



RADIO TEST REPORT

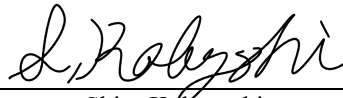
Test Report No. : 13734674S-A-R2

Applicant : Canon Inc.
Type of EUT : Built-in Wireless Module with Bluetooth
Model Number of EUT : WM01B
FCC ID : AZDWM01B
Test regulation : FCC Part 15 Subpart C: 2021
* Wireless LAN (2.4 GHz band) and Bluetooth Low energy part
Test Result : Complied (Refer to SECTION 3)

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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 13734674S-A-R1. 13734674S-A-R1 is replaced with this report.

Date of test: March 18 to May 15, 2021

Representative test engineer:


Shiro Kobayashi
Engineer

Approved by:


Toyokazu Imamura
Leader



CERTIFICATE 1266.03

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

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REVISION HISTORY

Original Test Report No.: 13734674S-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	13734674S-A	August 30, 2021	-	-
1	13734674S-A-R1	October 6, 2021	5	Correction of Receipt Date: From: "March 26, 2021" to "February 24, 2021"
			10	Correction of software: From "DUT labtool Version: 1.0.0.164 (Date: 2018.2.9, Storage location: Driven by connected Windows PC)" to "labtool Operation Ver.1.0 (FW Ver.41) (Date: 2021.3.25, Storage location: EUT memory)"
			12, 13	Addition of item "M"
			13	Addition of *3), *4)
			79	Corrected the measurement data of 4804 MHz (PK)
			85	Corrected the measurement plot data
2	13734674S-A-R2	October 28, 2021	10	Correction of software: From "labtool Operation Ver.1.0 (FW Ver.41) (Date: 2021.3.25, Storage location: EUT memory)" to "labtool Ver.1.0 (Date: 2021.2.22, Storage location: Driven by connected Windows PC)"

Reference: Abbreviations (Including words undescribed in this report)

A2LA	The American Association for Laboratory Accreditation	MCS	Modulation and Coding Scheme
AC	Alternating Current	MRA	Mutual Recognition Arrangement
AFH	Adaptive Frequency Hopping	N/A	Not Applicable
AM	Amplitude Modulation	NIST	National Institute of Standards and Technology
Amp, AMP	Amplifier	NS	No signal detect.
ANSI	American National Standards Institute	NSA	Normalized Site Attenuation
Ant, ANT	Antenna	NVLAP	National Voluntary Laboratory Accreditation Program
AP	Access Point	OBW	Occupied Band Width
ASK	Amplitude Shift Keying	OFDM	Orthogonal Frequency Division Multiplexing
Atten., ATT	Attenuator	P/M	Power meter
AV	Average	PCB	Printed Circuit Board
BPSK	Binary Phase-Shift Keying	PER	Packet Error Rate
BR	Bluetooth Basic Rate	PHY	Physical Layer
BT	Bluetooth	PK	Peak
BT LE	Bluetooth Low Energy	PN	Pseudo random Noise
BW	BandWidth	PRBS	Pseudo-Random Bit Sequence
Cal Int	Calibration Interval	PSD	Power Spectral Density
CCK	Complementary Code Keying	QAM	Quadrature Amplitude Modulation
Ch., CH	Channel	QP	Quasi-Peak
CISPR	Comite International Special des Perturbations Radioelectriques	QPSK	Quadri-Phase Shift Keying
CW	Continuous Wave	RBW	Resolution Band Width
DBPSK	Differential BPSK	RDS	Radio Data System
DC	Direct Current	RE	Radio Equipment
D-factor	Distance factor	RF	Radio Frequency
DFS	Dynamic Frequency Selection	RMS	Root Mean Square
DQPSK	Differential QPSK	RSS	Radio Standards Specifications
DSSS	Direct Sequence Spread Spectrum	Rx	Receiving
EDR	Enhanced Data Rate	SA, S/A	Spectrum Analyzer
EIRP, e.i.r.p.	Equivalent Isotropically Radiated Power	SG	Signal Generator
EMC	ElectroMagnetic Compatibility	SVSWR	Site-Voltage Standing Wave Ratio
EMI	ElectroMagnetic Interference	TR	Test Receiver
EN	European Norm	Tx	Transmitting
ERP, e.r.p.	Effective Radiated Power	VBW	Video BandWidth
EU	European Union	Vert.	Vertical
EUT	Equipment Under Test	WLAN	Wireless LAN
Fac.	Factor		
FCC	Federal Communications Commission		
FHSS	Frequency Hopping Spread Spectrum		
FM	Frequency Modulation		
Freq.	Frequency		
FSK	Frequency Shift Keying		
GFSK	Gaussian Frequency-Shift Keying		
GNSS	Global Navigation Satellite System		
GPS	Global Positioning System		
Hori.	Horizontal		
ICES	Interference-Causing Equipment Standard		
IEC	International Electrotechnical Commission		
IEEE	Institute of Electrical and Electronics Engineers		
IF	Intermediate Frequency		
ILAC	International Laboratory Accreditation Conference		
ISED	Innovation, Science and Economic Development Canada		
ISO	International Organization for Standardization		
JAB	Japan Accreditation Board		
LAN	Local Area Network		
LIMS	Laboratory Information Management System		

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SECTION 1: Customer information

Company Name	:	Canon Inc.
Address	:	9-1, Imaikami-cho, Nakahara-ku, Kawasaki, Kanagawa, 211-8501 JAPAN
Telephone Number	:	+81-3-3758-2111
Facsimile Number	:	+81-44-739-5495
Contact Person	:	Tetsuo Watanabe

The information provided from the customer is as follows;

- Applicant, Type of EUT, Model Number of EUT, FCC ID on the cover and other relevant pages
- Operating/Test Mode(s) (Mode(s)) on all the relevant pages
- SECTION 1: Customer information
- SECTION 2: Equipment under test (EUT) other than the Receipt Date
- SECTION 4: Operation of EUT 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 (EUT)

2.1 Identification of EUT

Type	:	Built-in Wireless Module with Bluetooth
Model Number	:	WM01B
Serial Number	:	Refer to SECTION 4.2
Rating	:	DC 3.3 V
Receipt Date	:	February 24, 2021
Country of Mass-production	:	Japan
Condition	:	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	:	No Modification by the test lab.

2.2 Product Description

Model: WM01B (referred to as the EUT in this report) is a Built-in Wireless Module with Bluetooth.

The clock frequencies used in the EUT: 38.4 MHz

Radio Specification

Equipment type : Transceiver
 Operating temperature : 0 deg. C to +50 deg. C

	Bluetooth (Low Energy)
Frequency of operation	2402 MHz - 2480 MHz
Channel spacing	1 MHz, 2 MHz
Modulation	GFSK
Antenna type	Monopole antenna x2
Antenna Gain	3.4 dBi
Antenna Connector type	U.FL connector (MHF connector)

	IEEE802.11b	IEEE802.11g	IEEE802.11n (20 MHz band)	IEEE802.11n (40 MHz band)
Frequency of operation	2412 MHz - 2462 MHz	2412 MHz - 2462 MHz	2412 MHz - 2462 MHz 5180 MHz - 5240 MHz 5260 MHz - 5320 MHz 5500 MHz - 5700 MHz 5745 MHz - 5825 MHz	2422 MHz - 2452 MHz 5190 MHz - 5230 MHz 5270 MHz - 5310 MHz 5510 MHz - 5670 MHz 5755 MHz - 5795 MHz
Channel spacing	5 MHz		2.4 GHz band 5 MHz 5 GHz band 20 MHz	2.4 GHz band 5 MHz 5 GHz band 40 MHz
Modulation	DSSS: DBPSK, DQPSK, CCK	OFDM: BPSK, QPSK, 16QAM, 64QAM		
	IEEE802.11a	IEEE802.11ac (20 MHz band)	IEEE802.11ac (40 MHz band)	IEEE802.11ac (80 MHz band)
Frequency of operation	5180 MHz - 5240 MHz 5260 MHz - 5320 MHz 5500 MHz - 5700 MHz 5745 MHz - 5825 MHz	5180 MHz - 5240 MHz 5260 MHz - 5320 MHz 5500 MHz - 5700 MHz 5745 MHz - 5825 MHz	5190 MHz - 5230 MHz 5270 MHz - 5310 MHz 5510 MHz - 5670 MHz 5755 MHz - 5795 MHz	5210 MHz 5290 MHz 5530 MHz, 5610 MHz 5775 MHz
Channel spacing	20 MHz		40 MHz	80 MHz
Modulation	OFDM: BPSK, QPSK, 16QAM, 64QAM, 256QAM (*256QAM is only for IEEE802.11ac 80 MHz band)			
Antenna gain	(ANT-1, ANT-2): 2.4 GHz band: 3.4 dBi, 5 GHz band: 3.9 dBi			
Antenna type	Monopole antenna x2			
Antenna Connector type	U.FL connector (MHF connector)			

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
FCC Part 15 final revised on May 3, 2021 and effective July 2, 2021

Title : FCC 47 CFR Part 15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz,
and 5725-5850 MHz

* The revision does not affect the test result conducted before its effective date.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.10-2013 6. Standard test methods ISED: RSS-Gen 8.8	FCC: Section 15.207 ISED: RSS-Gen 8.8	18.4 dB 9.04000 MHz, N AV, Tx BT LE 2 M-PHY 2402 MHz, 9.00520 MHz, N AV, Tx BT LE 2 M-PHY 2480 MHz	Complied a)	-
6 dB Bandwidth	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section 15.247(a)(2) ISED: RSS-247 5.2(a)	See data.	Complied b)	Conducted
Maximum Peak Output Power	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: RSS-Gen 6.12	FCC: Section 15.247(b)(3) ISED: RSS-247 5.4(d)		Complied c)	Conducted
Power Density	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section 15.247(e) ISED: RSS-247 5.2(b)		Complied d)	Conducted
Spurious Emission Restricted Band Edges	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: RSS-Gen 6.13	FCC: Section 15.247(d) ISED: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	2.0 dB 2378.561 MHz, AV, Vertical Tx BT LE 2 M-PHY 2402 MHz	Complied# e), f)	Conducted (below 30 MHz)/ Radiated (above 30 MHz) *1)

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.

*1) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05r02 8.5 and 8.6.

- a) Refer to APPENDIX 1 (data of Conducted Emission)
- b) Refer to APPENDIX 1 (data of 6 dB Bandwidth and 99 % Occupied Bandwidth)
- c) Refer to APPENDIX 1 (data of Maximum Peak Output Power)
- d) Refer to APPENDIX 1 (data of Power Density)
- e) Refer to APPENDIX 1 (data of Conducted Spurious Emission)
- f) 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.

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FCC Part 15.31 (e)

The RF Module has its own regulator. The RF Module is constantly provided voltage through the regulator regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203/212 Antenna requirement

The EUT has a unique coupling/antenna connector (U.FL(MHF)). Therefore the equipment complies with the requirement of 15.203/212.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99 % Occupied Bandwidth	ISED: RSS-Gen 6.7	ISED: -	N/A	b)	Conducted
b) Refer to APPENDIX 1 (data of 6 dB Bandwidth and 99 % Occupied Bandwidth)					

Other than above, 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 $k=2$.

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Item	Frequency range	Uncertainty (+/-)			
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR	No. 4,5,6,8 SR
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	2.6 dB	2.6 dB	2.6 dB	2.9 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.0 dB	2.7 dB	2.7 dB	-
	30 MHz-200 MHz	4.6 dB	4.6 dB	4.6 dB	-
	200 MHz-1 GHz	6.0 dB	6.0 dB	6.0 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	-
Radiated emission (Measurement distance: 1 m)	18 GHz-40 GHz	5.3 dB	5.3 dB	5.3 dB	-
	1 GHz-18 GHz	5.7 dB	5.7 dB	5.7 dB	-
	18 GHz-40 GHz	5.6 dB	5.6 dB	5.6 dB	-

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector)_SPM-06	1.4 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-06	1.6 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.89 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-07	1.2 dB
Power Measurement above 1 GHz (Average Detector)_SPM-13	0.91 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-13	1.2 dB
Spurious emission (Conducted) below 1GHz	0.87 dB
Spurious emission (Conducted) 1 GHz-3 GHz	0.96 dB
Spurious emission (Conducted) 3 GHz-18 GHz	3.0 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.6 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.2 dB
Bandwidth Measurement	0.012 %
Duty cycle and Time Measurement	0.27 %
Temperature_SCH-01	0.95 deg.C.
Humidity_SCH-01	0.83 %
Temperature_SCH-02	2.0 deg.C.
Humidity_SCH-02	6.6 %
Voltage	0.86 %

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3.5 Test Location

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A2LA Certificate Number: 1266.03

(FCC test firm registration number: 626366, ISED lab company number: 2973D / CAB identifier: JP0001)

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

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

SECTION 4: Operation of EUT during testing

4.1 Operating Mode(s)

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

Mode	Remarks*
IEEE 802.11b (11b)	1 Mbps, PN9
IEEE 802.11g (11g)	24 Mbps, PN9
IEEE 802.11n 20 MHz BW (11n-20)	MCS 6, PN9
IEEE 802.11n 40 MHz BW (11n-40)	MCS 3, PN9
Bluetooth Low Energy (BT LE) 1 M-PHY	PRBS9
Bluetooth Low Energy (BT LE) 2 M-PHY	PRBS9
*The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)	
*Power of the EUT was set by the software as follows; Power settings: 11b/g/n-20: 12 dBm, 11n-40: 11 dBm BT LE: 3 dBm Software: labtool Ver.1.0 (Date: 2021.2.22, Storage location: Driven by connected Windows PC) *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.	

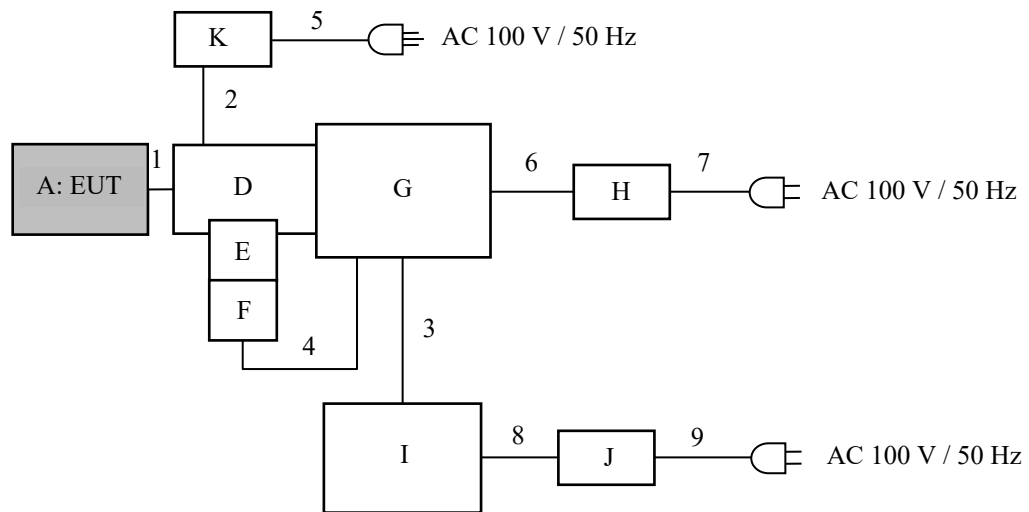
*The details of Operating mode(s)

Test Item	Operating Mode	Tested Antenna *1)	Tested frequency
Conducted Emission	Tx 11n-20	1	2437 MHz
	Tx BT LE (1 M-PHY/2 M-PHY)	2	2402 MHz 2440 MHz 2480 MHz
	Tx BT LE (2 M-PHY) + Tx 11n-20 5700 MHz	2	2402MHz
Spurious Emission	Tx 11b	1	2412 MHz
	Tx 11g		2437 MHz
	Tx 11n-20		2462 MHz
	Tx 11n-40	1	2422 MHz 2437 MHz 2452 MHz
	Tx BT LE (1 M-PHY/2 M-PHY)	2	2402 MHz 2440 MHz 2480 MHz
	Tx BT LE (2 M-PHY) + Tx 11n-20 5700 MHz	2	2402 MHz 2440 MHz 2480 MHz
6 dB Bandwidth 99 % Occupied Bandwidth Power Density	Tx 11b	1	2412 MHz
	Tx 11g		2437 MHz
	Tx 11n-20		2462 MHz
	Tx 11n-40	1	2422 MHz 2437 MHz 2452 MHz
	Tx BT LE (1 M-PHY/2 M-PHY)	2	2402 MHz 2440 MHz 2480 MHz
Maximum Peak Output Power	Tx 11b	1 & 2	2412 MHz
	Tx 11g		2437 MHz
	Tx 11n-20		2462 MHz
	Tx 11n-40	1 & 2	2422 MHz 2437 MHz 2452 MHz
	Tx BT LE (1 M-PHY/2 M-PHY)	1 & 2	2402 MHz 2440 MHz 2480 MHz

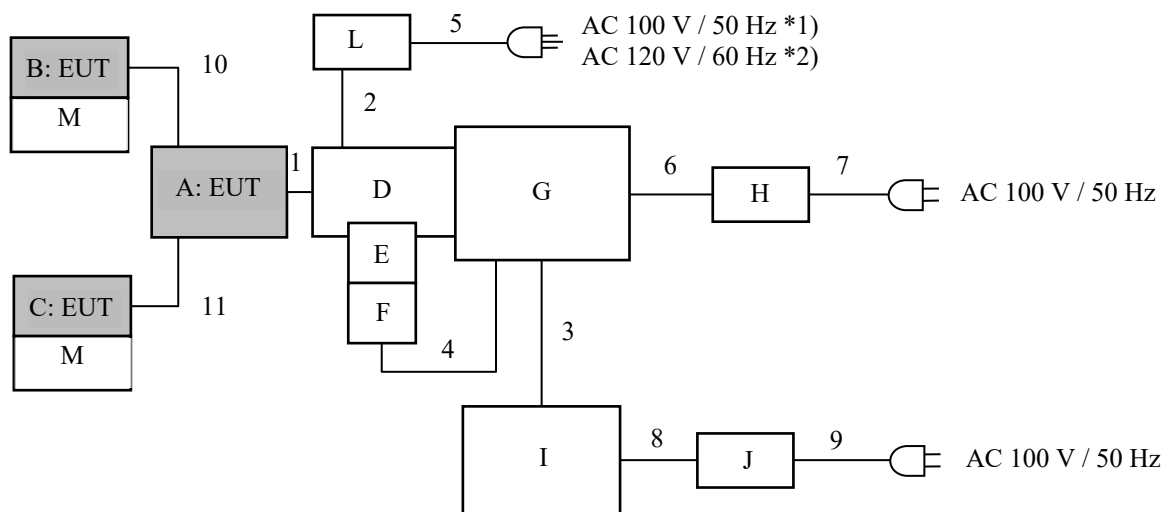
*1) Tested Antenna port was determined based on the test result of Maximum Peak Output Power.

4.2 Configuration and peripherals

<Antenna Terminal Conducted test>



<Conducted Emission test, Radiated Emission test>



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

*1) Radiated Emission test.

*2) Conducted Emission test.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Built-in Wireless Module with Bluetooth	WM01B	2	Canon	EUT
B	Antenna	ANT2444-16B/M-AB	3	Canon	EUT
C	Antenna	ANT2444-16B/M-AB	4	Canon	EUT
D	Interface board	BM7-4347 & BM7-5313 01	5	Canon	-
E	RS232 Transceiver	BOOSTXL-RS232 HVL161A	5041500092	Canon	-
F	USB-RS232C Converter	BCUSRC06	A80411	BUFFALO	-
G	Personal Computer	CF-N8HCCDDS	0GKSA13816	Panasonic	Linux
H	AC Adapter	CF-AA6412C	6412CM417501135D	Panasonic	-
I	Personal Computer	CF-NX3JDGCS	5CKSA57208	Panasonic	Windows
J	AC Adapter	CF-AA64B2C	64B2CM115206041B	Panasonic	-
K	DC Power Supply	PW16-5ADP	18026330	TEXIO	-
L	DC Power Supply	PAN35-10A	DE001677	KIUSUI	-
M	Grand plate	-	-	Canon	*3)

*3) Grand Plate for matching. Taking in consideration of antenna characteristics, the setup that does not affect spurious emissions was used.

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	Signal	0.1	Unshielded	Unshielded	-
2	DC	2.0	Unshielded	Unshielded	-
3	LAN	3.0	Unshielded	Unshielded	-
4	RS232C-USB	1.0	Shielded	Shielded	-
5	AC	2.0	Unshielded	Unshielded	-
6	DC	0.9	Unshielded	Unshielded	-
7	AC	0.8	Unshielded	Unshielded	-
8	DC	0.9	Unshielded	Unshielded	-
9	AC	0.7	Unshielded	Unshielded	-
10	RF	0.1	Shielded	Shielded	*4)
11	RF	0.1	Shielded	Shielded	*4)

*4) The cable length with the maximum emission was selected.

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SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a platform of nominal size, 1.0 m by 2.0 m, raised 0.8 m above the conducting ground plane. The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80 cm from a Line Impedance Stabilization Network (LISN) / Artificial mains Network (AMN) and excess AC cable was bundled in center.

I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane. All unused 50ohm connectors of the LISN (AMN) were resistivity terminated in 50 ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT via AC Adapter in a shielded room.

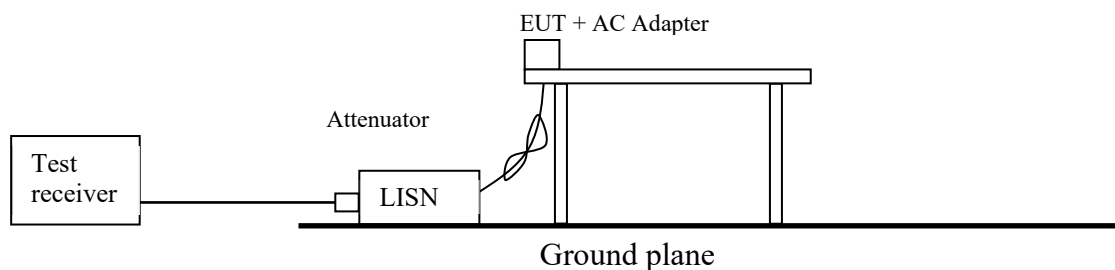
The EUT via AC Adapter was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

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

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

Figure 1: Test Setup



SECTION 6: 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 urethane platform of nominal size, 0.5 m by 0.5 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]

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

The height of the measuring antenna varied between 1 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.

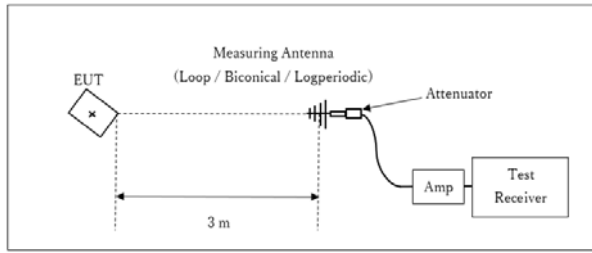
20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9(ISED) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (ISED).

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 2: Test Setup

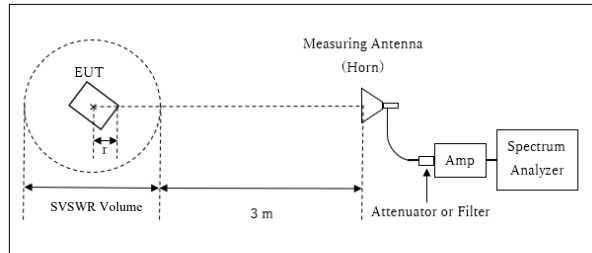
Below 1 GHz



x : Center of turn table

Test Distance: 3 m

1 GHz - 10 GHz



r : Radius of an outer periphery of EUT

x : Center of turn table

Distance Factor: $20 \times \log (3.83 \text{ m} / 3.0 \text{ m}) = 2.12 \text{ dB}$

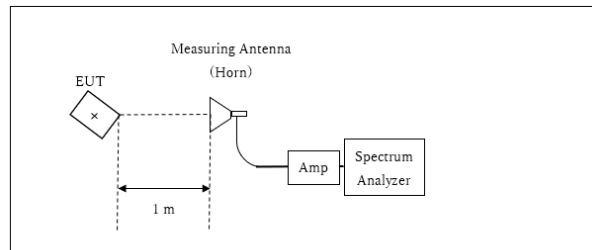
* Test Distance: $(3 + \text{SVSWR Volume} / 2) - r = 3.83 \text{ m}$

SVSWR Volume : 2.0 m

(SVSWR Volume has been calibrated based on CISPR 16-1-4.)

$r = 0.17 \text{ m}$

10 GHz - 26.5 GHz



x : Center of turn table

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

*Test Distance: 1 m

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

WLAN:

Module

Antenna polarization	Carrier	Spurious (30 MHz - 1 GHz)	Spurious (1 GHz - 2.8 GHz)	Spurious (2.8 GHz - 13 GHz)	Spurious (13 GHz - 18 GHz)	Spurious (18 GHz - 26.5 GHz)
Horizontal	X	X	X	X	Y	Z
Vertical	X	X	X	X	Y	Z

Antenna

Antenna polarization	Carrier	Spurious (30 MHz - 1 GHz)	Spurious (1 GHz - 2.8 GHz)	Spurious (2.8 GHz - 13 GHz)	Spurious (13 GHz - 18 GHz)	Spurious (18 GHz - 26.5 GHz)
Horizontal	Y	X	Y	Y	Z	X
Vertical	Y	X	Y	Y	Z	X

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BT LE:

Module

Antenna polarization	Carrier	Spurious (30 MHz - 1 GHz)	Spurious (1 GHz - 2.8 GHz)	Spurious (2.8 GHz - 10 GHz)	Spurious (10 GHz - 18 GHz)	Spurious (18 GHz - 26.5 GHz)
Horizontal	Z	X	Z	X	X	X
Vertical	X	X	X	X	X	X

Antenna

Antenna polarization	Carrier	Spurious (30 MHz - 1 GHz)	Spurious (1 GHz - 2.8 GHz)	Spurious (2.8 GHz - 10 GHz)	Spurious (10 GHz - 18 GHz)	Spurious (18 GHz - 26.5 GHz)
Horizontal	Z	X	Z	Z	X	X
Vertical	Z	C	Z	Z	X	X

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

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SECTION 7: Antenna Terminal Conducted Tests

Test Procedure

The tests were made with below setting connected to the antenna port.

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
6 dB Bandwidth	50 MHz (WLAN) 10 MHz (BT LE)	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99 % Occupied Bandwidth *1)	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak/ Average *2)	-	Power Meter (Sensor: 160 MHz BW)
Peak Power Density	1.5 times the 6 dB Bandwidth	3 kHz	9.1 kHz	Auto	Peak	Max Hold	Spectrum Analyzer *3)
Conducted Spurious Emission *4) *5)	9 kHz to 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz to 30 MHz	10 kHz	30 kHz				

*1) Peak hold was applied as Worst-case measurement.

*2) Reference data

*3) Section 11.10.2 Method PKPSD (peak PSD) of "ANSI C63.10-2013".

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

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

(9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 10 kHz)

*5) The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ohms. For example, the measurement at frequency 9 kHz resulted in a level of 45.5 dBuV/m, which is equivalent to $45.5 - 51.5 = -6.0$ dBuA/m, which has the same margin, 3 dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

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

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

Test data : APPENDIX

Test result : Pass

APPENDIX 1: Test data

Conducted Emission

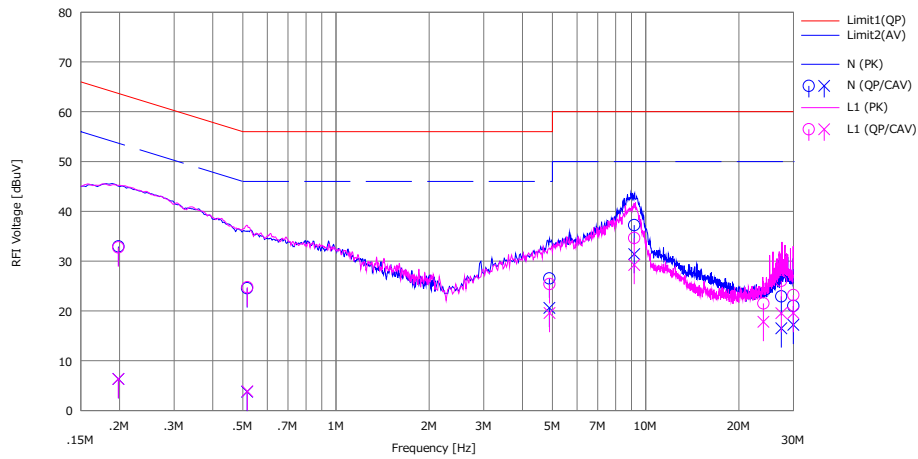
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2021/05/14

Mode : Tx 11n-20 2437 MHz
Power : AC 120 V / 60 Hz (DC 3.3 V)
Temp./Humi. : 24 deg.C / 43 %RH

Limit : FCC_Part 15 Subpart C(15.207)

Engineer : Toshinori Yamada



No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		(QP)	(CAV)		(QP)	(CAV)	(QP)	(AV)	(QP)	(AV)		
		[dBuV]	[dBuV]		[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.19847	20.50	-6.10	12.44	32.94	6.34	63.67	53.67	30.7	47.3	N	
2	0.51619	12.10	-8.70	12.47	24.57	3.77	56.00	46.00	31.4	42.2	N	
3	4.88934	13.80	7.90	12.72	26.52	20.62	56.00	46.00	29.4	25.3	N	
4	9.18490	24.30	18.50	12.91	37.21	31.41	60.00	50.00	22.7	18.5	N	
5	27.40869	9.30	2.90	13.62	22.92	16.52	60.00	50.00	37.0	33.4	N	
6	29.99974	7.30	3.50	13.70	21.00	17.20	60.00	50.00	39.0	32.8	N	
7	0.19817	20.30	-6.10	12.44	32.74	6.34	63.69	53.69	30.9	47.3	L1	
8	0.51744	12.30	-8.60	12.46	24.76	3.86	56.00	46.00	31.2	42.1	L1	
9	4.88980	12.70	6.90	12.69	25.39	19.59	56.00	46.00	30.6	26.4	L1	
10	9.18461	21.80	16.40	12.84	34.64	29.24	60.00	50.00	25.3	20.7	L1	
11	24.00060	8.30	4.60	13.20	21.50	17.80	60.00	50.00	38.5	32.2	L1	
12	27.40889	12.80	6.30	13.25	26.05	19.55	60.00	50.00	33.9	30.4	L1	
13	29.99980	9.90	6.30	13.29	23.19	19.59	60.00	50.00	36.8	30.4	L1	

Calculation: Result[dBuV]=Reading[dBuV]+C.Fac(LISN+Cable+ATT)[dB]
LISN: SLS-05(US)

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DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room

Date : 2021/05/14

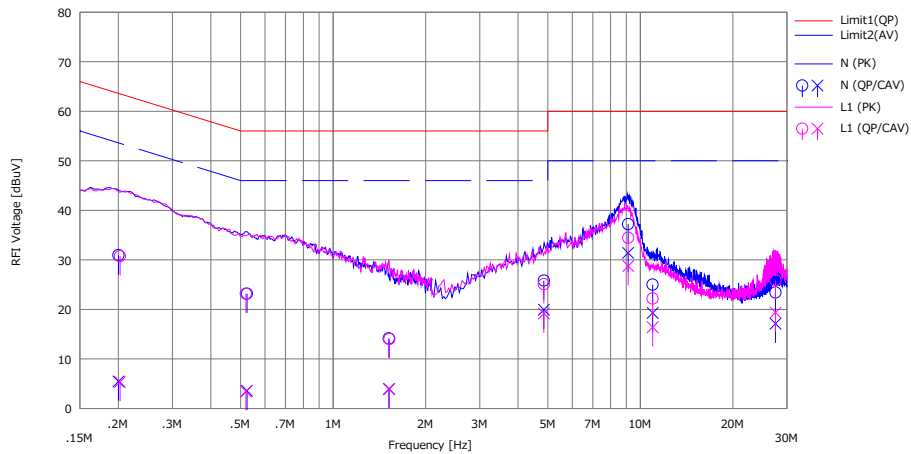
Mode : Tx BT LE 1 M-PHY 2402 MHz

Power : AC 120 V / 60 Hz (DC 3.3 V)

Temp./Humi. : 24 deg.C / 43 %RH

Limit : FCC_Part 15 Subpart C(15.207)

Engineer : Toshinori Yamada



No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		[QP] [dBuV]	[CAV] [dBuV]		[QP] [dBuV]	[CAV] [dBuV]	[QP] [dBuV]	[AV] [dBuV]	[QP] [dB]	[AV] [dB]		
1	0.20025	18.50	-7.00	12.44	30.94	5.44	63.60	53.60	32.6	48.1	N	
2	0.52445	10.70	-8.90	12.47	23.17	3.57	56.00	46.00	32.8	42.4	N	
3	1.51920	1.60	-8.60	12.53	14.13	3.93	56.00	46.00	41.8	42.0	N	
4	4.85422	13.10	7.20	12.71	25.81	19.91	56.00	46.00	30.1	26.0	N	
5	9.12511	24.30	18.50	12.91	37.21	31.41	60.00	50.00	22.7	18.5	N	
6	10.96613	12.00	6.30	12.98	24.98	19.28	60.00	50.00	35.0	30.7	N	
7	27.52250	9.80	3.50	13.62	23.42	17.12	60.00	50.00	36.5	32.8	N	
8	0.20265	18.30	-7.10	12.44	30.74	5.34	63.50	53.50	32.7	48.1	L1	
9	0.52052	10.70	-9.00	12.46	23.16	3.46	56.00	46.00	32.8	42.5	L1	
10	1.52529	1.50	-8.60	12.51	14.01	3.91	56.00	46.00	41.9	42.0	L1	
11	4.85446	12.40	6.50	12.68	25.08	19.18	56.00	46.00	30.9	26.8	L1	
12	9.12548	21.60	15.90	12.84	34.44	28.74	60.00	50.00	25.5	21.2	L1	
13	10.96646	9.30	3.50	12.89	22.19	16.39	60.00	50.00	37.8	33.6	L1	
14	27.52292	12.60	6.10	13.26	25.86	19.36	60.00	50.00	34.1	30.6	L1	

