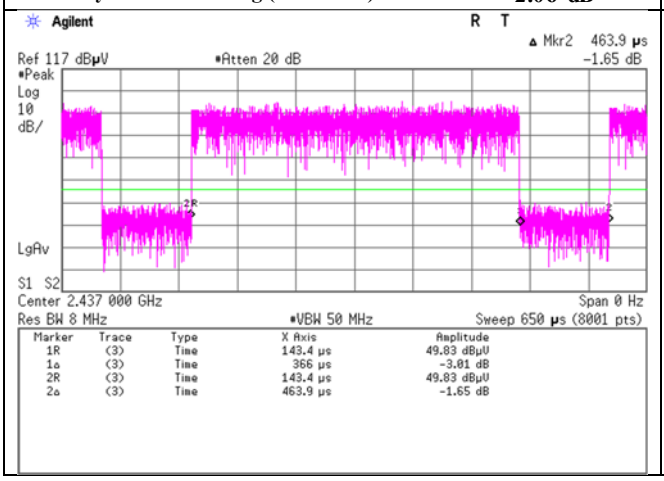
OFDM VHT20, MIMO, MCS 3

Tx on / (Tx on + Tx off) =	0.681
Tx on / (Tx on + Tx off) * 100 =	68.1 %
Duty factor = 20 * log (0.31 / 0.21) =	3.34 dB



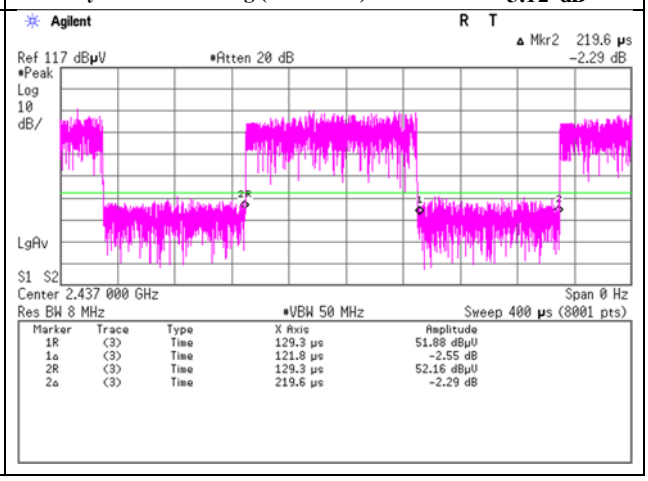
11n-20, SISO, MCS 3

Tx on / (Tx on + Tx off) =	0.789
Tx on / (Tx on + Tx off) * 100 =	78.9 %
Duty factor = 20 * log (0.46 / 0.37) =	2.06 dB



11n-40, MIMO, MCS 11

Tx on / (Tx on + Tx off) =	0.555
Tx on / (Tx on + Tx off) * 100 =	55.5 %
Duty factor = 20 * log (0.22 / 0.12) =	5.12 dB



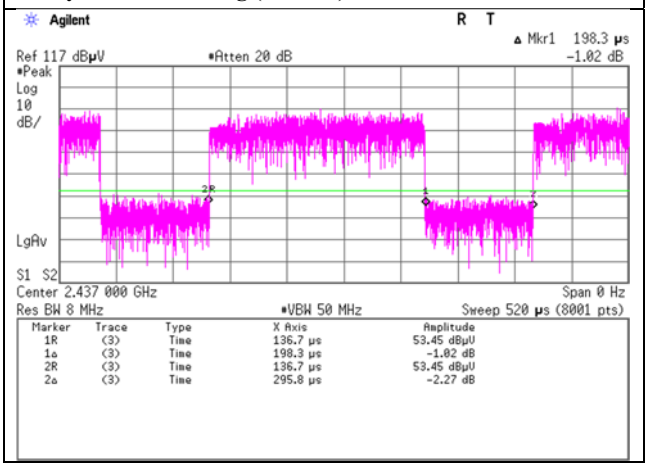
* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

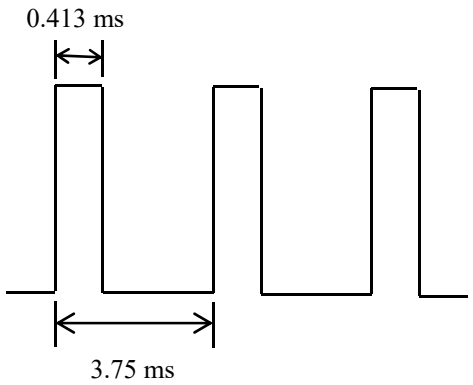
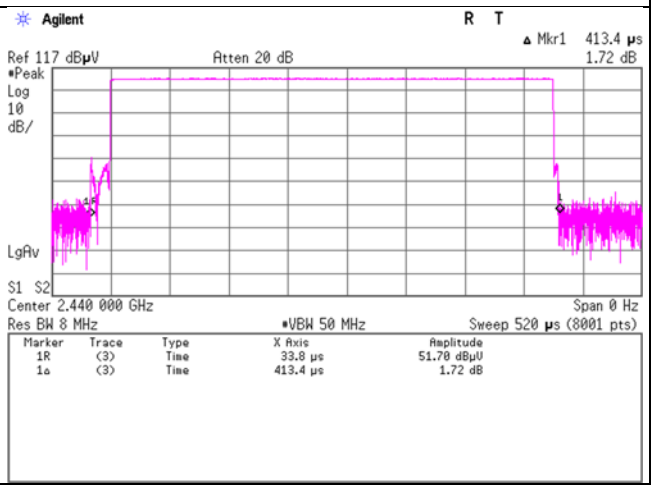
Duty factor Calculation chart

Report No.	12423101S-A-R1	
Test place	Shonan EMC Lab. No.2 Semi Anechoic Chamber	
Date	September 8, 2018	August 9, 2018
Temperature / Humidity	24 deg. C / 45 % RH	24 deg. C / 65 % RH
Engineer	Kazutaka Takeyama	Makoto Hosaka
Mode	Tx 11n-40	Tx BT LE (Hopping on)

11n-40, SISO, MCS 3

Tx on / (Tx on + Tx off) =	**0.670**
Tx on / (Tx on + Tx off) * 100 =	**67.0 %**
Duty factor = 20 * log (0.3 / 0.2) =	**3.47 dB**



Worst 100ms **Averaging factor (Dwell Factor) =** **20log(27×0.4134/100) = -19.05 dB**	**1cycle time** **0.413.4 ms**
	

*Worst TX Duty cycle of BLE is Advertising mode which max on time is 0.413 ms and Min interval is 3.75 ms (Refer to BLE Worst TX Duty sheet).
The result of AV detector is calculated from dwell factor and peak value.

Radiated Spurious Emission

Report No.	12423101S-A-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	3	2	3
Date	July 26, 2018	August 22, 2018	August 3, 2018
Temperature / Humidity	27 deg. C / 48 % RH	23 deg. C / 66 % RH	27 deg. C / 48 % RH
Engineer	Kazutaka Takeyama (1 GHz - 13 GHz)	Yosuke Ishikawa (13 GHz - 18 GHz)	Tatsuya Arai (18 GHz – 26.5 GHz)
Mode	Tx 11b 2412 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	50.48	27.78	14.13	44.13	2.28	50.54	73.90	23.3	152	110	
Hori.	4824.000	PK	53.94	31.28	6.46	44.46	2.28	49.50	73.90	24.4	232	153	
Hori.	7236.000	PK	50.02	36.13	8.18	44.00	2.28	52.61	73.90	21.2	150	1	
Hori.	9648.000	PK	49.16	38.58	9.14	43.83	2.28	55.33	73.90	18.5	150	1	
Hori.	14472.000	PK	46.68	41.96	11.12	38.39	-9.54	51.83	73.90	22.0	150	0	
Vert.	2390.000	PK	50.46	27.78	14.13	44.13	2.28	50.52	73.90	23.3	104	116	
Vert.	4824.000	PK	55.76	31.28	6.46	44.46	2.28	51.32	73.90	22.5	145	88	
Vert.	7236.000	PK	49.03	36.13	8.18	44.00	2.28	51.62	73.90	22.2	150	1	
Vert.	9648.000	PK	49.95	38.58	9.14	43.83	2.28	56.12	73.90	**17.7**	150	1	
Vert.	14472.000	PK	47.16	41.96	11.12	38.39	-9.54	52.31	73.90	21.5	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 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	40.25	27.78	14.13	44.13	0.86	2.28	41.17	53.90	12.7	*1)
Hori.	4824.000	AV	44.05	31.28	6.46	44.46	0.86	2.28	40.47	53.90	13.4	
Hori.	7236.000	AV	39.35	36.13	8.18	44.00	0.86	2.28	42.80	53.90	11.1	
Hori.	9648.000	AV	39.70	38.58	9.14	43.83	0.86	2.28	46.73	53.90	**7.2**	
Hori.	14472.000	AV	38.69	41.96	11.12	38.39	0.86	-9.54	44.70	53.90	9.2	
Vert.	2390.000	AV	41.34	27.78	14.13	44.13	0.86	2.28	42.26	53.90	11.6	*1)
Vert.	4824.000	AV	44.45	31.28	6.46	44.46	0.86	2.28	40.87	53.90	13.0	
Vert.	7236.000	AV	39.16	36.13	8.18	44.00	0.86	2.28	42.61	53.90	11.3	
Vert.	9648.000	AV	39.68	38.58	9.14	43.83	0.86	2.28	46.71	53.90	**7.2**	
Vert.	14472.000	AV	39.02	41.96	11.12	38.39	0.86	-9.54	45.03	53.90	8.9	

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 (3.90 m / 3.0 m) = 2.28 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)

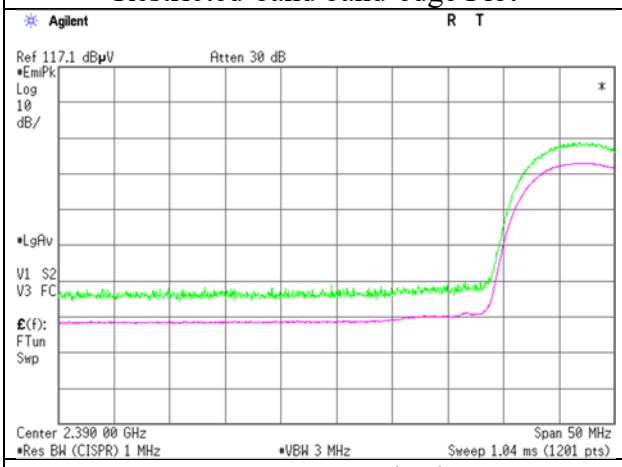
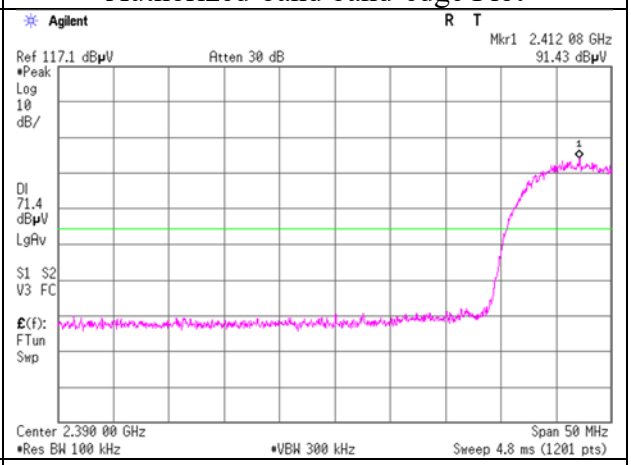
20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

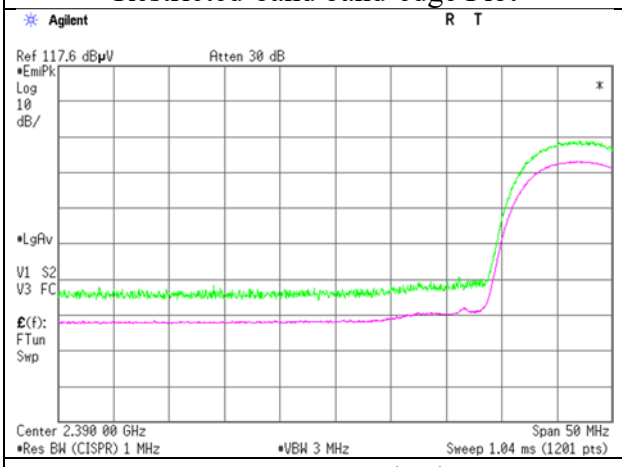
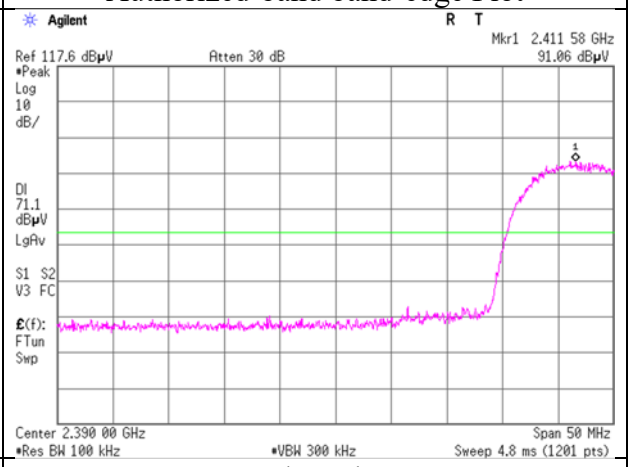
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	90.88	27.89	14.15	44.14	2.28	91.06	-	-	Carrier
Hori.	2400.000	PK	44.54	27.98	14.14	44.14	2.28	44.80	71.06	26.3	
Vert.	2412.000	PK	92.19	27.89	14.15	44.14	2.28	92.37	-	-	Carrier
Vert.	2400.000	PK	46.33	27.98	14.14	44.14	2.28	46.59	72.37	25.8	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	July 26, 2018
Temperature / Humidity	27 deg. C / 48 % RH
Engineer	Kazutaka Takeyama (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

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12423101S-A-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	3	2	3
Date	July 26, 2018	August 22, 2018	August 3, 2018
Temperature / Humidity	27 deg. C / 48 % RH	23 deg. C / 66 % RH	27 deg. C / 48 % RH
Engineer	Kazutaka Takeyama (1 GHz - 13 GHz)	Yosuke Ishikawa (13 GHz - 18 GHz)	Tatsuya Arai (18 GHz – 26.5 GHz)
Mode	Tx 11b 2437 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4874.000	PK	55.83	31.31	6.48	44.47	2.28	51.43	73.90	22.4	269	172	
Hori.	7311.000	PK	48.35	36.17	8.22	44.03	2.28	50.99	73.90	22.9	150	1	
Hori.	9748.000	PK	48.12	39.02	9.16	43.84	2.28	54.74	73.90	19.1	150	1	
Hori.	14622.000	PK	45.58	42.02	11.13	38.34	-9.54	50.85	73.90	23.0	150	0	
Vert.	4874.000	PK	55.98	31.31	6.48	44.47	2.28	51.58	73.90	22.3	189	9	
Vert.	7311.000	PK	48.54	36.17	8.22	44.03	2.28	51.18	73.90	22.7	150	1	
Vert.	9748.000	PK	48.21	39.02	9.16	43.84	2.28	54.83	73.90	**19.0**	150	1	
Vert.	14622.000	PK	46.27	42.02	11.13	38.34	-9.54	51.54	73.90	22.3	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 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	42.28	31.31	6.48	44.47	0.86	2.28	38.74	53.90	15.2	
Hori.	7311.000	AV	38.53	36.17	8.22	44.03	0.86	2.28	42.03	53.90	11.9	
Hori.	9748.000	AV	38.99	39.02	9.16	43.84	0.86	2.28	46.47	53.90	**7.4**	
Hori.	14622.000	AV	37.34	42.02	11.13	38.34	0.86	-9.54	43.47	53.90	10.4	
Vert.	4874.000	AV	42.79	31.31	6.48	44.47	0.86	2.28	39.25	53.90	14.7	
Vert.	7311.000	AV	38.93	36.17	8.22	44.03	0.86	2.28	42.43	53.90	11.5	
Vert.	9748.000	AV	39.02	39.02	9.16	43.84	0.86	2.28	46.50	53.90	**7.4**	
Vert.	14622.000	AV	37.48	42.02	11.13	38.34	0.86	-9.54	43.61	53.90	10.3	

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 (3.90 m / 3.0 m) = 2.28 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

Report No.	12423101S-A-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	3	2	3
Date	July 26, 2018	August 22, 2018	August 3, 2018
Temperature / Humidity	27 deg. C / 48 % RH	23 deg. C / 66 % RH	27 deg. C / 48 % RH
Engineer	Kazutaka Takeyama (1 GHz - 13 GHz)	Yosuke Ishikawa (13 GHz - 18 GHz)	Tatsuya Arai (18 GHz – 26.5 GHz)
Mode	Tx 11b 2462 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	50.85	27.28	14.22	44.16	2.28	50.47	73.90	23.4	183	209	
Hori.	4924.000	PK	52.77	31.42	6.51	44.49	2.28	48.49	73.90	25.4	185	167	
Hori.	7386.000	PK	48.38	36.34	8.27	44.06	2.28	51.21	73.90	22.6	150	1	
Hori.	9848.000	PK	47.90	38.94	9.18	43.86	2.28	54.44	73.90	**19.4**	150	1	
Hori.	14772.000	PK	44.94	41.69	11.15	38.29	-9.54	49.95	73.90	23.9	150	0	
Vert.	2483.500	PK	50.23	27.28	14.22	44.16	2.28	49.85	73.90	24.0	100	109	
Vert.	4924.000	PK	51.89	31.42	6.51	44.49	2.28	47.61	73.90	26.2	103	8	
Vert.	7386.000	PK	48.18	36.34	8.27	44.06	2.28	51.01	73.90	22.8	150	1	
Vert.	9848.000	PK	47.68	38.94	9.18	43.86	2.28	54.22	73.90	19.6	150	1	
Vert.	14772.000	PK	44.57	41.69	11.15	38.29	-9.54	49.58	73.90	24.3	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 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	41.20	27.28	14.22	44.16	0.86	2.28	41.68	53.90	12.2	*1)
Hori.	4924.000	AV	42.94	31.42	6.51	44.49	0.86	2.28	39.52	53.90	14.4	
Hori.	7386.000	AV	38.76	36.34	8.27	44.06	0.86	2.28	42.45	53.90	11.5	
Hori.	9848.000	AV	38.72	38.94	9.18	43.86	0.86	2.28	46.12	53.90	**7.8**	
Hori.	14772.000	AV	36.45	41.69	11.15	38.29	0.86	-9.54	42.32	53.90	11.6	
Vert.	2483.500	AV	40.83	27.28	14.22	44.16	0.86	2.28	41.31	53.90	12.6	*1)
Vert.	4924.000	AV	41.91	31.42	6.51	44.49	0.86	2.28	38.49	53.90	15.4	
Vert.	7386.000	AV	38.40	36.34	8.27	44.06	0.86	2.28	42.09	53.90	11.8	
Vert.	9848.000	AV	38.25	38.94	9.18	43.86	0.86	2.28	45.65	53.90	8.3	
Vert.	14772.000	AV	36.40	41.69	11.15	38.29	0.86	-9.54	42.27	53.90	11.6	

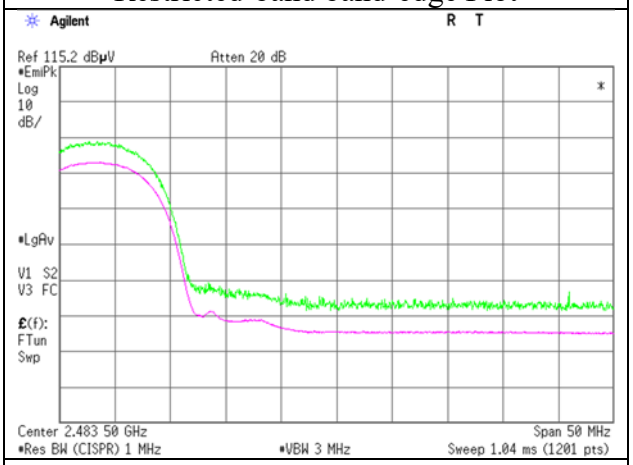
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	July 26, 2018
Temperature / Humidity	27 deg. C / 48 % RH
Engineer	Kazutaka Takeyama (1 GHz - 13 GHz)
Mode	Tx 11b 2462 MHz

Horizontal

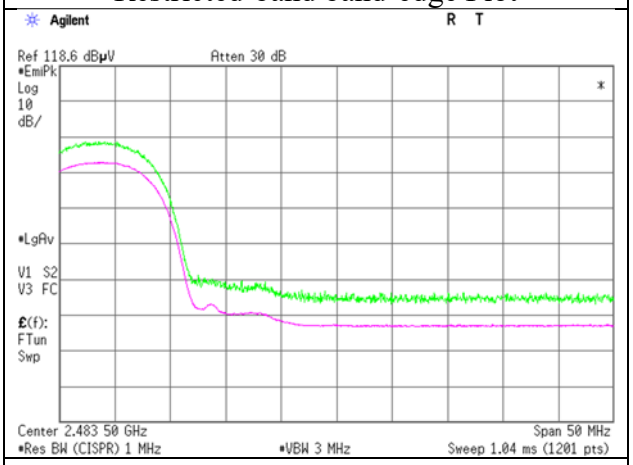
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12423101S-A-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	3	2	3
Date	July 26, 2018	August 22, 2018	August 3, 2018
Temperature / Humidity	27 deg. C / 48 % RH	23 deg. C / 66 % RH	27 deg. C / 48 % RH
Engineer	Kazutaka Takeyama (1 GHz - 13 GHz)	Yosuke Ishikawa (13 GHz - 18 GHz)	Tatsuya Arai (18 GHz – 26.5 GHz)
Mode	Tx 11b 2467 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	48.78	27.28	14.22	44.16	2.28	48.40	73.90	25.5	135	97	
Hori.	4934.000	PK	48.91	31.45	6.51	44.50	2.28	44.65	73.90	29.2	150	1	
Hori.	7401.000	PK	48.07	36.39	8.27	44.06	2.28	50.95	73.90	22.9	150	1	
Hori.	9868.000	PK	47.91	38.93	9.18	43.86	2.28	54.44	73.90	**19.4**	150	1	
Hori.	14802.000	PK	44.55	41.52	11.15	38.28	-9.54	49.40	73.90	24.5	150	0	
Vert.	2483.500	PK	49.20	27.28	14.22	44.16	2.28	48.82	73.90	25.0	135	112	
Vert.	4934.000	PK	49.59	31.45	6.51	44.50	2.28	45.33	73.90	28.5	150	1	
Vert.	7401.000	PK	48.15	36.39	8.27	44.06	2.28	51.03	73.90	22.8	150	1	
Vert.	9868.000	PK	47.45	38.93	9.18	43.86	2.28	53.98	73.90	19.9	150	1	
Vert.	14802.000	PK	45.24	41.52	11.15	38.28	-9.54	50.09	73.90	23.8	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 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	39.45	27.28	14.22	44.16	0.86	2.28	39.93	53.90	14.0	*1)
Hori.	4934.000	AV	39.67	31.45	6.51	44.50	0.86	2.28	36.27	53.90	17.6	
Hori.	7401.000	AV	38.54	36.39	8.27	44.06	0.86	2.28	42.28	53.90	11.6	
Hori.	9868.000	AV	38.10	38.93	9.18	43.86	0.86	2.28	45.49	53.90	**8.4**	
Hori.	14802.000	AV	36.34	41.52	11.15	38.28	0.86	-9.54	42.05	53.90	11.9	
Vert.	2483.500	AV	39.80	27.28	14.22	44.16	0.86	2.28	40.28	53.90	13.6	*1)
Vert.	4934.000	AV	39.52	31.45	6.51	44.50	0.86	2.28	36.12	53.90	17.8	
Vert.	7401.000	AV	38.66	36.39	8.27	44.06	0.86	2.28	42.40	53.90	11.5	
Vert.	9868.000	AV	37.97	38.93	9.18	43.86	0.86	2.28	45.36	53.90	8.5	
Vert.	14802.000	AV	36.42	41.52	11.15	38.28	0.86	-9.54	42.13	53.90	11.8	

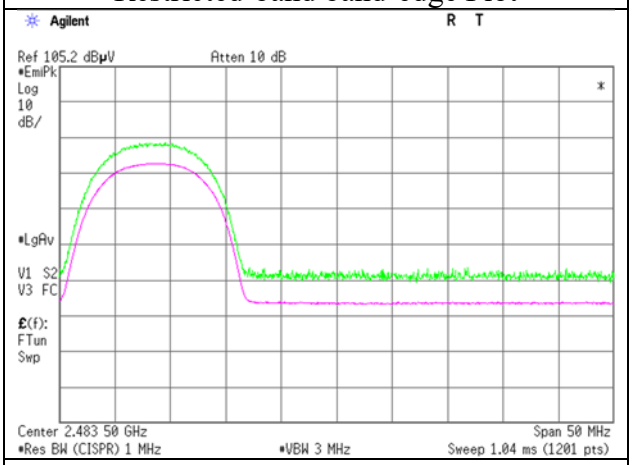
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	July 26, 2018
Temperature / Humidity	27 deg. C / 48 % RH
Engineer	Kazutaka Takeyama (1 GHz - 13 GHz)
Mode	Tx 11b 2467 MHz

Horizontal

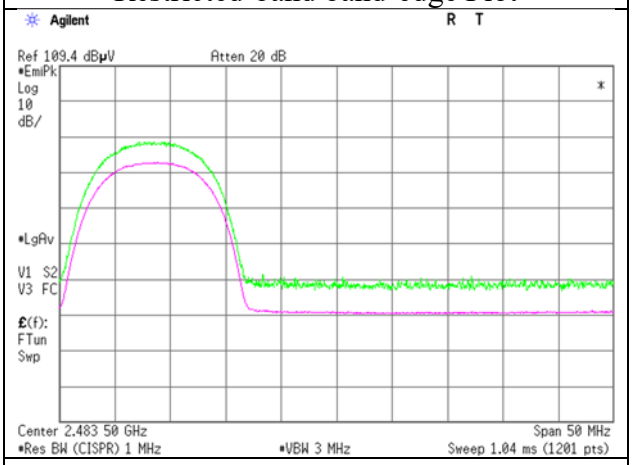
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12423101S-A-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	3	2	3
Date	July 26, 2018	August 22, 2018	August 3, 2018
Temperature / Humidity	27 deg. C / 48 % RH	23 deg. C / 66 % RH	27 deg. C / 48 % RH
Engineer	Kazutaka Takeyama (1 GHz - 13 GHz)	Yosuke Ishikawa (13 GHz - 18 GHz)	Tatsuya Arai (18 GHz – 26.5 GHz)
Mode	Tx 11b 2472 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	48.42	27.28	14.22	44.16	2.28	48.04	73.90	25.8	185	212	
Hori.	4944.000	PK	48.82	31.49	6.52	44.50	2.28	44.61	73.90	29.2	150	1	
Hori.	7416.000	PK	48.15	36.38	8.28	44.07	2.28	51.02	73.90	22.8	150	1	
Hori.	9888.000	PK	47.71	38.92	9.17	43.86	2.28	54.22	73.90	19.6	150	1	
Hori.	14832.000	PK	44.65	41.46	11.16	38.27	-9.54	49.46	73.90	24.4	150	0	
Vert.	2483.500	PK	49.37	27.28	14.22	44.16	2.28	48.99	73.90	24.9	100	110	
Vert.	4944.000	PK	48.05	31.49	6.52	44.50	2.28	43.84	73.90	30.0	150	1	
Vert.	7416.000	PK	47.75	36.38	8.28	44.07	2.28	50.62	73.90	23.2	150	1	
Vert.	9888.000	PK	48.01	38.92	9.17	43.86	2.28	54.52	73.90	**19.3**	150	1	
Vert.	14832.000	PK	44.85	41.46	11.16	38.27	-9.54	49.66	73.90	24.2	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 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	39.69	27.28	14.22	44.16	0.86	2.28	40.17	53.90	13.7	*1)
Hori.	4944.000	AV	39.30	31.49	6.52	44.50	0.86	2.28	35.95	53.90	18.0	
Hori.	7416.000	AV	37.38	36.38	8.28	44.07	0.86	2.28	41.11	53.90	12.8	
Hori.	9888.000	AV	37.94	38.92	9.17	43.86	0.86	2.28	45.31	53.90	**8.6**	
Hori.	14832.000	AV	36.74	41.46	11.16	38.27	0.86	-9.54	42.41	53.90	11.5	
Vert.	2483.500	AV	40.23	27.28	14.22	44.16	0.86	2.28	40.71	53.90	13.2	*1)
Vert.	4944.000	AV	39.54	31.49	6.52	44.50	0.86	2.28	36.19	53.90	17.7	
Vert.	7416.000	AV	38.58	36.38	8.28	44.07	0.86	2.28	42.31	53.90	11.6	
Vert.	9888.000	AV	37.73	38.92	9.17	43.86	0.86	2.28	45.10	53.90	8.8	
Vert.	14832.000	AV	36.55	41.46	11.16	38.27	0.86	-9.54	42.22	53.90	11.7	

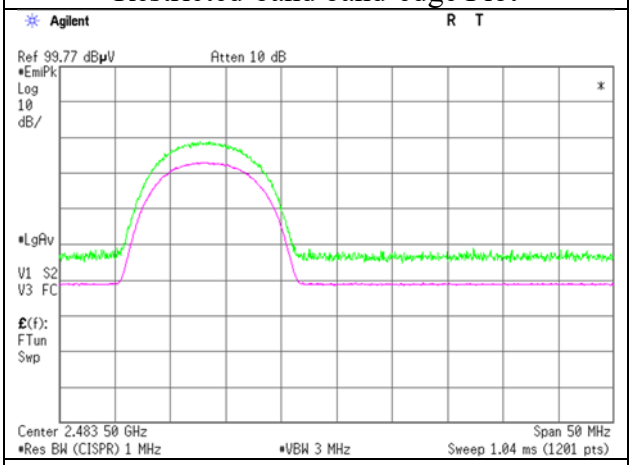
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	July 26, 2018
Temperature / Humidity	27 deg. C / 48 % RH
Engineer	Kazutaka Takeyama (1 GHz - 13 GHz)
Mode	Tx 11b 2472 MHz