Calculation: Result[dBuV] = Reading[dBuV] + C.Fac(LISN + Cable + ATT)[dB]
LISN: SLS-05(US)

DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room

Date : 2021/05/14

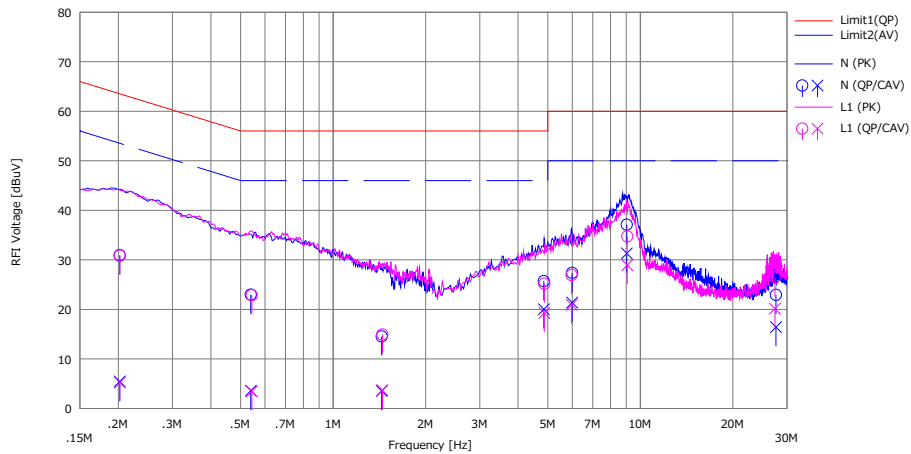
Mode : Tx BT LE 1 M-PHY 2440 MHz

Power : AC 120 V / 60 Hz (DC 3.3 V)

Temp./Humi. : 24 deg.C / 43 %RH

Limit : FCC_Part 15 Subpart C(15.207)

Engineer : Toshinori Yamada



No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<CAV> [dBuV]		<QP> [dBuV]	<CAV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.20213	18.50	-7.00	12.44	30.94	5.44	63.52	53.52	32.5	48.0	N	
2	0.53970	10.50	-8.90	12.48	22.98	3.58	56.00	46.00	33.0	42.4	N	
3	1.44023	2.00	-9.00	12.53	14.53	3.53	56.00	46.00	41.4	42.4	N	
4	4.85419	13.00	7.30	12.71	25.71	20.01	56.00	46.00	30.2	25.9	N	
5	5.99823	14.60	8.60	12.76	27.36	21.36	60.00	50.00	32.6	28.6	N	
6	9.03000	24.20	18.40	12.90	37.10	31.30	60.00	50.00	22.9	18.7	N	
7	27.63099	9.30	2.80	13.62	22.92	16.42	60.00	50.00	37.0	33.5	N	
8	0.20224	18.40	-7.20	12.44	30.84	5.24	63.52	53.52	32.6	48.2	L1	
9	0.54390	10.40	-9.00	12.46	22.86	3.46	56.00	46.00	33.1	42.5	L1	
10	1.44689	2.40	-8.80	12.51	14.91	3.71	56.00	46.00	41.0	42.2	L1	
11	4.87167	12.50	6.60	12.68	25.18	19.28	56.00	46.00	30.8	26.7	L1	
12	5.97823	14.20	8.20	12.73	26.93	20.93	60.00	50.00	33.0	29.0	L1	
13	9.06489	21.90	16.10	12.84	34.74	28.94	60.00	50.00	25.2	21.0	L1	
14	27.40919	13.20	6.90	13.25	26.45	20.15	60.00	50.00	33.5	29.8	L1	

Calculation: Result[dBuV] = Reading[dBuV] + C.Fac(LISN + Cable + ATT)[dB]
LISN: SLS-05(US)

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DATA OF CONDUCTED EMISSION TEST

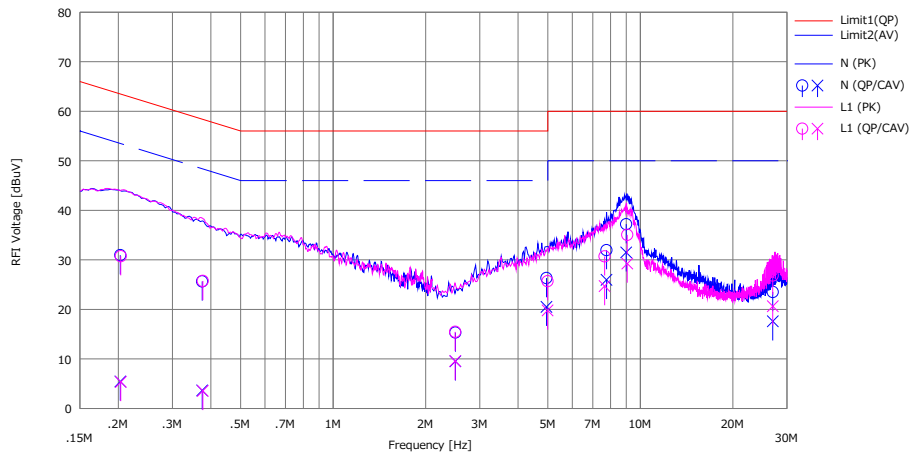
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room

Date : 2021/05/14

Mode : Tx BT LE 1 M-PHY 2480 MHz
Power : AC 120 V / 60 Hz (DC 3.3 V)
Temp./Humi. : 24 deg.C / 43 %RH

Limit : FCC_Part 15 Subpart C(15.207)

Engineer : Toshinori Yamada



No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		[QP] [dBuV]	[CAV] [dBuV]		[QP] [dBuV]	[CAV] [dBuV]	[QP] [dBuV]	[AV] [dBuV]	[QP] [dB]	[AV] [dB]		
1	0.20300	18.50	-7.00	12.44	30.94	5.44	63.49	53.49	32.5	48.0	N	
2	0.37492	13.20	-8.80	12.45	25.65	3.65	58.39	48.39	32.7	44.7	N	
3	2.50079	2.70	-3.10	12.61	15.31	9.51	56.00	46.00	40.6	36.4	N	
4	4.94805	13.60	7.80	12.72	26.32	20.52	56.00	46.00	29.6	25.4	N	
5	7.76027	19.10	13.10	12.85	31.95	25.95	60.00	50.00	28.0	24.0	N	
6	8.99500	24.30	18.60	12.90	37.20	31.50	60.00	50.00	22.8	18.5	N	
7	26.96960	9.90	4.00	13.60	23.50	17.60	60.00	50.00	36.5	32.4	N	
8	0.20375	18.30	-7.10	12.44	30.74	5.34	63.46	53.46	32.7	48.1	L1	
9	0.37682	13.30	-8.90	12.44	25.74	3.54	58.35	48.35	32.6	44.8	L1	
10	2.49750	2.90	-3.00	12.57	15.47	9.57	56.00	46.00	40.5	36.4	L1	
11	4.99101	13.00	7.10	12.69	25.69	19.79	56.00	46.00	30.3	26.2	L1	
12	7.64780	17.90	11.90	12.79	30.69	24.69	60.00	50.00	29.3	25.3	L1	
13	9.06640	22.20	16.40	12.84	35.04	29.24	60.00	50.00	24.9	20.7	L1	
14	26.97061	13.60	7.40	13.24	26.84	20.64	60.00	50.00	33.1	29.3	L1	

Calculation: Result[dBuV] = Reading[dBuV] + C.Fac(LISN + Cable + ATT)[dB]
LISN: SLS-05(US)

DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room

Date : 2021/05/14

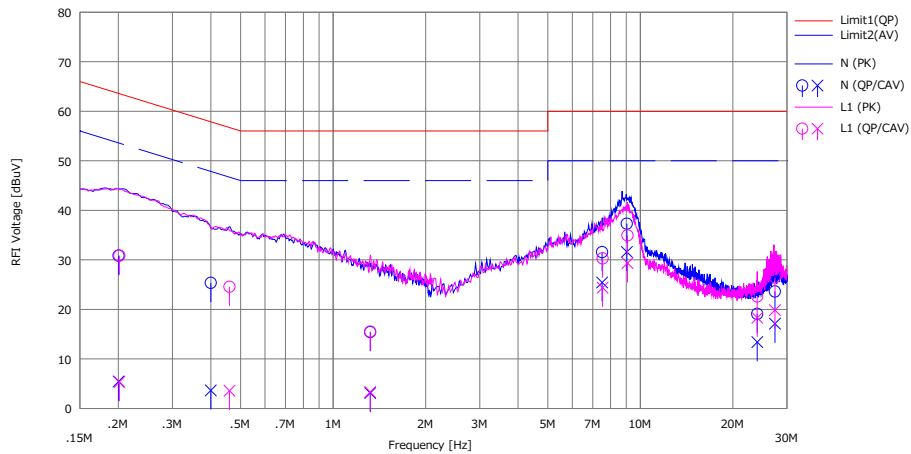
Mode : Tx BT LE 2 M-PHY 2402 MHz

Power : AC 120 V / 60 Hz (DC 3.3 V)

Temp./Humi. : 24 deg.C / 43 %RH

Limit : FCC_Part 15 Subpart C(15.207)

Engineer : Toshinori Yamada



No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<CAV> [dBuV]		<QP> [dBuV]	<CAV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.20046	18.40	-7.00	12.44	30.84	5.44	63.59	53.59	32.7	48.1	N	
2	0.40005	12.90	-8.80	12.45	25.35	3.65	57.85	47.85	32.5	44.2	N	
3	1.32097	2.90	-9.40	12.51	15.41	3.11	56.00	46.00	40.5	42.8	N	
4	7.50684	18.70	12.60	12.84	31.54	25.44	60.00	50.00	28.4	24.5	N	
5	9.04000	24.40	18.70	12.90	37.30	31.60	60.00	50.00	22.7	18.4	N	
6	24.00157	5.60	-0.10	13.49	19.09	13.39	60.00	50.00	40.9	36.6	N	
7	27.41140	10.00	3.50	13.62	23.62	17.12	60.00	50.00	36.3	32.8	N	
8	0.20165	18.40	-7.10	12.44	30.84	5.34	63.54	53.54	32.7	48.2	L1	
9	0.45992	12.10	-8.90	12.46	24.56	3.56	56.69	46.69	32.1	43.1	L1	
10	1.32102	3.00	-9.20	12.51	15.51	3.31	56.00	46.00	40.4	42.6	L1	
11	7.53663	17.50	11.60	12.79	30.29	24.39	60.00	50.00	29.7	25.6	L1	
12	9.07990	22.10	16.50	12.84	34.94	29.34	60.00	50.00	25.0	20.6	L1	
13	23.99957	9.40	5.10	13.20	22.60	18.30	60.00	50.00	37.4	31.7	L1	
14	27.41200	13.20	6.60	13.25	26.45	19.85	60.00	50.00	33.5	30.1	L1	

Calculation: Result[dBuV] = Reading[dBuV] + C.Fac(LISN + Cable + ATT)[dB]
LISN: SLS-05(US)

DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room

Date : 2021/05/14

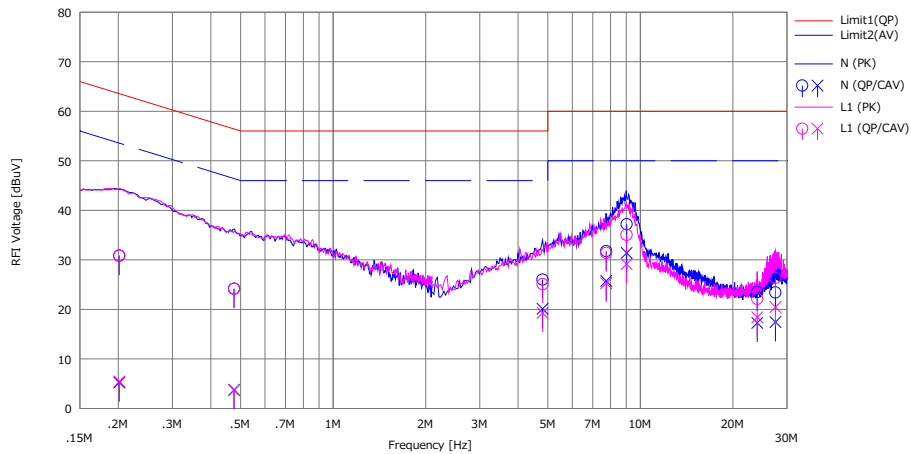
Mode : Tx BT LE 2 M-PHY 2440 MHz

Power : AC 120 V / 60 Hz (DC 3.3 V)

Temp./Humi. : 24 deg.C / 43 %RH

Limit : FCC_Part 15 Subpart C(15.207)

Engineer : Toshinori Yamada



No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<CAV> [dBuV]		<QP> [dBuV]	<CAV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.20146	18.40	-7.20	12.44	30.84	5.24	63.55	53.55	32.7	48.3	N	
2	0.47625	11.70	-8.70	12.47	24.17	3.77	56.40	46.40	32.2	42.6	N	
3	4.80645	13.30	7.40	12.71	26.01	20.11	56.00	46.00	29.9	25.8	N	
4	7.74182	18.90	12.90	12.85	31.75	25.75	60.00	50.00	28.2	24.2	N	
5	9.02400	24.30	18.50	12.90	37.20	31.40	60.00	50.00	22.8	18.6	N	
6	24.00024	10.00	3.80	13.49	23.49	17.29	60.00	50.00	36.5	32.7	N	
7	27.51959	9.80	3.80	13.62	23.42	17.42	60.00	50.00	36.5	32.5	N	
8	0.20164	18.40	-7.00	12.44	30.84	5.44	63.54	53.54	32.7	48.1	L1	
9	0.47564	11.70	-8.80	12.46	24.16	3.66	56.41	46.41	32.2	42.7	L1	
10	4.80901	12.40	6.60	12.68	25.08	19.28	56.00	46.00	30.9	26.7	L1	
11	7.74043	18.60	12.50	12.80	31.40	25.30	60.00	50.00	28.6	24.7	L1	
12	9.01800	22.20	16.30	12.84	35.04	29.14	60.00	50.00	24.9	20.8	L1	
13	24.00134	8.90	5.20	13.20	22.10	18.40	60.00	50.00	37.9	31.6	L1	
14	27.51969	13.10	7.20	13.26	26.36	20.46	60.00	50.00	33.6	29.5	L1	

Calculation: Result[dBuV] = Reading[dBuV] + C.Fac(LISN + Cable + ATT)[dB]
LISN: SLS-05(US)

UL Japan, Inc.

Shonan EMC Lab.

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DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room

Date : 2021/05/14

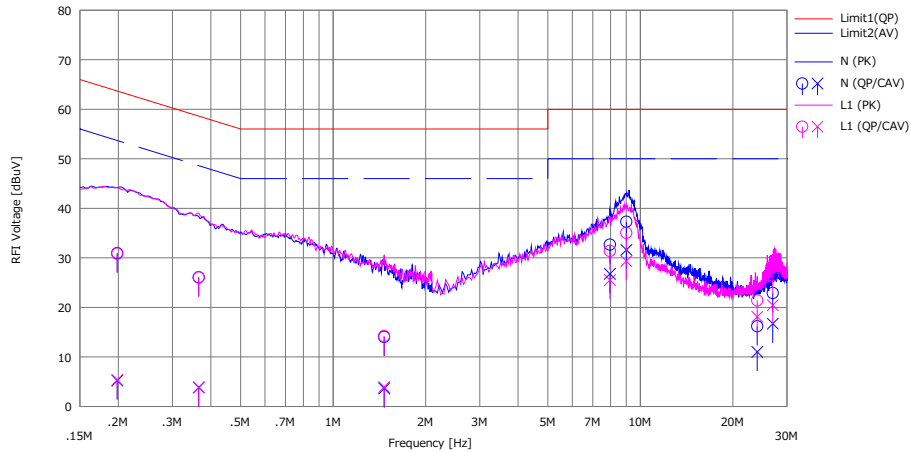
Mode : Tx BT LE 2 M-PHY 2480 MHz

Power : AC 120 V / 60 Hz (DC 3.3 V)

Temp./Humi. : 24 deg.C / 43 %RH

Limit : FCC_Part 15 Subpart C(15.207)

Engineer : Toshinori Yamada



No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<CAV> [dBuV]		<QP> [dBuV]	<CAV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.19840	18.50	-7.20	12.44	30.94	5.24	63.68	53.68	32.7	48.4	N	
2	0.36527	13.60	-8.60	12.45	26.05	3.85	58.61	48.61	32.5	44.7	N	
3	1.46630	1.50	-8.90	12.53	14.03	3.63	56.00	46.00	41.9	42.3	N	
4	7.95917	19.80	13.90	12.86	32.66	26.76	60.00	50.00	27.3	23.2	N	
5	9.00520	24.40	18.70	12.90	37.30	31.60	60.00	50.00	22.7	18.4	N	
6	24.00038	2.70	-2.50	13.49	16.19	10.99	60.00	50.00	43.8	39.0	N	
7	26.96871	9.30	3.10	13.60	22.90	16.70	60.00	50.00	37.1	33.3	N	
8	0.19850	18.40	-7.10	12.44	30.84	5.34	63.67	53.67	32.8	48.3	L1	
9	0.36527	13.60	-8.60	12.44	26.04	3.84	58.61	48.61	32.5	44.7	L1	
10	1.46615	1.70	-8.60	12.51	14.21	3.91	56.00	46.00	41.7	42.0	L1	
11	7.96068	18.60	12.70	12.80	31.40	25.50	60.00	50.00	28.6	24.5	L1	
12	9.00090	22.20	16.50	12.84	35.04	29.34	60.00	50.00	24.9	20.6	L1	
13	24.00050	8.20	4.90	13.20	21.40	18.10	60.00	50.00	38.6	31.9	L1	
14	26.96888	13.20	7.20	13.24	26.44	20.44	60.00	50.00	33.5	29.5	L1	

Calculation: Result[dBuV]=Reading[dBuV]+C.Fac(LISN+Cable+ATT)[dB]
LISN: SLS-05(US)

DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room

Date : 2021/05/15

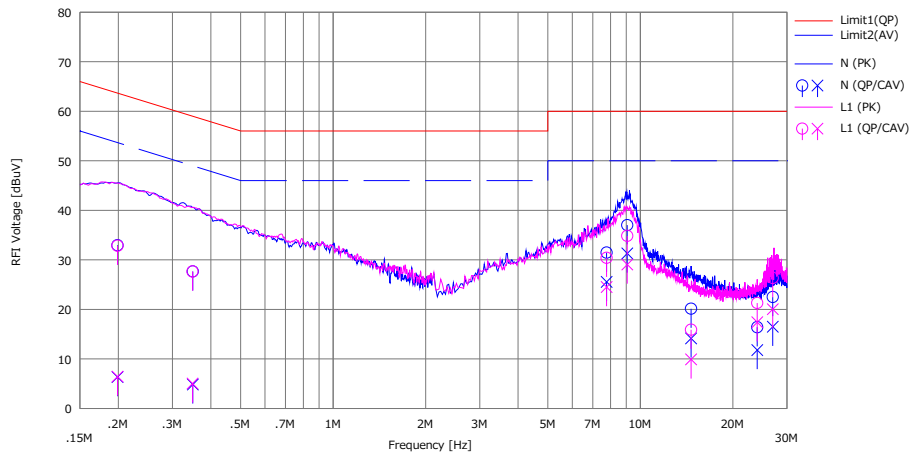
Mode : Tx BT LE 2 M-PHY 2440 MHz + Tx11n-20 5700 MHz

Power : AC 120 V / 60 Hz (DC 3.3 V)

Temp./Humi. : 24 deg.C / 43 %RH

Limit : FCC_Part 15 Subpart C(15.207)

Engineer : Toshinori Yamada



No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<CAV> [dBuV]		<QP> [dBuV]	<CAV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.19887	20.50	-6.10	12.44	32.94	6.34	63.66	53.66	30.7	47.3	N	
2	0.34952	15.20	-7.60	12.45	27.65	4.85	58.97	48.97	31.3	44.1	N	
3	7.76384	18.60	12.70	12.85	31.45	25.55	60.00	50.00	28.5	24.4	N	
4	9.06531	24.10	18.40	12.90	37.00	31.30	60.00	50.00	23.0	18.7	N	
5	14.62665	7.00	1.00	13.13	20.13	14.13	60.00	50.00	39.8	35.8	N	
6	24.00034	2.90	-1.70	13.49	16.39	11.79	60.00	50.00	43.6	38.2	N	
7	26.97165	8.90	2.90	13.60	22.50	16.50	60.00	50.00	37.5	33.5	N	
8	0.19882	20.40	-6.00	12.44	32.84	6.44	63.66	53.66	30.8	47.2	L1	
9	0.34881	15.20	-7.40	12.44	27.64	5.04	58.99	48.99	31.3	43.9	L1	
10	7.76414	17.60	11.70	12.80	30.40	24.50	60.00	50.00	29.6	25.5	L1	
11	9.06535	22.00	16.20	12.84	34.84	29.04	60.00	50.00	25.1	20.9	L1	
12	14.62697	2.90	-3.10	12.99	15.89	9.89	60.00	50.00	44.1	40.1	L1	
13	24.00112	8.10	4.20	13.20	21.30	17.40	60.00	50.00	38.7	32.6	L1	
14	26.97145	13.10	6.80	13.24	26.34	20.04	60.00	50.00	33.6	29.9	L1	

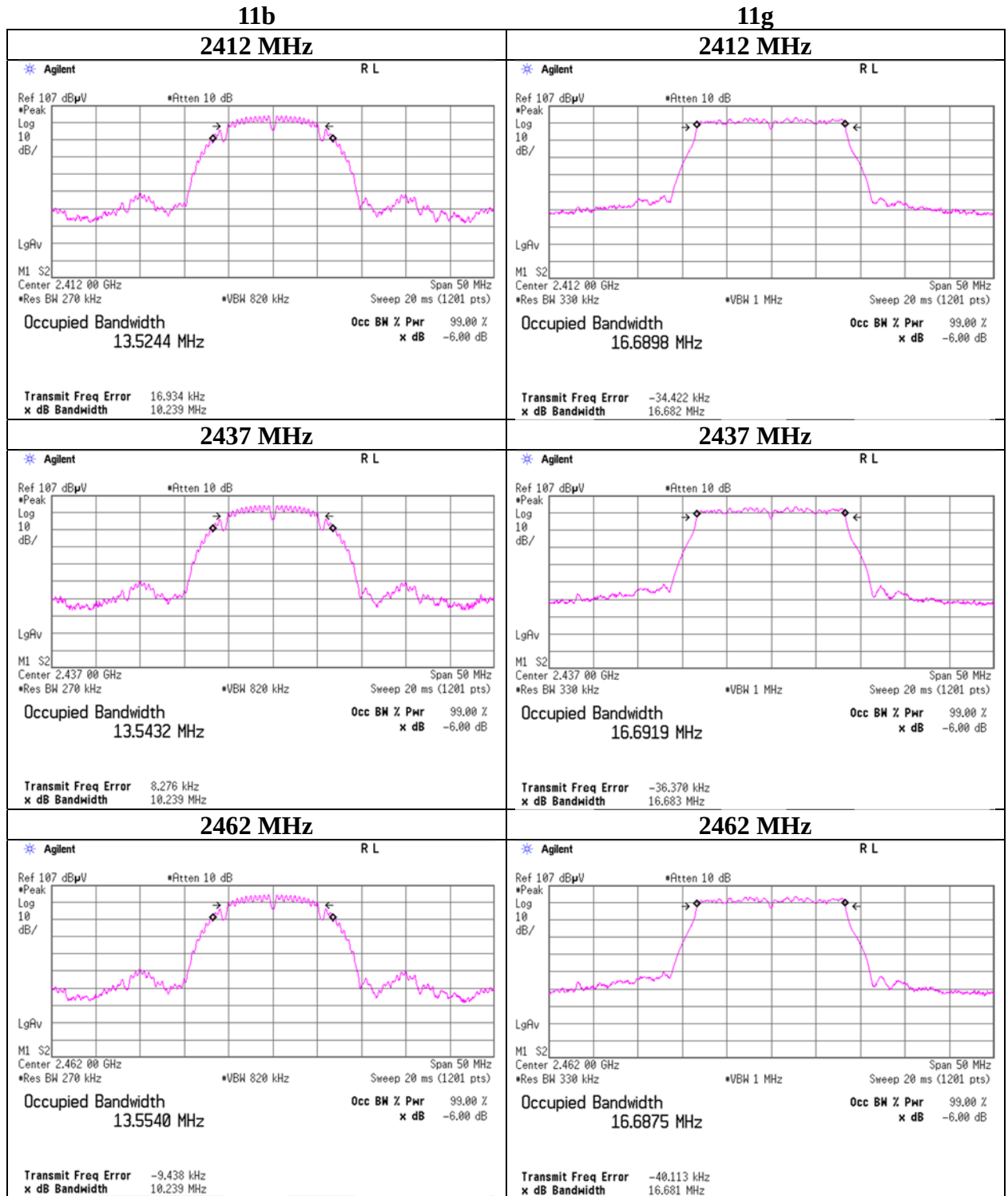
Calculation: Result[dBuV] = Reading[dBuV] + C.Fac(LISN + Cable + ATT)[dB]
LISN: SLS-05(US)

6 dB Bandwidth and 99 % Occupied Bandwidth

Report No.	13734674S-A-R2	
Test place	Shonan EMC Lab. No.5 Shielded Room	
Date	March 19, 2021	March 26, 2021
Temperature / Humidity	24 deg. C / 50 % RH	23 deg. C / 46 % RH
Engineer	Shiro Kobayashi	Toshinori Yamada
Mode	Tx	

Mode	Frequency [MHz]	99 % Occupied Bandwidth [kHz]	6 dB Bandwidth [MHz]	Limit for 6 dB Bandwidth [MHz]
11b	2412	13524.4	10.091	> 0.5000
	2437	13543.2	10.085	> 0.5000
	2462	13554.0	10.083	> 0.5000
11g	2412	16689.8	16.565	> 0.5000
	2437	16691.9	16.563	> 0.5000
	2462	16687.5	16.563	> 0.5000
11n-20	2412	17814.8	17.737	> 0.5000
	2437	17787.8	17.786	> 0.5000
	2462	17791.8	17.736	> 0.5000
11n-40	2422	36262.9	36.539	> 0.5000
	2437	36262.9	36.525	> 0.5000
	2452	36253.0	36.533	> 0.5000
BT LE 1 M-PHY	2402	1032.6	0.732	> 0.5000
	2440	1034.4	0.732	> 0.5000
	2480	1033.7	0.734	> 0.5000
BT LE 2 M-PHY	2402	2058.4	1.197	> 0.5000
	2440	2059.1	1.198	> 0.5000
	2480	2058.8	1.199	> 0.5000

99 %Occupied Bandwidth



UL Japan, Inc.

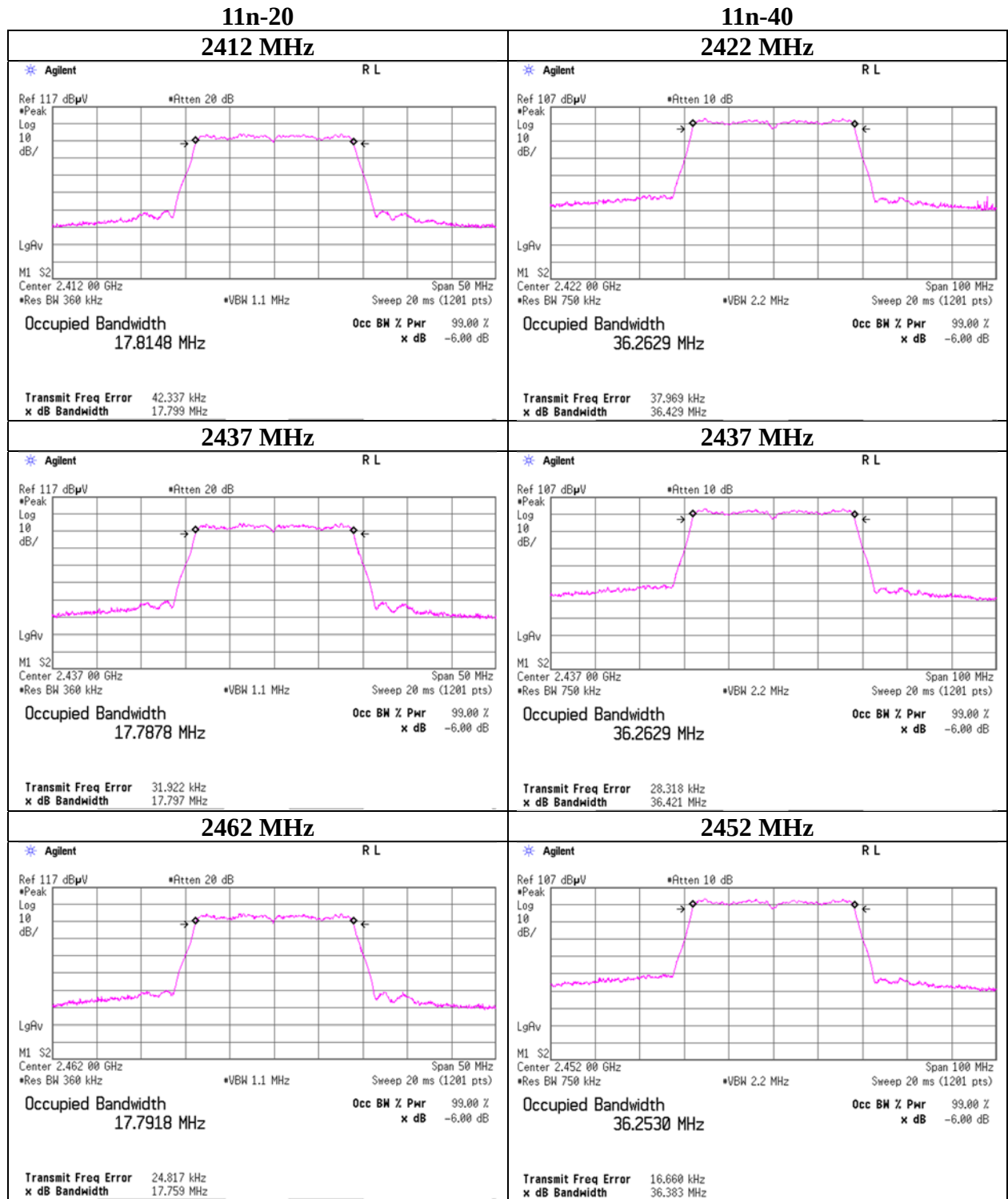
Shonan EMC Lab.