Horizontal

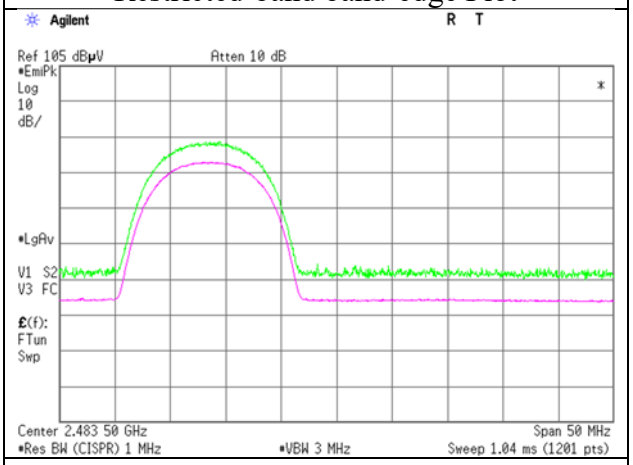
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12423101S-A-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	3	2	3
Date	August 11, 2018	August 22, 2018	August 3, 2018
Temperature / Humidity	25 deg. C / 54 % RH	23 deg. C / 66 % RH	27 deg. C / 48 % RH
Engineer	Kazuya Noda	Yosuke Ishikawa	Tatsuya Arai
	(1 GHz - 13 GHz)	(13 GHz - 18 GHz)	(18 GHz – 26.5 GHz)
Mode	Tx OFDM, VHT20, MIMO, 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.	2261.231	PK	45.51	28.17	13.98	36.67	2.28	53.27	73.90	20.6	285	43	
Hori.	2261.245	PK	44.39	28.17	13.98	36.67	2.28	52.15	73.90	21.7	100	268	
Hori.	2390.000	PK	49.24	27.86	14.09	36.58	2.28	56.89	73.90	17.0	254	44	
Hori.	4824.000	PK	45.66	31.46	6.45	36.88	2.28	48.97	73.90	24.9	185	241	
Hori.	7236.000	PK	46.08	36.85	8.26	37.30	2.28	56.17	73.90	17.7	150	0	
Hori.	14472.000	PK	47.61	41.96	11.12	38.39	-9.54	52.76	73.90	21.1	150	0	
Vert.	2261.231	PK	45.89	28.17	13.98	36.67	2.28	53.65	73.90	20.2	117	354	
Vert.	2261.245	PK	47.05	28.17	13.98	36.67	2.28	54.81	73.90	19.0	100	340	
Vert.	2390.000	PK	50.52	27.86	14.09	36.58	2.28	58.17	73.90	**15.7**	144	248	
Vert.	4824.000	PK	45.82	31.46	6.45	36.88	2.28	49.13	73.90	24.7	148	288	
Vert.	7236.000	PK	45.98	36.85	8.26	37.30	2.28	56.07	73.90	17.8	150	0	
Vert.	14472.000	PK	47.09	41.96	11.12	38.39	-9.54	52.24	73.90	21.6	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 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.	2261.231	AV	37.71	28.17	13.98	36.67	3.34	2.28	48.81	53.90	5.1	
Hori.	2261.245	AV	35.09	28.17	13.98	36.67	3.34	2.28	46.19	53.90	7.7	
Hori.	2390.000	AV	37.02	27.86	14.09	36.58	3.34	2.28	48.01	53.90	5.9	*1)
Hori.	4824.000	AV	35.61	31.46	6.45	36.88	3.34	2.28	42.26	53.90	11.6	
Hori.	7236.000	AV	36.03	36.85	8.26	37.30	3.34	2.28	49.46	53.90	**4.4**	
Hori.	14472.000	AV	38.80	41.96	11.12	38.39	3.34	-9.54	47.29	53.90	6.6	
Vert.	2261.231	AV	37.04	28.17	13.98	36.67	3.34	2.28	48.14	53.90	5.8	
Vert.	2261.245	AV	37.33	28.17	13.98	36.67	3.34	2.28	48.43	53.90	5.5	
Vert.	2390.000	AV	36.64	27.86	14.09	36.58	3.34	2.28	47.63	53.90	6.3	*1)
Vert.	4824.000	AV	35.75	31.46	6.45	36.88	3.34	2.28	42.40	53.90	11.5	
Vert.	7236.000	AV	35.98	36.85	8.26	37.30	3.34	2.28	49.41	53.90	4.5	
Vert.	14472.000	AV	39.10	41.96	11.12	38.39	3.34	-9.54	47.59	53.90	6.3	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 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)

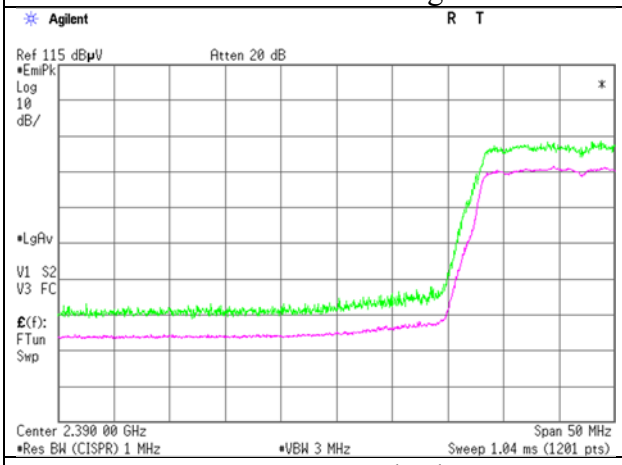
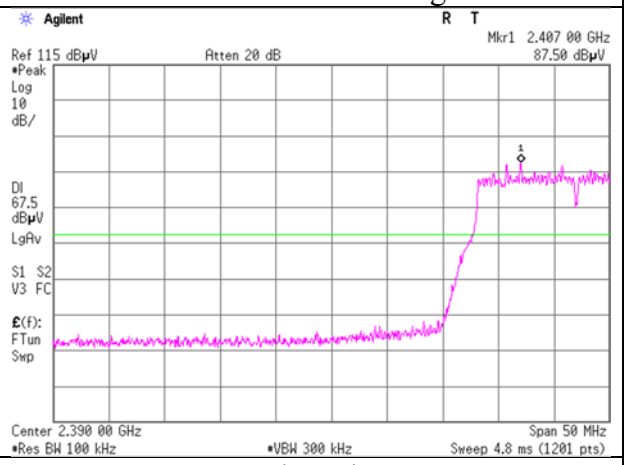
20 dBc Data Sheet **(RBW 100 kHz, VBW 300 kHz)**

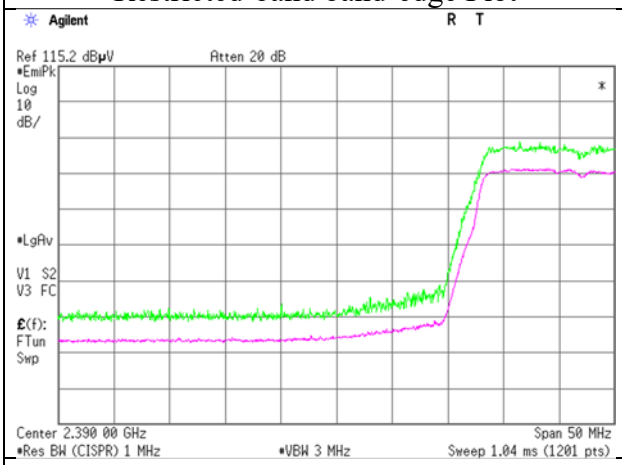
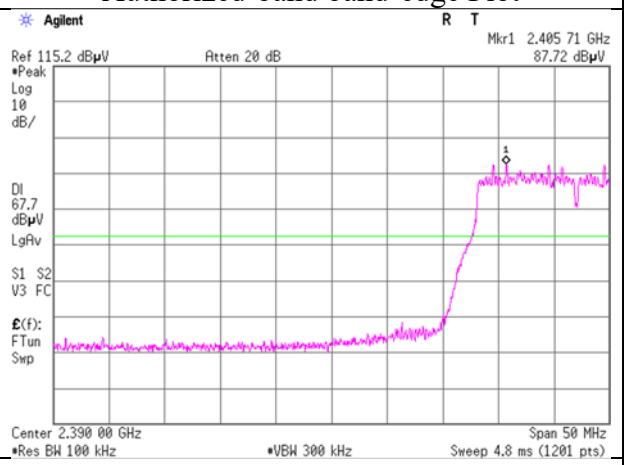
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	87.66	27.85	14.11	36.57	2.28	95.33	-	-	Carrier
Hori.	2400.000	PK	44.41	27.86	14.10	36.58	2.28	52.07	75.33	23.3	
Vert.	2412.000	PK	87.83	27.85	14.11	36.57	2.28	95.50	-	-	Carrier
Vert.	2400.000	PK	46.88	27.86	14.10	36.58	2.28	54.54	75.50	21.0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	August 11, 2018
Temperature / Humidity	25 deg. C / 54 % RH
Engineer	Kazuya Noda (1 GHz - 13 GHz)
Mode	Tx OFDM, VHT20, MIMO, 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

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12423101S-A-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	2	3	2	3
Date	August 26, 2018	August 11, 2018	August 22, 2018	August 3, 2018
Temperature / Humidity	24 deg. C / 63 % RH	25 deg. C / 54 % RH	23 deg. C / 66 % RH	27 deg. C / 48 % RH
Engineer	Makoto Hosaka	Kazuya Noda	Yosuke Ishikawa	Tatsuya Arai
	(30 MHz - 1000 MHz)	(1 GHz - 13 GHz)	(13 GHz - 18 GHz)	(18 GHz – 26.5 GHz)
Mode	Tx OFDM, VHT20, MIMO, 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.	84.654	QP	35.40	7.17	8.11	31.89	0.00	18.79	40.00	21.2	341	87	
Hori.	125.002	QP	43.10	13.60	8.00	31.86	0.00	32.84	43.50	10.6	368	59	
Hori.	250.005	QP	50.30	11.74	5.81	31.73	0.00	36.12	46.00	**9.8**	143	359	
Hori.	375.014	QP	40.20	15.12	6.86	31.66	0.00	30.52	46.00	15.4	100	235	
Hori.	948.717	QP	30.00	21.96	9.30	30.57	0.00	30.69	46.00	15.3	100	222	
Hori.	4874.000	PK	44.97	31.40	6.45	36.90	2.28	48.20	73.90	25.7	150	0	
Hori.	7311.000	PK	45.03	36.99	8.31	37.42	2.28	55.19	73.90	18.7	150	0	
Hori.	14622.000	PK	45.87	42.02	11.13	38.34	-9.54	51.14	73.90	22.7	150	0	
Vert.	45.725	QP	31.40	12.71	7.11	31.91	0.00	19.31	40.00	20.6	100	4	
Vert.	68.054	QP	37.40	6.74	7.11	31.90	0.00	19.35	40.00	20.6	100	160	
Vert.	250.005	QP	44.30	11.74	5.81	31.73	0.00	30.12	46.00	15.8	100	183	
Vert.	4874.000	PK	45.14	31.40	6.45	36.90	2.28	48.37	73.90	25.5	150	0	
Vert.	7311.000	PK	45.38	36.99	8.31	37.42	2.28	55.54	73.90	18.3	150	0	
Vert.	14622.000	PK	45.81	42.02	11.13	38.34	-9.54	51.08	73.90	22.8	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 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	34.67	31.40	6.45	36.90	3.34	2.28	41.24	53.90	12.7	
Hori.	7311.000	AV	35.90	36.99	8.31	37.42	3.34	2.28	49.40	53.90	**4.5**	
Hori.	14622.000	AV	37.39	42.02	11.13	38.34	3.34	-9.54	46.00	53.90	7.9	
Vert.	4874.000	AV	34.74	31.40	6.45	36.90	3.34	2.28	41.31	53.90	12.6	
Vert.	7311.000	AV	35.81	36.99	8.31	37.42	3.34	2.28	49.31	53.90	4.6	
Vert.	14622.000	AV	37.41	42.02	11.13	38.34	3.34	-9.54	46.02	53.90	7.9	

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 (3.90 m / 3.0 m) = 2.28 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

Report No.	12423101S-A-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	3	2	3
Date	August 11, 2018	August 22, 2018	August 3, 2018
Temperature / Humidity	25 deg. C / 54 % RH	23 deg. C / 66 % RH	27 deg. C / 48 % RH
Engineer	Kazuya Noda (1 GHz - 13 GHz)	Yosuke Ishikawa (13 GHz - 18 GHz)	Tatsuya Arai (18 GHz – 26.5 GHz)
Mode	Tx OFDM, VHT20, MIMO, 2462 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	46.71	27.65	14.18	36.52	2.28	54.30	73.90	19.6	192	48	
Hori.	4924.000	PK	45.16	31.37	6.46	36.92	2.28	48.35	73.90	25.5	100	0	
Hori.	7386.000	PK	44.51	37.01	8.37	37.54	2.28	54.63	73.90	19.2	100	0	
Hori.	14772.000	PK	45.28	41.69	11.15	38.29	-9.54	50.29	73.90	23.6	150	0	
Vert.	2483.500	PK	50.54	27.65	14.18	36.52	2.28	58.13	73.90	**15.7**	174	351	
Vert.	4924.000	PK	44.74	31.37	6.46	36.92	2.28	47.93	73.90	25.9	150	0	
Vert.	7386.000	PK	45.51	37.01	8.37	37.54	2.28	55.63	73.90	18.2	150	0	
Vert.	14772.000	PK	45.07	41.69	11.15	38.29	-9.54	50.08	73.90	23.8	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 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	36.93	27.65	14.18	36.52	3.34	2.28	47.86	53.90	6.0	*1)
Hori.	4924.000	AV	34.68	31.37	6.46	36.92	3.34	2.28	41.21	53.90	12.7	
Hori.	7386.000	AV	35.38	37.01	8.37	37.54	3.34	2.28	48.84	53.90	**5.1**	
Hori.	14772.000	AV	36.49	41.69	11.15	38.29	3.34	-9.54	44.84	53.90	9.1	
Vert.	2483.500	AV	37.38	27.65	14.18	36.52	3.34	2.28	48.31	53.90	5.6	*1)
Vert.	4924.000	AV	34.82	31.37	6.46	36.92	3.34	2.28	41.35	53.90	12.6	
Vert.	7386.000	AV	35.24	37.01	8.37	37.54	3.34	2.28	48.70	53.90	5.2	
Vert.	14772.000	AV	36.74	41.69	11.15	38.29	3.34	-9.54	45.09	53.90	8.8	

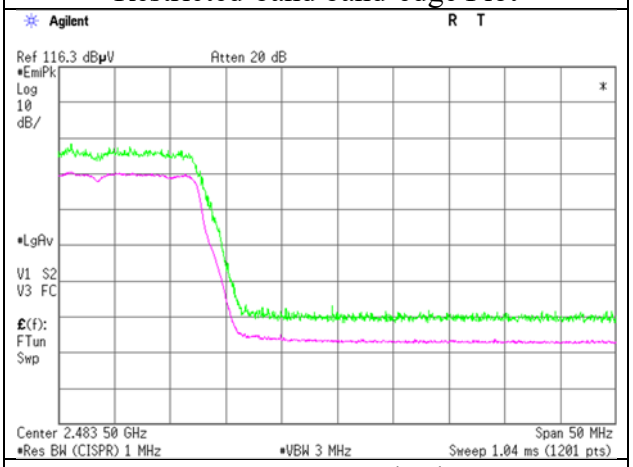
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	August 11, 2018
Temperature / Humidity	25 deg. C / 54 % RH
Engineer	Kazuya Noda (1 GHz - 13 GHz)
Mode	Tx OFDM, VHT20, MIMO, 2462 MHz