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

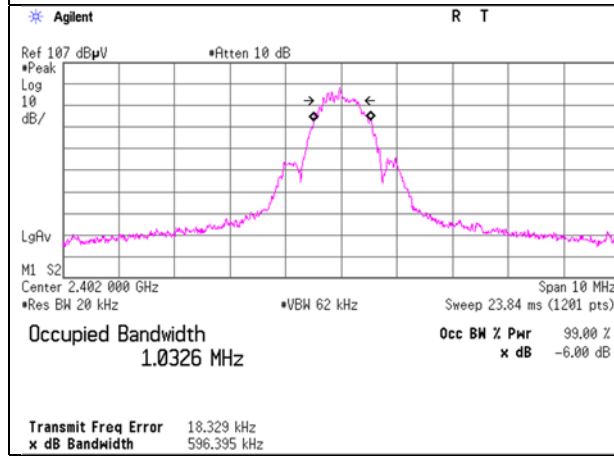
99 % Occupied Bandwidth



99 % Occupied Bandwidth

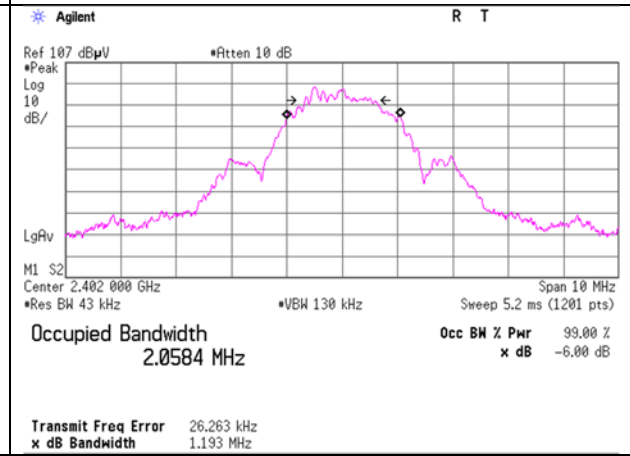
BT LE 1 M-PHY

2402 MHz

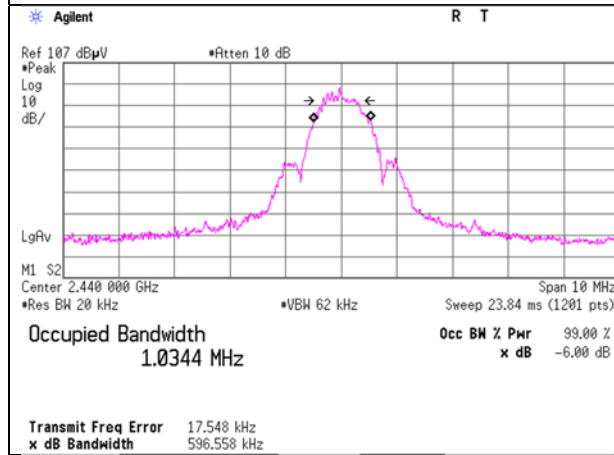


BT LE 2 M-PHY

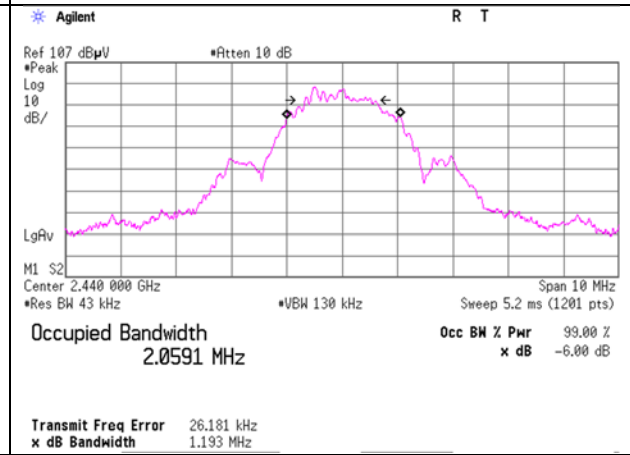
2402 MHz



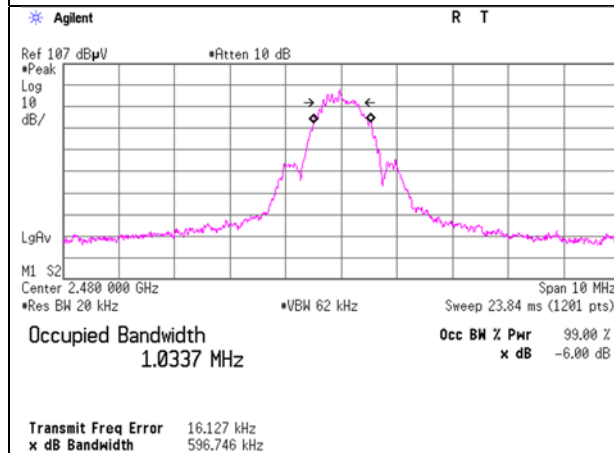
2440 MHz



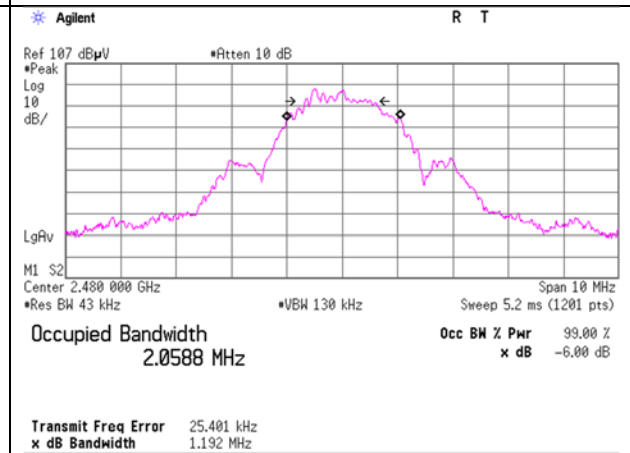
2440 MHz



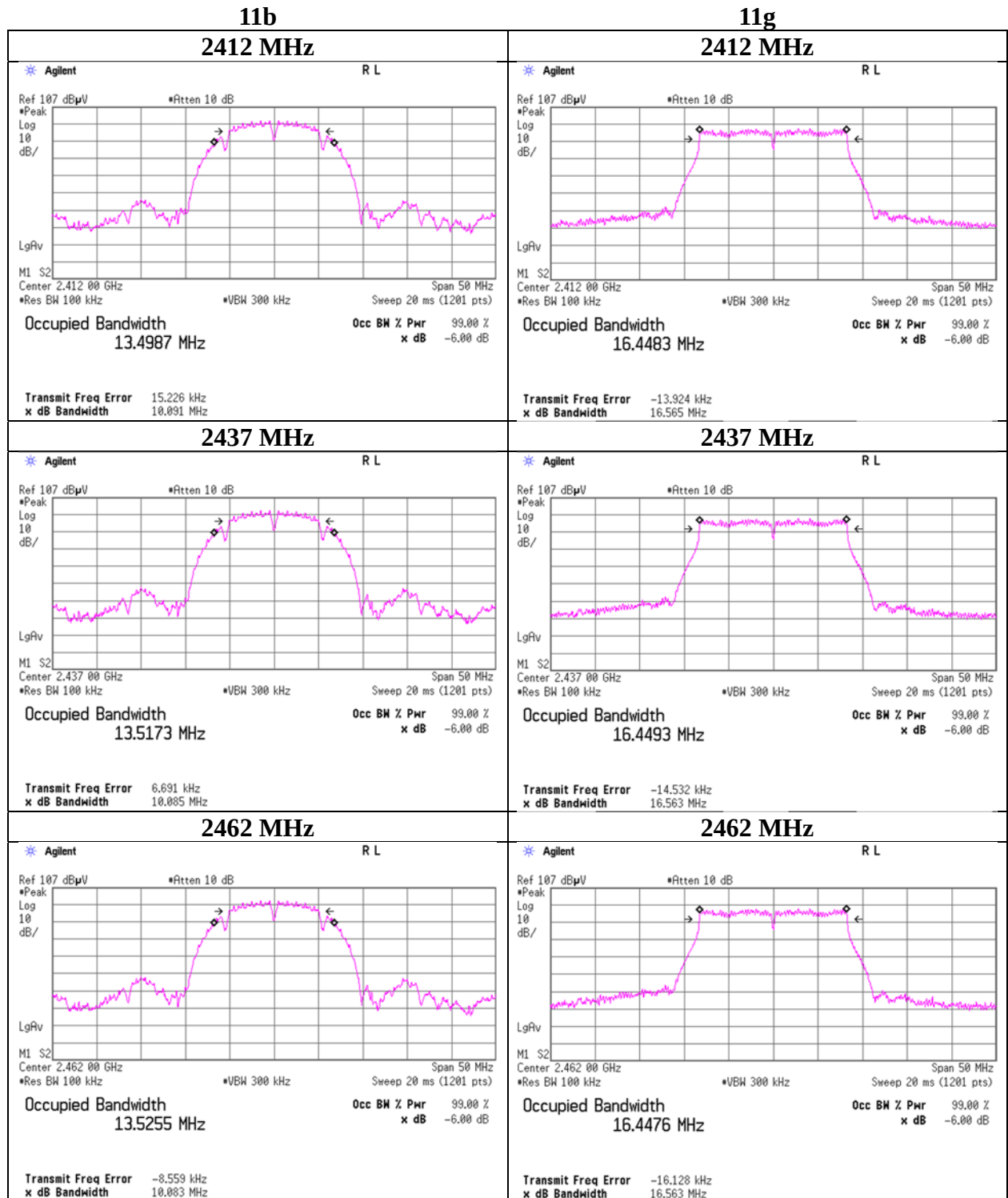
2480 MHz



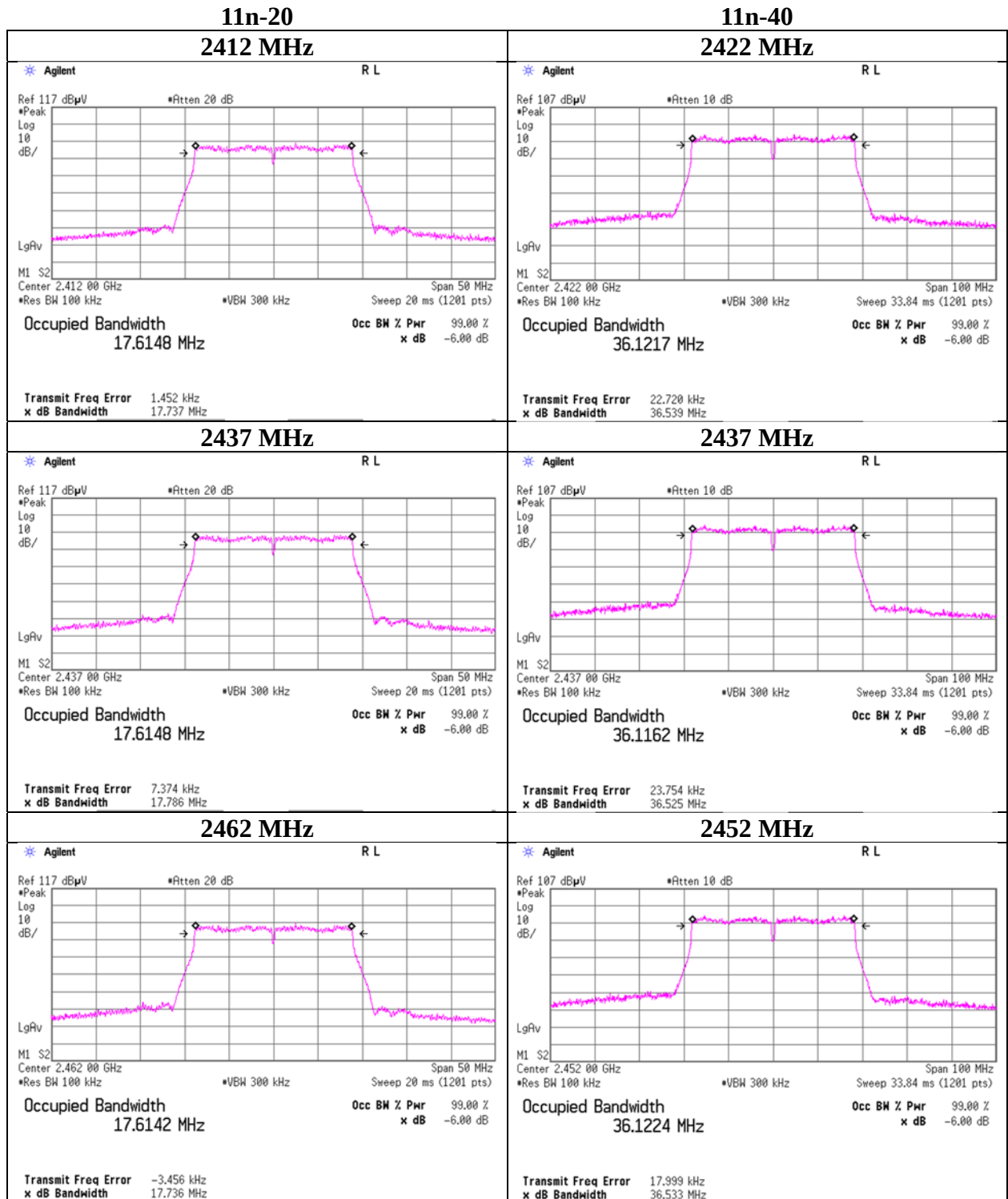
2480 MHz



6 dB Bandwidth



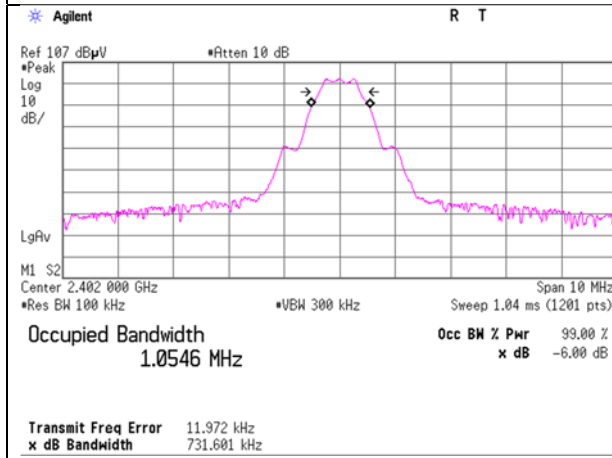
6 dB Bandwidth



6 dB Bandwidth

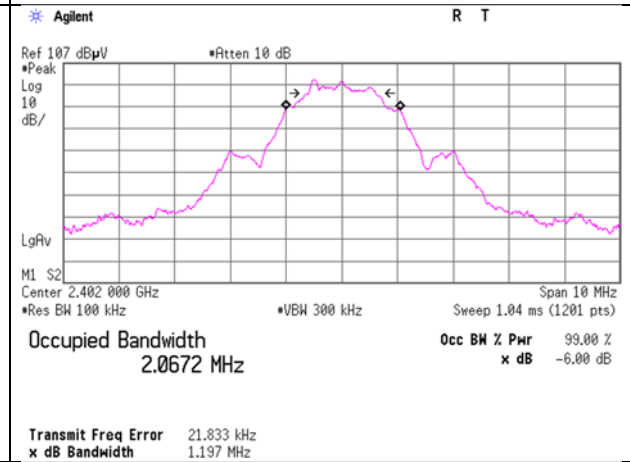
BT LE 1 M-PHY

2402 MHz

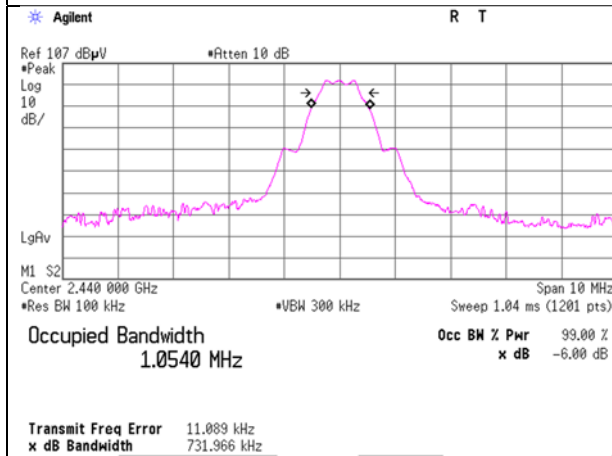


BT LE 2 M-PHY

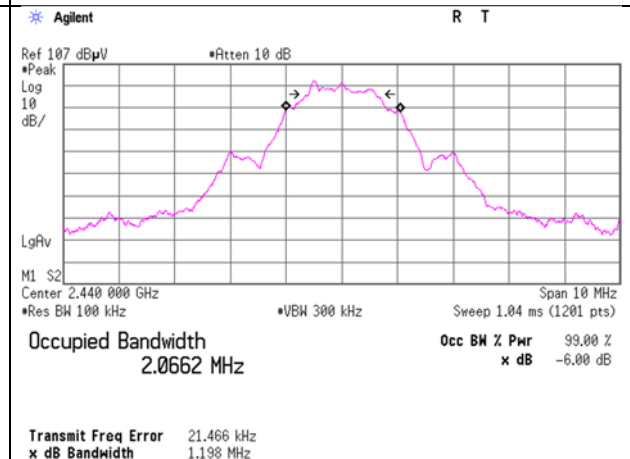
2402 MHz



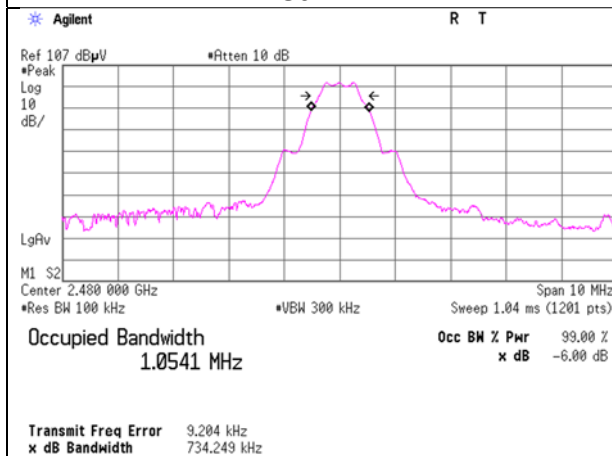
2440 MHz



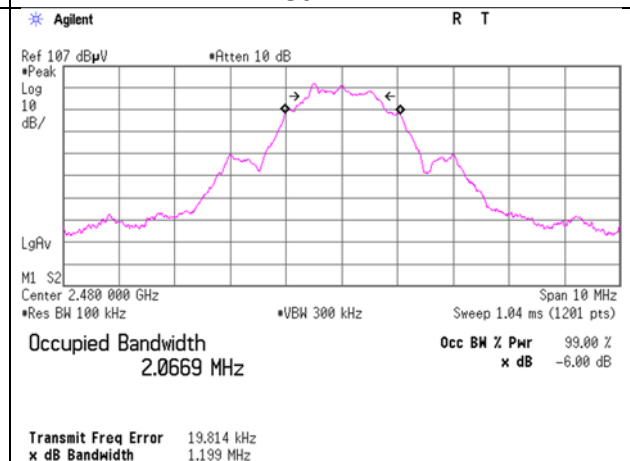
2440 MHz



2480 MHz



2480 MHz



Maximum Peak Output Power

Report No.	13734674S-A-R2
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	March 18, 2021
Temperature / Humidity	23 deg. C / 33 % RH
Engineer	Yosuke Murakami
Mode	Tx 11b

Antenna 1				Conducted Power					e.i.r.p. for RSS-247					
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
2412	3.42	1.67	10.18	15.27	33.65	30.00	1000	14.73	3.40	18.67	73.62	36.02	4000	17.35
2437	3.66	1.66	10.18	15.50	35.48	30.00	1000	14.50	3.40	18.90	77.62	36.02	4000	17.12
2462	3.76	1.66	10.18	15.60	36.31	30.00	1000	14.40	3.40	19.00	79.43	36.02	4000	17.02

Antenna 2				Conducted Power					e.i.r.p. for RSS-247					
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
2412	3.34	1.67	10.18	15.19	33.04	30.00	1000	14.81	3.40	18.59	72.28	36.02	4000	17.43
2437	3.59	1.66	10.18	15.43	34.91	30.00	1000	14.57	3.40	18.83	76.38	36.02	4000	17.19
2462	3.70	1.66	10.18	15.54	35.81	30.00	1000	14.46	3.40	18.94	78.34	36.02	4000	17.08

Sample Calculation:

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

e.i.r.p. Result = Conducted Power Result + Antenna Gain

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

Antenna 1, 2437MHz		
Rate	Reading	Remark
[Mbps]	[dBm]	
1	3.66	*
2	3.62	-
5.5	2.84	-
11	3.55	-

Antenna 2, 2437MHz		
Rate	Reading	Remark
[Mbps]	[dBm]	
1	3.59	-
2	3.58	-
5.5	2.80	-
11	3.54	-

*: Worst Rate

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

Maximum Peak Output Power

Report No. 13734674S-A-R2
Test place Shonan EMC Lab. No.5 Shielded Room
Date March 18, 2021
Temperature / Humidity 23 deg. C / 33 % RH
Engineer Yosuke Murakami
Mode Tx 11g

Antenna 1				Conducted Power					e.i.r.p. for RSS-247					
Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	Antenna Gain	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	11.30	1.67	10.18	23.15	206.54	30.00	1000	6.85	3.40	26.55	451.86	36.02	4000	9.47
2437	11.48	1.66	10.18	23.32	214.78	30.00	1000	6.68	3.40	26.72	469.89	36.02	4000	9.30
2462	11.56	1.66	10.18	23.40	218.78	30.00	1000	6.60	3.40	26.80	478.63	36.02	4000	9.22

Antenna 2				Conducted Power					e.i.r.p. for RSS-247					
Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	Antenna Gain	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	11.28	1.67	10.18	23.13	205.59	30.00	1000	6.87	3.40	26.53	449.78	36.02	4000	9.49
2437	11.45	1.66	10.18	23.29	213.30	30.00	1000	6.71	3.40	26.69	466.66	36.02	4000	9.33
2462	11.54	1.66	10.18	23.38	217.77	30.00	1000	6.62	3.40	26.78	476.43	36.02	4000	9.24

Sample Calculation:

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

e.i.r.p. Result = Conducted Power Result + Antenna Gain

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

Antenna 1, 2437 MHz		
Rate	Reading	Remark
[Mbps]	[dBm]	
6	11.43	-
9	11.47	-
12	11.40	-
18	10.83	-
24	11.48	*
36	11.30	-
48	11.28	-
54	11.46	-

Antenna 2, 2437 MHz		
Rate	Reading	Remark
[Mbps]	[dBm]	
6	11.42	-
9	11.41	-
12	11.32	-
18	10.75	-
24	11.45	-
36	11.25	-
48	10.62	-
54	11.46	-

*: Worst Rate

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

Maximum Peak Output Power

Report No. 13734674S-A-R2
Test place Shonan EMC Lab. No.5 Shielded Room
Date March 18, 2021
Temperature / Humidity 23 deg. C / 33 % RH
Engineer Yosuke Murakami
Mode Tx 11n-20

Antenna 1				Conducted Power					e.i.r.p. for RSS-247					
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
2412	12.45	1.67	10.18	24.30	269.15	30.00	1000	5.70	3.40	27.70	588.84	36.02	4000	8.32
2437	12.61	1.66	10.18	24.45	278.61	30.00	1000	5.55	3.40	27.85	609.54	36.02	4000	8.17
2462	12.57	1.66	10.18	24.41	276.06	30.00	1000	5.59	3.40	27.81	603.95	36.02	4000	8.21

Antenna 2				Conducted Power					e.i.r.p. for RSS-247					
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
2412	12.38	1.67	10.18	24.23	264.85	30.00	1000	5.77	3.40	27.63	579.43	36.02	4000	8.39
2437	12.52	1.66	10.18	24.36	272.90	30.00	1000	5.64	3.40	27.76	597.04	36.02	4000	8.26
2462	12.51	1.66	10.18	24.35	272.27	30.00	1000	5.65	3.40	27.75	595.66	36.02	4000	8.27

Sample Calculation:

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

e.i.r.p. Result = Conducted Power Result + Antenna Gain

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

Antenna 1, 2437 MHz		
Rate	Reading	Remark
[MCS]	[dBm]	
0	10.94	-
1	11.05	-
2	11.64	-
3	11.00	-
4	12.08	-
5	10.90	-
6	12.61	*
7	11.58	-

Antenna 2, 2437 MHz		
Rate	Reading	Remark
[MCS]	[dBm]	
0	10.90	-
1	11.00	-
2	11.81	-
3	10.93	-
4	11.99	-
5	10.84	-
6	12.52	-
7	11.48	-

*: Worst Rate

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

Maximum Peak Output Power

Report No. 13734674S-A-R2
Test place Shonan EMC Lab. No.5 Shielded Room
Date March 18, 2021
Temperature / Humidity 23 deg. C / 33 % RH
Engineer Yosuke Murakami
Mode Tx 11n-40

Antenna 1				Conducted Power					e.i.r.p. for RSS-247					
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
2422	11.25	1.67	10.18	23.10	204.17	30.00	1000	6.90	3.40	26.50	446.68	36.02	4000	9.52
2437	11.36	1.66	10.18	23.20	208.93	30.00	1000	6.80	3.40	26.60	457.09	36.02	4000	9.42
2452	11.33	1.67	10.18	23.18	207.97	30.00	1000	6.82	3.40	26.58	454.99	36.02	4000	9.44

Antenna 2				Conducted Power					e.i.r.p. for RSS-247					
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
2412	11.20	1.67	10.18	23.05	201.84	30.00	1000	6.95	3.40	26.45	441.57	36.02	4000	9.57
2437	11.28	1.66	10.18	23.12	205.12	30.00	1000	6.88	3.40	26.52	448.75	36.02	4000	9.50
2462	11.27	1.67	10.18	23.12	205.12	30.00	1000	6.88	3.40	26.52	448.75	36.02	4000	9.50

Sample Calculation:

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

e.i.r.p. Result = Conducted Power Result + Antenna Gain

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

Antenna 1, 2437 MHz

Rate	Reading	Remark
[MCS]	[dBm]	
0	9.89	-
1	9.64	-
2	10.59	-
3	11.36	*
4	10.98	-
5	10.59	-
6	10.76	-
7	10.65	-

Antenna 2, 2437 MHz

Rate	Reading	Remark
[MCS]	[dBm]	
0	9.74	-
1	9.69	-
2	10.89	-
3	11.28	-
4	10.82	-
5	10.50	-
6	10.86	-
7	10.74	-

*: Worst Rate

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

Maximum Peak Output Power

Report No. 13734674S-A-R2
Test place Shonan EMC Lab. No.5 Shielded Room
Date March 19, 2021
Temperature / Humidity 24 deg. C / 50 % RH
Engineer Shiro Kobayashi
Mode Tx BT LE 1 M-PHY

Antenna 1				Conducted Power					e.i.r.p. for RSS-247					
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
2402	-7.41	1.10	9.96	3.65	2.32	30.00	1000	26.35	3.40	7.05	5.07	36.02	4000	28.97
2440	-7.53	1.10	9.96	3.53	2.25	30.00	1000	26.47	3.40	6.93	4.93	36.02	4000	29.09
2480	-7.75	1.10	9.96	3.31	2.14	30.00	1000	26.69	3.40	6.71	4.69	36.02	4000	29.31

Antenna 2				Conducted Power					e.i.r.p. for RSS-247					
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
2402	-7.40	1.10	9.96	3.66	2.32	30.00	1000	26.34	3.40	7.06	5.08	36.02	4000	28.96
2440	-7.49	1.10	9.96	3.57	2.28	30.00	1000	26.43	3.40	6.97	4.98	36.02	4000	29.05
2480	-7.75	1.10	9.96	3.31	2.14	30.00	1000	26.69	3.40	6.71	4.69	36.02	4000	29.31

Sample Calculation:

Result = Reading + Cable Loss + Attenuator Loss

e.i.r.p. Result = Conducted Power Result + Antenna Gain

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

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Maximum Peak Output Power

Report No. 13734674S-A-R2
Test place Shonan EMC Lab. No.5 Shielded Room
Date March 19, 2021
Temperature / Humidity 24 deg. C / 50 % RH
Engineer Shiro Kobayashi
Mode Tx BT LE 2 M-PHY

Antenna 1				Conducted Power					e.i.r.p. for RSS-247					
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
2402	-7.42	1.10	9.96	3.64	2.31	30.00	1000	26.36	3.40	7.04	5.06	36.02	4000	28.98
2440	-7.53	1.10	9.96	3.53	2.25	30.00	1000	26.47	3.40	6.93	4.93	36.02	4000	29.09
2480	-7.75	1.10	9.96	3.31	2.14	30.00	1000	26.69	3.40	6.71	4.69	36.02	4000	29.31

Antenna 2				Conducted Power					e.i.r.p. for RSS-247					
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
2402	-7.40	1.10	9.96	3.66	2.32	30.00	1000	26.34	3.40	7.06	5.08	36.02	4000	28.96
2440	-7.51	1.10	9.96	3.55	2.26	30.00	1000	26.45	3.40	6.95	4.95	36.02	4000	29.07
2480	-7.74	1.10	9.96	3.32	2.15	30.00	1000	26.68	3.40	6.72	4.70	36.02	4000	29.30

Sample Calculation:

Result = Reading + Cable Loss + Attenuator Loss

e.i.r.p. Result = Conducted Power Result + Antenna Gain

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

Average Output Power (Reference data for RF Exposure)

Report No. 13734674S-A-R2
Test place Shonan EMC Lab. No.5 Shielded Room
Date March 18, 2021 March 19, 2021
Temperature / Humidity 23 deg. C / 33 % RH 24 deg. C / 50 % RH
Engineer Yosuke Murakami Shiro Kobayashi
Mode Tx

11b 1 Mbps

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	0.62	1.67	10.18	12.47	17.66	0.00	12.47	17.66
2437	0.85	1.66	10.18	12.69	18.58	0.00	12.69	18.58
2462	0.98	1.66	10.18	12.82	19.14	0.00	12.82	19.14

11g 6 Mbps

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	0.56	1.67	10.18	12.41	17.42	0.00	12.41	17.42
2437	0.78	1.66	10.18	12.62	18.28	0.00	12.62	18.28
2462	0.92	1.66	10.18	12.76	18.88	0.00	12.76	18.88

11n-20 MCS 0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2412	0.72	1.67	10.18	12.57	18.07	0.00	12.57	18.07
2437	0.94	1.66	10.18	12.78	18.97	0.00	12.78	18.97
2462	1.06	1.66	10.18	12.90	19.50	0.00	12.90	19.50

11n-40 MCS 0

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2422	-0.21	1.67	10.18	11.64	14.59	0.00	11.64	14.59
2437	-0.08	1.66	10.18	11.76	15.00	0.00	11.76	15.00
2452	-0.01	1.67	10.18	11.84	15.28	0.00	11.84	15.28

BT LE 1 M-PHY

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2402	-9.72	1.10	9.96	1.34	1.36	1.95	3.29	2.13
2440	-9.82	1.10	9.96	1.24	1.33	1.95	3.19	2.08
2480	-10.07	1.10	9.96	0.99	1.26	1.95	2.94	1.97

BT LE 2 M-PHY

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2402	-12.51	1.10	9.96	-1.45	0.72	4.67	3.22	2.10
2440	-12.61	1.10	9.96	-1.55	0.70	4.67	3.12	2.05
2480	-12.85	1.10	9.96	-1.79	0.66	4.67	2.88	1.94

Sample Calculation:

Result (Time average) = Reading + Cable Loss + Attenuator Loss

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

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

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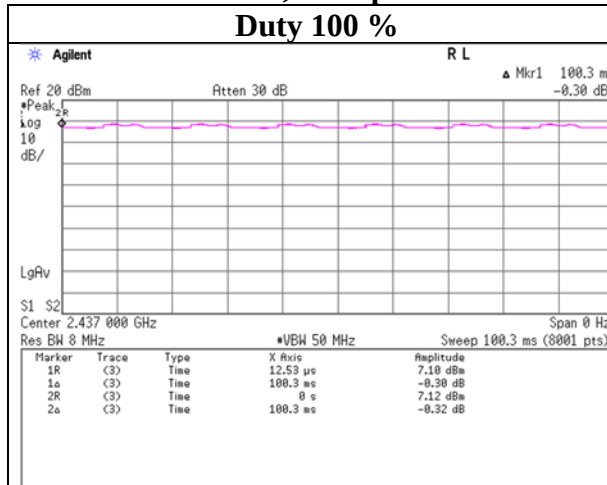
Facsimile : +81 463 50 6401

Burst rate confirmation

Report No. 13734674S-A-R2
Test place Shonan EMC Lab. No.5 Shielded Room
Date March 26, 2021
Temperature / Humidity 23 deg. C / 46 % RH
Engineer Toshinori Yamada
Mode Tx

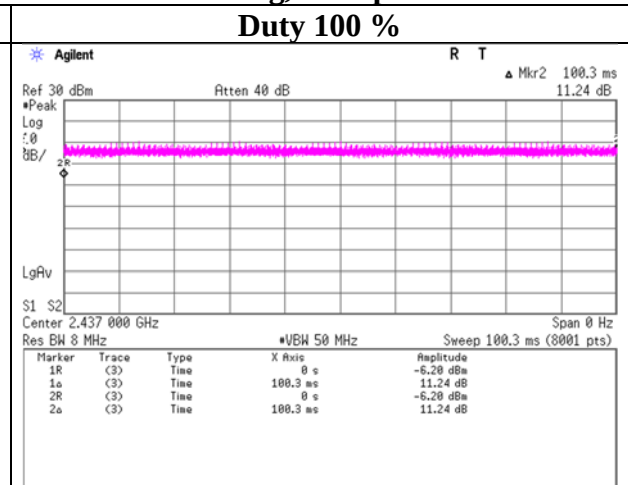
11b, 1 Mbps

Duty 100 %



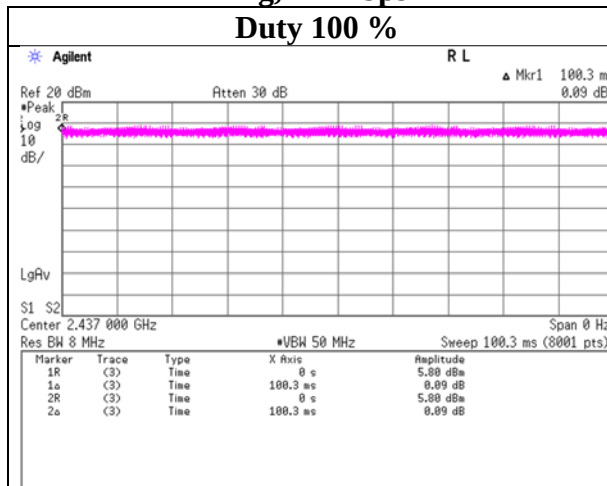
11g, 6 Mbps

Duty 100 %



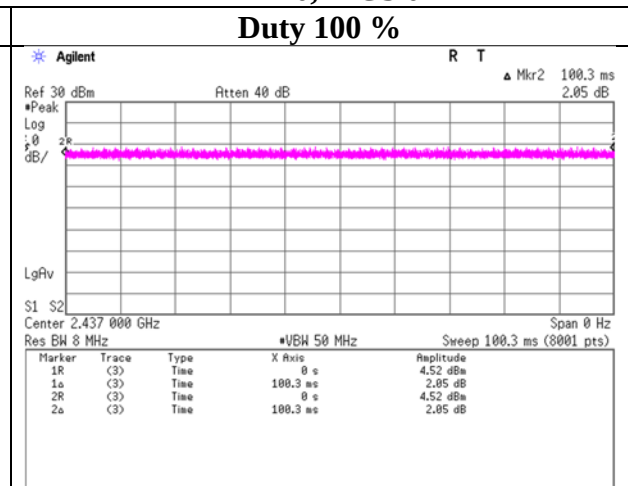
11g, 24 Mbps

Duty 100 %



11n-20, MCS 0

Duty 100 %



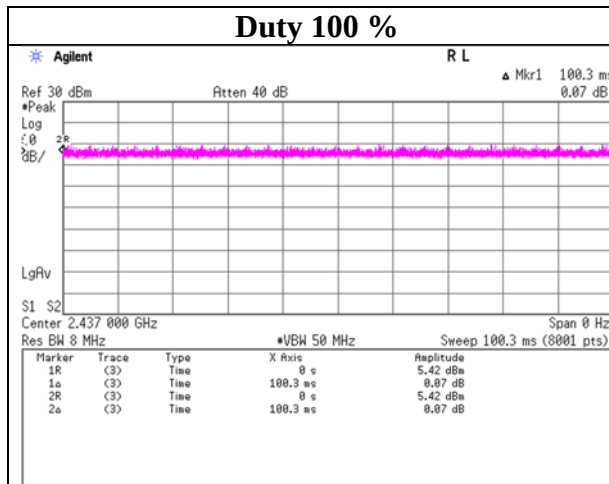
* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

Burst rate confirmation

Report No. 13734674S-A-R2
Test place Shonan EMC Lab. No.5 Shielded Room
Date March 26, 2021
Temperature / Humidity 23 deg. C / 46 % RH
Engineer Toshinori Yamada
Mode Tx

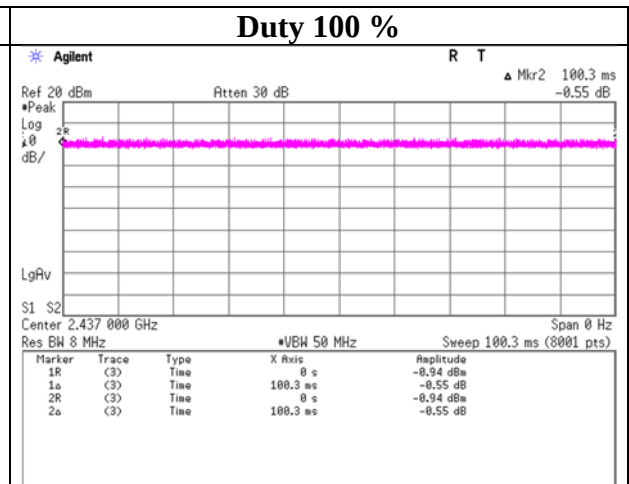
11n-20 MCS 6

Duty 100 %



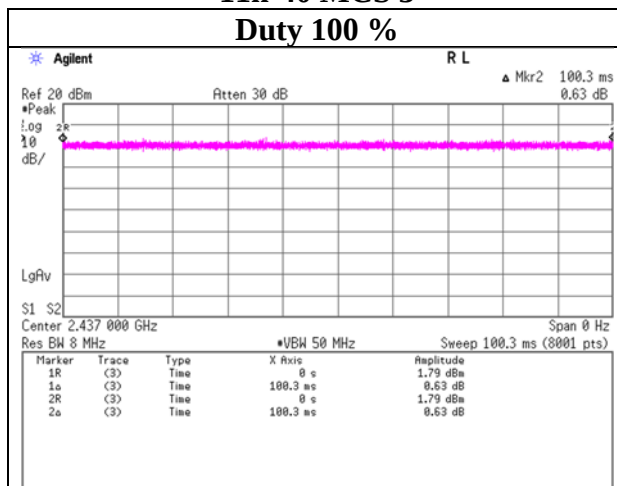
11n-40 MCS 0

Duty 100 %



11n-40 MCS 3

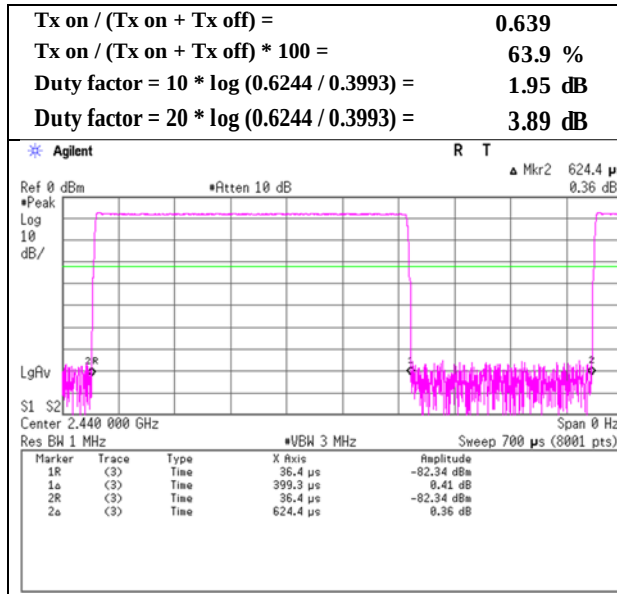
Duty 100 %



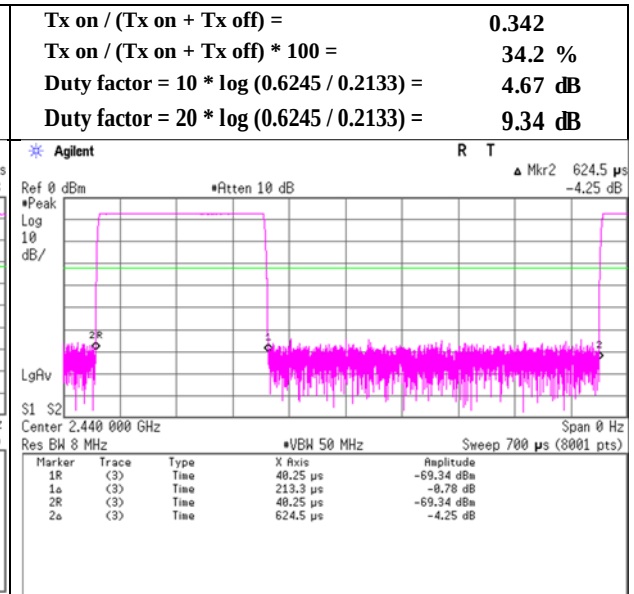
Burst rate confirmation

Report No. 13734674S-A-R2
Test place Shonan EMC Lab. No.5 Shielded Room
Date March 19, 2021
Temperature / Humidity 24 deg. C / 50 % RH
Engineer Shiro Kobayashi
Mode Tx

BT LE 1 M-PHY



BT LE 2 M-PHY



* for Antenna power is 10 x log (xxxx / yyyy)

* for Radiated emission is 20 x log (xxxx / yyyy)

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

Radiated Spurious Emission

Report No. 13734674S-A-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 1 3 3
Date March 29, 2021 April 25, 2021 April 26, 2021
Temperature / Humidity 23 deg.C, 44 %RH 24 deg.C, 31 %RH 25 deg.C, 25 %RH
Engineer Yohsuke Matsuzawa Kenichi Adachi Takahiro Kawakami
(1 GHz -10 GHz) (10 GHz - 18 GHz) (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	45.35	27.93	14.82	39.55	2.12	50.67	73.9	23.2	168	353	-
Hori.	4824.000	PK	49.64	31.49	7.60	39.73	2.12	51.12	73.9	22.7	249	206	-
Hori.	7236.000	PK	45.24	36.92	9.34	39.52	2.12	54.10	73.9	19.8	150	0	-
Hori.	9648.000	PK	47.31	38.33	10.93	39.61	2.12	59.08	73.9	14.8	143	310	-
Hori.	2390.000	AV	37.03	27.93	14.82	39.55	2.12	42.35	53.9	11.5	168	353	-
Hori.	4824.000	AV	44.13	31.49	7.60	39.73	2.12	45.61	53.9	8.2	249	206	-
Hori.	7236.000	AV	36.69	36.92	9.34	39.52	2.12	45.55	53.9	8.3	150	0	-
Hori.	9648.000	AV	37.71	38.33	10.93	39.61	2.12	49.48	53.9	4.4	143	310	-
Vert.	2390.000	PK	46.02	27.93	14.82	39.55	2.12	51.34	73.9	22.5	205	205	-
Vert.	4824.000	PK	52.29	31.49	7.60	39.73	2.12	53.77	73.9	20.1	171	227	-
Vert.	7236.000	PK	45.65	36.92	9.34	39.52	2.12	54.51	73.9	19.3	150	0	-
Vert.	9648.000	PK	47.47	38.33	10.93	39.61	2.12	59.24	73.9	14.6	136	25	-
Vert.	2390.000	AV	36.55	27.93	14.82	39.55	2.12	41.87	53.9	12.0	205	205	-
Vert.	4824.000	AV	49.10	31.49	7.60	39.73	2.12	50.58	53.9	3.3	171	227	-
Vert.	7236.000	AV	36.81	36.92	9.34	39.52	2.12	45.67	53.9	8.2	150	0	-
Vert.	9648.000	AV	38.57	38.33	10.93	39.61	2.12	50.34	53.9	3.5	136	25	-

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

Distance factor : 1 GHz - 10 GHz : 20log(3.83 m / 3.0 m) = 2.12 dB

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

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	90.18	27.90	14.84	39.56	2.12	95.48	-	-	Carrier
Hori.	2400.000	PK	40.53	27.92	14.83	39.56	2.12	45.84	75.4	29.5	-
Vert.	2412.000	PK	90.23	27.90	14.84	39.56	2.12	95.53	-	-	Carrier
Vert.	2400.000	PK	37.59	27.92	14.83	39.56	2.12	42.90	75.5	32.6	-

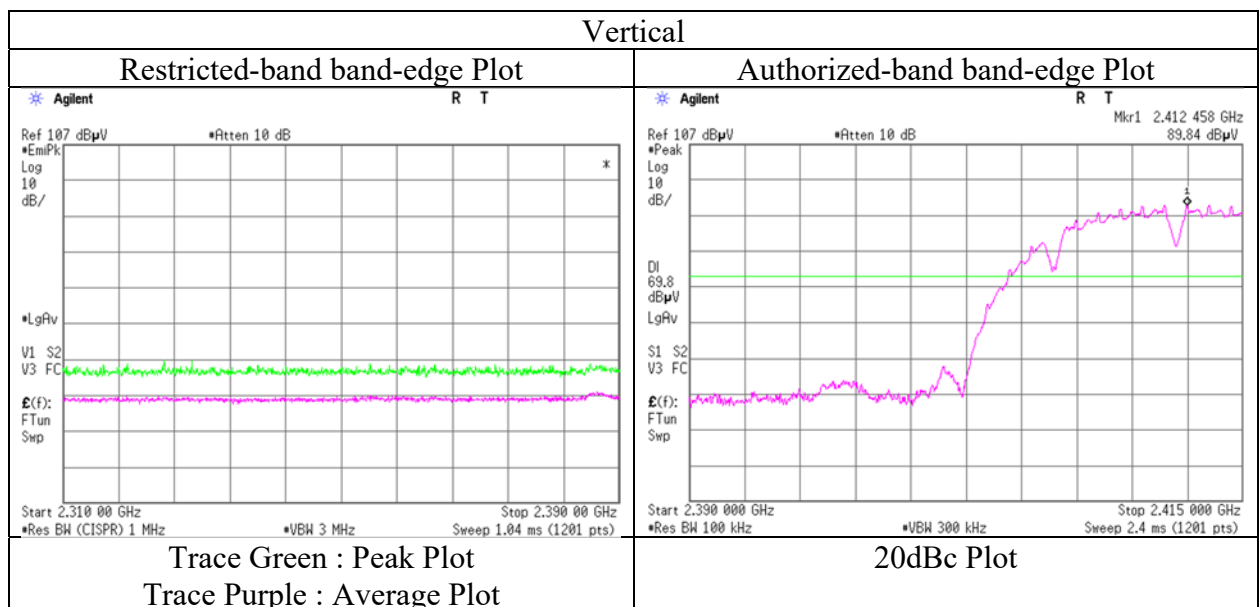
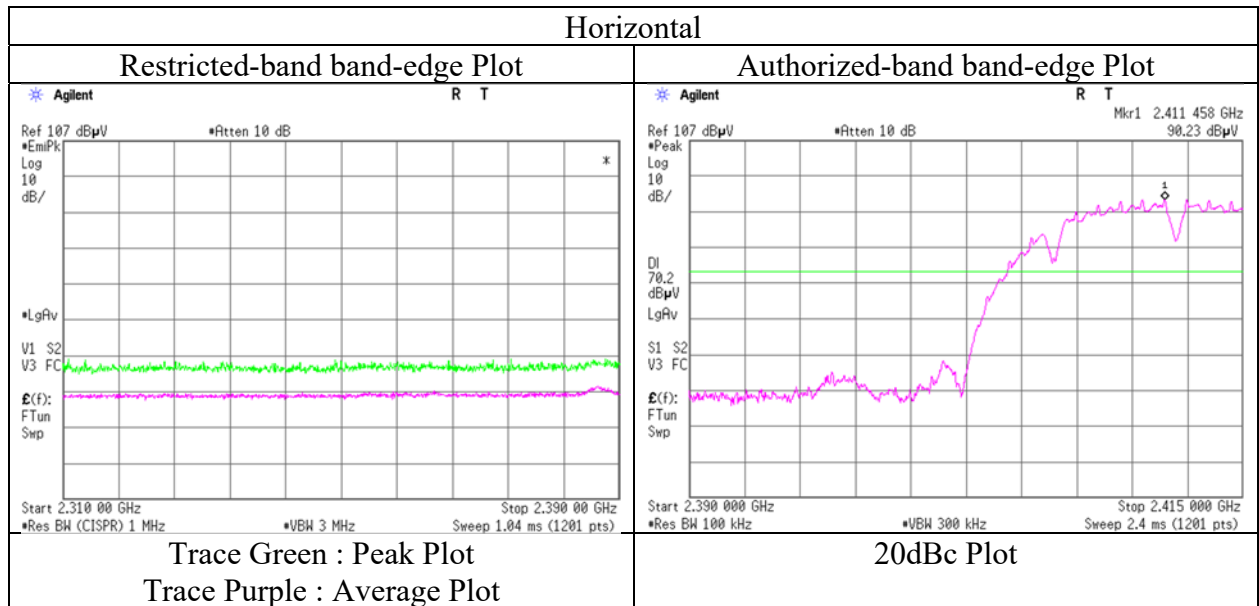
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : 20log(3.83 m / 3.0 m) = 2.12 dB

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

Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13734674S-A-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	1
Date	March 29, 2021
Temperature / Humidity	23 deg.C, 44 %RH
Engineer	Yohsuke Matsuzawa
Mode	Tx 11b 2412 MHz



* 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.	13734674S-A-R2		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	1	3	3
Date	March 29, 2021	April 25, 2021	May 3, 2021
Temperature / Humidity	23 deg.C, 44 %RH	24 deg.C, 31 %RH	22 deg.C, 48 %RH
Engineer	Yohsuke Matsuzawa (1 GHz -10 GHz)	Kenichi Adachi (10 GHz - 18 GHz)	Takahiro Suzuki (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	49.37	31.51	7.63	39.72	2.12	50.91	73.9	22.9	198	216	-
Hori.	7311.000	PK	45.25	36.93	9.39	39.56	2.12	54.13	73.9	19.7	150	0	-
Hori.	9748.000	PK	46.58	38.60	10.93	39.49	2.12	58.74	73.9	15.1	132	315	-
Hori.	4874.000	AV	44.72	31.51	7.63	39.72	2.12	46.26	53.9	7.6	198	216	-
Hori.	7311.000	AV	34.98	36.93	9.39	39.56	2.12	43.86	53.9	10.0	150	0	-
Hori.	9748.000	AV	37.78	38.60	10.93	39.49	2.12	49.94	53.9	3.9	132	315	-
Vert.	4874.000	PK	52.98	31.51	7.63	39.72	2.12	54.52	73.9	19.3	183	227	-
Vert.	7311.000	PK	45.55	36.93	9.39	39.56	2.12	54.43	73.9	19.4	150	0	-
Vert.	9748.000	PK	46.44	38.60	10.93	39.49	2.12	58.60	73.9	15.3	131	26	-
Vert.	4874.000	AV	49.31	31.51	7.63	39.72	2.12	50.85	53.9	3.0	183	227	-
Vert.	7311.000	AV	34.96	36.93	9.39	39.56	2.12	43.84	53.9	10.0	150	0	-
Vert.	9748.000	AV	37.43	38.60	10.93	39.49	2.12	49.59	53.9	4.3	131	26	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83\text{ m} / 3.0\text{ m}) = 2.12\text{ dB}$

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

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Radiated Spurious Emission

Report No.	13734674S-A-R2		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	1	3	3
Date	March 29, 2021	April 25, 2021	May 3, 2021
Temperature / Humidity	23 deg.C, 44 %RH	24 deg.C, 31 %RH	22 deg.C, 48 %RH
Engineer	Yohsuke Matsuzawa (1 GHz - 10 GHz)	Kenichi Adachi (10 GHz - 18 GHz)	Takahiro Suzuki (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	46.67	27.84	14.93	39.58	2.12	51.98	73.9	21.9	235	176	-
Hori.	4924.000	PK	49.76	31.57	7.68	39.71	2.12	51.42	73.9	22.4	196	214	-
Hori.	7386.000	PK	44.53	37.00	9.45	39.60	2.12	53.50	73.9	20.4	150	0	-
Hori.	9848.000	PK	46.82	38.71	10.94	39.37	2.12	59.22	73.9	14.6	117	313	-
Hori.	2483.500	AV	36.14	27.84	14.93	39.58	2.12	41.45	53.9	12.4	235	176	-
Hori.	4924.000	AV	45.59	31.57	7.68	39.71	2.12	47.25	53.9	6.6	196	214	-
Hori.	7386.000	AV	36.71	37.00	9.45	39.60	2.12	45.68	53.9	8.2	150	0	-
Hori.	9848.000	AV	36.96	38.71	10.94	39.37	2.12	49.36	53.9	4.5	117	313	-
Vert.	2483.500	PK	45.35	27.84	14.93	39.58	2.12	50.66	73.9	23.2	176	196	-
Vert.	3282.647	PK	53.99	28.46	6.73	39.56	2.12	51.74	73.9	22.1	163	223	-
Vert.	4924.000	PK	53.34	31.57	7.68	39.71	2.12	55.00	73.9	18.9	164	224	-
Vert.	7386.000	PK	44.52	37.00	9.45	39.60	2.12	53.49	73.9	20.4	150	0	-
Vert.	9848.000	PK	46.63	38.71	10.94	39.37	2.12	59.03	73.9	14.8	129	35	-
Vert.	2483.500	AV	36.63	27.84	14.93	39.58	2.12	41.94	53.9	11.9	176	196	-
Vert.	3282.647	AV	51.13	28.46	6.73	39.56	2.12	48.88	53.9	5.0	163	223	-
Vert.	4924.000	AV	50.12	31.57	7.68	39.71	2.12	51.78	53.9	2.1	164	224	-
Vert.	7386.000	AV	34.58	37.00	9.45	39.60	2.12	43.55	53.9	10.3	150	0	-
Vert.	9848.000	AV	36.96	38.71	10.94	39.37	2.12	49.36	53.9	4.5	129	35	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83 \text{ m} / 3.0 \text{ m}) = 2.12 \text{ dB}$

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

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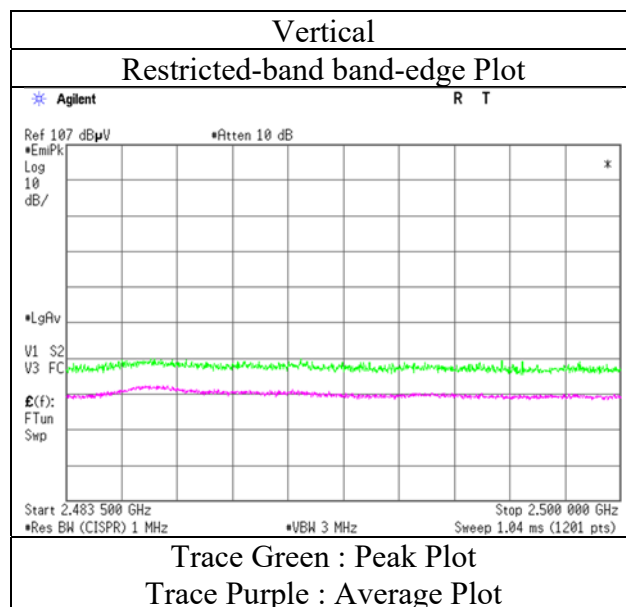
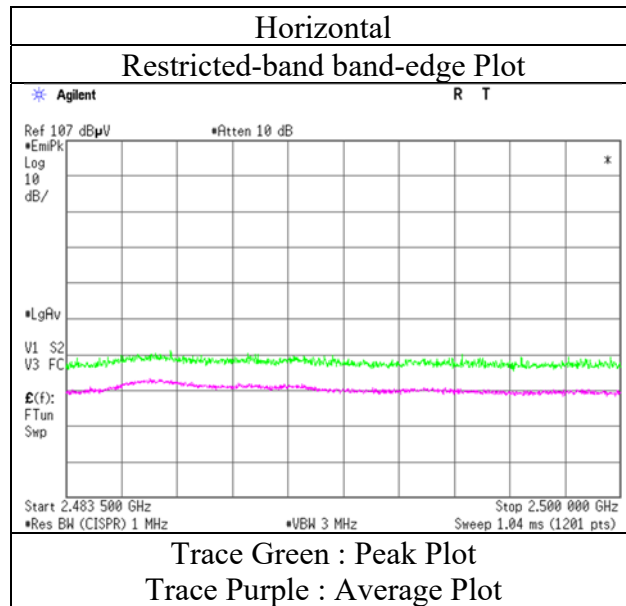
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13734674S-A-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	1
Date	March 29, 2021
Temperature / Humidity	23 deg.C, 44 %RH
Engineer	Yohsuke Matsuzawa
Mode	Tx 11b 2462 MHz



* 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. 13734674S-A-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 1
Date March 29, 2021
Temperature / Humidity 23 deg.C, 44 %RH
Engineer Yohsuke Matsuzawa
(1 GHz - 10 GHz)
Mode Tx 11g 2412 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	47.59	27.93	14.82	39.55	2.12	52.91	73.9	20.9	201	355	-
Hori.	4824.000	PK	44.29	31.49	7.60	39.73	2.12	45.77	73.9	28.1	221	166	-
Hori.	7236.000	PK	45.84	36.92	9.34	39.52	2.12	54.70	73.9	19.2	150	0	-
Hori.	9648.000	PK	46.16	38.33	10.93	39.61	2.12	57.93	73.9	15.9	150	0	-
Hori.	2390.000	AV	37.88	27.93	14.82	39.55	2.12	43.20	53.9	10.7	201	355	-
Hori.	4824.000	AV	36.56	31.49	7.60	39.73	2.12	38.04	53.9	15.8	221	166	-
Hori.	7236.000	AV	36.29	36.92	9.34	39.52	2.12	45.15	53.9	8.7	150	0	-
Hori.	9648.000	AV	37.73	38.33	10.93	39.61	2.12	49.50	53.9	4.4	150	0	-
Vert.	2390.000	PK	48.18	27.93	14.82	39.55	2.12	53.50	73.9	20.4	100	0	-
Vert.	4824.000	PK	48.61	31.49	7.60	39.73	2.12	50.09	73.9	23.8	154	150	-
Vert.	7236.000	PK	44.81	36.92	9.34	39.52	2.12	53.67	73.9	20.2	150	0	-
Vert.	9648.000	PK	46.20	38.33	10.93	39.61	2.12	57.97	73.9	15.9	133	33	-
Vert.	2390.000	AV	37.15	27.93	14.82	39.55	2.12	42.47	53.9	11.4	100	0	-
Vert.	4824.000	AV	38.81	31.49	7.60	39.73	2.12	40.29	53.9	13.6	154	150	-
Vert.	7236.000	AV	35.99	36.92	9.34	39.52	2.12	44.85	53.9	9.0	150	0	-
Vert.	9648.000	AV	37.37	38.33	10.93	39.61	2.12	49.14	53.9	4.7	133	33	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83 \text{ m} / 3.0 \text{ m}) = 2.12 \text{ dB}$

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

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	87.74	27.90	14.84	39.56	2.12	93.04	-	-	Carrier
Hori.	2400.000	PK	42.03	27.92	14.83	39.56	2.12	47.34	73.0	25.6	-
Vert.	2412.000	PK	88.85	27.90	14.84	39.56	2.12	94.15	-	-	Carrier
Vert.	2400.000	PK	42.81	27.92	14.83	39.56	2.12	48.12	74.1	25.9	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83 \text{ m} / 3.0 \text{ m}) = 2.12 \text{ dB}$

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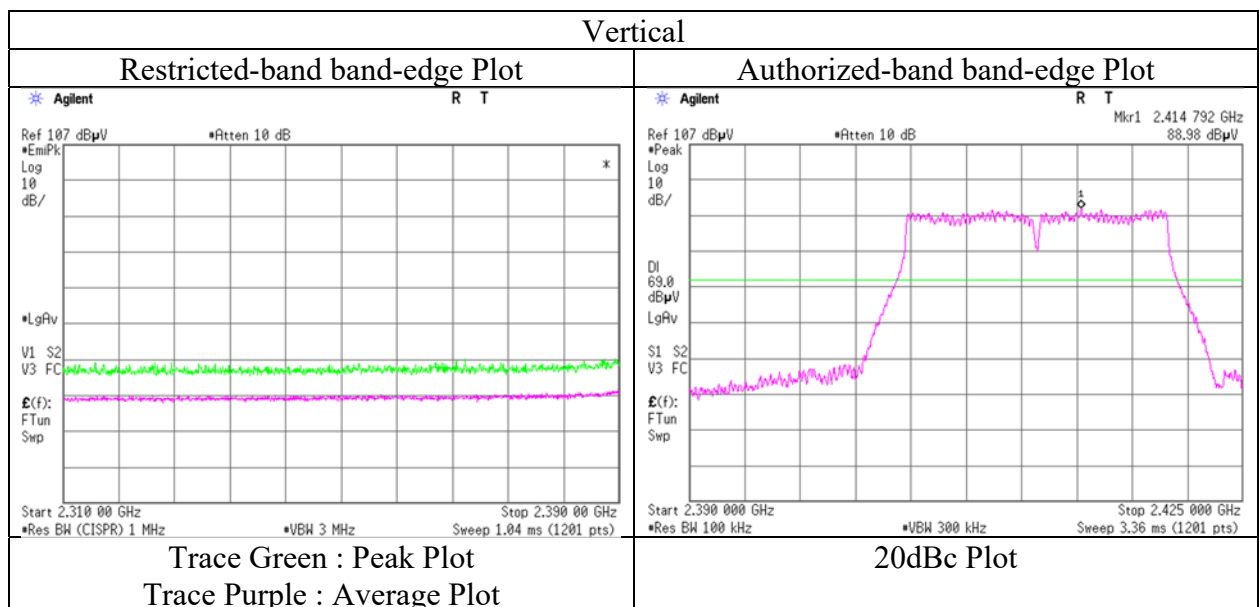
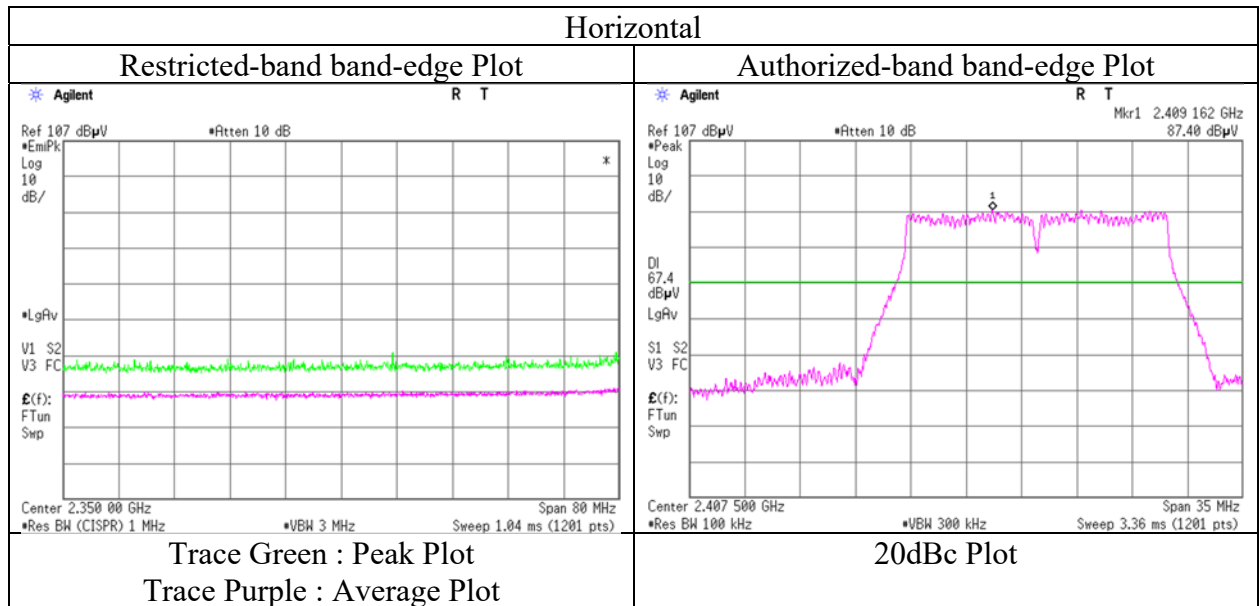
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13734674S-A-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	1
Date	March 29, 2021
Temperature / Humidity	23 deg.C, 44 %RH
Engineer	Yohsuke Matsuzawa
Mode	Tx 11g 2412 MHz



* 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. 13734674S-A-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 1
Date March 29, 2021
Temperature / Humidity 23 deg.C, 44 %RH
Engineer Yohsuke Matsuzawa
(1 GHz - 10 GHz)
Mode Tx 11g 2437 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4874.000	PK	45.49	31.51	7.63	39.72	2.12	47.03	73.9	26.8	207	0	-
Hori.	7311.000	PK	44.40	36.93	9.39	39.56	2.12	53.28	73.9	20.6	150	0	-
Hori.	9748.000	PK	44.81	38.60	10.93	39.49	2.12	56.97	73.9	16.9	154	177	-
Hori.	4874.000	AV	36.59	31.51	7.63	39.72	2.12	38.13	53.9	15.7	207	0	-
Hori.	7311.000	AV	36.27	36.93	9.39	39.56	2.12	45.15	53.9	8.7	150	0	-
Hori.	9748.000	AV	36.73	38.60	10.93	39.49	2.12	48.89	53.9	5.0	154	177	-
Vert.	4874.000	PK	44.24	31.51	7.63	39.72	2.12	45.78	73.9	28.1	221	0	-
Vert.	7311.000	PK	45.05	36.93	9.39	39.56	2.12	53.93	73.9	19.9	150	0	-
Vert.	9748.000	PK	45.81	38.60	10.93	39.49	2.12	57.97	73.9	15.9	133	23	-
Vert.	4874.000	AV	36.32	31.51	7.63	39.72	2.12	37.86	53.9	16.0	221	0	-
Vert.	7311.000	AV	36.29	36.93	9.39	39.56	2.12	45.17	53.9	8.7	150	0	-
Vert.	9748.000	AV	36.83	38.60	10.93	39.49	2.12	48.99	53.9	4.9	133	23	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83\text{ m} / 3.0\text{ m}) = 2.12\text{ dB}$

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

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Shonan EMC Lab.

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

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Radiated Spurious Emission

Report No. 13734674S-A-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 1
Date March 29, 2021
Temperature / Humidity 23 deg.C, 44 %RH
Engineer Yohsuke Matsuzawa
(1 GHz - 10 GHz)
Mode Tx 11g 2462 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	51.87	27.84	14.93	39.58	2.12	57.18	73.9	16.7	235	177	-
Hori.	4924.000	PK	46.72	31.57	7.68	39.71	2.12	48.38	73.9	25.5	189	221	-
Hori.	7386.000	PK	45.32	37.00	9.45	39.60	2.12	54.29	73.9	19.6	150	0	-
Hori.	9848.000	PK	45.82	38.71	10.94	39.37	2.12	58.22	73.9	15.6	144	0	-
Hori.	2483.500	AV	39.81	27.84	14.93	39.58	2.12	45.12	53.9	8.7	235	177	-
Hori.	4924.000	AV	35.93	31.57	7.68	39.71	2.12	37.59	53.9	16.3	189	221	-
Hori.	7386.000	AV	36.44	37.00	9.45	39.60	2.12	45.41	53.9	8.4	150	0	-
Hori.	9848.000	AV	36.18	38.71	10.94	39.37	2.12	48.58	53.9	5.3	144	0	-
Vert.	2483.500	PK	53.79	27.84	14.93	39.58	2.12	59.10	73.9	14.8	202	204	-
Vert.	3282.569	PK	56.42	28.46	6.73	39.56	2.12	54.17	73.9	19.7	100	0	-
Vert.	4924.000	PK	45.60	31.57	7.68	39.71	2.12	47.26	73.9	26.6	177	144	-
Vert.	7386.000	PK	44.44	37.00	9.45	39.60	2.12	53.41	73.9	20.4	150	0	-
Vert.	9848.000	PK	44.67	38.71	10.94	39.37	2.12	57.07	73.9	16.8	123	32	-
Vert.	2483.500	AV	42.35	27.84	14.93	39.58	2.12	47.66	53.9	6.2	202	204	-
Vert.	3282.569	AV	51.30	28.46	6.73	39.56	2.12	49.05	53.9	4.8	100	0	-
Vert.	4924.000	AV	37.63	31.57	7.68	39.71	2.12	39.29	53.9	14.6	177	144	-
Vert.	7386.000	AV	36.21	37.00	9.45	39.60	2.12	45.18	53.9	8.7	150	0	-
Vert.	9848.000	AV	36.34	38.71	10.94	39.37	2.12	48.74	53.9	5.1	123	32	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83 \text{ m} / 3.0 \text{ m}) = 2.12 \text{ dB}$

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

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Shonan EMC Lab.