Horizontal

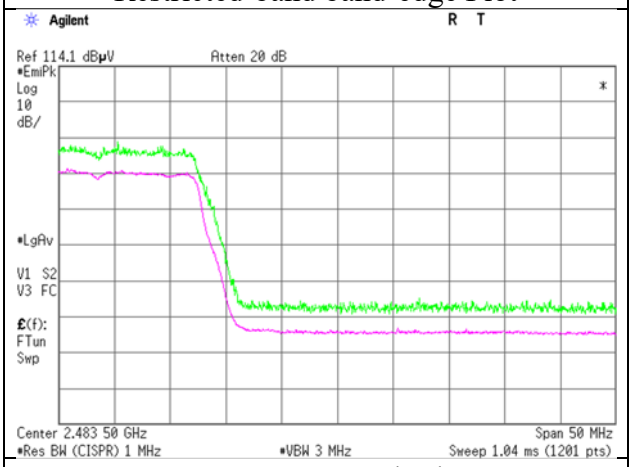
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12423101S-A-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	3	2	3
Date	August 11, 2018	August 22, 2018	August 3, 2018
Temperature / Humidity	25 deg. C / 54 % RH	23 deg. C / 66 % RH	27 deg. C / 48 % RH
Engineer	Kazuya Noda (1 GHz - 13 GHz)	Yosuke Ishikawa (13 GHz - 18 GHz)	Tatsuya Arai (18 GHz – 26.5 GHz)
Mode	Tx OFDM, VHT20, MIMO, 2467 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.	2312.800	PK	44.72	28.11	14.03	36.63	2.28	52.51	73.90	21.3	365	33	
Hori.	2483.500	PK	47.33	27.65	14.18	36.52	2.28	54.92	73.90	18.9	337	136	
Hori.	4934.000	PK	44.68	31.41	6.46	36.92	2.28	47.91	73.90	25.9	150	0	
Hori.	7401.000	PK	44.37	36.99	8.38	37.56	2.28	54.46	73.90	19.4	150	0	
Hori.	14802.000	PK	44.77	41.52	11.15	38.28	-9.54	49.62	73.90	24.2	150	0	
Vert.	2312.800	PK	44.85	28.11	14.03	36.63	2.28	52.64	73.90	21.2	133	105	
Vert.	2483.500	PK	46.31	27.65	14.18	36.52	2.28	53.90	73.90	20.0	185	272	
Vert.	4934.000	PK	44.85	31.41	6.46	36.92	2.28	48.08	73.90	25.8	150	0	
Vert.	7401.000	PK	44.98	36.99	8.38	37.56	2.28	55.07	73.90	**18.8**	150	0	
Vert.	14802.000	PK	44.68	41.52	11.15	38.28	-9.54	49.53	73.90	24.3	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 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.	2312.800	AV	35.29	28.11	14.03	36.63	3.34	2.28	46.42	53.90	7.5	
Hori.	2483.500	AV	36.08	27.65	14.18	36.52	3.34	2.28	47.01	53.90	6.9	*1)
Hori.	4934.000	AV	35.24	31.41	6.46	36.92	3.34	2.28	41.81	53.90	12.1	
Hori.	7401.000	AV	35.78	36.99	8.38	37.56	3.34	2.28	49.21	53.90	**4.7**	
Hori.	14802.000	AV	36.27	41.52	11.15	38.28	3.34	-9.54	44.46	53.90	9.4	
Vert.	2312.800	AV	35.82	28.11	14.03	36.63	3.34	2.28	46.95	53.90	7.0	
Vert.	2483.500	AV	35.49	27.65	14.18	36.52	3.34	2.28	46.42	53.90	7.5	*1)
Vert.	4934.000	AV	34.85	31.41	6.46	36.92	3.34	2.28	41.42	53.90	12.5	
Vert.	7401.000	AV	35.12	36.99	8.38	37.56	3.34	2.28	48.55	53.90	5.4	
Vert.	14802.000	AV	36.52	41.52	11.15	38.28	3.34	-9.54	44.71	53.90	9.2	

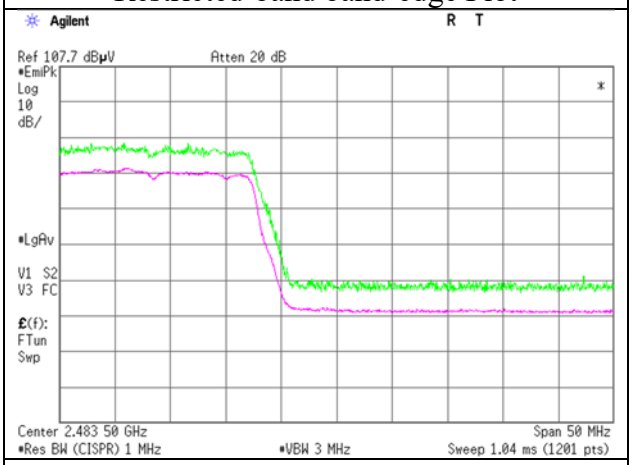
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	August 11, 2018
Temperature / Humidity	25 deg. C / 54 % RH
Engineer	Kazuya Noda (1 GHz - 13 GHz)
Mode	Tx OFDM, VHT20, MIMO, 2467 MHz

Horizontal

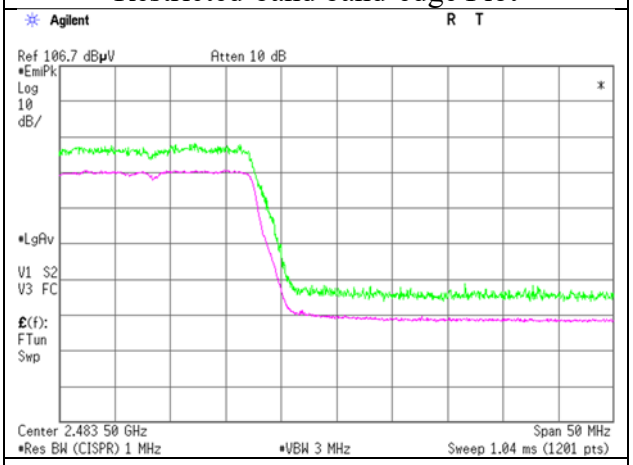
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12423101S-A-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	3	2	3
Date	August 11, 2018	August 22, 2018	August 3, 2018
Temperature / Humidity	25 deg. C / 54 % RH	23 deg. C / 66 % RH	27 deg. C / 48 % RH
Engineer	Kazuya Noda	Yosuke Ishikawa	Tatsuya Arai
	(1 GHz - 13 GHz)	(13 GHz - 18 GHz)	(18 GHz – 26.5 GHz)
Mode	Tx OFDM, VHT20, MIMO, 2472 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	44.08	27.65	14.18	36.52	2.28	51.67	73.90	22.2	313	49	
Hori.	4944.000	PK	44.71	31.44	6.48	36.93	2.28	47.98	73.90	25.9	150	0	
Hori.	7416.000	PK	45.22	37.03	8.39	37.59	2.28	55.33	73.90	18.5	150	0	
Hori.	14832.000	PK	44.67	41.46	11.16	38.27	-9.54	49.48	73.90	24.4	150	0	
Vert.	2483.500	PK	44.64	27.65	14.18	36.52	2.28	52.23	73.90	21.6	138	252	
Vert.	4944.000	PK	44.81	31.44	6.48	36.93	2.28	48.08	73.90	25.8	150	0	
Vert.	7416.000	PK	45.38	37.03	8.39	37.59	2.28	55.49	73.90	**18.4**	150	0	
Vert.	14832.000	PK	45.72	41.46	11.16	38.27	-9.54	50.53	73.90	23.3	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 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	35.65	27.65	14.18	36.52	3.34	2.28	46.58	53.90	7.3	*1)
Hori.	4944.000	AV	34.93	31.44	6.48	36.93	3.34	2.28	41.54	53.90	12.4	
Hori.	7416.000	AV	34.91	37.03	8.39	37.59	3.34	2.28	48.36	53.90	5.5	
Hori.	14832.000	AV	36.65	41.46	11.16	38.27	3.34	-9.54	44.80	53.90	9.1	
Vert.	2483.500	AV	35.08	27.65	14.18	36.52	3.34	2.28	46.01	53.90	7.9	*1)
Vert.	4944.000	AV	34.81	31.44	6.48	36.93	3.34	2.28	41.42	53.90	12.5	
Vert.	7416.000	AV	35.15	37.03	8.39	37.59	3.34	2.28	48.60	53.90	**5.3**	
Vert.	14832.000	AV	36.56	41.46	11.16	38.27	3.34	-9.54	44.71	53.90	9.2	

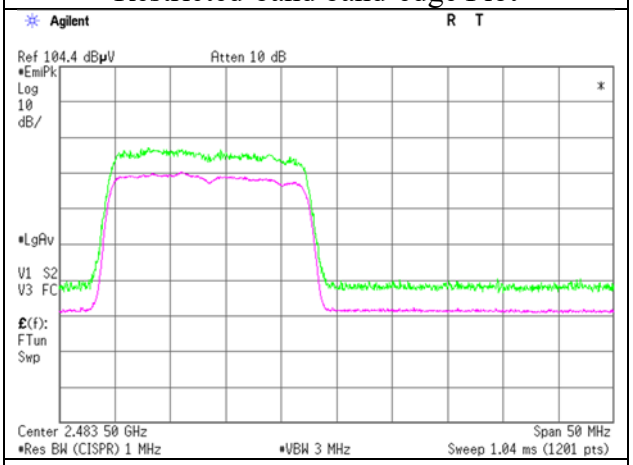
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	August 11, 2018
Temperature / Humidity	25 deg. C / 54 % RH
Engineer	Kazuya Noda (1 GHz - 13 GHz)
Mode	Tx OFDM, VHT20, MIMO, 2472 MHz

Horizontal

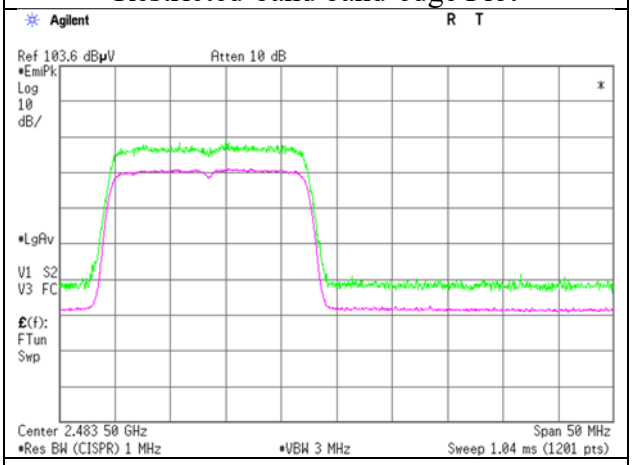
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	July 24, 2018
Temperature / Humidity	24 deg. C / 54 % RH
Engineer	Kazutaka Takeyama (1 GHz - 13 GHz)
Mode	Tx 11n-20, SISO, 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	56.79	27.78	14.09	44.13	2.28	56.81	73.90	**17.0**	147	210	
Vert.	2390.000	PK	50.88	27.78	14.09	44.13	2.28	50.90	73.90	23.0	147	70	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 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	43.39	27.78	14.09	44.13	2.06	2.28	45.47	53.90	**8.4**	*1)
Vert.	2390.000	AV	40.95	27.78	14.09	44.13	2.06	2.28	43.03	53.90	10.9	*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 (3.90 m / 3.0 m) = 2.28 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)

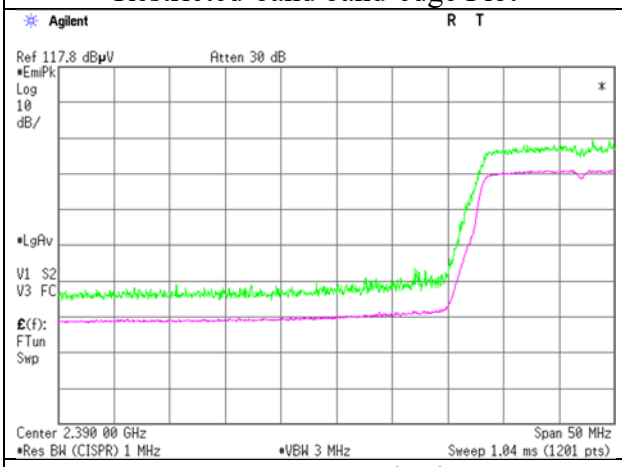
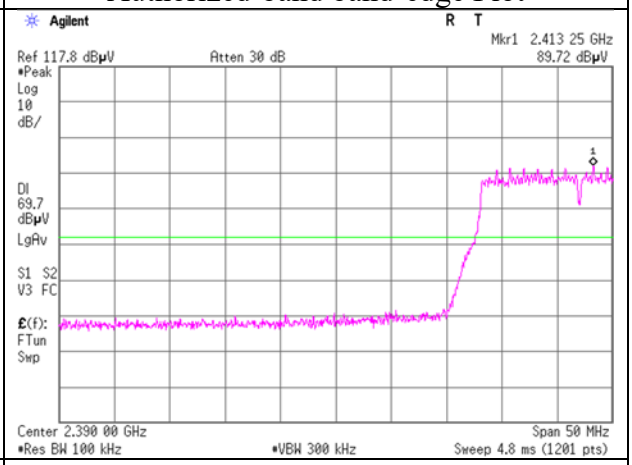
20 dBc Data Sheet **(RBW 100 kHz, VBW 300 kHz)**

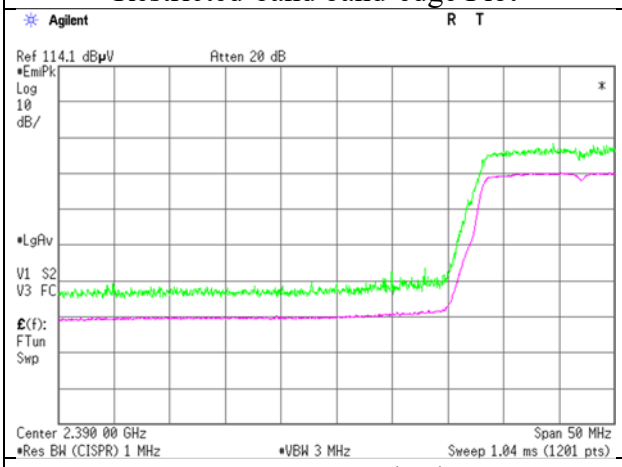
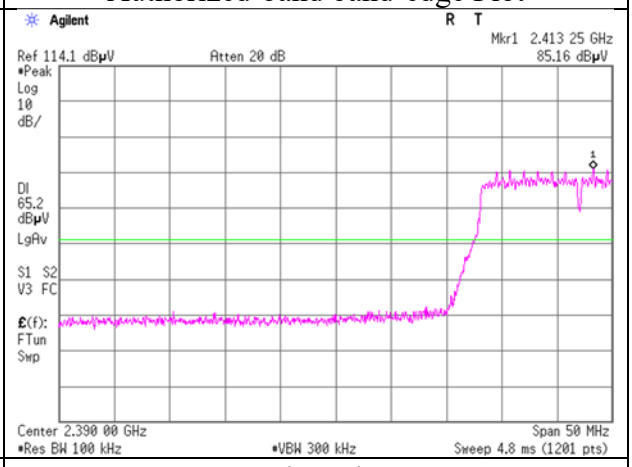
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	88.29	27.89	14.11	44.14	2.28	88.43	-	-	Carrier
Hori.	2400.000	PK	48.28	27.98	14.10	44.14	2.28	48.50	68.43	19.9	
Vert.	2412.000	PK	84.04	27.89	14.11	44.14	2.28	84.18	-	-	Carrier
Vert.	2400.000	PK	45.13	27.98	14.10	44.14	2.28	45.35	64.18	18.8	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	July 24, 2018
Temperature / Humidity	24 deg. C / 54 % RH
Engineer	Kazutaka Takeyama (1 GHz - 13 GHz)
Mode	Tx 11n-20, SISO, 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

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	July 24, 2018
Temperature / Humidity	24 deg. C / 54 % RH
Engineer	Kazutaka Takeyama (1 GHz - 13 GHz)
Mode	Tx 11n-20, SISO, 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	56.47	27.28	14.18	44.16	2.28	56.05	73.90	**17.8**	130	215	
Vert.	2483.500	PK	53.83	27.28	14.18	44.16	2.28	53.41	73.90	20.4	106	103	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 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	43.17	27.28	14.18	44.16	2.06	2.28	44.81	53.90	**9.1**	*1)
Vert.	2483.500	AV	41.97	27.28	14.18	44.16	2.06	2.28	43.61	53.90	10.3	*1)

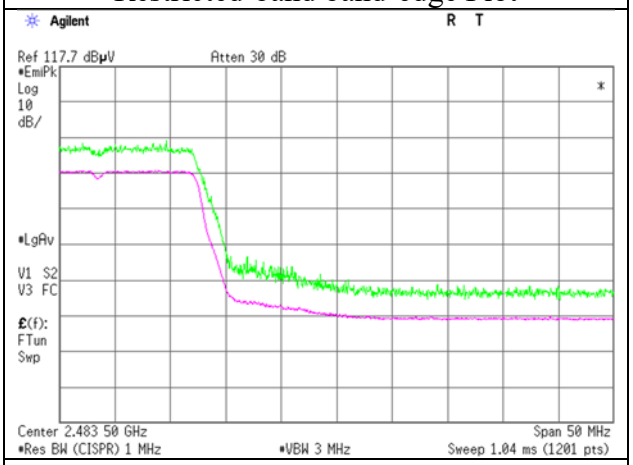
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	July 24, 2018
Temperature / Humidity	24 deg. C / 54 % RH
Engineer	Kazutaka Takeyama (1 GHz - 13 GHz)
Mode	Tx 11n-20, SISO, 2462 MHz

Horizontal

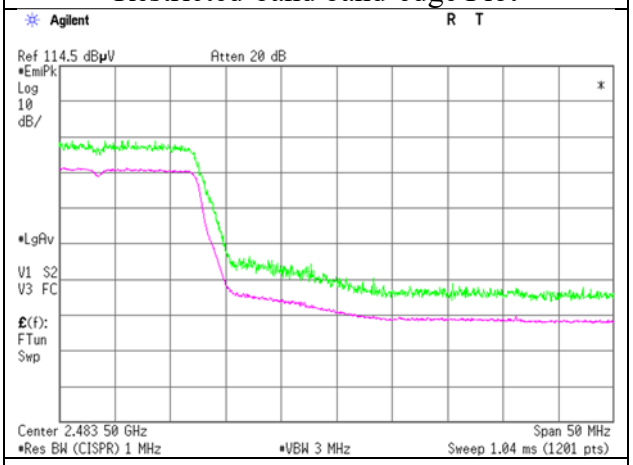
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	July 24, 2018
Temperature / Humidity	24 deg. C / 54 % RH
Engineer	Kazutaka Takeyama (1 GHz - 13 GHz)
Mode	Tx 11n-20, SISO, 2467 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	50.32	27.28	14.18	44.16	2.28	49.90	73.90	**24.0**	175	206	
Vert.	2483.500	PK	49.39	27.28	14.18	44.16	2.28	48.97	73.90	24.9	105	108	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 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	40.10	27.28	14.18	44.16	2.06	2.28	41.74	53.90	**12.2**	*1)
Vert.	2483.500	AV	39.93	27.28	14.18	44.16	2.06	2.28	41.57	53.90	12.3	*1)

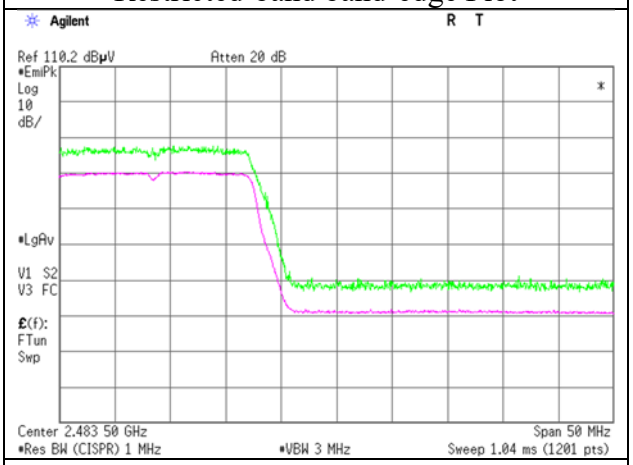
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	July 24, 2018
Temperature / Humidity	24 deg. C / 54 % RH
Engineer	Kazutaka Takeyama (1 GHz - 13 GHz)
Mode	Tx 11n-20, SISO, 2467 MHz

Horizontal

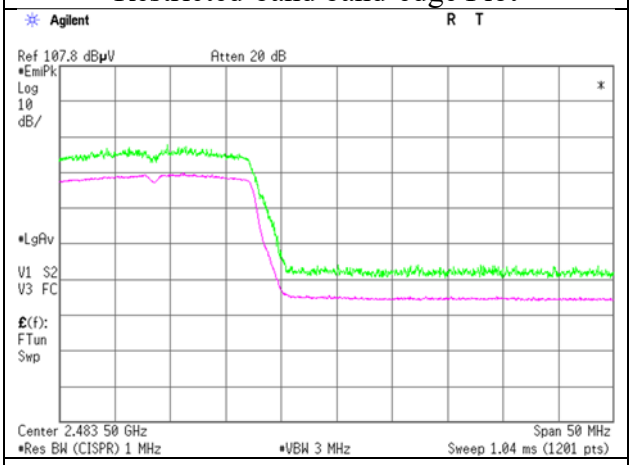
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	July 24, 2018
Temperature / Humidity	24 deg. C / 54 % RH
Engineer	Kazutaka Takeyama (1 GHz - 13 GHz)
Mode	Tx 11n-20, SISO, 2472 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	49.90	27.28	14.18	44.16	2.28	49.48	73.90	**24.4**	181	216	
Vert.	2483.500	PK	49.29	27.28	14.18	44.16	2.28	48.87	73.90	25.0	137	114	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 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	39.99	27.28	14.18	44.16	2.06	2.28	41.63	53.90	12.3	*1)
Vert.	2483.500	AV	40.13	27.28	14.18	44.16	2.06	2.28	41.77	53.90	**12.1**	*1)

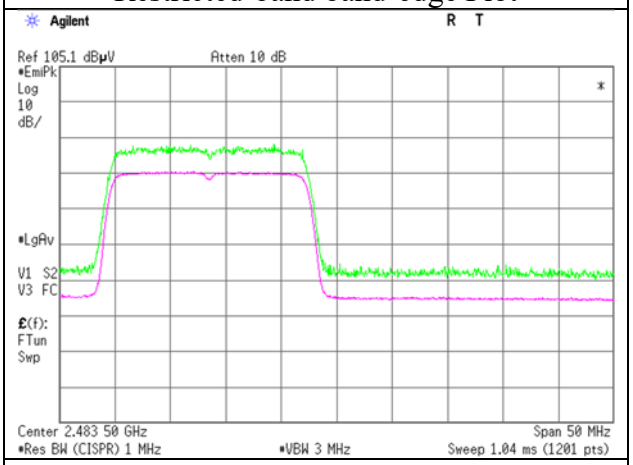
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	July 24, 2018
Temperature / Humidity	24 deg. C / 54 % RH
Engineer	Kazutaka Takeyama (1 GHz - 13 GHz)
Mode	Tx 11n-20, SISO, 2472 MHz

Horizontal

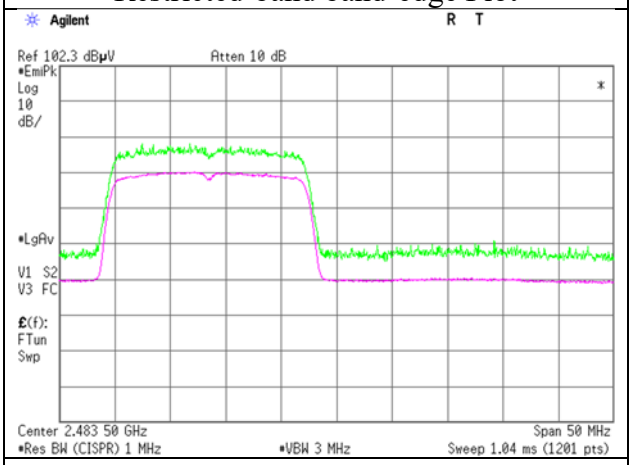
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12423101S-A-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	3	2	3
Date	August 11, 2018	August 22, 2018	August 3, 2018
Temperature / Humidity	25 deg. C / 54 % RH	23 deg. C / 66 % RH	27 deg. C / 48 % RH
Engineer	Kazuya Noda (1 GHz - 13 GHz)	Yosuke Ishikawa (13 GHz - 18 GHz)	Tatsuya Arai (18 GHz – 26.5 GHz)
Mode	Tx 11n-40, MIMO, 2422 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2389.100	PK	48.20	27.86	14.09	36.58	2.28	55.85	73.90	18.0	228	43	
Hori.	2390.000	PK	47.53	27.86	14.09	36.58	2.28	55.18	73.90	18.7	228	43	
Hori.	4844.000	PK	44.52	31.49	6.45	36.89	2.28	47.85	73.90	26.0	150	0	
Hori.	7266.000	PK	45.63	36.91	8.29	37.35	2.28	55.76	73.90	18.1	150	0	
Hori.	14532.000	PK	46.71	42.09	11.12	38.37	-9.54	52.01	73.90	21.8	150	0	
Vert.	2389.100	PK	49.54	27.86	14.09	36.58	2.28	57.19	73.90	**16.7**	148	247	
Vert.	2390.000	PK	48.14	27.86	14.09	36.58	2.28	55.79	73.90	18.1	148	247	
Vert.	4844.000	PK	44.26	31.49	6.45	36.89	2.28	47.59	73.90	26.3	150	0	
Vert.	7266.000	PK	45.34	36.91	8.29	37.35	2.28	55.47	73.90	18.4	150	0	
Vert.	14532.000	PK	46.99	42.09	11.12	38.37	-9.54	52.29	73.90	21.6	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 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.	2389.100	AV	36.23	27.86	14.09	36.58	5.12	2.28	49.00	53.90	4.9	
Hori.	2390.000	AV	36.65	27.86	14.09	36.58	5.12	2.28	49.42	53.90	4.5	*1)
Hori.	4844.000	AV	34.69	31.49	6.45	36.89	5.12	2.28	43.14	53.90	10.8	
Hori.	7266.000	AV	35.80	36.91	8.29	37.35	5.12	2.28	51.05	53.90	2.9	
Hori.	14532.000	AV	38.19	42.09	11.12	38.37	5.12	-9.54	48.61	53.90	5.3	
Vert.	2389.100	AV	36.29	27.86	14.09	36.58	5.12	2.28	49.06	53.90	4.8	
Vert.	2390.000	AV	36.92	27.86	14.09	36.58	5.12	2.28	49.69	53.90	4.2	*1)
Vert.	4844.000	AV	34.58	31.49	6.45	36.89	5.12	2.28	43.03	53.90	10.9	
Vert.	7266.000	AV	35.89	36.91	8.29	37.35	5.12	2.28	51.14	53.90	**2.8**	
Vert.	14532.000	AV	38.37	42.09	11.12	38.37	5.12	-9.54	48.79	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 (3.90 m / 3.0 m) = 2.28 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)

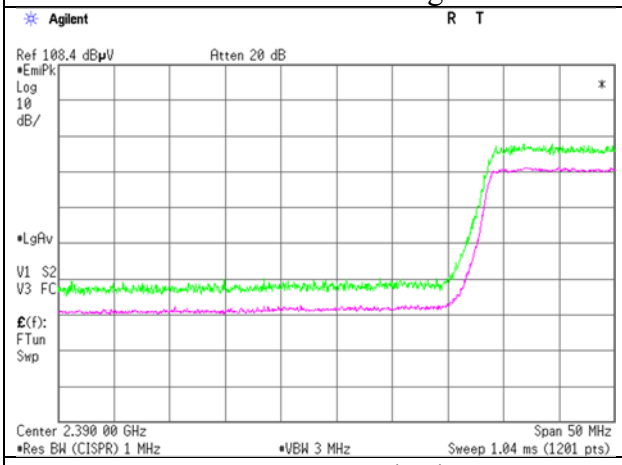
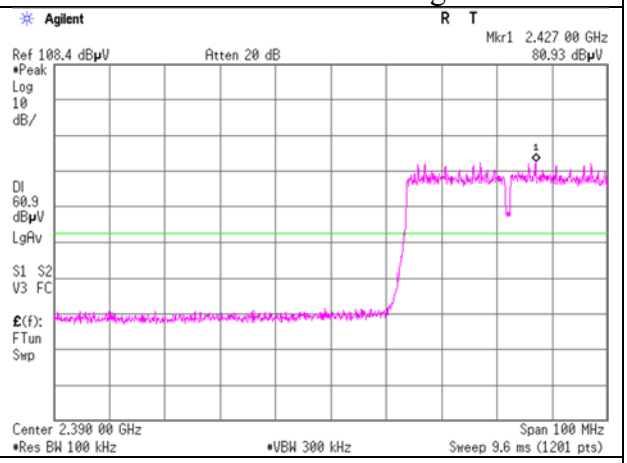
20 dBc Data Sheet **(RBW 100 kHz, VBW 300 kHz)**

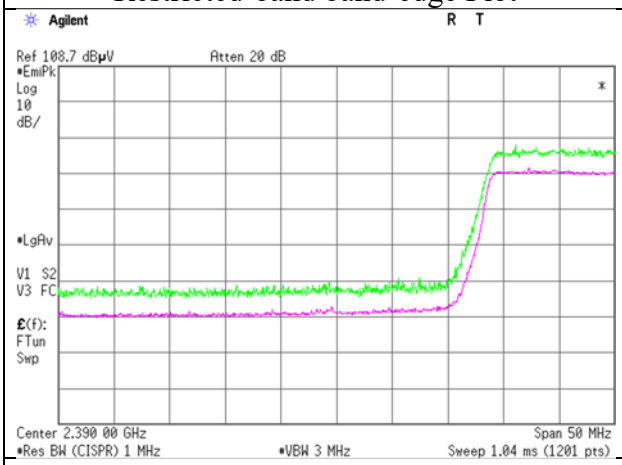
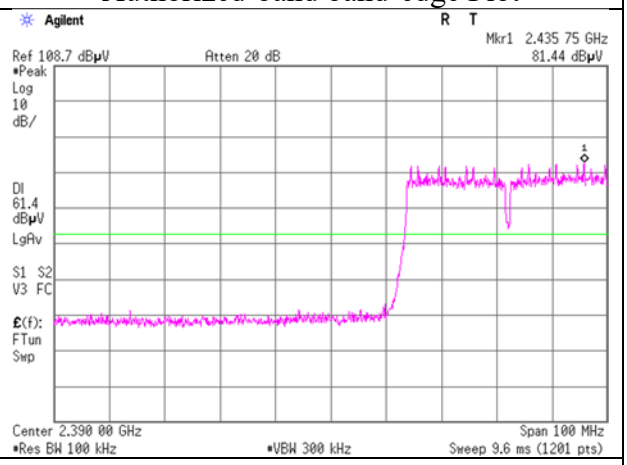
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2422.000	PK	80.67	27.83	14.11	36.56	2.28	88.33	-	-	Carrier
Hori.	2400.000	PK	38.83	27.86	14.10	36.58	2.28	46.49	68.33	21.8	
Vert.	2422.000	PK	81.43	27.83	14.11	36.56	2.28	89.09	-	-	Carrier
Vert.	2400.000	PK	39.71	27.86	14.10	36.58	2.28	47.37	69.09	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 (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	August 11, 2018
Temperature / Humidity	25 deg. C / 54 % RH
Engineer	Kazuya Noda (1 GHz - 13 GHz)
Mode	Tx 11n-40, MIMO, 2422 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

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12423101S-A-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	3	2	3
Date	August 11, 2018	August 22, 2018	August 3, 2018
Temperature / Humidity	25 deg. C / 54 % RH	23 deg. C / 66 % RH	27 deg. C / 48 % RH
Engineer	Kazuya Noda (1 GHz - 13 GHz)	Yosuke Ishikawa (13 GHz - 18 GHz)	Tatsuya Arai (18 GHz – 26.5 GHz)
Mode	Tx 11n-40, MIMO, 2437 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4874.000	PK	44.84	31.40	6.45	36.90	2.28	48.07	73.90	25.8	150	0	
Hori.	7311.000	PK	44.97	36.99	8.31	37.42	2.28	55.13	73.90	18.7	150	0	
Hori.	14622.000	PK	45.09	42.02	11.13	38.34	-9.54	50.36	73.90	23.5	150	0	
Vert.	4874.000	PK	44.45	31.40	6.45	36.90	2.28	47.68	73.90	26.2	150	0	
Vert.	7311.000	PK	45.12	36.99	8.31	37.42	2.28	55.28	73.90	**18.6**	150	0	
Vert.	14622.000	PK	45.65	42.02	11.13	38.34	-9.54	50.92	73.90	22.9	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 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	35.02	31.40	6.45	36.90	5.12	2.28	43.37	53.90	10.5	
Hori.	7311.000	AV	35.93	36.99	8.31	37.42	5.12	2.28	51.21	53.90	**2.7**	
Hori.	14622.000	AV	37.52	42.02	11.13	38.34	5.12	-9.54	47.91	53.90	6.0	
Vert.	4874.000	AV	34.84	31.40	6.45	36.90	5.12	2.28	43.19	53.90	10.7	
Vert.	7311.000	AV	35.66	36.99	8.31	37.42	5.12	2.28	50.94	53.90	3.0	
Vert.	14622.000	AV	37.55	42.02	11.13	38.34	5.12	-9.54	47.94	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 (3.90 m / 3.0 m) = 2.28 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