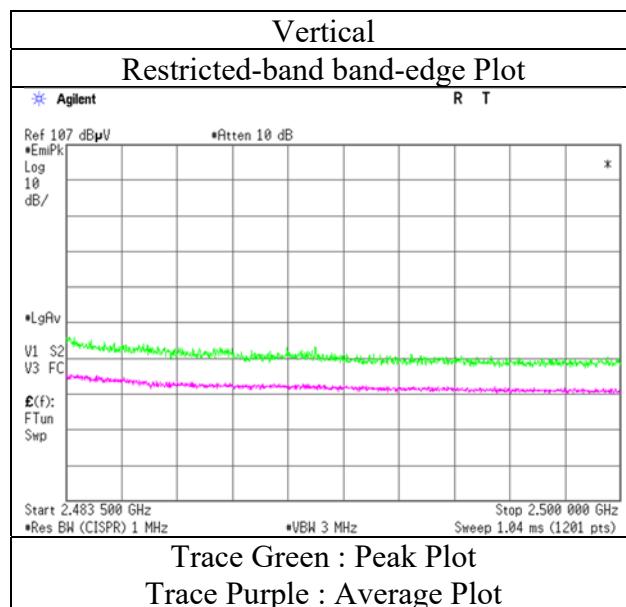
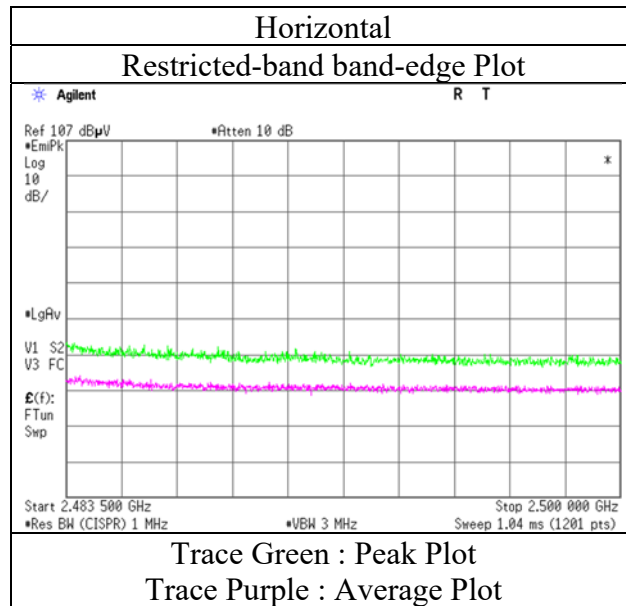
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13734674S-A-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	1
Date	March 29, 2021
Temperature / Humidity	23 deg.C, 44 %RH
Engineer	Yohsuke Matsuzawa
Mode	Tx 11g 2462 MHz



* 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. 13734674S-A-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 1 3 3
Date March 29, 2021 April 25, 2021 May 3, 2021
Temperature / Humidity 23 deg.C, 44 %RH 24 deg.C, 31 %RH 22 deg.C, 48 %RH
Engineer Yohsuke Matsuzawa Kenichi Adachi Takahiro Suzuki
(1 GHz - 10 GHz) (10 GHz - 18 GHz) (18 GHz - 26.5 GHz)
Mode Tx 11n-20 2412 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	52.94	27.93	14.82	39.55	2.12	58.26	73.9	15.6	233	203	-
Hori.	4824.000	PK	47.29	31.49	7.60	39.73	2.12	48.77	73.9	25.1	203	0	-
Hori.	7236.000	PK	46.38	36.92	9.34	39.52	2.12	55.24	73.9	18.6	150	0	-
Hori.	9648.000	PK	46.20	38.33	10.93	39.61	2.12	57.97	73.9	15.9	150	0	-
Hori.	2390.000	AV	39.75	27.93	14.82	39.55	2.12	45.07	53.9	8.8	233	203	-
Hori.	4824.000	AV	36.72	31.49	7.60	39.73	2.12	38.20	53.9	15.7	203	0	-
Hori.	7236.000	AV	36.37	36.92	9.34	39.52	2.12	45.23	53.9	8.6	150	0	-
Hori.	9648.000	AV	36.69	38.33	10.93	39.61	2.12	48.46	53.9	5.4	150	0	-
Vert.	2390.000	PK	51.57	27.93	14.82	39.55	2.12	56.89	73.9	17.0	202	199	-
Vert.	4824.000	PK	46.37	31.49	7.60	39.73	2.12	47.85	73.9	26.0	187	224	-
Vert.	7236.000	PK	44.92	36.92	9.34	39.52	2.12	53.78	73.9	20.1	150	0	-
Vert.	9648.000	PK	45.10	38.33	10.93	39.61	2.12	56.87	73.9	17.0	150	0	-
Vert.	2390.000	AV	39.77	27.93	14.82	39.55	2.12	45.09	53.9	8.8	202	199	-
Vert.	4824.000	AV	37.39	31.49	7.60	39.73	2.12	38.87	53.9	15.0	187	224	-
Vert.	7236.000	AV	36.29	36.92	9.34	39.52	2.12	45.15	53.9	8.7	150	0	-
Vert.	9648.000	AV	36.77	38.33	10.93	39.61	2.12	48.54	53.9	5.3	150	0	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83\text{ m} / 3.0\text{ m}) = 2.12\text{ dB}$

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

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	89.63	27.90	14.84	39.56	2.12	94.93	-	-	Carrier
Hori.	2400.000	PK	45.13	27.92	14.83	39.56	2.12	50.44	74.9	24.4	-
Vert.	2412.000	PK	88.26	27.90	14.84	39.56	2.12	93.56	-	-	Carrier
Vert.	2400.000	PK	44.99	27.92	14.83	39.56	2.12	50.30	73.5	23.2	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83\text{ m} / 3.0\text{ m}) = 2.12\text{ dB}$

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

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Shonan EMC Lab.

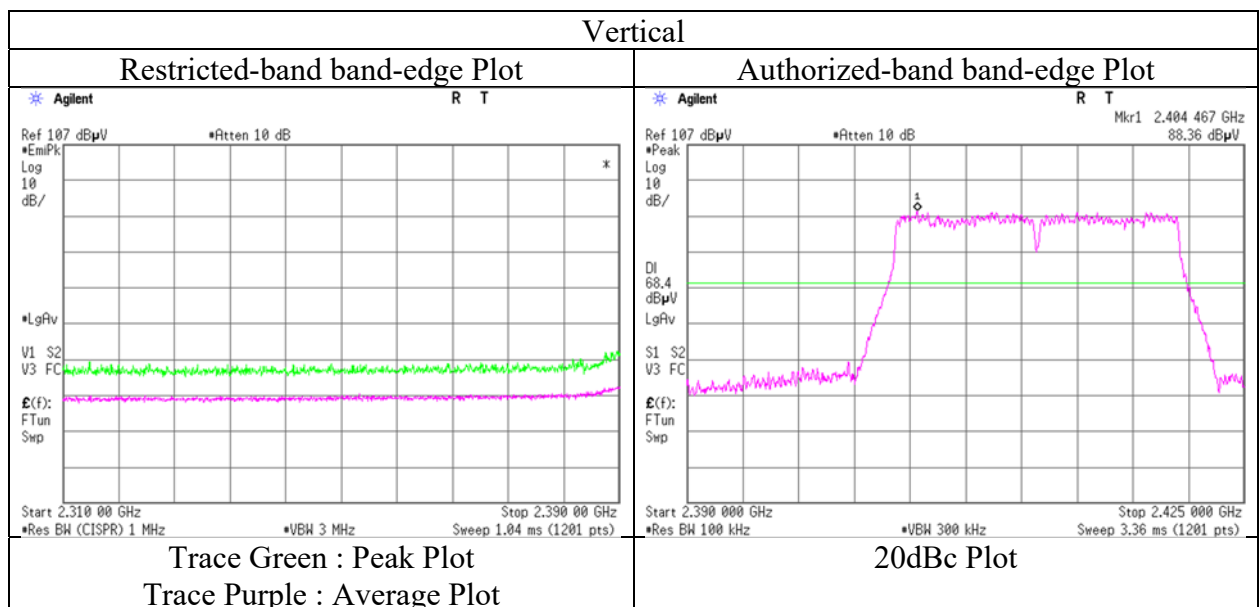
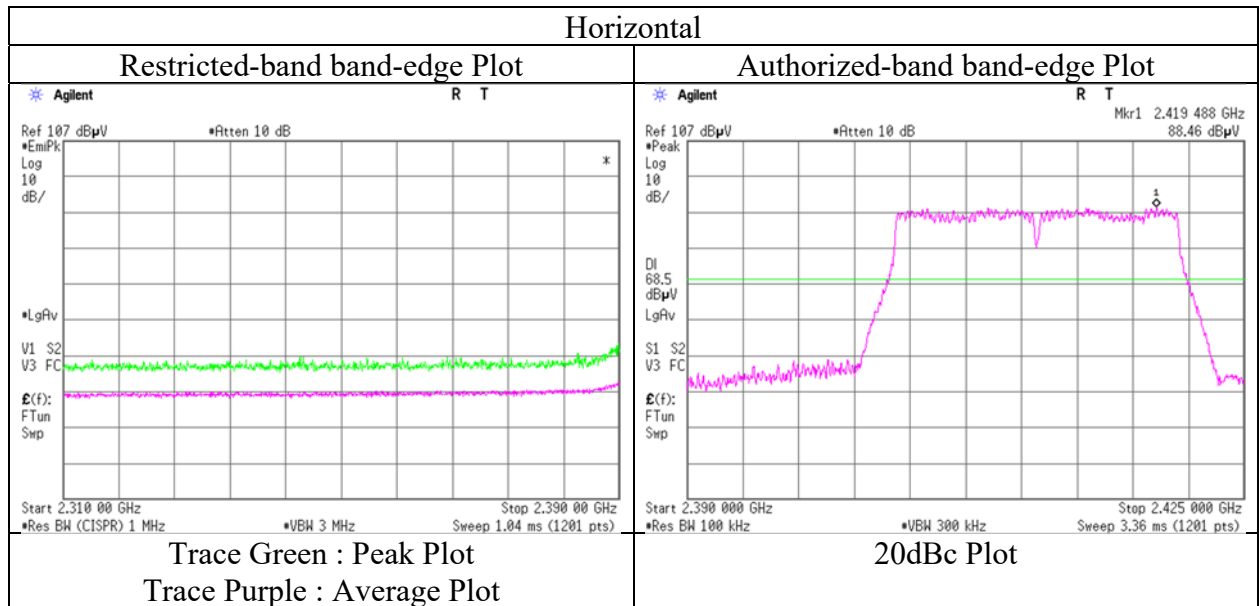
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13734674S-A-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	1
Date	March 29, 2021
Temperature / Humidity	23 deg.C, 44 %RH
Engineer	Yohsuke Matsuzawa
Mode	Tx 11n-20 2412 MHz



* 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.	13734674S-A-R2			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	3	1	3	3
Date	May 12, 2021	March 29, 2021	April 25, 2021	May 3, 2021
Temperature / Humidity	23 deg.C, 45 %RH	23 deg.C, 44 %RH	24 deg.C, 31 %RH	22 deg.C, 48 %RH
Engineer	Toshinori Yamada	Yohsuke Matsuzawa	Kenichi Adachi	Takahiro Suzuki
	(30 MHz - 1 GHz)	(1 GHz - 10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx 11n-20 2437 MHz			

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	203.098	QP	38.40	16.84	8.03	32.05	0.00	31.22	43.5	12.2	163	273	-
Hori.	250.497	QP	41.80	17.48	8.30	31.98	0.00	35.60	46.0	10.4	144	241	-
Hori.	304.620	QP	41.40	14.08	8.60	31.97	0.00	32.11	46.0	13.8	173	105	-
Hori.	368.667	QP	36.50	15.31	8.91	31.93	0.00	28.79	46.0	17.2	118	151	-
Hori.	609.239	QP	31.93	19.23	9.92	31.90	0.00	29.18	46.0	16.8	198	237	-
Hori.	4874.000	PK	46.69	31.51	7.63	39.72	2.12	48.23	73.9	25.6	229	355	-
Hori.	7311.000	PK	46.49	36.93	9.39	39.56	2.12	55.37	73.9	18.5	150	0	-
Hori.	9748.000	PK	45.36	38.60	10.93	39.49	2.12	57.52	73.9	16.3	150	0	-
Hori.	4874.000	AV	37.10	31.51	7.63	39.72	2.12	38.64	53.9	15.2	229	355	-
Hori.	7311.000	AV	36.78	36.93	9.39	39.56	2.12	45.66	53.9	8.2	150	0	-
Hori.	9748.000	AV	36.73	38.60	10.93	39.49	2.12	48.89	53.9	5.0	150	0	-
Vert.	61.981	QP	30.30	7.81	6.51	32.16	0.00	12.46	40.0	27.5	100	6	-
Vert.	128.583	QP	31.20	13.87	7.37	32.11	0.00	20.33	43.5	23.1	100	325	-
Vert.	283.410	QP	33.90	18.73	8.49	31.98	0.00	29.14	46.0	16.8	100	301	-
Vert.	368.690	QP	36.80	15.31	8.91	31.93	0.00	29.09	46.0	16.9	100	294	-
Vert.	609.239	QP	28.40	19.23	9.92	31.90	0.00	25.65	46.0	20.3	190	121	-
Vert.	4874.000	PK	46.29	31.51	7.63	39.72	2.12	47.83	73.9	26.0	201	167	-
Vert.	7311.000	PK	45.75	36.93	9.39	39.56	2.12	54.63	73.9	19.2	150	0	-
Vert.	9748.000	PK	46.30	38.60	10.93	39.49	2.12	58.46	73.9	15.4	150	0	-
Vert.	4874.000	AV	36.78	31.51	7.63	39.72	2.12	38.32	53.9	15.5	201	167	-
Vert.	7311.000	AV	36.76	36.93	9.39	39.56	2.12	45.64	53.9	8.2	150	0	-
Vert.	9748.000	AV	36.12	38.60	10.93	39.49	2.12	48.28	53.9	5.6	150	0	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83\text{ m} / 3.0\text{ m}) = 2.12\text{ dB}$

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

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Shonan EMC Lab.

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Radiated Spurious Emission

Report No.	13734674S-A-R2		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	1	3	3
Date	March 29, 2021	April 25, 2021	May 4, 2021
Temperature / Humidity	23 deg.C, 44 %RH	24 deg.C, 31 %RH	23 deg.C, 43 %RH
Engineer	Yohsuke Matsuzawa (1 GHz - 10 GHz)	Kenichi Adachi (10 GHz - 18 GHz)	Takahiro Suzuki (18 GHz - 26.5 GHz)
Mode	Tx 11n-20 2462 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	58.52	27.84	14.93	39.58	2.12	63.83	73.9	10.0	233	195	-
Hori.	4924.000	PK	46.06	31.57	7.68	39.71	2.12	47.72	73.9	26.1	177	209	-
Hori.	7386.000	PK	45.13	37.00	9.45	39.60	2.12	54.10	73.9	19.8	150	0	-
Hori.	9848.000	PK	45.05	38.71	10.94	39.37	2.12	57.45	73.9	16.4	150	0	-
Hori.	2483.500	AV	44.09	27.84	14.93	39.58	2.12	49.40	53.9	4.5	233	195	-
Hori.	4924.000	AV	35.13	31.57	7.68	39.71	2.12	36.79	53.9	17.1	177	209	-
Hori.	7386.000	AV	34.62	37.00	9.45	39.60	2.12	43.59	53.9	10.3	150	0	-
Hori.	9848.000	AV	35.38	38.71	10.94	39.37	2.12	47.78	53.9	6.1	150	0	-
Vert.	2483.500	PK	58.80	27.84	14.93	39.58	2.12	64.11	73.9	9.7	204	204	-
Vert.	3282.620	PK	55.94	28.46	6.73	39.56	2.12	53.69	73.9	20.2	224	208	-
Vert.	4924.000	PK	45.31	31.57	7.68	39.71	2.12	46.97	73.9	26.9	198	178	-
Vert.	7386.000	PK	44.87	37.00	9.45	39.60	2.12	53.84	73.9	20.0	150	0	-
Vert.	9848.000	PK	44.59	38.71	10.94	39.37	2.12	56.99	73.9	16.9	150	0	-
Vert.	2483.500	AV	44.59	27.84	14.93	39.58	2.12	49.90	53.9	4.0	204	204	-
Vert.	3282.620	AV	50.24	28.46	6.73	39.56	2.12	47.99	53.9	5.9	224	208	-
Vert.	4924.000	AV	35.19	31.57	7.68	39.71	2.12	36.85	53.9	17.0	198	178	-
Vert.	7386.000	AV	34.65	37.00	9.45	39.60	2.12	43.62	53.9	10.2	150	0	-
Vert.	9848.000	AV	34.65	38.71	10.94	39.37	2.12	47.05	53.9	6.8	150	0	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83 \text{ m} / 3.0 \text{ m}) = 2.12 \text{ dB}$

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

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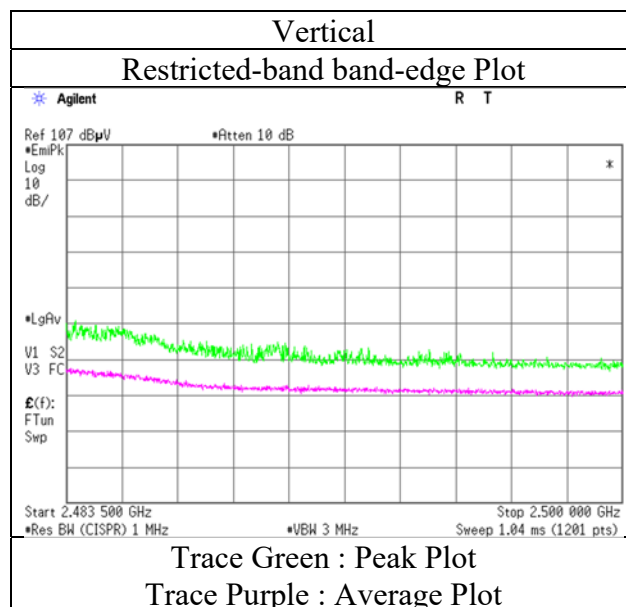
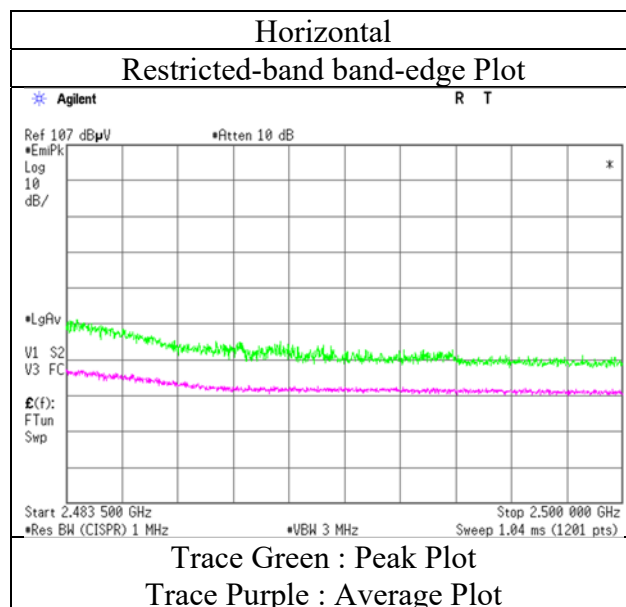
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13734674S-A-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	1
Date	March 29, 2021
Temperature / Humidity	23 deg.C, 44 %RH
Engineer	Yohsuke Matsuzawa
Mode	Tx 11n-20 2462 MHz



* 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.

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Radiated Spurious Emission

Report No.	13734674S-A-R2		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	2	3	3
Date	April 11, 2021	April 25, 2021	May 4, 2021
Temperature / Humidity	23 deg.C, 34 %RH	24 deg.C, 31 %RH	23 deg.C, 43 %RH
Engineer	Kenichi Adachi	Kenichi Adachi	Takahiro Suzuki
	(1 GHz - 10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx 11n-40 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.	2390.000	PK	51.25	28.56	14.24	38.68	2.12	57.49	73.9	16.4	168	273	-
Hori.	3229.297	PK	46.26	29.20	6.08	38.31	2.12	45.35	73.9	28.5	218	94	-
Hori.	4844.000	PK	44.78	31.58	6.82	38.54	2.12	46.76	73.9	27.1	134	292	-
Hori.	7266.000	PK	44.68	37.66	8.31	39.21	2.12	53.56	73.9	20.3	146	264	-
Hori.	9688.000	PK	46.05	38.94	9.52	39.65	2.12	56.98	73.9	16.9	119	307	-
Hori.	2390.000	AV	40.16	28.56	14.24	38.68	2.12	46.40	53.9	7.5	168	273	-
Hori.	3229.297	AV	37.59	29.20	6.08	38.31	2.12	36.68	53.9	17.2	218	94	-
Hori.	4844.000	AV	35.03	31.58	6.82	38.54	2.12	37.01	53.9	16.8	134	292	-
Hori.	7266.000	AV	34.82	37.66	8.31	39.21	2.12	43.70	53.9	10.2	146	264	-
Hori.	9688.000	AV	36.64	38.94	9.52	39.65	2.12	47.57	53.9	6.3	119	307	-
Vert.	2390.000	PK	48.87	28.56	14.24	38.68	2.12	55.11	73.9	18.7	185	31	-
Vert.	3229.297	PK	49.98	29.20	6.08	38.31	2.12	49.07	73.9	24.8	121	89	-
Vert.	4844.000	PK	45.76	31.58	6.82	38.54	2.12	47.74	73.9	26.1	135	90	-
Vert.	7266.000	PK	45.29	37.66	8.31	39.21	2.12	54.17	73.9	19.7	105	21	-
Vert.	9688.000	PK	46.76	38.94	9.52	39.65	2.12	57.69	73.9	16.2	106	295	-
Vert.	2390.000	AV	38.64	28.56	14.24	38.68	2.12	44.88	53.9	9.0	185	31	-
Vert.	3229.297	AV	42.84	29.20	6.08	38.31	2.12	41.93	53.9	11.9	121	89	-
Vert.	4844.000	AV	36.17	31.58	6.82	38.54	2.12	38.15	53.9	15.7	135	90	-
Vert.	7266.000	AV	35.48	37.66	8.31	39.21	2.12	44.36	53.9	9.5	105	21	-
Vert.	9688.000	AV	37.41	38.94	9.52	39.65	2.12	48.34	53.9	5.5	106	295	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83\text{ m} / 3.0\text{ m}) = 2.12\text{ dB}$

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

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2422.000	PK	85.08	28.50	14.27	38.66	2.12	91.31	-	-	Carrier
Hori.	2400.000	PK	43.52	28.54	14.25	38.67	2.12	49.76	71.3	21.5	-
Vert.	2422.000	PK	82.98	28.50	14.27	38.66	2.12	89.21	-	-	Carrier
Vert.	2400.000	PK	41.76	28.54	14.25	38.67	2.12	48.00	69.2	21.2	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83\text{ m} / 3.0\text{ m}) = 2.12\text{ dB}$

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

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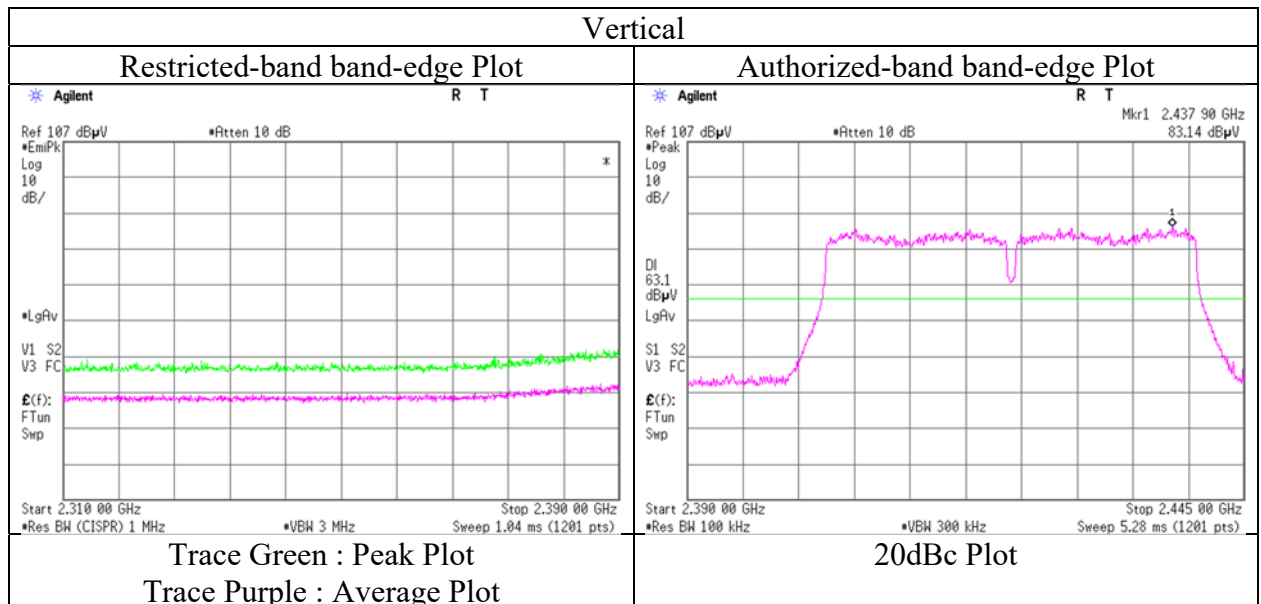
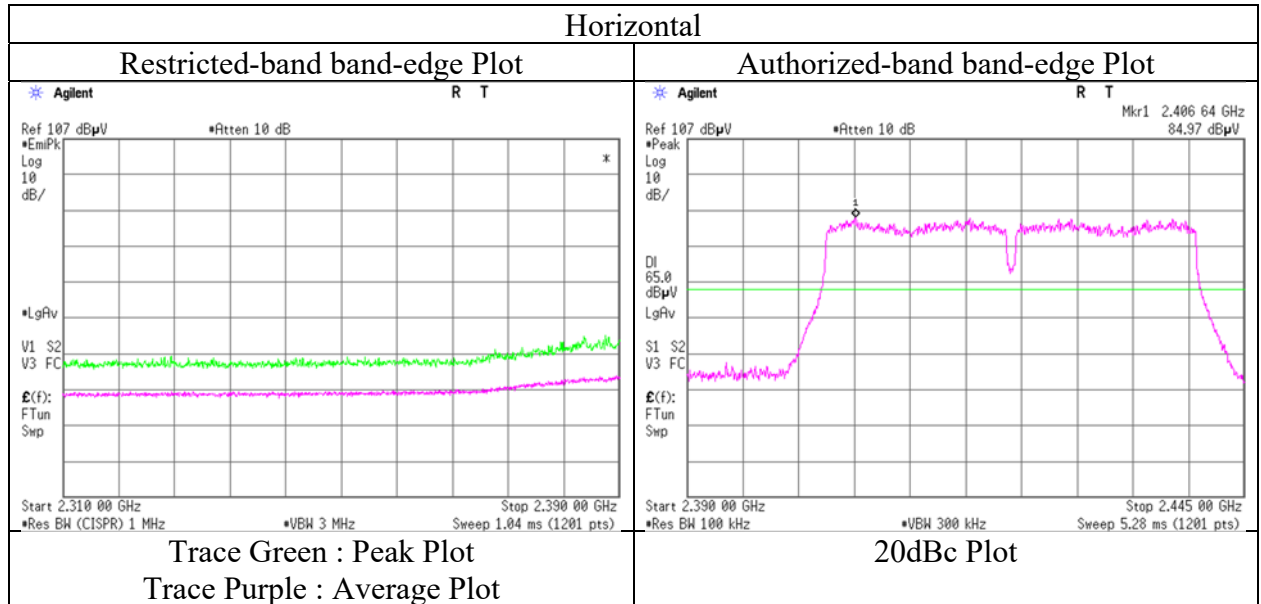
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13734674S-A-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	April 11, 2021
Temperature / Humidity	23 deg.C, 34 %RH
Engineer	Kenichi Adachi
Mode	Tx 11n-40 2422 MHz



* 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.

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Radiated Spurious Emission

Report No.	13734674S-A-R2		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	2	3	3
Date	April 11, 2021	April 25, 2021	May 4, 2021
Temperature / Humidity	23 deg.C, 34 %RH	24 deg.C, 31 %RH	23 deg.C, 43 %RH
Engineer	Kenichi Adachi	Kenichi Adachi	Takahiro Suzuki
	(1 GHz - 10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx 11n-40 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.	3249.286	PK	46.12	29.11	6.08	38.30	2.12	45.13	73.9	28.7	221	92	-
Hori.	4874.000	PK	44.58	31.58	6.84	38.54	2.12	46.58	73.9	27.3	133	291	-
Hori.	7311.000	PK	46.32	37.71	8.33	39.27	2.12	55.21	73.9	18.6	147	263	-
Hori.	9748.000	PK	46.76	39.09	9.54	39.62	2.12	57.89	73.9	16.0	122	307	-
Hori.	3249.286	AV	37.28	29.11	6.08	38.30	2.12	36.29	53.9	17.6	221	92	-
Hori.	4874.000	AV	34.89	31.58	6.84	38.54	2.12	36.89	53.9	17.0	133	291	-
Hori.	7311.000	AV	35.48	37.71	8.33	39.27	2.12	44.37	53.9	9.5	147	263	-
Hori.	9748.000	AV	37.42	39.09	9.54	39.62	2.12	48.55	53.9	5.3	122	307	-
Vert.	3249.286	PK	49.72	29.11	6.08	38.30	2.12	48.73	73.9	25.1	119	91	-
Vert.	4874.000	PK	45.42	31.58	6.84	38.54	2.12	47.42	73.9	26.4	134	90	-
Vert.	7311.000	PK	46.55	37.71	8.33	39.27	2.12	55.44	73.9	18.4	104	24	-
Vert.	9748.000	PK	46.94	39.09	9.54	39.62	2.12	58.07	73.9	15.8	107	293	-
Vert.	3249.286	AV	42.68	29.11	6.08	38.30	2.12	41.69	53.9	12.2	119	91	-
Vert.	4874.000	AV	35.88	31.58	6.84	38.54	2.12	37.88	53.9	16.0	134	90	-
Vert.	7311.000	AV	35.74	37.71	8.33	39.27	2.12	44.63	53.9	9.2	104	24	-
Vert.	9748.000	AV	37.62	39.09	9.54	39.62	2.12	48.75	53.9	5.1	107	293	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83\text{ m} / 3.0\text{ m}) = 2.12\text{ dB}$

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

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Radiated Spurious Emission

Report No.	13734674S-A-R2		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	2	3	3
Date	April 11, 2021	April 25, 2021	May 4, 2021
Temperature / Humidity	23 deg.C, 34 %RH	24 deg.C, 31 %RH	23 deg.C, 43 %RH
Engineer	Kenichi Adachi (1 GHz - 10 GHz)	Kenichi Adachi (10 GHz - 18 GHz)	Takahiro Suzuki (18 GHz - 26.5 GHz)
Mode	Tx 11n-40 2452 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	50.08	28.40	14.34	38.62	2.12	56.32	73.9	17.5	166	274	-
Hori.	3269.286	PK	45.78	29.02	6.08	38.29	2.12	44.71	73.9	29.1	216	88	-
Hori.	4904.000	PK	45.88	31.59	6.86	38.54	2.12	47.91	73.9	25.9	131	292	-
Hori.	7356.000	PK	45.85	37.77	8.37	39.33	2.12	54.78	73.9	19.1	144	265	-
Hori.	9808.000	PK	47.22	39.21	9.58	39.58	2.12	58.55	73.9	15.3	113	303	-
Hori.	2483.500	AV	40.24	28.40	14.34	38.62	2.12	46.48	53.9	7.4	166	274	-
Hori.	3269.286	AV	37.08	29.02	6.08	38.29	2.12	36.01	53.9	17.8	216	88	-
Hori.	4904.000	AV	36.14	31.59	6.86	38.54	2.12	38.17	53.9	15.7	131	292	-
Hori.	7356.000	AV	36.04	37.77	8.37	39.33	2.12	44.97	53.9	8.9	144	265	-
Hori.	9808.000	AV	37.06	39.21	9.58	39.58	2.12	48.39	53.9	5.5	113	303	-
Vert.	2483.500	PK	49.69	28.40	14.34	38.62	2.12	55.93	73.9	17.9	184	29	-
Vert.	3269.286	PK	49.48	29.02	6.08	38.29	2.12	48.41	73.9	25.4	120	87	-
Vert.	4904.000	PK	46.92	31.59	6.86	38.54	2.12	48.95	73.9	24.9	134	92	-
Vert.	7356.000	PK	46.09	37.77	8.37	39.33	2.12	55.02	73.9	18.8	104	18	-
Vert.	9808.000	PK	47.48	39.21	9.58	39.58	2.12	58.81	73.9	15.0	105	296	-
Vert.	2483.500	AV	39.88	28.40	14.34	38.62	2.12	46.12	53.9	7.7	184	29	-
Vert.	3269.286	AV	42.32	29.02	6.08	38.29	2.12	41.25	53.9	12.6	120	87	-
Vert.	4904.000	AV	37.22	31.59	6.86	38.54	2.12	39.25	53.9	14.6	134	92	-
Vert.	7356.000	AV	36.24	37.77	8.37	39.33	2.12	45.17	53.9	8.7	104	18	-
Vert.	9808.000	AV	37.34	39.21	9.58	39.58	2.12	48.67	53.9	5.2	105	296	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83\text{ m} / 3.0\text{ m}) = 2.12\text{ dB}$

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

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Shonan EMC Lab.