Report No.	12423101S-A-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	3	2	3
Date	August 11, 2018	August 22, 2018	August 3, 2018
Temperature / Humidity	25 deg. C / 54 % RH	23 deg. C / 66 % RH	27 deg. C / 48 % RH
Engineer	Kazuya Noda (1 GHz - 13 GHz)	Yosuke Ishikawa (13 GHz - 18 GHz)	Tatsuya Arai (18 GHz – 26.5 GHz)
Mode	Tx 11n-40, MIMO, 2457 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	46.17	27.65	14.18	36.52	2.28	53.76	73.90	20.1	226	48	
Hori.	4914.000	PK	44.83	31.34	6.46	36.92	2.28	47.99	73.90	25.9	150	0	
Hori.	7371.000	PK	45.11	37.02	8.37	37.52	2.28	55.26	73.90	18.6	150	0	
Hori.	14742.000	PK	44.31	41.83	11.14	38.30	-9.54	49.44	73.90	24.4	150	0	
Vert.	2483.500	PK	44.71	27.65	14.18	36.52	2.28	52.30	73.90	21.6	147	245	
Vert.	4914.000	PK	45.39	31.34	6.46	36.92	2.28	48.55	73.90	25.3	150	0	
Vert.	7371.000	PK	45.22	37.02	8.37	37.52	2.28	55.37	73.90	**18.5**	150	0	
Vert.	14742.000	PK	44.28	41.83	11.14	38.30	-9.54	49.41	73.90	24.4	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 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	36.67	27.65	14.18	36.52	5.12	2.28	49.38	53.90	4.5	*1)
Hori.	4914.000	AV	35.42	31.34	6.46	36.92	5.12	2.28	43.70	53.90	10.2	
Hori.	7371.000	AV	35.56	37.02	8.37	37.52	5.12	2.28	50.83	53.90	3.1	
Hori.	14742.000	AV	36.42	41.83	11.14	38.30	5.12	-9.54	46.67	53.90	7.2	
Vert.	2483.500	AV	35.41	27.65	14.18	36.52	5.12	2.28	48.12	53.90	5.8	*1)
Vert.	4914.000	AV	35.20	31.34	6.46	36.92	5.12	2.28	43.48	53.90	10.4	
Vert.	7371.000	AV	35.65	37.02	8.37	37.52	5.12	2.28	50.92	53.90	**3.0**	
Vert.	14742.000	AV	36.47	41.83	11.14	38.30	5.12	-9.54	46.72	53.90	7.2	

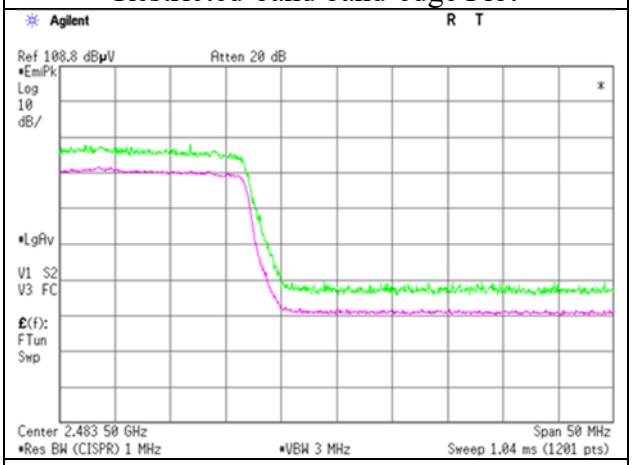
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	August 11, 2018
Temperature / Humidity	25 deg. C / 54 % RH
Engineer	Kazuya Noda (1 GHz - 13 GHz)
Mode	Tx 11n-40, MIMO, 2457 MHz

Horizontal

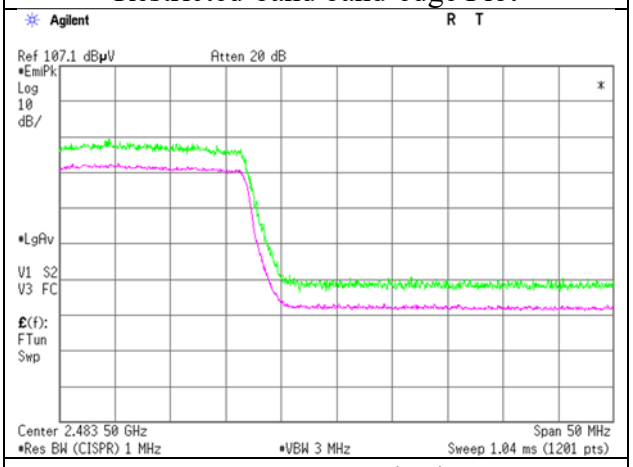
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12423101S-A-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	3	2	3
Date	August 11, 2018	August 22, 2018	August 3, 2018
Temperature / Humidity	25 deg. C / 54 % RH	23 deg. C / 66 % RH	27 deg. C / 48 % RH
Engineer	Kazuya Noda (1 GHz - 13 GHz)	Yosuke Ishikawa (13 GHz - 18 GHz)	Tatsuya Arai (18 GHz – 26.5 GHz)
Mode	Tx 11n-40, MIMO, 2462 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	50.48	27.65	14.18	36.52	2.28	58.07	73.90	**15.8**	217	49	
Hori.	4924.000	PK	44.62	31.37	6.46	36.92	2.28	47.81	73.90	26.0	150	0	
Hori.	7386.000	PK	45.57	37.01	8.37	37.54	2.28	55.69	73.90	18.2	150	0	
Hori.	14772.000	PK	44.78	41.69	11.15	38.29	-9.54	49.79	73.90	24.1	150	0	
Vert.	2483.500	PK	48.55	27.65	14.18	36.52	2.28	56.14	73.90	17.7	143	247	
Vert.	4924.000	PK	44.54	31.37	6.46	36.92	2.28	47.73	73.90	26.1	150	0	
Vert.	7386.000	PK	45.61	37.01	8.37	37.54	2.28	55.73	73.90	18.1	150	0	
Vert.	14772.000	PK	44.06	41.69	11.15	38.29	-9.54	49.07	73.90	24.8	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 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	37.26	27.65	14.18	36.52	5.12	2.28	49.97	53.90	3.9	*1)
Hori.	4924.000	AV	34.75	31.37	6.46	36.92	5.12	2.28	43.06	53.90	10.8	
Hori.	7386.000	AV	35.52	37.01	8.37	37.54	5.12	2.28	50.76	53.90	**3.1**	
Hori.	14772.000	AV	36.64	41.69	11.15	38.29	5.12	-9.54	46.77	53.90	7.1	
Vert.	2483.500	AV	36.40	27.65	14.18	36.52	5.12	2.28	49.11	53.90	4.8	*1)
Vert.	4924.000	AV	34.38	31.37	6.46	36.92	5.12	2.28	42.69	53.90	11.2	
Vert.	7386.000	AV	35.31	37.01	8.37	37.54	5.12	2.28	50.55	53.90	3.4	
Vert.	14772.000	AV	36.58	41.69	11.15	38.29	5.12	-9.54	46.71	53.90	7.2	

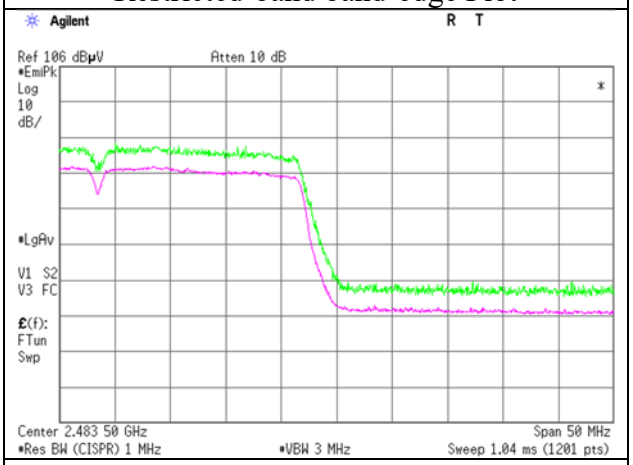
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	August 11, 2018
Temperature / Humidity	25 deg. C / 54 % RH
Engineer	Kazuya Noda (1 GHz - 13 GHz)
Mode	Tx 11n-40, MIMO, 2462 MHz

Horizontal

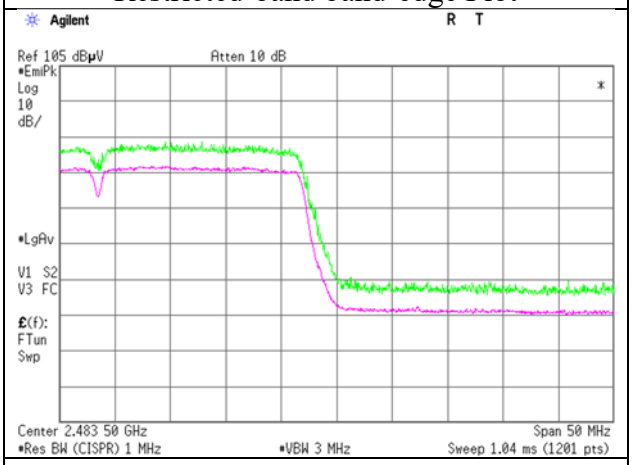
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12423101S-A-R1	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	3	2
Date	August 11, 2018	September 9, 2018
Temperature / Humidity	25 deg. C / 54 % RH	25 deg. C / 55 % RH
Engineer	Kazuya Noda (1 GHz - 13 GHz)	Kazutaka Takeyama (1 GHz – 2.8 GHz)
Mode	Tx 11n-40, SISO, 2422 MHz	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2384.460	PK	53.44	27.85	14.09	44.13	2.28	53.53	73.90	20.3	377	48	
Hori.	2387.880	PK	55.54	27.86	14.09	44.13	2.28	55.64	73.90	18.2	377	48	
Hori.	2390.000	PK	54.67	27.86	14.09	44.13	2.28	54.77	73.90	19.1	377	48	
Vert.	2384.460	PK	56.06	27.85	14.09	44.13	2.28	56.15	73.90	17.7	211	351	
Vert.	2387.880	PK	57.51	27.86	14.09	44.13	2.28	57.61	73.90	**16.2**	211	351	
Vert.	2390.000	PK	56.03	27.86	14.09	44.13	2.28	56.13	73.90	17.7	211	351	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 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.	2384.460	AV	42.76	27.85	14.09	44.13	3.47	2.28	46.32	53.90	7.6	
Hori.	2387.880	AV	42.91	27.86	14.09	44.13	3.47	2.28	46.48	53.90	7.4	
Hori.	2390.000	AV	43.25	27.86	14.09	44.13	3.47	2.28	46.82	53.90	7.1	*1)
Vert.	2384.460	AV	44.22	27.85	14.09	44.13	3.47	2.28	47.78	53.90	6.1	
Vert.	2387.880	AV	44.31	27.86	14.09	44.13	3.47	2.28	47.88	53.90	6.0	
Vert.	2390.000	AV	44.92	27.86	14.09	44.13	3.47	2.28	48.49	53.90	**5.4**	*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 (3.90 m / 3.0 m) = 2.28 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)

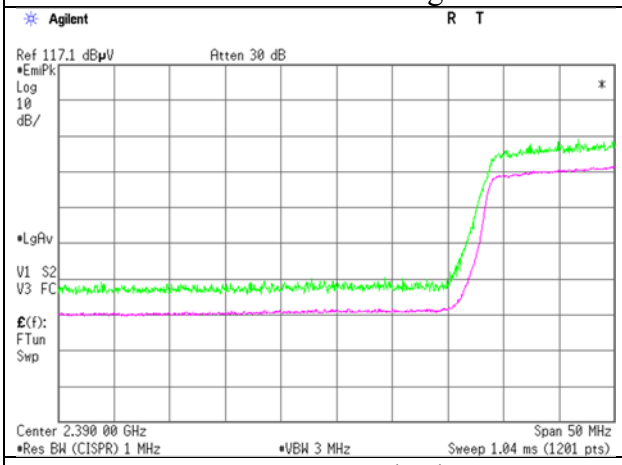
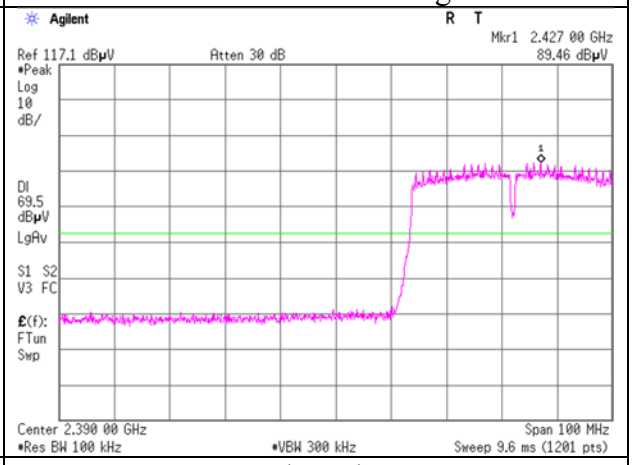
20 dBc Data Sheet **(RBW 100 kHz, VBW 300 kHz)**

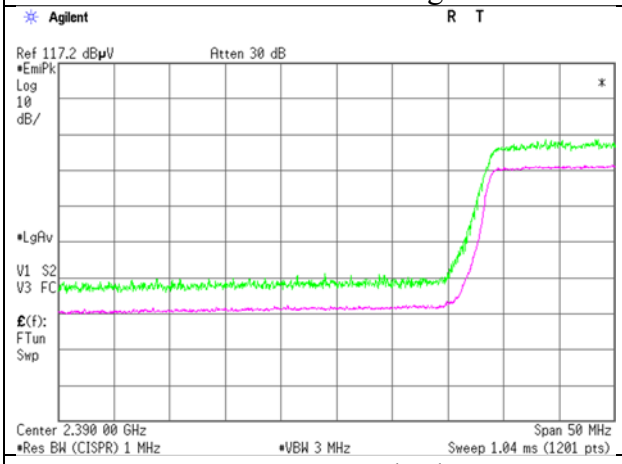
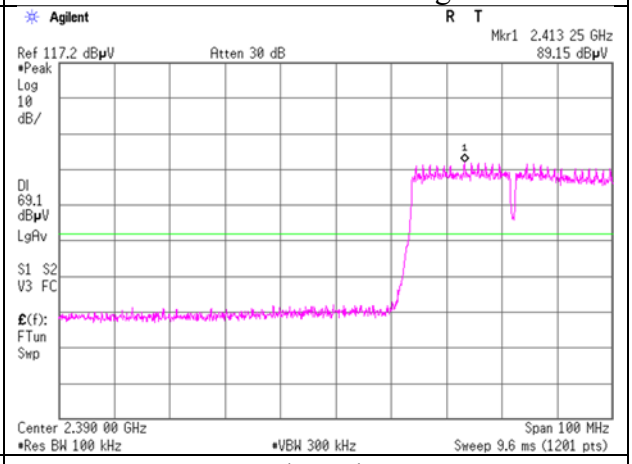
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2422.000	PK	81.00	27.85	13.99	36.56	2.28	88.56	-	-	Carrier
Hori.	2400.000	PK	38.50	27.91	13.98	36.58	2.28	46.09	68.56	22.5	
Vert.	2422.000	PK	80.80	27.85	13.99	36.56	2.28	88.36	-	-	Carrier
Vert.	2400.000	PK	38.40	27.91	13.98	36.58	2.28	45.99	68.36	22.4	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	August 11, 2018
Temperature / Humidity	25 deg. C / 54 % RH
Engineer	Kazuya Noda (1 GHz - 13 GHz)
Mode	Tx 11n-40, SISO, 2422 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