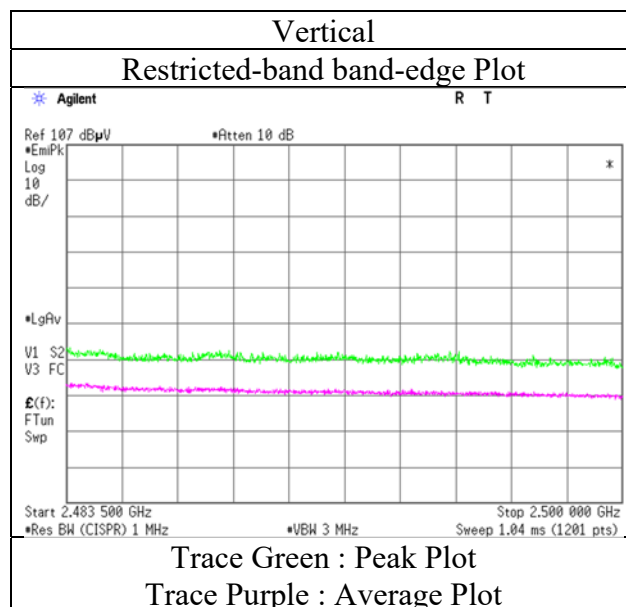
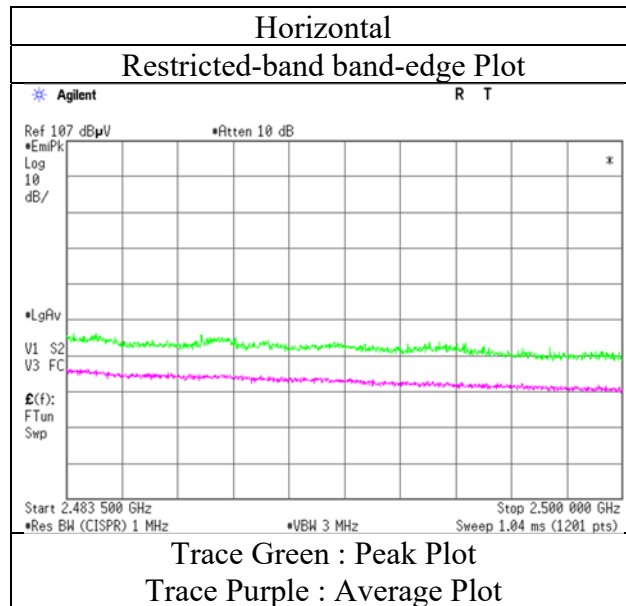
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13734674S-A-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	April 11, 2021
Temperature / Humidity	23 deg.C, 34 %RH
Engineer	Kenichi Adachi
Mode	Tx 11n-40 2452 MHz



* 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. 13734674S-A-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 3 2 3 3 3
Date May 13, 2021 April 11, 2021 May 10, 2021 May 9, 2021 May 8, 2021
Temperature / Humidity 23 deg.C, 40 %RH 23 deg.C, 34 %RH 23 deg.C, 40 %RH 23 deg.C, 47 %RH 23 deg.C, 51 %RH
Engineer Toshinori Yamada Kenichi Adachi Yosuke Murakami Yasumasa Owaki Yasumasa Owaki
(30 MHz - 1 GHz) (1 GHz -2.8 GHz) (2.8 GHz - 10 GHz) (10 GHz - 18 GHz) (18 GHz - 26.5 GHz)
Mode Tx BT LE 1 M-PHY 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.	195.996	QP	36.70	16.64	7.83	32.05	0.00	29.12	43.5	14.3	161	280	-
Hori.	257.704	QP	40.70	17.56	8.34	31.98	0.00	34.62	46.0	11.3	135	137	-
Hori.	331.817	QP	38.90	14.25	8.74	31.94	0.00	29.95	46.0	16.0	100	197	-
Hori.	2390.000	PK	44.58	28.56	14.24	38.68	2.12	50.82	73.9	23.0	123	89	-
Hori.	4804.000	PK	53.41	31.60	7.01	42.89	2.12	51.25	73.9	22.6	311	131	-
Hori.	7206.000	PK	48.28	37.60	8.58	43.39	2.12	53.19	73.9	20.7	150	0	Floor Noise
Hori.	9608.000	PK	50.47	38.92	9.75	43.18	2.12	58.08	73.9	15.8	150	0	Floor Noise
Hori.	7206.000	AV	39.67	37.60	8.58	43.39	2.12	44.58	53.9	9.3	150	0	Floor Noise
Hori.	9608.000	AV	40.48	38.92	9.75	43.18	2.12	48.09	53.9	5.8	150	0	Floor Noise
Vert.	80.386	QP	34.30	6.54	7.56	32.15	0.00	16.25	40.0	23.7	133	165	-
Vert.	134.115	QP	32.70	14.20	7.47	32.10	0.00	22.27	43.5	21.2	100	7	-
Vert.	155.689	QP	32.20	15.15	7.84	32.09	0.00	23.10	43.5	20.4	100	18	-
Vert.	215.350	QP	33.00	16.85	8.10	32.03	0.00	25.92	43.5	17.5	132	210	-
Vert.	331.822	QP	36.30	14.25	8.74	31.94	0.00	27.35	46.0	18.6	100	272	-
Vert.	378.877	QP	28.50	15.66	8.96	31.93	0.00	21.19	46.0	24.8	141	309	-
Vert.	2390.000	PK	44.64	28.56	14.24	38.68	2.12	50.88	73.9	23.0	254	276	-
Vert.	4804.000	PK	52.20	31.60	7.01	42.89	2.12	50.04	73.9	23.8	163	329	-
Vert.	7206.000	PK	49.20	37.60	8.58	43.39	2.12	54.11	73.9	19.7	150	0	Floor Noise
Vert.	9608.000	PK	49.38	38.92	9.75	43.18	2.12	56.99	73.9	16.9	150	0	Floor Noise
Vert.	7206.000	AV	39.58	37.60	8.58	43.39	2.12	44.49	53.9	9.4	150	0	Floor Noise
Vert.	9608.000	AV	40.36	38.92	9.75	43.18	2.12	47.97	53.9	5.9	150	0	Floor Noise

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

Distance factor : 1 GHz - 10 GHz : 20log (3.83 m / 3.0 m) = 2.12 dB

10 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	35.58	28.56	14.24	38.68	3.89	2.12	45.71	53.9	8.1	*1)
Hori.	4804.000	AV	45.54	31.60	7.01	42.89	3.89	2.12	47.27	53.9	6.6	-
Vert.	2390.000	AV	35.78	28.56	14.24	38.68	3.89	2.12	45.91	53.9	7.9	*1)
Vert.	4804.000	AV	43.96	31.60	7.01	42.89	3.89	2.12	45.69	53.9	8.2	-

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

Distance factor : 1 GHz - 10 GHz : 20log (3.83 m / 3.0 m) = 2.12 dB

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

Duty factor refer to "Burst rate confirmation" 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	89.10	28.54	14.26	38.67	2.12	95.35	-	-	Carrier
Hori.	2400.000	PK	39.14	28.54	14.25	38.67	2.12	45.38	75.3	29.9	-
Vert.	2402.000	PK	89.62	28.54	14.26	38.67	2.12	95.87	-	-	Carrier
Vert.	2400.000	PK	39.46	28.54	14.25	38.67	2.12	45.70	75.8	30.1	-

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

Distance factor : 1 GHz - 10 GHz : 20log (3.83 m / 3.0 m) = 2.12 dB

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

UL Japan, Inc.

Shonan EMC Lab.

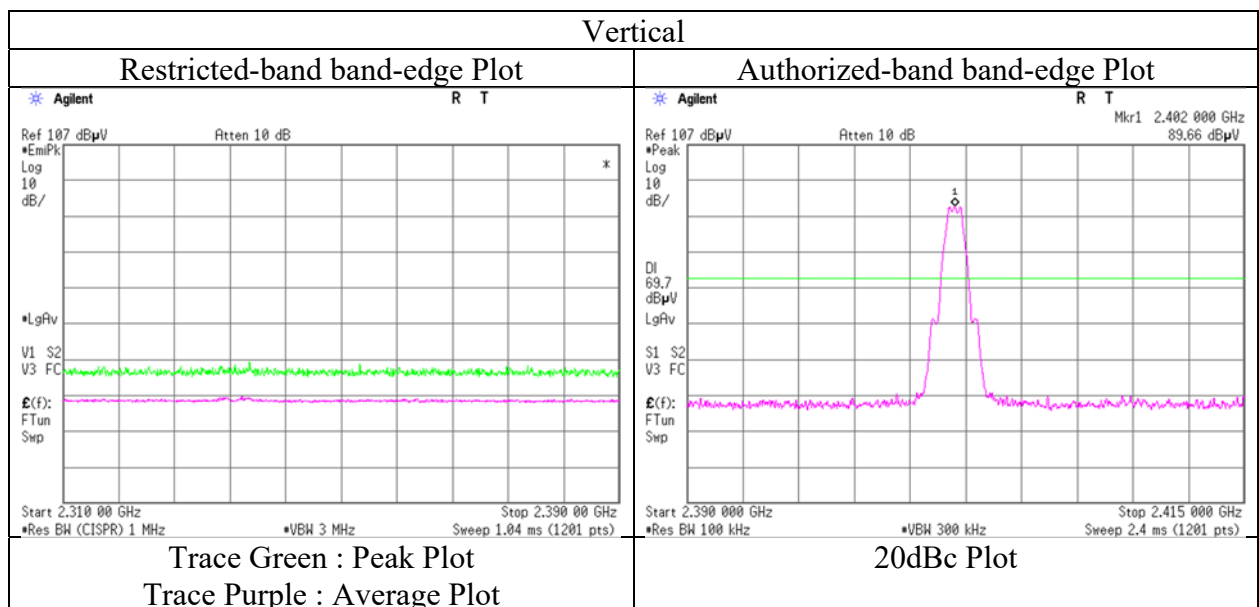
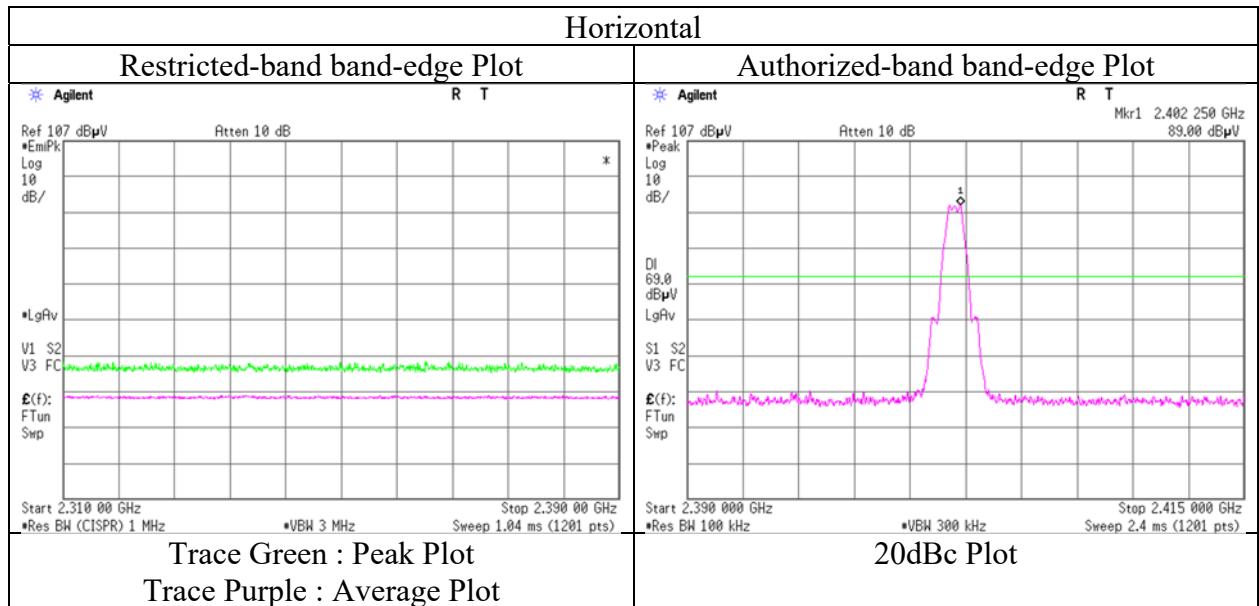
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13734674S-A-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	April 11, 2021
Temperature / Humidity	23 deg.C, 34 %RH
Engineer	Kenichi Adachi
Mode	Tx BT LE 1 M-PHY 2402 MHz



* 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.

UL Japan, Inc.

Shonan EMC Lab.

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission

Report No. 13734674S-A-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 3 2 3 3 3
Date May 13, 2021 April 11, 2021 May 10, 2021 May 9, 2021 May 8, 2021
Temperature / Humidity 23 deg.C, 40 %RH 23 deg.C, 34 %RH 23 deg.C, 40 %RH 23 deg.C, 47 %RH 23 deg.C, 51 %RH
Engineer Toshinori Yamada Kenichi Adachi Yosuke Murakami Yasumasa Owaki Yasumasa Owaki
(30 MHz - 1 GHz) (1 GHz -2.8 GHz) (2.8 GHz - 10 GHz) (10 GHz - 18 GHz) (18 GHz - 26.5 GHz)
Mode Tx BT LE 1 M-PHY 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.	196.164	QP	36.50	16.65	7.83	32.05	0.00	28.93	43.5	14.5	167	284	-
Hori.	256.000	QP	40.90	17.56	8.33	31.98	0.00	34.81	46.0	11.1	135	142	-
Hori.	331.767	QP	37.60	14.25	8.74	31.94	0.00	28.65	46.0	17.3	100	198	-
Hori.	4880.000	PK	52.34	31.63	7.06	42.89	2.12	50.26	73.9	23.6	265	141	-
Hori.	7320.000	PK	48.47	37.71	8.66	43.52	2.12	53.44	73.9	20.4	150	0	Floor Noise
Hori.	9760.000	PK	48.43	39.19	9.83	42.98	2.12	56.59	73.9	17.3	150	0	Floor Noise
Hori.	7320.000	AV	38.70	37.71	8.66	43.52	2.12	43.67	53.9	10.2	150	0	Floor Noise
Hori.	9760.000	AV	39.03	39.19	9.83	42.98	2.12	47.19	53.9	6.7	150	0	Floor Noise
Vert.	80.378	QP	32.00	6.54	7.56	32.15	0.00	13.95	40.0	26.0	134	175	-
Vert.	134.227	QP	33.40	14.20	7.47	32.10	0.00	22.97	43.5	20.5	100	7	-
Vert.	161.325	QP	31.50	15.43	7.85	32.08	0.00	22.70	43.5	20.8	100	355	-
Vert.	215.376	QP	32.80	16.85	8.10	32.03	0.00	25.72	43.5	17.7	123	225	-
Vert.	331.767	QP	35.70	14.25	8.74	31.94	0.00	26.75	46.0	19.2	100	258	-
Vert.	371.479	QP	27.50	15.41	8.92	31.93	0.00	19.90	46.0	26.1	167	288	-
Vert.	4880.000	PK	50.21	31.63	7.06	42.89	2.12	48.13	73.9	25.7	186	332	-
Vert.	7320.000	PK	47.74	37.71	8.66	43.52	2.12	52.71	73.9	21.1	150	0	Floor Noise
Vert.	9760.000	PK	48.32	39.19	9.83	42.98	2.12	56.48	73.9	17.4	150	0	Floor Noise
Vert.	7320.000	AV	38.79	37.71	8.66	43.52	2.12	43.76	53.9	10.1	150	0	Floor Noise
Vert.	9760.000	AV	39.16	39.19	9.83	42.98	2.12	47.32	53.9	6.5	150	0	Floor Noise

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83 \text{ m} / 3.0 \text{ m}) = 2.12 \text{ dB}$

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

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4880.000	AV	43.91	31.63	7.06	42.89	3.89	2.12	45.72	53.9	8.1	-
Vert.	4880.000	AV	40.88	31.63	7.06	42.89	3.89	2.12	42.69	53.9	11.2	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83 \text{ m} / 3.0 \text{ m}) = 2.12 \text{ dB}$

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

Duty factor refer to "Burst rate confirmation" sheet.

Radiated Spurious Emission

Report No. 13734674S-A-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 3 2 3 3 3
Date May 13, 2021 April 11, 2021 May 10, 2021 May 9, 2021 May 8, 2021
Temperature / Humidity 23 deg.C, 40 %RH 23 deg.C, 34 %RH 23 deg.C, 40 %RH 23 deg.C, 47 %RH 23 deg.C, 51 %RH
Engineer Toshinori Yamada Kenichi Adachi Yosuke Murakami Yasumasa Owaki Yasumasa Owaki
(30 MHz - 1 GHz) (1 GHz -2.8 GHz) (2.8 GHz - 10 GHz) (10 GHz - 18 GHz) (18 GHz - 26.5 GHz)
Mode Tx BT LE 1 M-PHY 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.	196.151	QP	36.60	16.65	7.83	32.05	0.00	29.03	43.5	14.4	165	280	-
Hori.	255.960	QP	40.90	17.57	8.33	31.98	0.00	34.82	46.0	11.1	134	161	-
Hori.	331.845	QP	38.20	14.25	8.74	31.94	0.00	29.25	46.0	16.7	100	201	-
Hori.	2483.500	PK	47.14	28.40	14.34	38.62	2.12	53.38	73.9	20.5	126	88	-
Hori.	4960.000	PK	51.52	31.79	7.13	42.89	2.12	49.67	73.9	24.2	256	140	-
Hori.	7440.000	PK	47.48	37.88	8.73	43.65	2.12	52.56	73.9	21.3	150	0	Floor Noise
Hori.	9920.000	PK	46.67	39.05	9.91	42.77	2.12	54.98	73.9	18.9	150	0	Floor Noise
Hori.	7440.000	AV	38.71	37.88	8.73	43.65	2.12	43.79	53.9	10.1	150	0	Floor Noise
Hori.	9920.000	AV	37.71	39.05	9.91	42.77	2.12	46.02	53.9	7.8	150	0	Floor Noise
Vert.	80.389	QP	33.20	6.54	7.56	32.15	0.00	15.15	40.0	24.8	132	182	-
Vert.	134.223	QP	33.40	14.20	7.47	32.10	0.00	22.97	43.5	20.5	100	4	-
Vert.	163.244	QP	31.70	15.50	7.87	32.08	0.00	22.99	43.5	20.5	100	10	-
Vert.	215.364	QP	32.80	16.85	8.10	32.03	0.00	25.72	43.5	17.7	135	206	-
Vert.	331.818	QP	36.10	14.25	8.74	31.94	0.00	27.15	46.0	18.8	100	268	-
Vert.	371.241	QP	27.70	15.40	8.92	31.93	0.00	20.09	46.0	25.9	145	291	-
Vert.	2483.500	PK	47.65	28.40	14.34	38.62	2.12	53.89	73.9	20.0	252	274	-
Vert.	4960.000	PK	51.57	31.79	7.13	42.89	2.12	49.72	73.9	24.1	201	276	-
Vert.	7440.000	PK	48.56	37.88	8.73	43.65	2.12	53.64	73.9	20.2	150	0	Floor Noise
Vert.	9920.000	PK	47.96	39.05	9.91	42.77	2.12	56.27	73.9	17.6	150	0	Floor Noise
Vert.	7440.000	AV	39.04	37.88	8.73	43.65	2.12	44.12	53.9	9.7	150	0	Floor Noise
Vert.	9920.000	AV	37.88	39.05	9.91	42.77	2.12	46.19	53.9	7.7	150	0	Floor Noise

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83\text{ m} / 3.0\text{ m}) = 2.12\text{ dB}$

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

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	35.02	28.40	14.34	38.62	3.89	2.12	45.15	53.9	8.7	*1)
Hori.	4960.000	AV	42.26	31.79	7.13	42.89	3.89	2.12	44.30	53.9	9.6	-
Vert.	2483.500	AV	35.29	28.40	14.34	38.62	3.89	2.12	45.42	53.9	8.4	*1)
Vert.	4960.000	AV	40.94	31.79	7.13	42.89	3.89	2.12	42.98	53.9	10.9	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83\text{ m} / 3.0\text{ m}) = 2.12\text{ dB}$

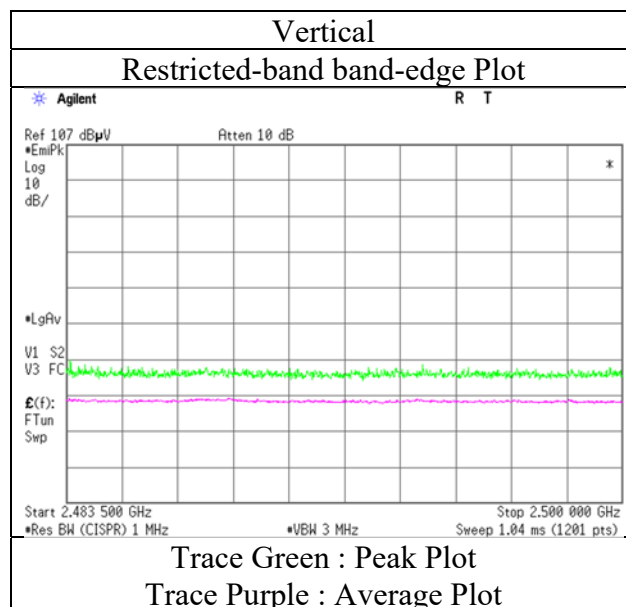
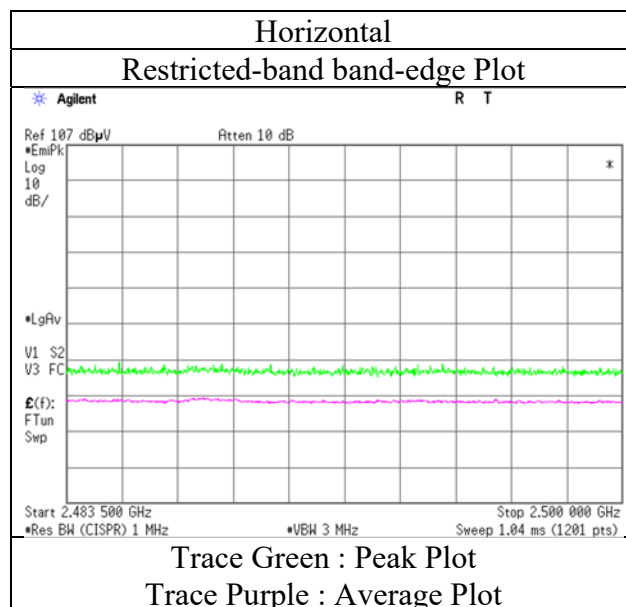
10 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Duty factor refer to "Burst rate confirmation" sheet.

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

Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13734674S-A-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	April 11, 2021
Temperature / Humidity	23 deg.C, 34 %RH
Engineer	Kenichi Adachi
Mode	Tx BT LE 1 M-PHY 2480 MHz



* 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. 13734674S-A-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 3 2 3 3 3
Date May 13, 2021 April 11, 2021 May 10, 2021 May 9, 2021 May 8, 2021
Temperature / Humidity 23 deg.C, 40 %RH 23 deg.C, 34 %RH 23 deg.C, 40 %RH 23 deg.C, 47 %RH 23 deg.C, 51 %RH
Engineer Toshinori Yamada Kenichi Adachi Yosuke Murakami Yasumasa Owaki Yasumasa Owaki
(30 MHz - 1 GHz) (1 GHz -2.8 GHz) (2.8 GHz - 10 GHz) (10 GHz - 18 GHz) (18 GHz - 26.5 GHz)
Mode Tx BT LE 2 M-PHY 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.	196.196	QP	36.50	16.65	7.83	32.05	0.00	28.93	43.5	14.5	166	280	-
Hori.	259.066	QP	41.30	17.61	8.35	31.98	0.00	35.28	46.0	10.7	132	145	-
Hori.	331.695	QP	36.80	14.25	8.74	31.94	0.00	27.85	46.0	18.1	100	21	-
Hori.	2378.561	PK	47.46	28.59	14.23	38.69	2.12	53.71	73.9	20.1	128	88	-
Hori.	2390.000	PK	44.87	28.56	14.24	38.68	2.12	51.11	73.9	22.7	128	88	-
Hori.	4804.000	PK	54.07	31.60	7.01	42.89	2.12	51.91	73.9	21.9	222	139	-
Hori.	7206.000	PK	48.89	37.60	8.58	43.39	2.12	53.80	73.9	20.1	150	0	Floor Noise
Hori.	9608.000	PK	49.35	38.92	9.75	43.18	2.12	56.96	73.9	16.9	150	0	Floor Noise
Hori.	7206.000	AV	39.55	37.60	8.58	43.39	2.12	44.46	53.9	9.4	150	0	Floor Noise
Hori.	9608.000	AV	40.13	38.92	9.75	43.18	2.12	47.74	53.9	6.1	150	0	Floor Noise
Vert.	80.388	QP	32.70	6.54	7.56	32.15	0.00	14.65	40.0	25.3	136	169	-
Vert.	136.232	QP	33.20	14.29	7.52	32.10	0.00	22.91	43.5	20.5	100	12	-
Vert.	163.347	QP	31.40	15.50	7.87	32.08	0.00	22.69	43.5	20.8	100	18	-
Vert.	215.532	QP	33.30	16.85	8.10	32.03	0.00	26.22	43.5	17.2	126	214	-
Vert.	331.825	QP	34.80	14.25	8.74	31.94	0.00	25.85	46.0	20.1	100	271	-
Vert.	371.099	QP	27.50	15.39	8.92	31.93	0.00	19.88	46.0	26.1	110	283	-
Vert.	2378.561	PK	48.35	28.59	14.23	38.69	2.12	54.60	73.9	19.3	253	273	-
Vert.	2390.000	PK	47.84	28.56	14.24	38.68	2.12	54.08	73.9	19.8	253	273	-
Vert.	4804.000	PK	50.86	31.60	7.01	42.89	2.12	48.70	73.9	25.2	100	4	-
Vert.	7206.000	PK	48.60	37.60	8.58	43.39	2.12	53.51	73.9	20.3	150	0	Floor Noise
Vert.	9608.000	PK	50.05	38.92	9.75	43.18	2.12	57.66	73.9	16.2	150	0	Floor Noise
Vert.	7206.000	AV	39.71	37.60	8.58	43.39	2.12	44.62	53.9	9.2	150	0	Floor Noise
Vert.	9608.000	AV	40.06	38.92	9.75	43.18	2.12	47.67	53.9	6.2	150	0	Floor Noise

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

Distance factor : 1 GHz - 10 GHz : 20log(3.83 m / 3.0 m) = 2.12 dB

10 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.	2378.561	AV	35.82	28.59	14.23	38.69	9.34	2.12	51.41	53.9	2.4	-
Hori.	2390.000	AV	35.22	28.56	14.24	38.68	9.34	2.12	50.80	53.9	3.1	*1)
Hori.	4804.000	AV	42.37	31.60	7.01	42.89	9.34	2.12	49.55	53.9	4.3	-
Vert.	2378.561	AV	36.26	28.59	14.23	38.69	9.34	2.12	51.85	53.9	2.0	-
Vert.	2390.000	AV	35.34	28.56	14.24	38.68	9.34	2.12	50.92	53.9	2.9	*1)
Vert.	4804.000	AV	40.32	31.60	7.01	42.89	9.34	2.12	47.50	53.9	6.3	-

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

Distance factor : 1 GHz - 10 GHz : 20log(3.83 m / 3.0 m) = 2.12 dB

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

Duty factor refer to "Burst rate confirmation" 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	89.34	28.54	14.26	38.67	2.12	95.59	-	-	Carrier
Hori.	2400.000	PK	56.89	28.54	14.25	38.67	2.12	63.13	75.5	12.3	-
Vert.	2402.000	PK	90.84	28.54	14.26	38.67	2.12	97.09	-	-	Carrier
Vert.	2400.000	PK	57.55	28.54	14.25	38.67	2.12	63.79	77.0	13.2	-

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

Distance factor : 1 GHz - 10 GHz : 20log(3.83 m / 3.0 m) = 2.12 dB

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

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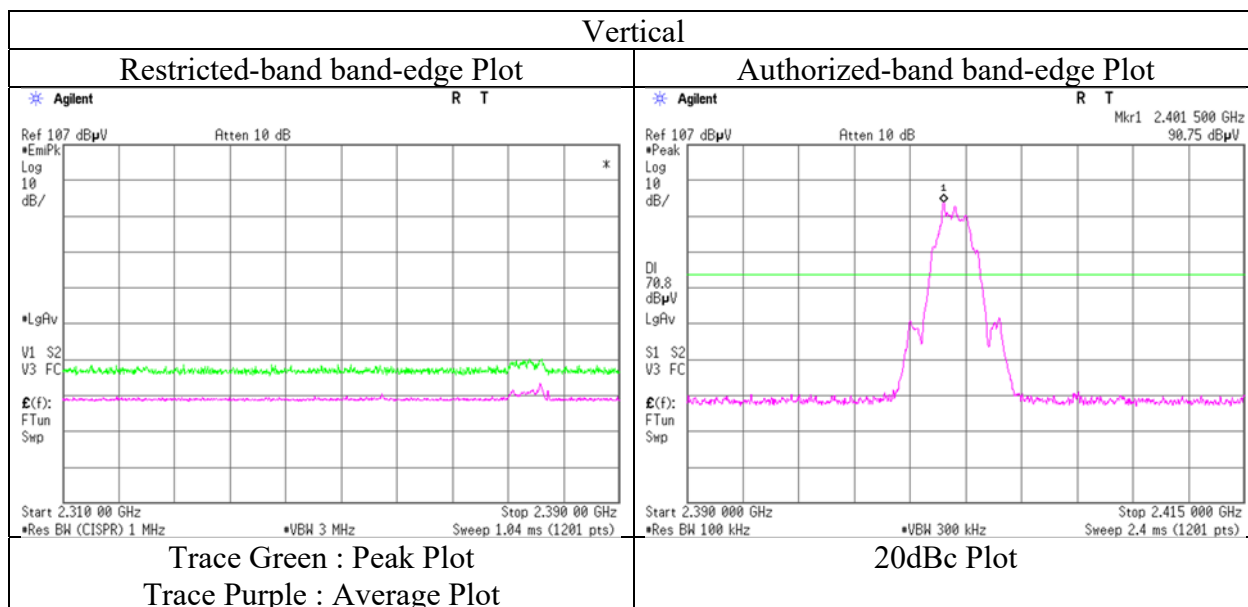
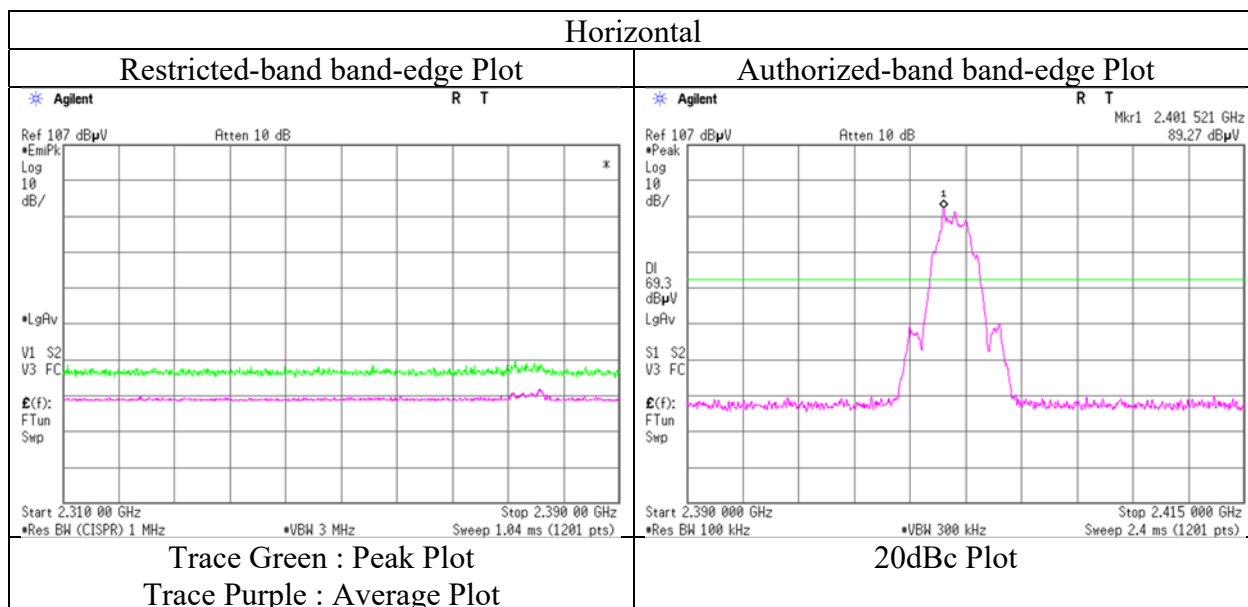
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13734674S-A-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	April 11, 2021
Temperature / Humidity	23 deg.C, 34 %RH
Engineer	Kenichi Adachi
Mode	Tx BT LE 2 M-PHY 2402 MHz



* 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. 13734674S-A-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 3 2 3 3 3
Date May 13, 2021 April 11, 2021 May 10, 2021 May 9, 2021 May 8, 2021
Temperature / Humidity 23 deg.C, 40 %RH 23 deg.C, 34 %RH 23 deg.C, 40 %RH 23 deg.C, 47 %RH 23 deg.C, 51 %RH
Engineer Toshinori Yamada Kenichi Adachi Yosuke Murakami Yasumasa Owaki Yasumasa Owaki
(30 MHz - 1 GHz) (1 GHz -2.8 GHz) (2.8 GHz - 10 GHz) (10 GHz - 18 GHz) (18 GHz - 26.5 GHz)
Mode Tx BT LE 2 M-PHY 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.	195.204	QP	36.10	16.65	7.83	32.05	0.00	28.53	43.5	14.9	169	273	-
Hori.	258.018	QP	41.30	17.56	8.34	31.98	0.00	35.22	46.0	10.7	132	144	-
Hori.	331.764	QP	36.50	14.25	8.74	31.94	0.00	27.55	46.0	18.4	100	195	-
Hori.	4880.000	PK	49.48	31.63	7.06	42.89	2.12	47.40	73.9	26.5	156	342	-
Hori.	7320.000	PK	47.69	37.71	8.66	43.52	2.12	52.66	73.9	21.2	150	0	Floor Noise
Hori.	9760.000	PK	49.20	39.19	9.83	42.98	2.12	57.36	73.9	16.5	150	0	Floor Noise
Hori.	7320.000	AV	38.66	37.71	8.66	43.52	2.12	43.63	53.9	10.2	150	0	Floor Noise
Hori.	9760.000	AV	38.49	39.19	9.83	42.98	2.12	46.65	53.9	7.2	150	0	Floor Noise
Vert.	80.390	QP	32.00	6.54	7.56	32.15	0.00	13.95	40.0	26.0	136	177	-
Vert.	136.270	QP	33.30	14.30	7.52	32.10	0.00	23.02	43.5	20.4	100	4	-
Vert.	162.380	QP	31.70	15.47	7.86	32.08	0.00	22.95	43.5	20.5	100	22	-
Vert.	215.500	QP	33.20	16.85	8.10	32.03	0.00	26.12	43.5	17.3	130	223	-
Vert.	331.846	QP	34.30	14.25	8.74	31.94	0.00	25.35	46.0	20.6	100	258	-
Vert.	370.217	QP	27.70	15.37	8.92	31.93	0.00	20.06	46.0	25.9	100	287	-
Vert.	4880.000	PK	52.26	31.63	7.06	42.89	2.12	50.18	73.9	23.7	267	142	-
Vert.	7320.000	PK	48.10	37.71	8.66	43.52	2.12	53.07	73.9	20.8	150	0	Floor Noise
Vert.	9760.000	PK	48.01	39.19	9.83	42.98	2.12	56.17	73.9	17.7	150	0	Floor Noise
Vert.	7320.000	AV	38.94	37.71	8.66	43.52	2.12	43.91	53.9	9.9	150	0	Floor Noise
Vert.	9760.000	AV	38.76	39.19	9.83	42.98	2.12	46.92	53.9	6.9	150	0	Floor Noise

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83 \text{ m} / 3.0 \text{ m}) = 2.12 \text{ dB}$

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

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4880.000	AV	39.11	31.63	7.06	42.89	9.34	2.12	46.37	53.9	7.5	-
Vert.	4880.000	AV	40.95	31.63	7.06	42.89	9.34	2.12	48.21	53.9	5.6	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83 \text{ m} / 3.0 \text{ m}) = 2.12 \text{ dB}$

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

Duty factor refer to "Burst rate confirmation" sheet.

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Shonan EMC Lab.

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Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission

Report No. 13734674S-A-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 3 2 3 3 3
Date May 13, 2021 April 11, 2021 May 10, 2021 May 9, 2021 May 8, 2021
Temperature / Humidity 23 deg.C, 40 %RH 23 deg.C, 34 %RH 23 deg.C, 40 %RH 23 deg.C, 47 %RH 23 deg.C, 51 %RH
Engineer Toshinori Yamada Kenichi Adachi Yosuke Murakami Yasumasa Owaki Yasumasa Owaki
(30 MHz - 1 GHz) (1 GHz -2.8 GHz) (2.8 GHz - 10 GHz) (10 GHz - 18 GHz) (18 GHz - 26.5 GHz)
Mode Tx BT LE 2 M-PHY 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.	195.210	QP	36.20	16.65	7.83	32.05	0.00	28.63	43.5	14.8	200	287	-
Hori.	258.010	QP	41.40	17.56	8.34	31.98	0.00	35.32	46.0	10.6	200	247	-
Hori.	331.819	QP	36.80	14.25	8.74	31.94	0.00	27.85	46.0	18.1	100	193	-
Hori.	2483.500	PK	45.12	28.40	14.34	38.62	2.12	51.36	73.9	22.5	131	89	-
Hori.	2517.718	PK	47.46	28.35	14.36	38.60	2.12	53.69	73.9	20.2	131	89	-
Hori.	4960.000	PK	50.61	31.79	7.13	42.89	2.12	48.76	73.9	25.1	259	148	-
Hori.	7440.000	PK	47.80	37.88	8.73	43.65	2.12	52.88	73.9	21.0	150	0	Floor Noise
Hori.	9920.000	PK	47.98	39.05	9.91	42.77	2.12	56.29	73.9	17.6	150	0	Floor Noise
Hori.	7440.000	AV	38.93	37.88	8.73	43.65	2.12	44.01	53.9	9.8	150	0	Floor Noise
Hori.	9920.000	AV	37.82	39.05	9.91	42.77	2.12	46.13	53.9	7.7	150	0	Floor Noise
Vert.	80.385	QP	32.20	6.54	7.56	32.15	0.00	14.15	40.0	25.8	132	168	-
Vert.	136.265	QP	33.20	14.30	7.52	32.10	0.00	22.92	43.5	20.5	100	2	-
Vert.	156.680	QP	32.10	15.21	7.84	32.08	0.00	23.07	43.5	20.4	100	20	-
Vert.	215.505	QP	33.30	16.85	8.10	32.03	0.00	26.22	43.5	17.2	132	225	-
Vert.	331.823	QP	34.60	14.25	8.74	31.94	0.00	25.65	46.0	20.3	100	256	-
Vert.	370.270	QP	27.50	15.37	8.92	31.93	0.00	19.86	46.0	26.1	100	287	-
Vert.	2483.500	PK	45.17	28.40	14.34	38.62	2.12	51.41	73.9	22.4	252	269	-
Vert.	2517.718	PK	47.88	28.35	14.36	38.60	2.12	54.11	73.9	19.7	252	269	-
Vert.	4960.000	PK	50.29	31.79	7.13	42.89	2.12	48.44	73.9	25.4	238	289	-
Vert.	7440.000	PK	48.55	37.88	8.73	43.65	2.12	53.63	73.9	20.2	150	0	Floor Noise
Vert.	9920.000	PK	47.30	39.05	9.91	42.77	2.12	55.61	73.9	18.2	150	0	Floor Noise
Vert.	7440.000	AV	38.99	37.88	8.73	43.65	2.12	44.07	53.9	9.8	150	0	Floor Noise
Vert.	9920.000	AV	38.27	39.05	9.91	42.77	2.12	46.58	53.9	7.3	150	0	Floor Noise

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83\text{ m} / 3.0\text{ m}) = 2.12\text{ dB}$

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

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	35.41	28.40	14.34	38.62	9.34	2.12	50.99	53.9	2.9	*1)
Hori.	2517.718	AV	35.88	28.35	14.36	38.60	9.34	2.12	51.45	53.9	2.4	-
Hori.	4960.000	AV	40.12	31.79	7.13	42.89	9.34	2.12	47.61	53.9	6.2	-
Vert.	2483.500	AV	35.43	28.40	14.34	38.62	9.34	2.12	51.01	53.9	2.8	*1)
Vert.	2517.718	AV	36.03	28.35	14.36	38.60	9.34	2.12	51.60	53.9	2.3	-
Vert.	4960.000	AV	39.38	31.79	7.13	42.89	9.34	2.12	46.87	53.9	7.0	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83\text{ m} / 3.0\text{ m}) = 2.12\text{ dB}$

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

Duty factor refer to "Burst rate confirmation" sheet.

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

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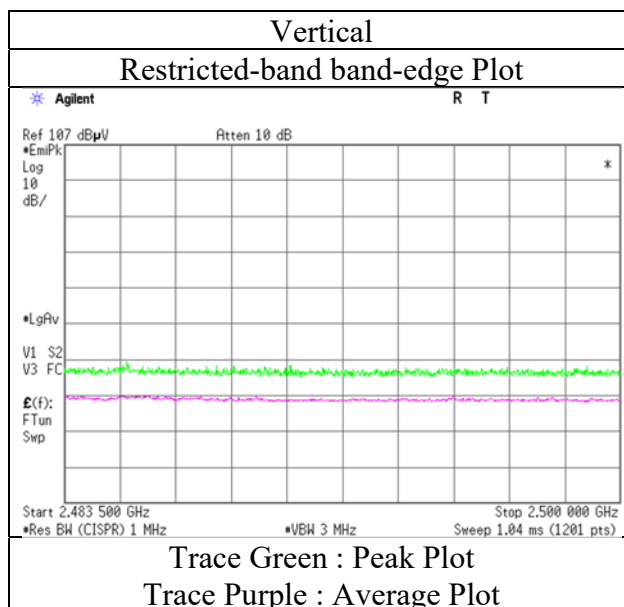
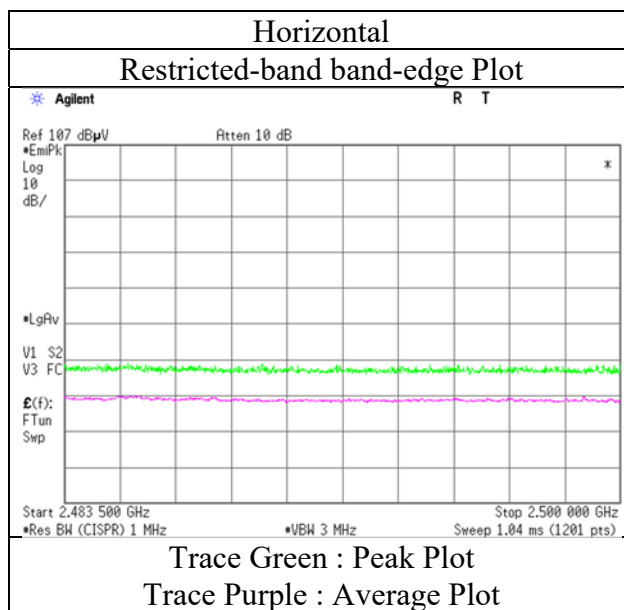
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13734674S-A-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	April 11, 2021
Temperature / Humidity	23 deg.C, 34 %RH
Engineer	Kenichi Adachi
Mode	Tx BT LE 2 M-PHY 2480 MHz



* 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. 13734674S-A-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 3
Date May 11, 2021
Temperature / Humidity 21 deg.C, 51 %RH
Engineer Yosuke Murakami
(1 GHz - 2.8 GHz)
Mode Tx BT LE 1 M-PHY 2402 MHz + Tx 11n-20 5700 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	47.75	28.41	14.35	41.62	2.12	51.01	73.9	22.8	156	331	-
Vert.	2390.000	PK	47.08	28.41	14.35	41.62	2.12	50.34	73.9	23.5	224	248	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83 \text{ m} / 3.0 \text{ m}) = 2.12 \text{ dB}$

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

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	38.17	28.41	14.35	41.62	3.89	2.12	45.32	53.9	8.5	*1)
Vert.	2390.000	AV	36.51	28.41	14.35	41.62	3.89	2.12	43.66	53.9	10.2	*1)

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83 \text{ m} / 3.0 \text{ m}) = 2.12 \text{ dB}$

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

Duty factor refer to "Burst rate confirmation" 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	91.72	28.38	14.37	41.63	2.12	94.96	-	-	Carrier
Hori.	2400.000	PK	40.14	28.38	14.36	41.63	2.12	43.37	74.9	31.5	-
Vert.	2402.000	PK	90.22	28.38	14.37	41.63	2.12	93.46	-	-	Carrier
Vert.	2400.000	PK	38.65	28.38	14.36	41.63	2.12	41.88	73.4	31.5	-

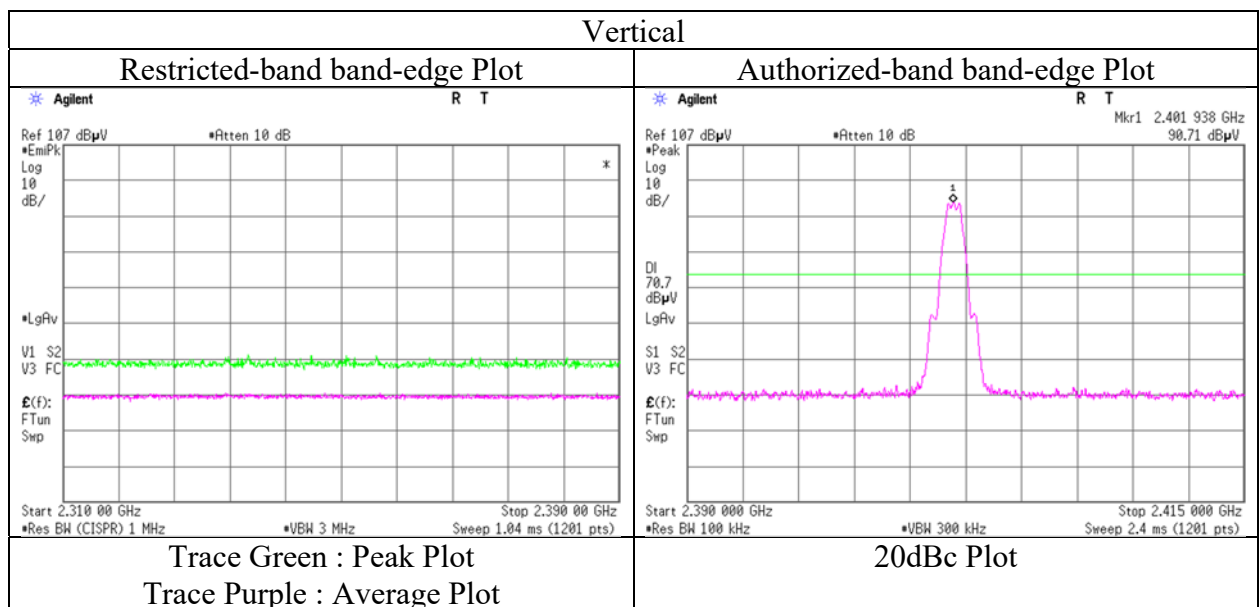
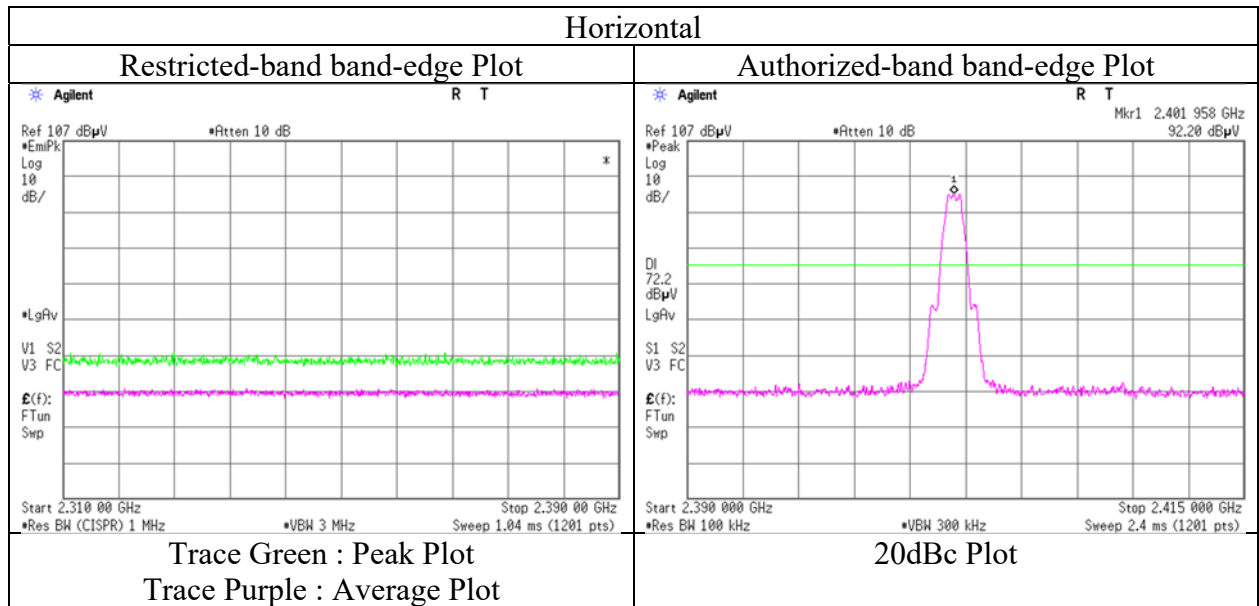
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : $20\log(3.83 \text{ m} / 3.0 \text{ m}) = 2.12 \text{ dB}$

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

Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13734674S-A-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	May 11, 2021
Temperature / Humidity	21 deg.C, 51 %RH
Engineer	Yosuke Murakami
Mode	Tx BT LE 1 M-PHY 2402 MHz + Tx 11n-20 5700 MHz



* 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. 13734674S-A-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 3
Date May 11, 2021
Temperature / Humidity 21 deg.C, 51 %RH
Engineer Yosuke Murakami
(1 GHz - 2.8 GHz)
Mode Tx BT LE 1 M-PHY 2480 MHz + Tx 11n-20 5700 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	46.65	28.28	14.45	41.65	2.12	49.85	73.9	24.0	187	41	-
Vert.	2483.500	PK	48.36	28.28	14.45	41.65	2.12	51.56	73.9	22.3	153	25	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83 \text{ m} / 3.0 \text{ m}) = 2.12 \text{ dB}$

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

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	38.24	28.28	14.45	41.65	3.89	2.12	45.33	53.9	8.5	*1)
Vert.	2483.500	AV	36.72	28.28	14.45	41.65	3.89	2.12	43.81	53.9	10.0	*1)

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83 \text{ m} / 3.0 \text{ m}) = 2.12 \text{ dB}$

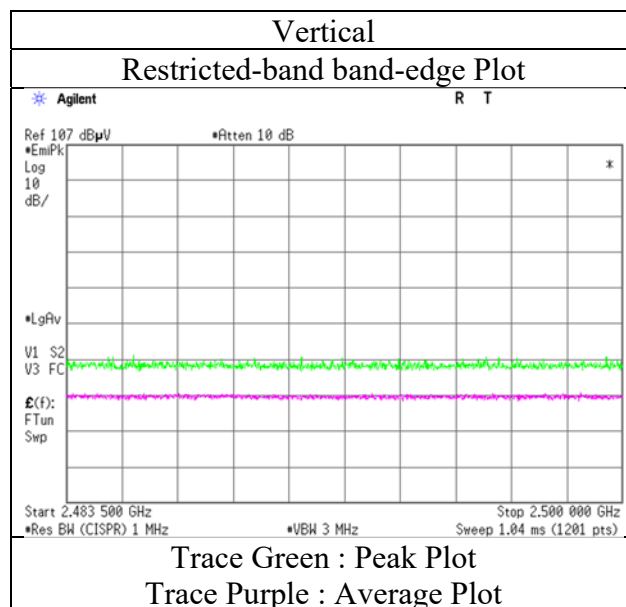
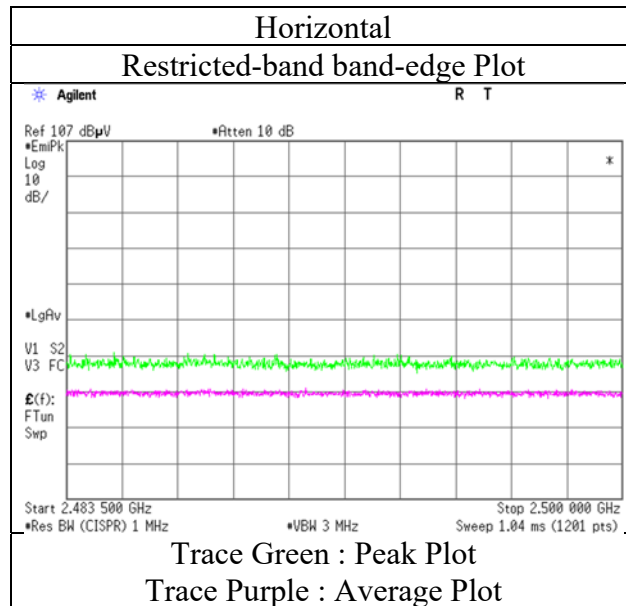
10 GHz - 40 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

Duty factor refer to "Burst rate confirmation" sheet.

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

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No. 13734674S-A-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 3
Date May 11, 2021
Temperature / Humidity 21 deg.C, 51 %RH
Engineer Yosuke Murakami
Mode Tx BT LE 1-M PHY 2480 MHz + Tx 11n-20 5700 MHz



* 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. 13734674S-A-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 3 3 3 3
Date May 13, 2021 May 11, 2021 May 9, 2021 May 8, 2021
Temperature / Humidity 23 deg.C, 40 %RH 21 deg.C, 51 %RH 23 deg.C, 47 %RH 23 deg.C, 51 %RH
Engineer Toshinori Yamada Yosuke Murakami Yasumasa Owaki
(30 MHz - 1 GHz) (1 GHz - 10 GHz) (10 GHz - 18 GHz) (18 GHz - 26.5 GHz)
Mode Tx BT LE 2 M-PHY 2402 MHz + Tx 11n-20 5700 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.	202.174	QP	36.00	16.78	8.02	32.05	0.00	28.75	43.5	14.7	168	284	-
Hori.	260.204	QP	41.20	17.64	8.36	31.98	0.00	35.22	46.0	10.7	130	143	-
Hori.	342.289	QP	38.50	14.57	8.79	31.93	0.00	29.93	46.0	16.0	100	168	-
Hori.	356.246	QP	40.80	14.94	8.86	31.92	0.00	32.68	46.0	13.3	100	102	-
Hori.	712.487	QP	38.70	20.54	10.33	31.81	0.00	37.76	46.0	8.2	151	213	-
Hori.	2378.600	PK	49.95	28.43	14.34	41.62	2.12	53.22	73.9	20.6	155	332	-
Hori.	2390.000	PK	47.33	28.41	14.35	41.62	2.12	50.59	73.9	23.3	155	332	-
Hori.	4804.000	PK	49.93	31.75	6.80	38.55	2.12	52.05	73.9	21.8	394	122	-
Hori.	7206.000	PK	49.54	37.60	9.11	43.39	2.12	54.98	73.9	18.9	150	0	-
Hori.	9608.000	PK	50.10	38.92	10.14	43.18	2.12	58.10	73.9	15.8	150	0	-
Hori.	7206.000	AV	39.46	37.60	9.11	43.39	2.12	44.90	53.9	9.0	150	0	Floor Noise
Hori.	9608.000	AV	40.30	38.92	10.14	43.18	2.12	48.30	53.9	5.6	150	0	Floor Noise
Vert.	136.368	QP	33.80	14.30	7.52	32.10	0.00	23.52	43.5	19.9	100	8	-
Vert.	279.040	QP	34.10	18.52	8.46	31.98	0.00	29.10	46.0	16.9	100	127	-
Vert.	315.723	QP	38.20	14.02	8.66	31.96	0.00	28.92	46.0	17.0	100	128	-
Vert.	341.950	QP	39.70	14.56	8.79	31.93	0.00	31.12	46.0	14.8	144	121	-
Vert.	356.246	QP	40.70	14.94	8.86	31.92	0.00	32.58	46.0	13.4	100	129	-
Vert.	712.487	QP	37.10	20.54	10.33	31.81	0.00	36.16	46.0	9.8	100	162	-
Vert.	2378.333	PK	48.54	28.43	14.34	41.62	2.12	51.81	73.9	22.0	372	103	-
Vert.	2390.000	PK	46.60	28.41	14.35	41.62	2.12	49.86	73.9	24.0	372	103	-
Vert.	4804.000	PK	49.16	31.75	6.80	38.55	2.12	51.28	73.9	22.6	193	302	-
Vert.	7206.000	PK	48.45	37.60	9.11	43.39	2.12	53.89	73.9	20.0	150	0	-
Vert.	9608.000	PK	50.52	38.92	10.14	43.18	2.12	58.52	73.9	15.3	150	0	-
Vert.	7206.000	AV	39.60	37.60	9.11	43.39	2.12	45.04	53.9	8.8	150	0	Floor Noise
Vert.	9608.000	AV	40.19	38.92	10.14	43.18	2.12	48.19	53.9	5.7	150	0	Floor Noise

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83 \text{ m} / 3.0 \text{ m}) = 2.12 \text{ dB}$

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

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2378.600	AV	37.50	28.43	14.34	41.62	9.34	2.12	50.11	53.9	3.7	-
Hori.	2390.000	AV	37.42	28.41	14.35	41.62	9.34	2.12	50.02	53.9	3.8	* 1)
Hori.	4804.000	AV	40.26	31.75	6.80	38.55	9.34	2.12	51.72	53.9	2.1	-
Vert.	2378.333	AV	36.90	28.43	14.34	41.62	9.34	2.12	49.51	53.9	4.3	-
Vert.	2390.000	AV	36.31	28.41	14.35	41.62	9.34	2.12	48.91	53.9	4.9	* 1)
Vert.	4804.000	AV	39.01	31.75	6.80	38.55	9.34	2.12	50.47	53.9	3.4	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83 \text{ m} / 3.0 \text{ m}) = 2.12 \text{ dB}$

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

Duty factor refer to "Burst rate confirmation" 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	91.98	28.38	14.37	41.63	2.12	95.22	-	-	Carrier
Hori.	2400.000	PK	58.52	28.38	14.36	41.63	2.12	61.75	75.2	13.4	-
Vert.	2402.000	PK	90.87	28.38	14.37	41.63	2.12	94.11	-	-	Carrier
Vert.	2400.000	PK	57.18	28.38	14.36	41.63	2.12	60.41	74.1	13.6	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83 \text{ m} / 3.0 \text{ m}) = 2.12 \text{ dB}$

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

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Shonan EMC Lab.

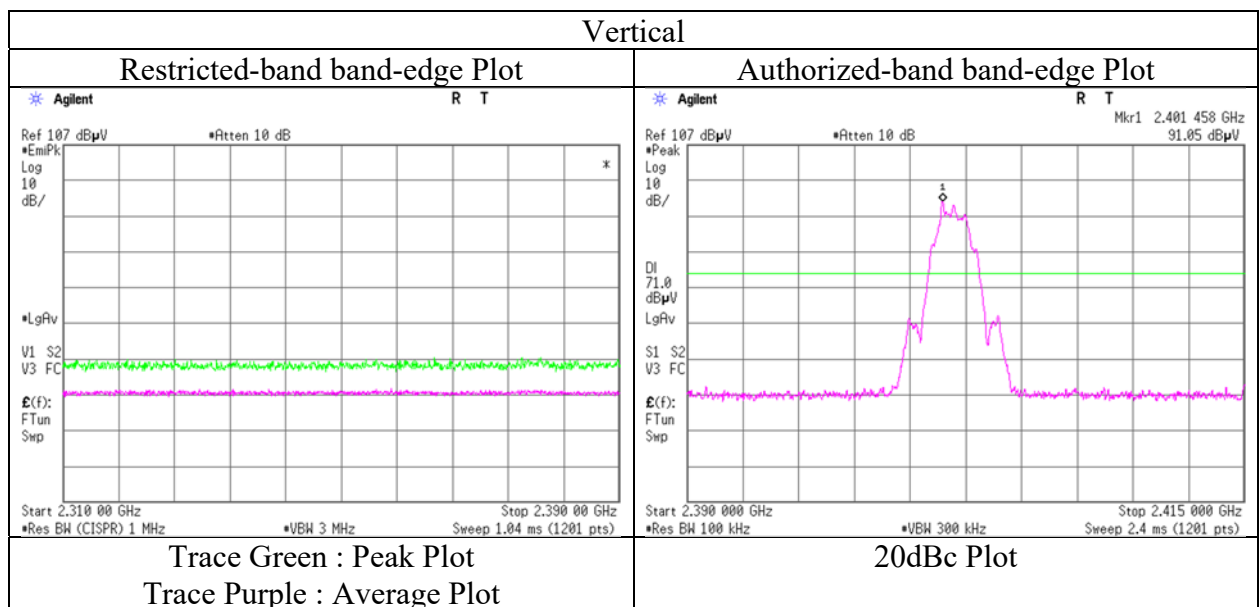
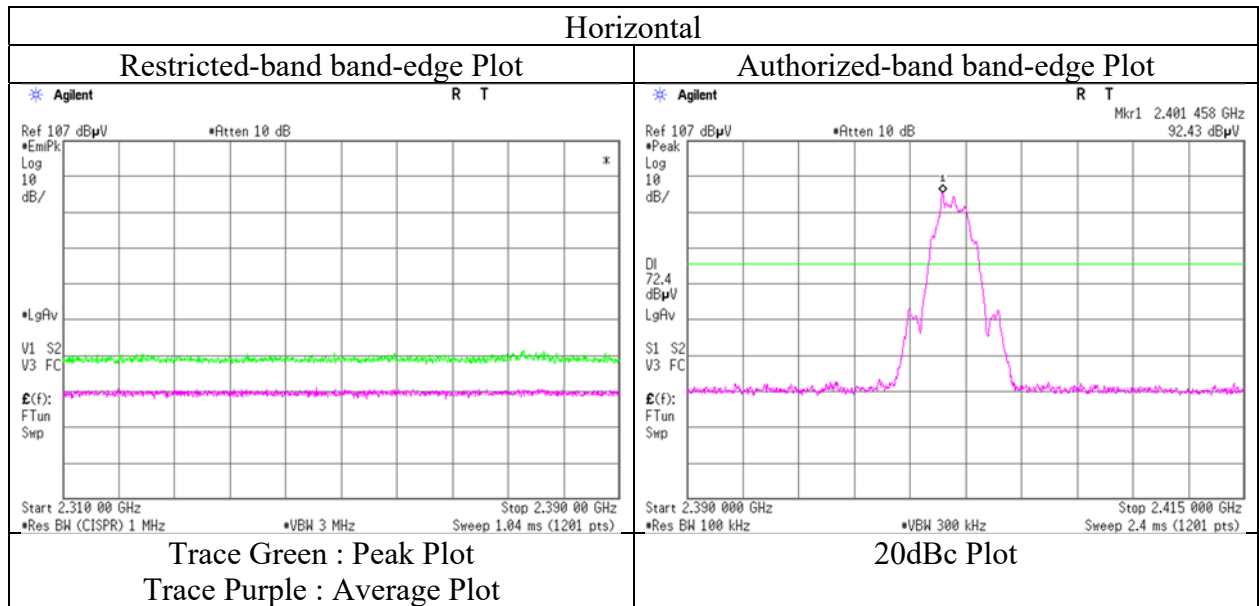
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No. 13734674S-A-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 3
Date May 11, 2021
Temperature / Humidity 21 deg.C, 51 %RH
Engineer Yosuke Murakami
Mode Tx BT LE 2 M-PHY 2402 MHz + Tx 11n-20 5700 MHz



* 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.

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Shonan EMC Lab.

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

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Radiated Spurious Emission

Report No. 13734674S-A-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 3
Date May 11, 2021
Temperature / Humidity 21 deg.C, 51 %RH
Engineer Yosuke Murakami
(1 GHz - 2.8 GHz)
Mode Tx BT LE 2 M-PHY 2480 MHz + Tx 11n-20 5700 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	48.39	28.28	14.45	41.65	2.12	51.59	73.9	22.3	162	39	-
Vert.	2483.500	PK	46.80	28.28	14.45	41.65	2.12	50.00	73.9	23.9	260	14	-

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83 \text{ m} / 3.0 \text{ m}) = 2.12 \text{ dB}$

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

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	38.70	28.28	14.45	41.65	9.34	2.12	51.24	53.9	2.6	*1)
Vert.	2483.500	AV	36.73	28.28	14.45	41.65	9.34	2.12	49.27	53.9	4.6	*1)

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

Distance factor : 1 GHz - 10 GHz : $20\log(3.83 \text{ m} / 3.0 \text{ m}) = 2.12 \text{ dB}$

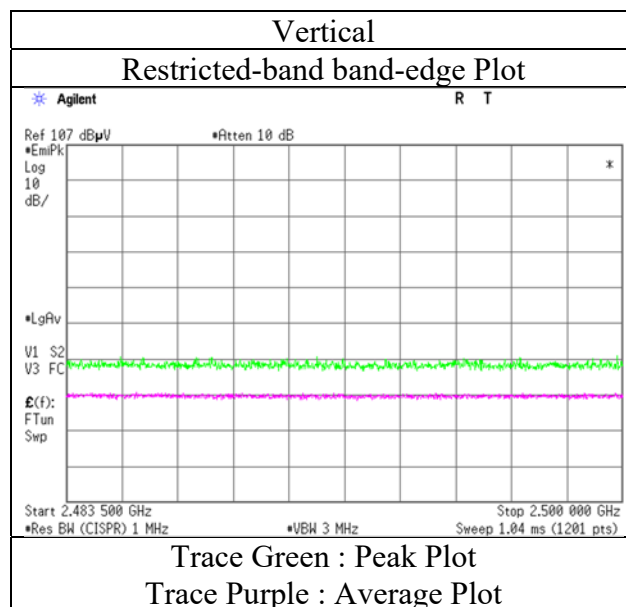
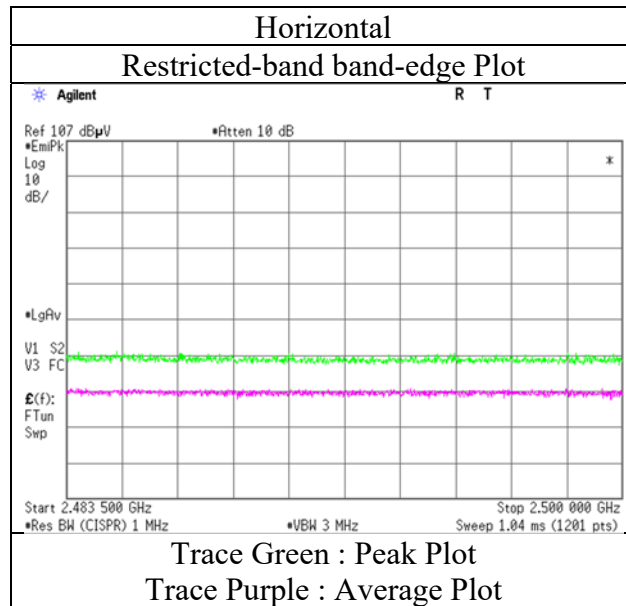
10 GHz - 40 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$

Duty factor refer to "Burst rate confirmation" sheet.