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	August 11, 2018
Temperature / Humidity	25 deg. C / 54 % RH
Engineer	Kazuya Noda (1 GHz - 13 GHz)
Mode	Tx 11n-40, SISO, 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	60.59	27.65	14.18	44.16	2.28	60.54	73.90	**13.3**	152	51	
Vert.	2483.500	PK	57.42	27.65	14.18	44.16	2.28	57.37	73.90	16.5	178	295	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 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	46.25	27.65	14.18	44.16	3.47	2.28	49.67	53.90	**4.2**	*1)
Vert.	2483.500	AV	43.52	27.65	14.18	44.16	3.47	2.28	46.94	53.90	7.0	*1)

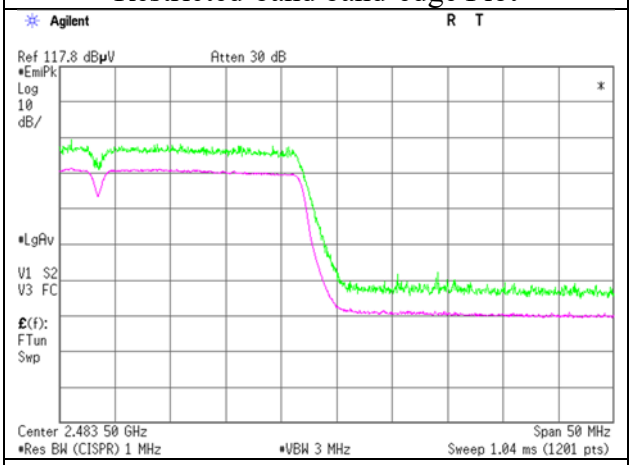
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	August 11, 2018
Temperature / Humidity	25 deg. C / 54 % RH
Engineer	Kazuya Noda (1 GHz - 13 GHz)
Mode	Tx 11n-40, SISO, 2462 MHz

Horizontal

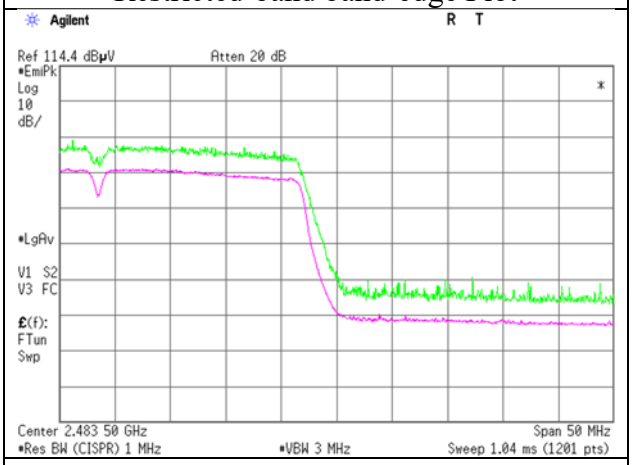
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12423101S-A-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	2	2	1	2
Date	August 26, 2018	August 9, 2018	August 24, 2018	August 8, 2018
Temperature / Humidity	24 deg. C / 63 % RH	24 deg. C / 65 % RH	23 deg. C / 67 % RH	24 deg. C / 66 % RH
Engineer	Makoto Hosaka (30 MHz - 1000 MHz)	Makoto Hosaka (1 GHz - 13 GHz)	Yosuke Ishikawa (13 GHz - 18 GHz)	Makoto Hosaka (18 GHz – 26.5 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.	91.158	QP	35.40	8.44	8.07	31.89	0.00	20.02	43.50	23.4	358	103	
Hori.	250.007	QP	56.80	11.74	5.81	31.73	0.00	42.62	46.00	**3.3**	159	24	
Hori.	321.899	QP	36.50	14.25	6.42	31.68	0.00	25.49	46.00	20.5	112	292	
Hori.	947.553	QP	30.10	21.95	9.29	30.58	0.00	30.76	46.00	15.2	100	226	
Hori.	2390.000	PK	45.39	27.91	13.89	36.58	2.28	52.89	73.90	21.0	158	155	
Hori.	3202.654	PK	46.88	28.83	5.61	36.62	2.28	46.98	73.90	26.9	100	179	
Hori.	4804.000	PK	46.99	31.31	6.51	36.88	2.28	50.21	73.90	23.6	100	345	
Hori.	7206.000	PK	44.96	36.77	7.66	37.26	2.28	54.41	73.90	19.4	150	0	
Hori.	9608.000	PK	45.38	38.11	8.64	38.47	2.28	55.94	73.90	17.9	150	0	
Hori.	12010.000	PK	46.14	39.10	10.21	38.04	2.28	59.69	73.90	14.2	150	0	
Hori.	3202.654	AV	40.96	28.83	5.61	36.62	2.28	41.06	53.90	12.8	100	179	
Vert.	53.757	QP	36.90	9.87	7.14	31.91	0.00	22.00	40.00	18.0	100	328	
Vert.	63.258	QP	38.50	7.53	6.93	31.90	0.00	21.06	40.00	18.9	100	48	
Vert.	82.788	QP	39.20	6.82	8.09	31.89	0.00	22.22	40.00	17.7	100	200	
Vert.	99.275	QP	35.50	10.15	7.95	31.88	0.00	21.72	43.50	21.7	100	2	
Vert.	250.007	QP	48.10	11.74	5.81	31.73	0.00	33.92	46.00	12.0	159	93	
Vert.	2390.000	PK	44.27	27.91	13.89	36.58	2.28	51.77	73.90	22.1	161	306	
Vert.	3202.654	PK	48.00	28.83	5.61	36.62	2.28	48.10	73.90	25.8	162	214	
Vert.	4804.000	PK	44.30	31.31	6.51	36.88	2.28	47.52	73.90	26.3	152	227	
Vert.	7206.000	PK	44.92	36.77	7.66	37.26	2.28	54.37	73.90	19.5	150	0	
Vert.	9608.000	PK	45.32	38.11	8.64	38.47	2.28	55.88	73.90	18.0	150	0	
Vert.	12010.000	PK	45.71	39.10	10.21	38.04	2.28	59.26	73.90	14.6	150	0	
Vert.	3202.654	AV	41.61	28.83	5.61	36.62	2.28	41.71	53.90	12.1	162	214	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Peak 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	PK	45.39	27.91	13.89	36.58	-19.05	2.28	31.56	53.90	22.3	*1)
Hori.	4804.000	PK	46.99	31.31	6.51	36.88	-19.05	2.28	28.88	53.90	25.0	
Hori.	7206.000	PK	44.96	36.77	7.66	37.26	-19.05	2.28	33.08	53.90	20.8	
Hori.	9608.000	PK	45.38	38.11	8.64	38.47	-19.05	2.28	34.61	53.90	19.3	
Hori.	12010.000	PK	46.14	39.10	10.21	38.04	-19.05	2.28	38.36	53.90	**15.5**	
Vert.	2390.000	PK	44.27	27.91	13.89	36.58	-19.05	2.28	30.44	53.90	23.5	*1)
Vert.	4804.000	PK	44.30	31.31	6.51	36.88	-19.05	2.28	26.19	53.90	27.7	
Vert.	7206.000	PK	44.92	36.77	7.66	37.26	-19.05	2.28	33.04	53.90	20.9	
Vert.	9608.000	PK	45.32	38.11	8.64	38.47	-19.05	2.28	34.55	53.90	19.4	
Vert.	12010.000	PK	45.71	39.10	10.21	38.04	-19.05	2.28	37.93	53.90	16.0	

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 (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Dwell factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

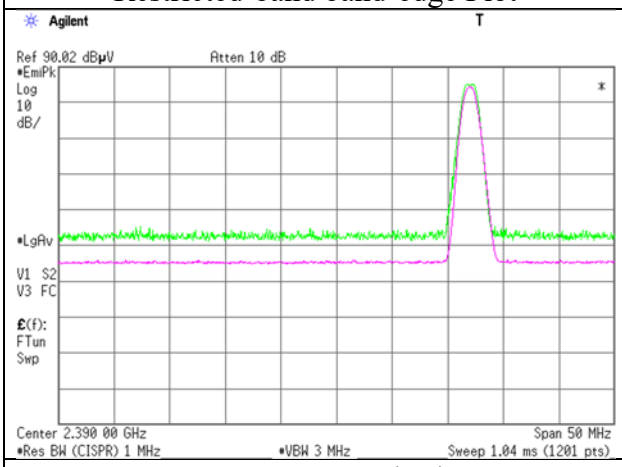
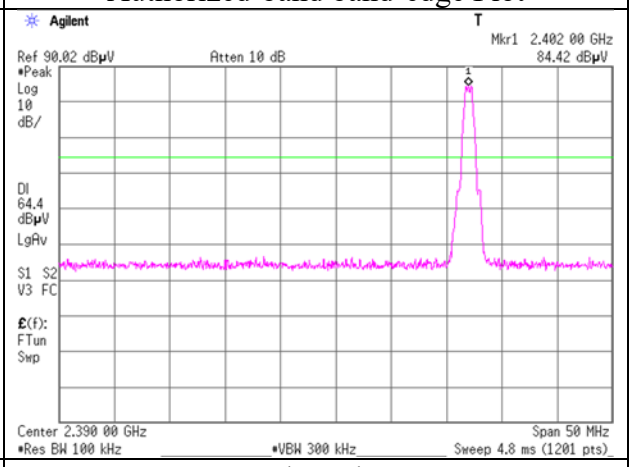
20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

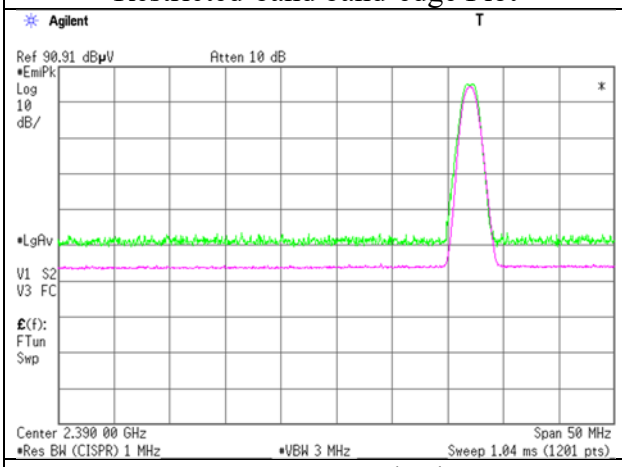
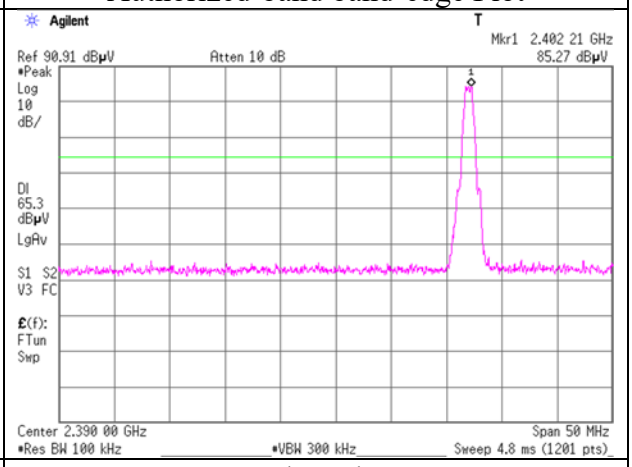
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	84.24	27.90	13.90	36.57	2.28	91.75	-	-	Carrier
Hori.	2400.000	PK	35.77	27.91	13.90	36.58	2.28	43.28	71.75	28.5	
Vert.	2402.000	PK	85.17	27.90	13.90	36.57	2.28	92.68	-	-	Carrier
Vert.	2400.000	PK	35.06	27.91	13.90	36.58	2.28	42.57	72.68	30.1	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	August 9, 2018
Temperature / Humidity	24 deg. C / 65 % RH
Engineer	Makoto Hosaka (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

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	12423101S-A-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	2	2	1	2
Date	August 26, 2018	August 9, 2018	August 24, 2018	August 8, 2018
Temperature / Humidity	24 deg. C / 63 % RH	24 deg. C / 65 % RH	23 deg. C / 67 % RH	24 deg. C / 66 % RH
Engineer	Makoto Hosaka	Makoto Hosaka	Yosuke Ishikawa	Makoto Hosaka
	(30 MHz - 1000 MHz)	(1 GHz - 13 GHz)	(13 GHz - 18 GHz)	(18 GHz – 26.5 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.	122.118	QP	31.90	13.26	7.94	31.86	0.00	21.24	43.50	22.2	260	158	
Hori.	250.013	QP	56.30	11.74	5.81	31.73	0.00	42.12	46.00	**3.8**	151	12	
Hori.	318.997	QP	38.10	14.15	6.39	31.69	0.00	26.95	46.00	19.0	112	255	
Hori.	944.191	QP	30.00	21.94	9.28	30.60	0.00	30.62	46.00	15.3	100	229	
Hori.	3253.320	PK	49.03	28.44	5.62	36.63	2.28	48.74	73.90	25.1	136	203	
Hori.	4880.000	PK	47.82	31.15	6.53	36.90	2.28	50.88	73.90	23.0	152	347	
Hori.	7320.000	PK	44.19	36.84	7.73	37.44	2.28	53.60	73.90	20.3	150	0	
Hori.	9760.000	PK	43.70	38.58	8.81	38.65	2.28	54.72	73.90	19.1	150	0	
Hori.	12200.000	PK	43.71	39.02	10.64	38.37	2.28	57.28	73.90	16.6	150	0	
Hori.	3253.320	AV	42.55	28.44	5.62	36.63	2.28	42.26	53.90	11.6	136	203	
Vert.	52.080	QP	35.80	10.47	7.16	31.91	0.00	21.52	40.00	18.4	100	70	
Vert.	74.988	QP	41.70	6.27	7.68	31.90	0.00	23.75	40.00	16.2	100	44	
Vert.	112.134	QP	34.50	12.19	7.86	31.87	0.00	22.68	43.50	20.8	100	16	
Vert.	250.013	QP	48.70	11.74	5.81	31.73	0.00	34.52	46.00	11.4	100	197	
Vert.	3253.320	PK	49.25	28.44	5.62	36.63	2.28	48.96	73.90	24.9	135	184	
Vert.	4880.000	PK	44.97	31.15	6.53	36.90	2.28	48.03	73.90	25.8	137	225	
Vert.	7320.000	PK	44.00	36.84	7.73	37.44	2.28	53.41	73.90	20.4	150	0	
Vert.	9760.000	PK	43.54	38.58	8.81	38.65	2.28	54.56	73.90	19.3	150	0	
Vert.	12200.000	PK	44.55	39.02	10.64	38.37	2.28	58.12	73.90	15.7	150	0	
Vert.	3253.320	AV	42.66	28.44	5.62	36.63	2.28	42.37	53.90	11.5	135	184	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Peak 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.	4880.000	PK	47.82	31.15	6.53	36.90	-19.05	2.28	29.55	53.90	24.4	
Hori.	7320.000	PK	44.19	36.84	7.73	37.44	-19.05	2.28	32.27	53.90	21.6	
Hori.	9760.000	PK	43.70	38.58	8.81	38.65	-19.05	2.28	33.39	53.90	20.5	
Hori.	12200.000	PK	43.71	39.02	10.64	38.37	-19.05	2.28	35.95	53.90	18.0	
Vert.	4880.000	PK	44.97	31.15	6.53	36.90	-19.05	2.28	26.70	53.90	27.2	
Vert.	7320.000	PK	44.00	36.84	7.73	37.44	-19.05	2.28	32.08	53.90	21.8	
Vert.	9760.000	PK	43.54	38.58	8.81	38.65	-19.05	2.28	33.23	53.90	20.7	
Vert.	12200.000	PK	44.55	39.02	10.64	38.37	-19.05	2.28	36.79	53.90	**17.1**	

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 (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Dwell factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission

Report No.	12423101S-A-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	2	2	1	2
Date	August 26, 2018	August 9, 2018	August 24, 2018	August 8, 2018
Temperature / Humidity	24 deg. C / 63 % RH	24 deg. C / 65 % RH	23 deg. C / 67 % RH	24 deg. C / 66 % RH
Engineer	Makoto Hosaka	Makoto Hosaka	Yosuke Ishikawa	Makoto Hosaka
	(30 MHz - 1000 MHz)	(1 GHz - 13 GHz)	(13 GHz - 18 GHz)	(18 GHz – 26.5 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.	90.987	QP	35.00	8.40	8.07	31.89	0.00	19.58	43.50	23.9	337	96	
Hori.	113.862	QP	27.90	12.40	7.86	31.87	0.00	16.29	43.50	27.2	291	133	
Hori.	250.014	QP	56.30	11.74	5.81	31.73	0.00	42.12	46.00	**3.8**	157	6	
Hori.	319.799	QP	36.00	14.18	6.40	31.69	0.00	24.89	46.00	21.1	113	252	
Hori.	954.036	QP	30.40	22.00	9.32	30.52	0.00	31.20	46.00	14.8	100	226	
Hori.	2483.500	PK	44.54	27.67	13.96	36.52	2.28	51.93	73.90	21.9	148	40	
Hori.	3306.650	PK	48.66	28.11	5.61	36.63	2.28	48.03	73.90	25.8	146	206	
Hori.	4960.000	PK	47.88	31.33	6.56	36.93	2.28	51.12	73.90	22.7	115	205	
Hori.	7440.000	PK	44.01	36.97	7.81	37.63	2.28	53.44	73.90	20.4	150	0	
Hori.	9920.000	PK	44.09	38.80	9.00	38.84	2.28	55.33	73.90	18.5	150	0	
Hori.	12400.000	PK	43.33	38.29	11.08	38.72	2.28	56.26	73.90	17.6	150	0	
Hori.	3306.650	AV	42.84	28.11	5.61	36.63	2.28	42.21	53.90	11.6	146	206	
Vert.	53.780	QP	36.80	9.86	7.14	31.91	0.00	21.89	40.00	18.1	100	110	
Vert.	78.323	QP	40.00	6.30	7.94	31.89	0.00	22.35	40.00	17.6	100	280	
Vert.	250.014	QP	49.00	11.74	5.81	31.73	0.00	34.82	46.00	11.1	157	102	
Vert.	2483.500	PK	44.09	27.67	13.96	36.52	2.28	51.48	73.90	22.4	179	289	
Vert.	3306.650	PK	52.90	28.11	5.61	36.63	2.28	52.27	73.90	21.6	128	333	
Vert.	4960.000	PK	45.88	31.33	6.56	36.93	2.28	49.12	73.90	24.7	102	273	
Vert.	7440.000	PK	42.95	36.97	7.81	37.63	2.28	52.38	73.90	21.5	150	0	
Vert.	9920.000	PK	42.67	38.80	9.00	38.84	2.28	53.91	73.90	19.9	150	0	
Vert.	12400.000	PK	43.91	38.29	11.08	38.72	2.28	56.84	73.90	17.0	150	0	
Vert.	3306.650	AV	43.88	28.11	5.61	36.63	2.28	43.25	53.90	10.6	128	333	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Peak 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	PK	44.54	27.67	13.96	36.52	-19.05	2.28	30.60	53.90	23.3	*1)
Hori.	4960.000	PK	47.88	31.33	6.56	36.93	-19.05	2.28	29.79	53.90	24.1	
Hori.	7440.000	PK	44.01	36.97	7.81	37.63	-19.05	2.28	32.11	53.90	21.8	
Hori.	9920.000	PK	44.09	38.80	9.00	38.84	-19.05	2.28	34.00	53.90	19.9	
Hori.	12400.000	PK	43.33	38.29	11.08	38.72	-19.05	2.28	34.93	53.90	19.0	
Vert.	2483.500	PK	44.09	27.67	13.96	36.52	-19.05	2.28	30.15	53.90	23.8	*1)
Vert.	4960.000	PK	45.88	31.33	6.56	36.93	-19.05	2.28	27.79	53.90	26.1	
Vert.	7440.000	PK	42.95	36.97	7.81	37.63	-19.05	2.28	31.05	53.90	22.9	
Vert.	9920.000	PK	42.67	38.80	9.00	38.84	-19.05	2.28	32.58	53.90	21.3	
Vert.	12400.000	PK	43.91	38.29	11.08	38.72	-19.05	2.28	35.51	53.90	**18.4**	

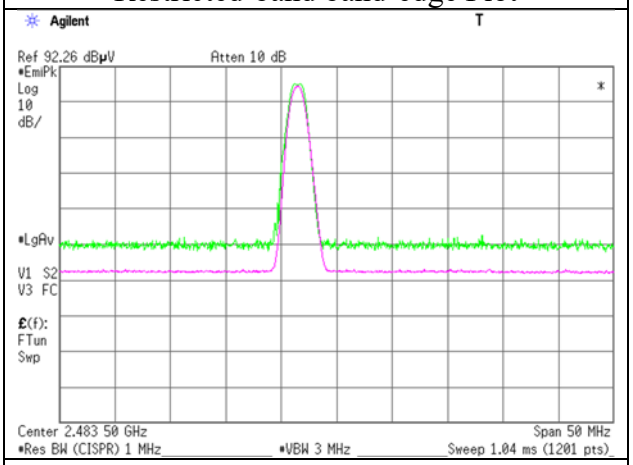
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Dwell factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12423101S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	August 9, 2018
Temperature / Humidity	24 deg. C / 65 % RH
Engineer	Makoto Hosaka (1 GHz - 13 GHz)
Mode	Tx BT LE, 2480 MHz

Horizontal

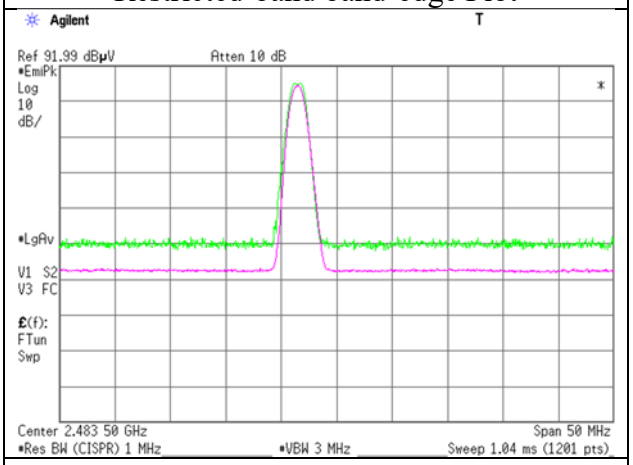
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot

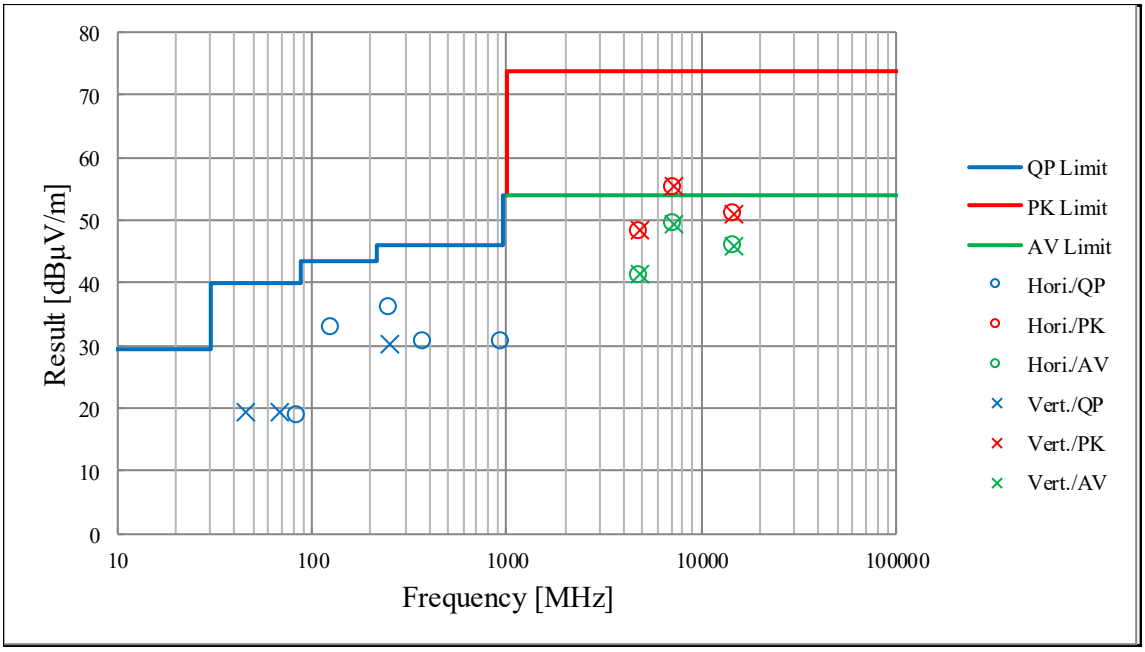


Trace Green : Peak Plot
Trace Purple : Average Plot

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission
(Plot data, Worst case)

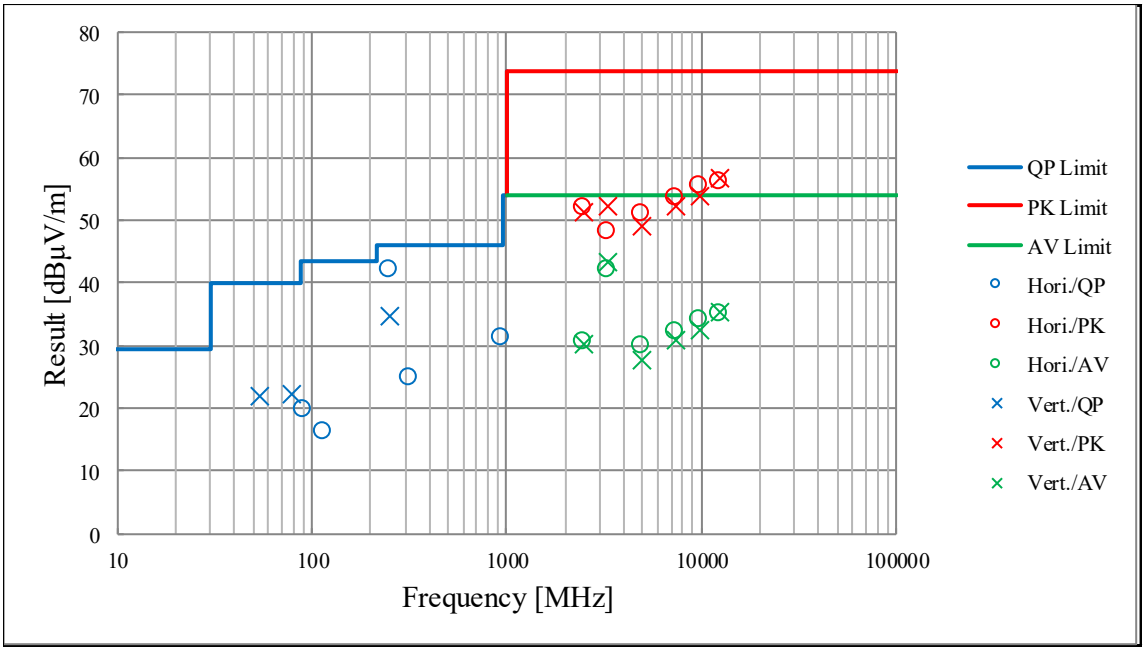
Report No.	12423101S-A-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	2	3	2	3
Date	August 26, 2018	August 11, 2018	August 22, 2018	August 3, 2018
Temperature / Humidity	24 deg. C / 63 % RH	25 deg. C / 54 % RH	23 deg. C / 66 % RH	27 deg. C / 48 % RH
Engineer	Makoto Hosaka	Kazuya Noda	Yosuke Ishikawa	Tatsuya Arai
	(30 MHz - 1000 MHz)	(1 GHz - 13 GHz)	(13 GHz - 18 GHz)	(18 GHz – 26.5 GHz)
Mode	Tx OFDM, VHT20, MIMO, 2437 MHz			



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

Radiated Spurious Emission
(Plot data, Worst case)

Report No.	12423101S-A-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	2	2	1	2
Date	August 26, 2018	August 9, 2018	August 24, 2018	August 8, 2018
Temperature / Humidity	24 deg. C / 63 % RH	24 deg. C / 65 % RH	23 deg. C / 67 % RH	24 deg. C / 66 % RH
Engineer	Makoto Hosaka	Makoto Hosaka	Yosuke Ishikawa	Makoto Hosaka
	(30 MHz - 1000 MHz)	(1 GHz - 13 GHz)	(13 GHz - 18 GHz)	(18 GHz – 26.5 GHz)
Mode	Tx BT LE, 2480 MHz			



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

APPENDIX 2: Test instruments

Test Instruments (1/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAEC-01(NSA)	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2018/05/29 * 12
SAF-04	Pre Amplifier	TOYO Corporation	TPA0118-36	1440489	RE	2018/06/26 * 12
SHA-01	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-725	RE	2018/07/23 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2017/10/30 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	RE	2018/04/13 * 12
KJM-09	Measure	KOMELON	KMC-36	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE	-
STS-01	Digital Hitester	Hioki	3805-50	080997812	RE	2017/10/16 * 12
SFL-18	Highpass Filter	MICRO-TRONICS	HPM50111	119	RE	2018/04/20 * 12
SAF-05	Pre Amplifier	TOYO Corporation	TPA0118-36	1440490	RE	2018/02/15 * 12
SCC-G43	Coaxial Cable	HUBER+SUHNER	SUCOFLEX_104_E	SN MY 13406/4E	RE	2018/07/10 * 12
SCC-G40	Coaxial Cable	Junkosha	MWX221-01000NFSNMS/B	1612S005	RE	2018/01/29 * 12
SCC-G44	Coaxial Cable	HUBER+SUHNER	SUCOFLEX 104	800070/4A	RE	2018/03/28 * 12
SHA-02	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-726	RE	2018/07/23 * 12
SOS-03	Humidity Indicator	A&D	AD-5681	4063325	RE	2017/10/30 * 12
STR-07	Test Receiver	Rohde & Schwarz	ESU26	100484	RE	2017/09/26 * 12
SJM-09	Measure	PROMART	SEN1935	-	RE	-
SAEC-02(SVSWR)	Semi-Anechoic Chamber	TDK	SAEC-02(SVSWR)	2	RE	2018/07/15 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE	
STS-02	Digital Hitester	Hioki	3805-50	080997819	RE	2018/03/08 * 12
SAT10-05	Attenuator(above1 GHz)	Agilent	8493C-010	74864	RE	2017/11/22 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2017/11/16 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	RE	2017/10/10 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	2046104	RE	2017/09/22 * 12
SCC-G06	Coaxial Cable	Junkosha	J12J102207-00	MAY-23-16-091	RE	2018/06/01 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2018/07/23 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2017/10/30 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2018/03/05 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE	-

Test Instruments (2/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAEC-03(SVSWR)	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	RE	2018/07/17 * 12
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE	2017/10/16 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2018/05/11 * 12
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2017/11/22 * 12
SFL-18	Highpass Filter	MICRO-TRONICS	HPM50111	119	RE	2018/04/20 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2018/06/02 * 12
STR-08	Test Receiver	Rohde & Schwarz	ESW44	101581	RE	2017/11/24 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM9861	RE	2018/07/23 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2018/03/27 * 12
SHA-06	Horn Antenna	ETS LINDGREN	3160-10	LM3459	RE	2018/07/23 * 12
SAF-10	Pre Amplifier	TOYO Corporation	HAP26-40W	00000010	RE	2018/03/27 * 12
SCC-G33	Coaxial Cable	Junkosha	MWX241-01000KMSKMS	-	RE	2018/04/20 * 12
SCC-G45	Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102 E	800137/2EA	RE	2018/03/28 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2017/10/30 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE	-
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE	2017/10/16 * 12

***Hyphens for Last Calibration Date, Calibration Due Date and Cal Int (month) are instruments that Calibration is not required (e.g. software), or instruments checked in advance before use.**

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

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

Test item: RE: Radiated Emission test