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

Radiated Spurious Emission
(Reference Plot for band-edge)

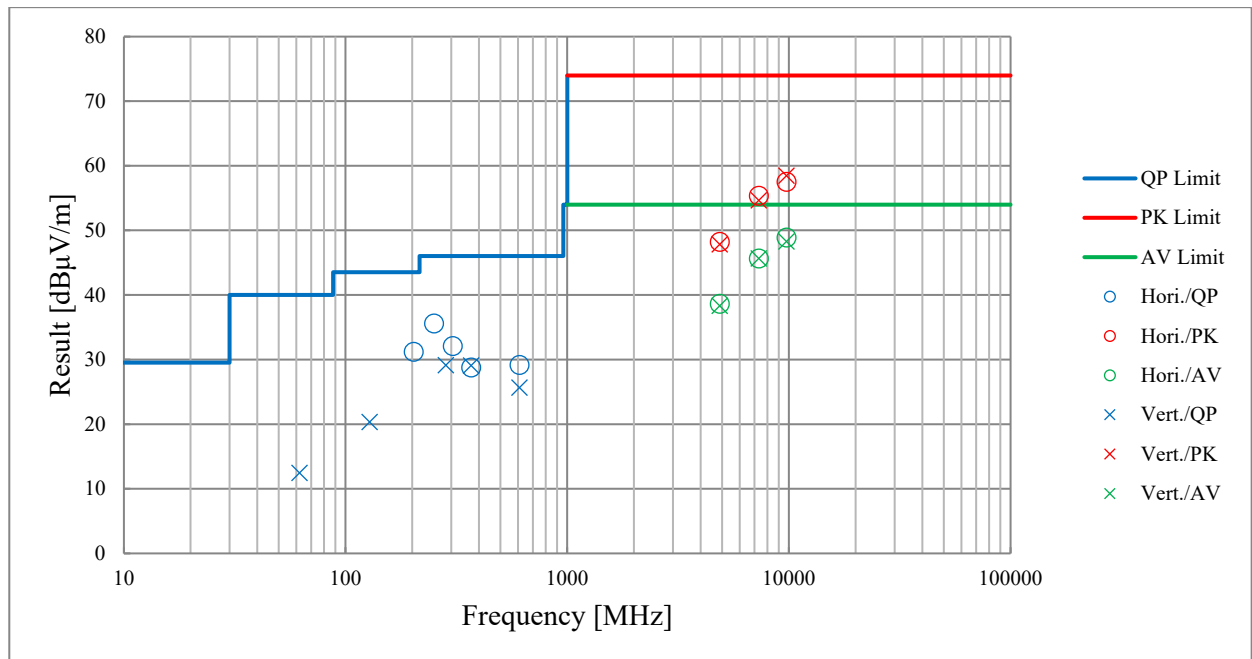
Report No. 13734674S-A-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 3
Date May 11, 2021
Temperature / Humidity 21 deg.C, 51 %RH
Engineer Yosuke Murakami
Mode Tx BT LE 2 M-PHY 2480 MHz + Tx 11n-20 5700 MHz



* 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)

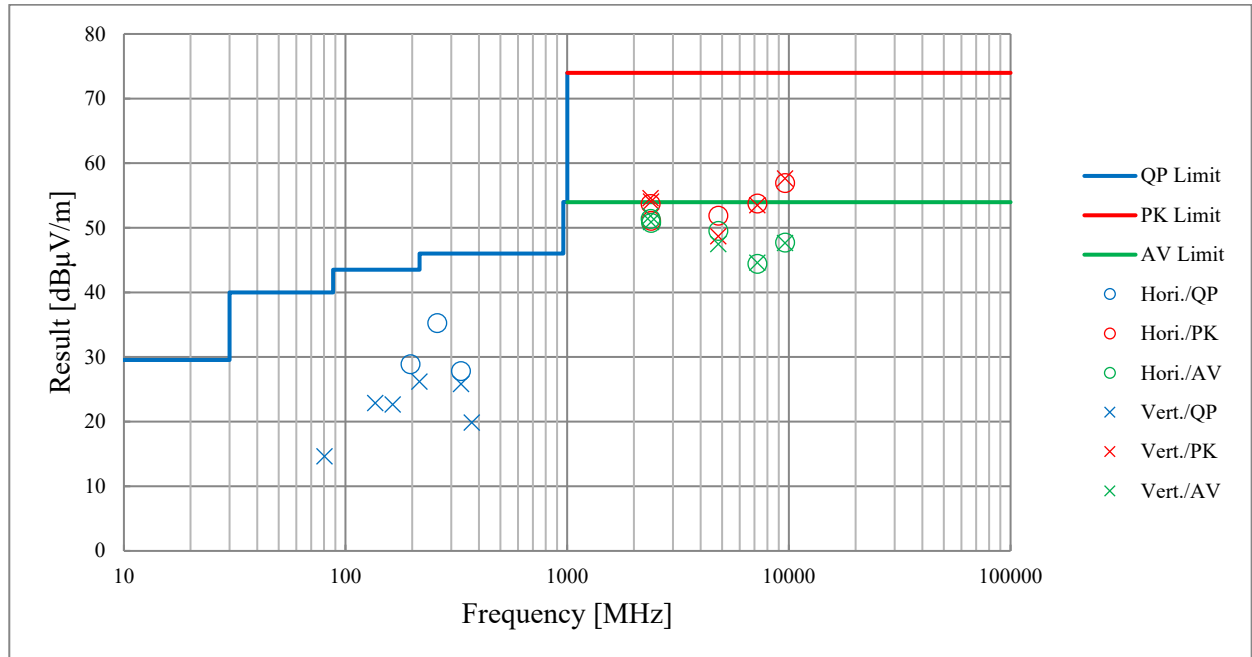
Report No.	13734674S-A-R2			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	3	1	3	3
Date	May 12, 2021	March 29, 2021	April 25, 2021	May 3, 2021
Temperature / Humidity	23 deg.C, 45 %RH	23 deg.C, 44 %RH	24 deg.C, 31 %RH	22 deg.C, 48 %RH
Engineer	Toshinori Yamada (30 MHz - 1 GHz)	Yohsuke Matsuzawa (1 GHz - 10 GHz)	Kenichi Adachi (10 GHz - 18 GHz)	Takahiro Suzuki (18 GHz - 26.5 GHz)
Mode	Tx 11n-20 2437 MHz			



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

Radiated Spurious Emission (Plot data, Worst case)

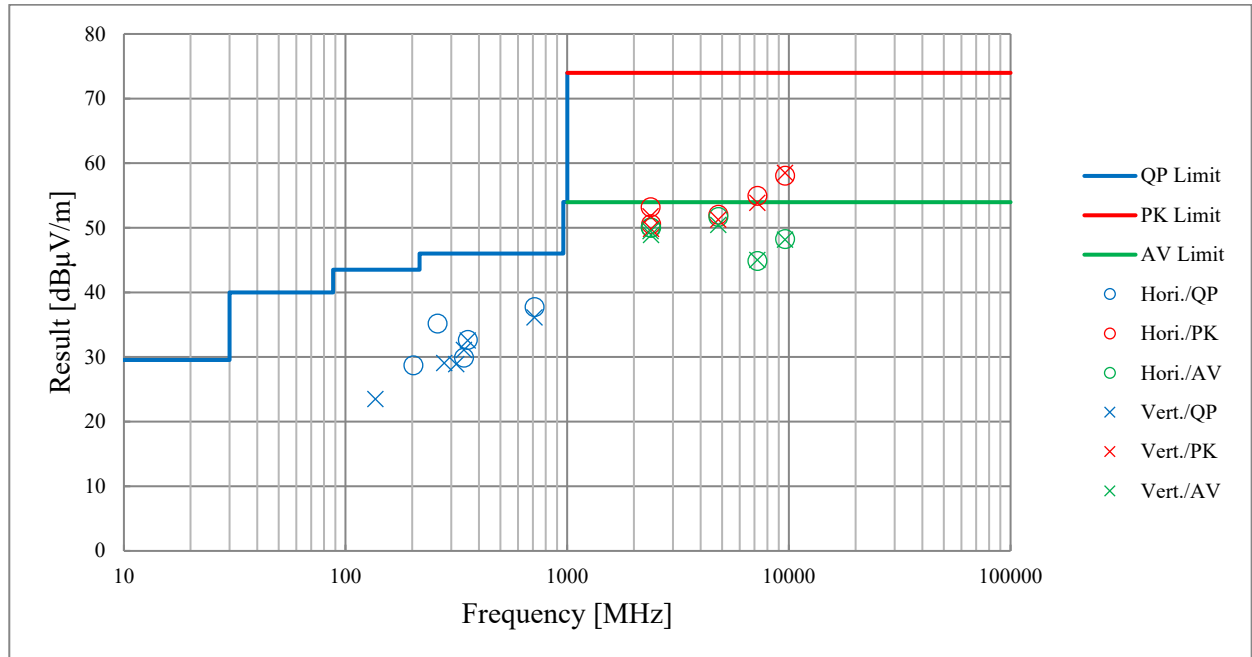
Report No.	13734674S-A-R2				
Test place	Shonan EMC Lab.				
Semi Anechoic Chamber	3	2	3	3	3
Date	May 13, 2021	April 11, 2021	May 10, 2021	May 9, 2021	May 8, 2021
Temperature / Humidity	23 deg.C, 40 %RH	23 deg.C, 34 %RH	23 deg.C, 40 %RH	23 deg.C, 47 %RH	23 deg.C, 51 %RH
Engineer	Toshinori Yamada	Kenichi Adachi	Yosuke Murakami	Yasumasa Owaki	Yasumasa Owaki
	(30 MHz - 1 GHz)	(1 GHz - 2.8 GHz)	(2.8 GHz - 10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx BT LE 2 M-PHY 2402 MHz				



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

Radiated Spurious Emission (Plot data, Worst case)

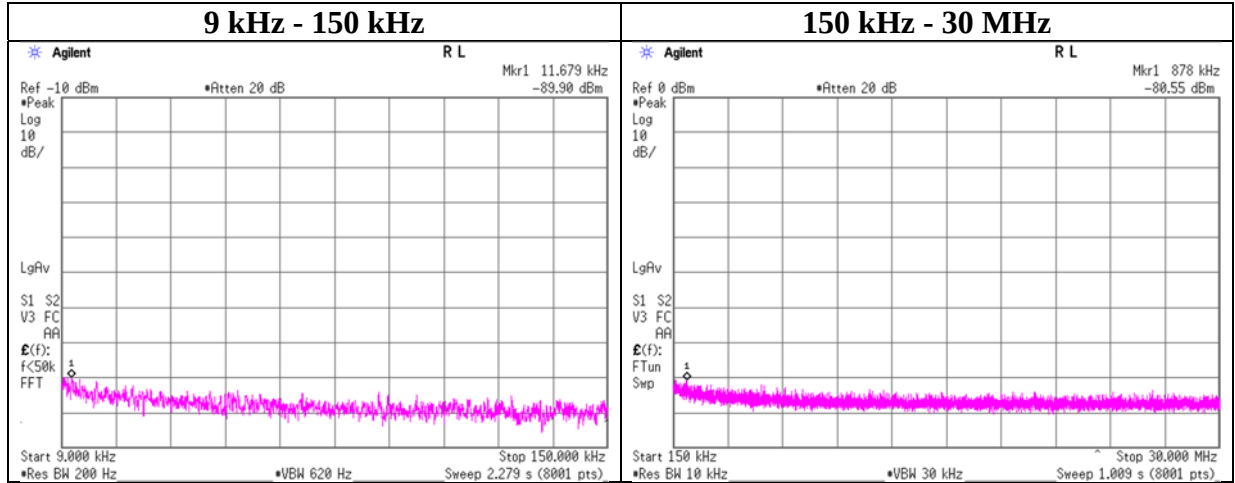
Report No.	13734674S-A-R2			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	3	3	3	3
Date	May 13, 2021	May 11, 2021	May 9, 2021	May 8, 2021
Temperature / Humidity	23 deg.C, 40 %RH	21 deg.C, 51 %RH	23 deg.C, 47 %RH	23 deg.C, 51 %RH
Engineer	Toshinori Yamada	Yosuke Murakami	Yasumasa Owaki	Yasumasa Owaki
	(30 MHz - 1 GHz)	(1 GHz - 10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx BT LE 2 M-PHY 2402 MHz + Tx 11n-20 5700 MHz			



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

Conducted Spurious Emission

Report No. 13734674S-A-R2
Test place Shonan EMC Lab. No.5 Shielded Room
Date March 26, 2021
Temperature / Humidity 23 deg. C / 46 % RH
Engineer Toshinori Yamada
Mode Tx 11n-20 2437 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
11.68	-89.90	0.02	10.11	3.40	1	-76.4	300	6.0	-15.1	46.2	61.3	-
878.00	-80.55	0.02	10.11	3.40	1	-67.0	30	6.0	14.2	28.7	14.5	-

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

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

N: Number of output

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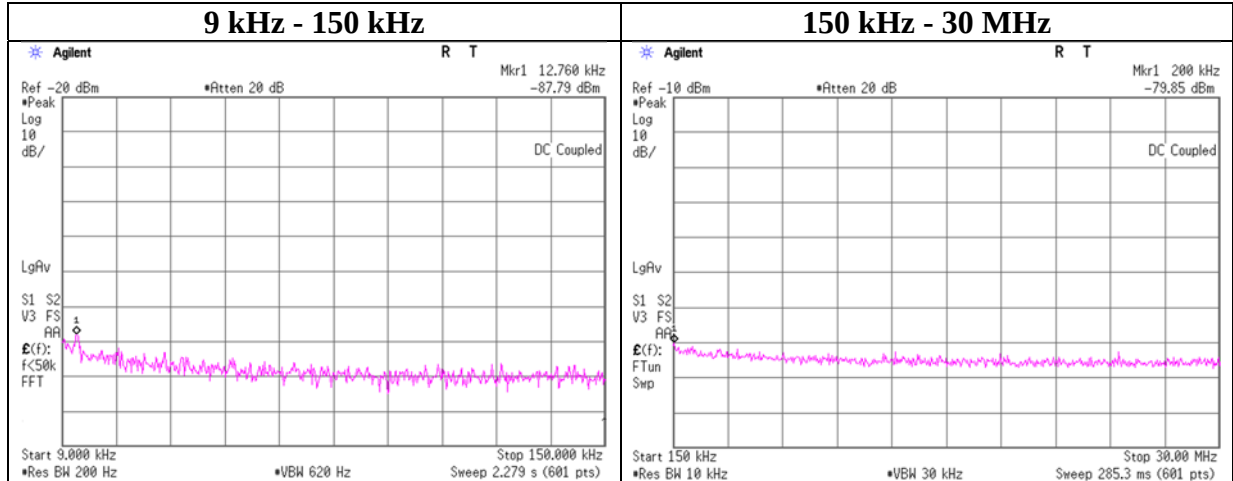
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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Conducted Spurious Emission

Report No. 13734674S-A-R2
Test place Shonan EMC Lab. No.5 Shielded Room
Date March 19, 2021
Temperature / Humidity 24 deg. C / 50 % RH
Engineer Shiro Kobayashi
Mode Tx BT LE 1 M-PHY 2402 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
12.76	-87.79	0.01	9.93	3.40	1	-74.5	300	6.0	-13.2	45.4	58.6	-
200.00	-79.85	0.01	9.93	3.40	1	-66.5	300	6.0	-5.3	21.5	26.8	-

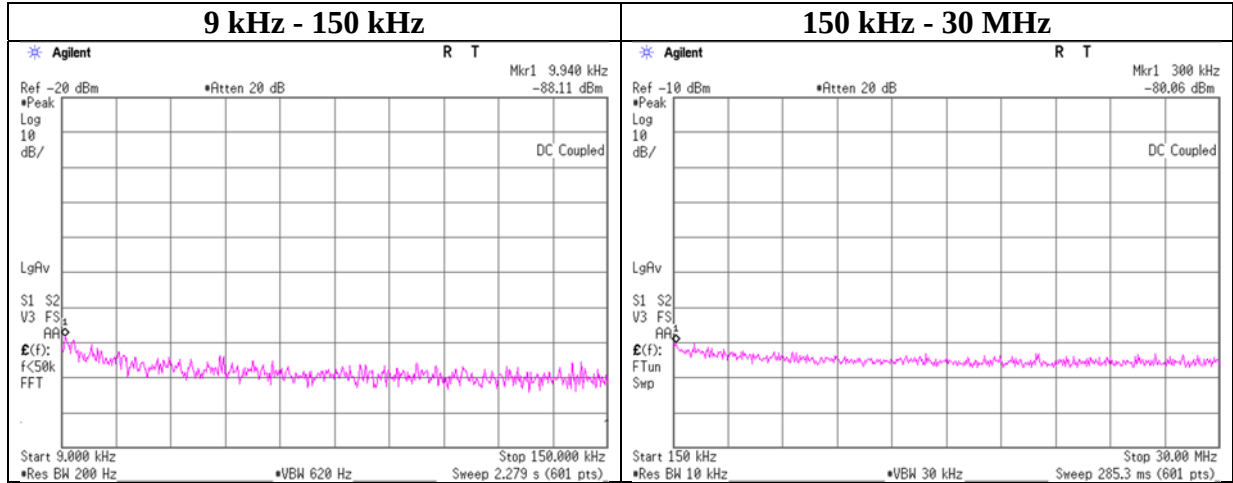
$$E \text{ [dBuV/m]} = \text{EIRP [dBm]} - 20 \log (\text{Distance [m]}) + \text{Ground bounce [dB]} + 104.8 \text{ [dBuV/m]}$$

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

N: Number of output

Conducted Spurious Emission

Report No. 13734674S-A-R2
Test place Shonan EMC Lab. No.5 Shielded Room
Date March 19, 2021
Temperature / Humidity 24 deg. C / 50 % RH
Engineer Shiro Kobayashi
Mode Tx BT LE 1 M-PHY 2440 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain* [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
9.94	-88.11	0.01	9.93	3.40	1	-74.8	300	6.0	-13.5	47.6	61.1	-
300.00	-80.06	0.01	9.93	3.40	1	-66.7	300	6.0	-5.5	18.0	23.5	-

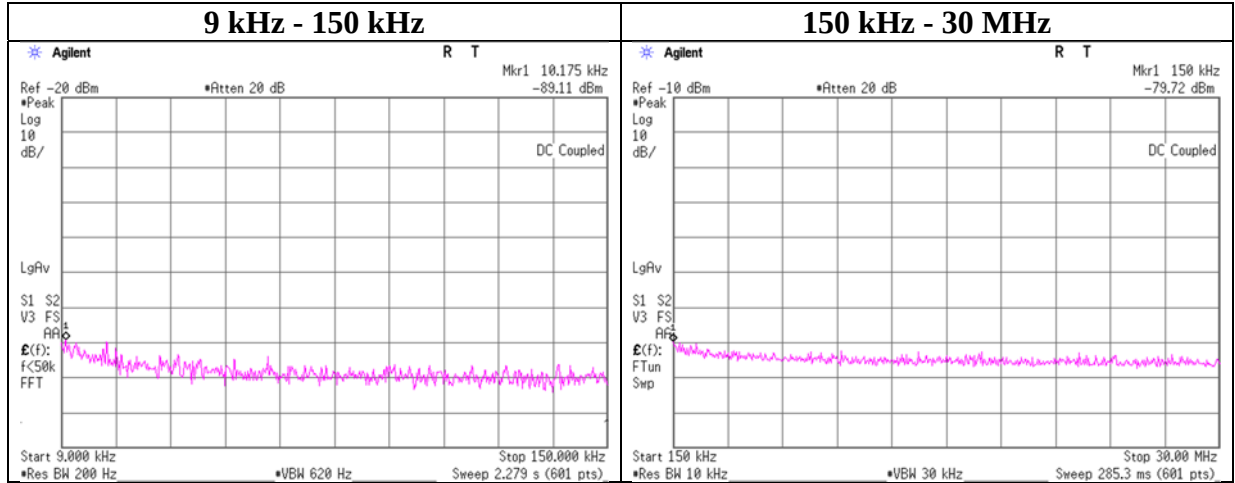
$$E \text{ [dBuV/m]} = \text{EIRP [dBm]} - 20 \log (\text{Distance [m]}) + \text{Ground bounce [dB]} + 104.8 \text{ [dBuV/m]}$$

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

N: Number of output

Conducted Spurious Emission

Report No. 13734674S-A-R2
Test place Shonan EMC Lab. No.5 Shielded Room
Date March 19, 2021
Temperature / Humidity 24 deg. C / 50 % RH
Engineer Shiro Kobayashi
Mode Tx BT LE 1 M-PHY 2480 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
10.18	-89.11	0.01	9.93	3.40	1	-75.8	300	6.0	-14.5	47.4	61.9	-
150.00	-79.72	0.01	9.93	3.40	1	-66.4	300	6.0	-5.1	24.0	29.1	-

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

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

N: Number of output

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Shonan EMC Lab.

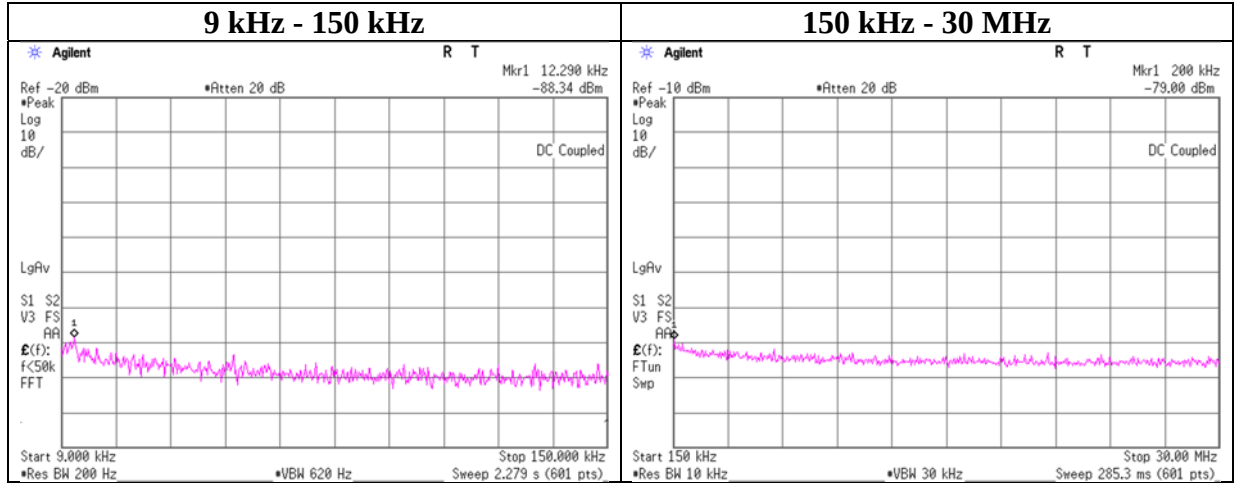
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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Conducted Spurious Emission

Report No. 13734674S-A-R2
Test place Shonan EMC Lab. No.5 Shielded Room
Date March 19, 2021
Temperature / Humidity 24 deg. C / 50 % RH
Engineer Shiro Kobayashi
Mode Tx BT LE 2 M-PHY 2402 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
12.29	-88.34	0.01	9.93	3.40	1	-75.0	300	6.0	-13.7	45.8	59.5	-
200.00	-79.00	0.01	9.93	3.40	1	-65.7	300	6.0	-4.4	21.5	25.9	-

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

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

N: Number of output

UL Japan, Inc.

Shonan EMC Lab.

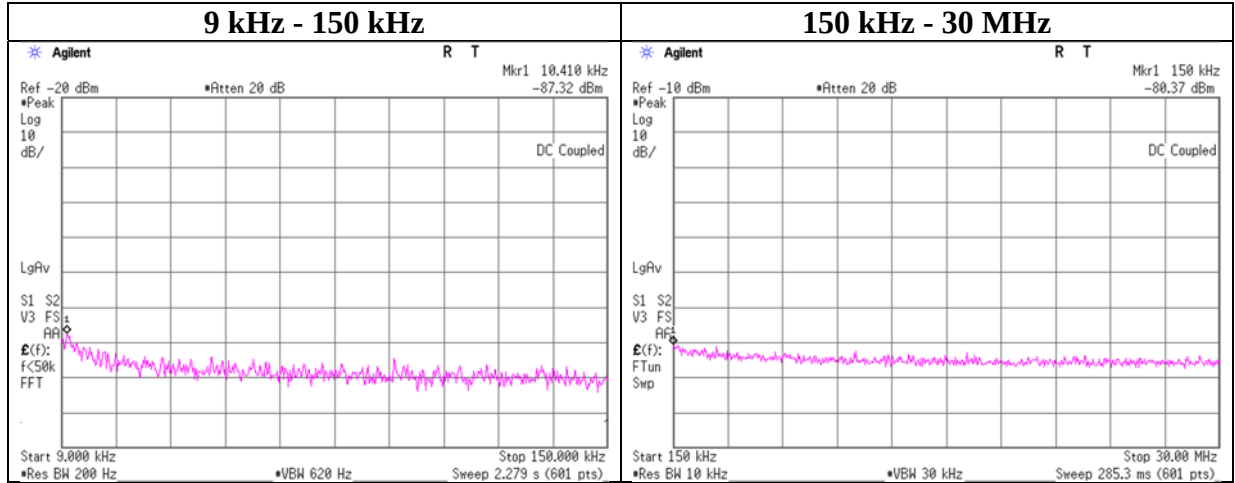
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Conducted Spurious Emission

Report No. 13734674S-A-R2
Test place Shonan EMC Lab. No.5 Shielded Room
Date March 19, 2021
Temperature / Humidity 24 deg. C / 50 % RH
Engineer Shiro Kobayashi
Mode Tx BT LE 2 M-PHY 2440 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
10.41	-87.32	0.01	9.93	3.40	1	-74.0	300	6.0	-12.7	47.2	59.9	-
150.00	-80.37	0.01	9.93	3.40	1	-67.0	300	6.0	-5.8	24.0	29.8	-

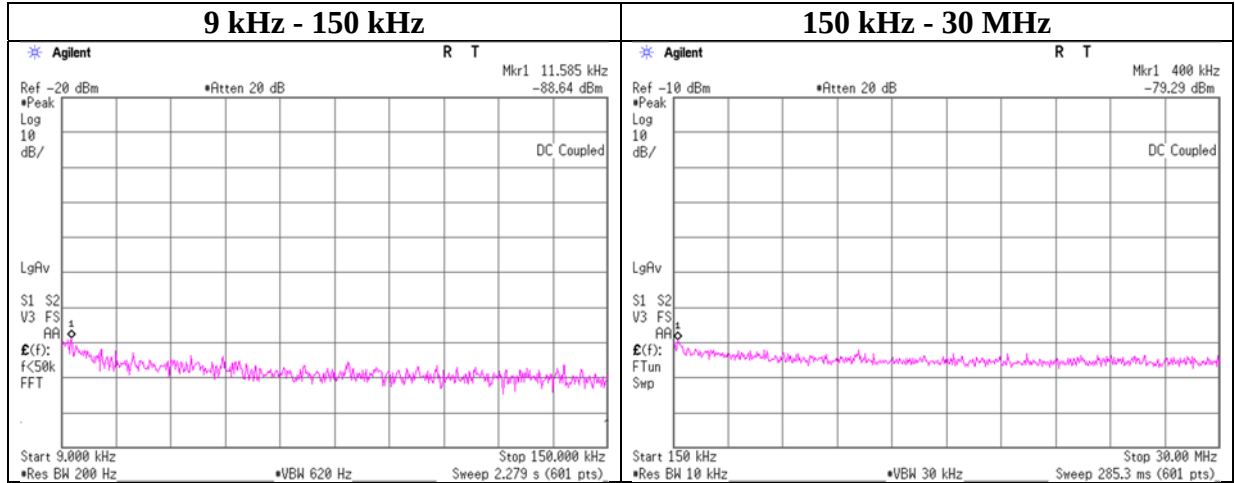
$$E \text{ [dBuV/m]} = \text{EIRP [dBm]} - 20 \log (\text{Distance [m]}) + \text{Ground bounce [dB]} + 104.8 \text{ [dBuV/m]}$$

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

N: Number of output

Conducted Spurious Emission

Report No. 13734674S-A-R2
Test place Shonan EMC Lab. No.5 Shielded Room
Date March 19, 2021
Temperature / Humidity 24 deg. C / 50 % RH
Engineer Shiro Kobayashi
Mode Tx BT LE 2 M-PHY 2480 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
11.59	-88.64	0.01	9.93	3.40	1	-75.3	300	6.0	-14.0	46.3	60.3	-
400.00	-79.29	0.01	9.93	3.40	1	-66.0	300	6.0	-4.7	15.5	20.2	-

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

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

N: Number of output

Power Density

Report No. 13734674S-A-R2
Test place Shonan EMC Lab. No.5 Shielded Room
Date March 19, 2021 March 26, 2021
Temperature / Humidity 24 deg. C / 50 % RH 23 deg. C / 46 % RH
Engineer Shiro Kobayashi Toshinori Yamada
Mode Tx

11b

Freq. [MHz]	Reading [dBm / 3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm / 3 kHz]	Limit [dBm / 3 kHz]	Margin [dB]
2412	-26.08	1.67	10.18	-14.23	8.00	22.23
2437	-25.97	1.66	10.18	-14.13	8.00	22.13
2462	-25.82	1.66	10.18	-13.98	8.00	21.98

11g

Freq. [MHz]	Reading [dBm / 3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm / 3 kHz]	Limit [dBm / 3 kHz]	Margin [dB]
2412	-25.67	1.67	10.18	-13.82	8.00	21.82
2437	-25.43	1.66	10.18	-13.59	8.00	21.59
2462	-25.46	1.66	10.18	-13.62	8.00	21.62

11n-20

Freq. [MHz]	Reading [dBm / 3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm / 3 kHz]	Limit [dBm / 3 kHz]	Margin [dB]
2412	-24.67	1.67	10.18	-12.82	8.00	20.82
2437	-24.32	1.66	10.18	-12.48	8.00	20.48
2462	-24.32	1.66	10.18	-12.48	8.00	20.48

11n-40

Freq. [MHz]	Reading [dBm / 3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm / 3 kHz]	Limit [dBm / 3 kHz]	Margin [dB]
2422	-30.00	1.67	10.18	-18.15	8.00	26.15
2437	-29.88	1.66	10.18	-18.04	8.00	26.04
2452	-29.59	1.67	10.18	-17.74	8.00	25.74

BT LE 1 M-PHY

Freq. [MHz]	Reading [dBm / 3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm / 3 kHz]	Limit [dBm / 3 kHz]	Margin [dB]
2402	-22.25	1.10	9.96	-11.19	8.00	19.19
2440	-22.39	1.10	9.96	-11.33	8.00	19.33
2480	-22.59	1.10	9.96	-11.53	8.00	19.53

BT LE 2 M-PHY

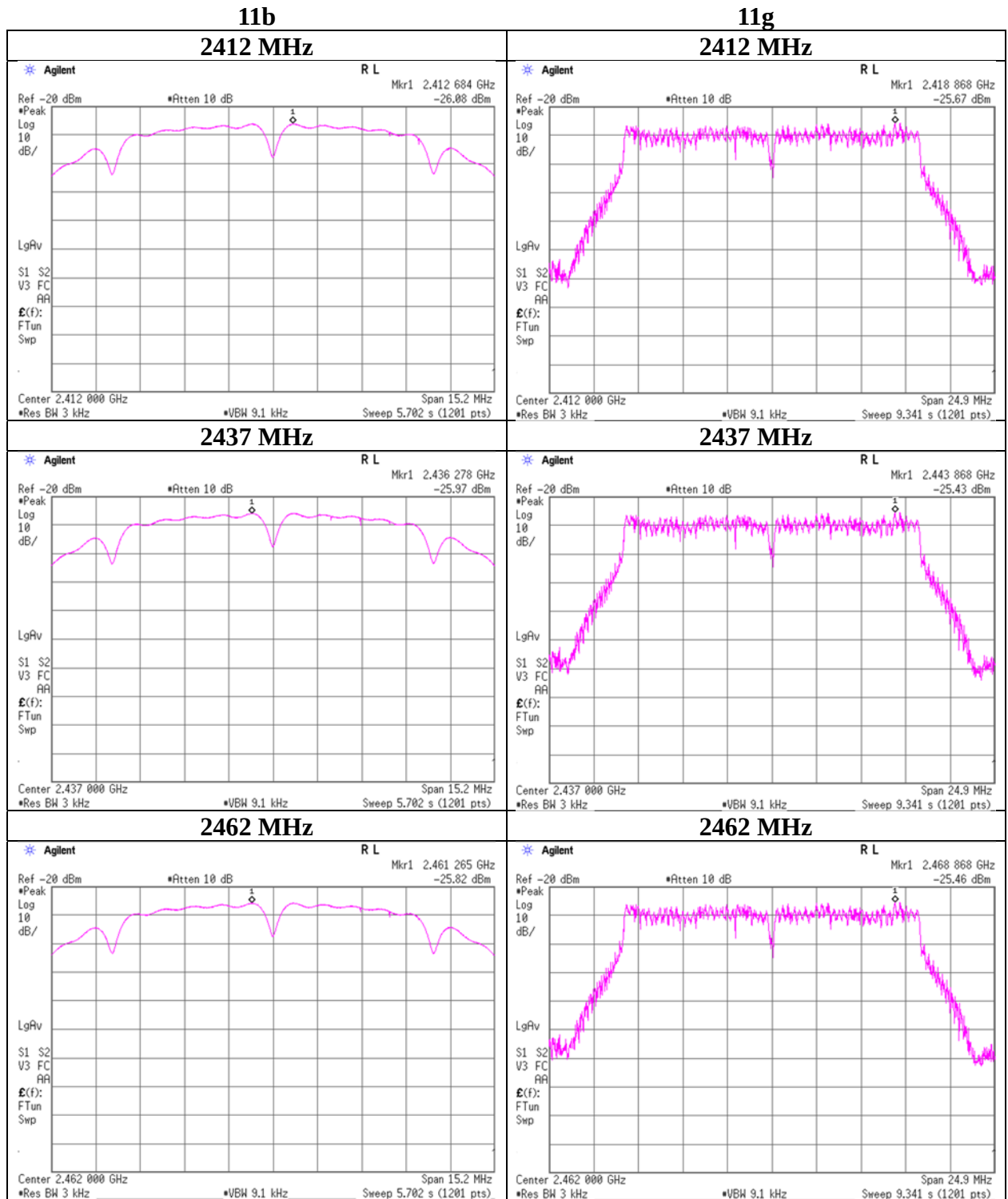
Freq. [MHz]	Reading [dBm / 3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm / 3 kHz]	Limit [dBm / 3 kHz]	Margin [dB]
2402	-25.83	1.10	9.96	-14.77	8.00	22.77
2440	-25.90	1.10	9.96	-14.84	8.00	22.84
2480	-26.15	1.10	9.96	-15.09	8.00	23.09

Sample Calculation:

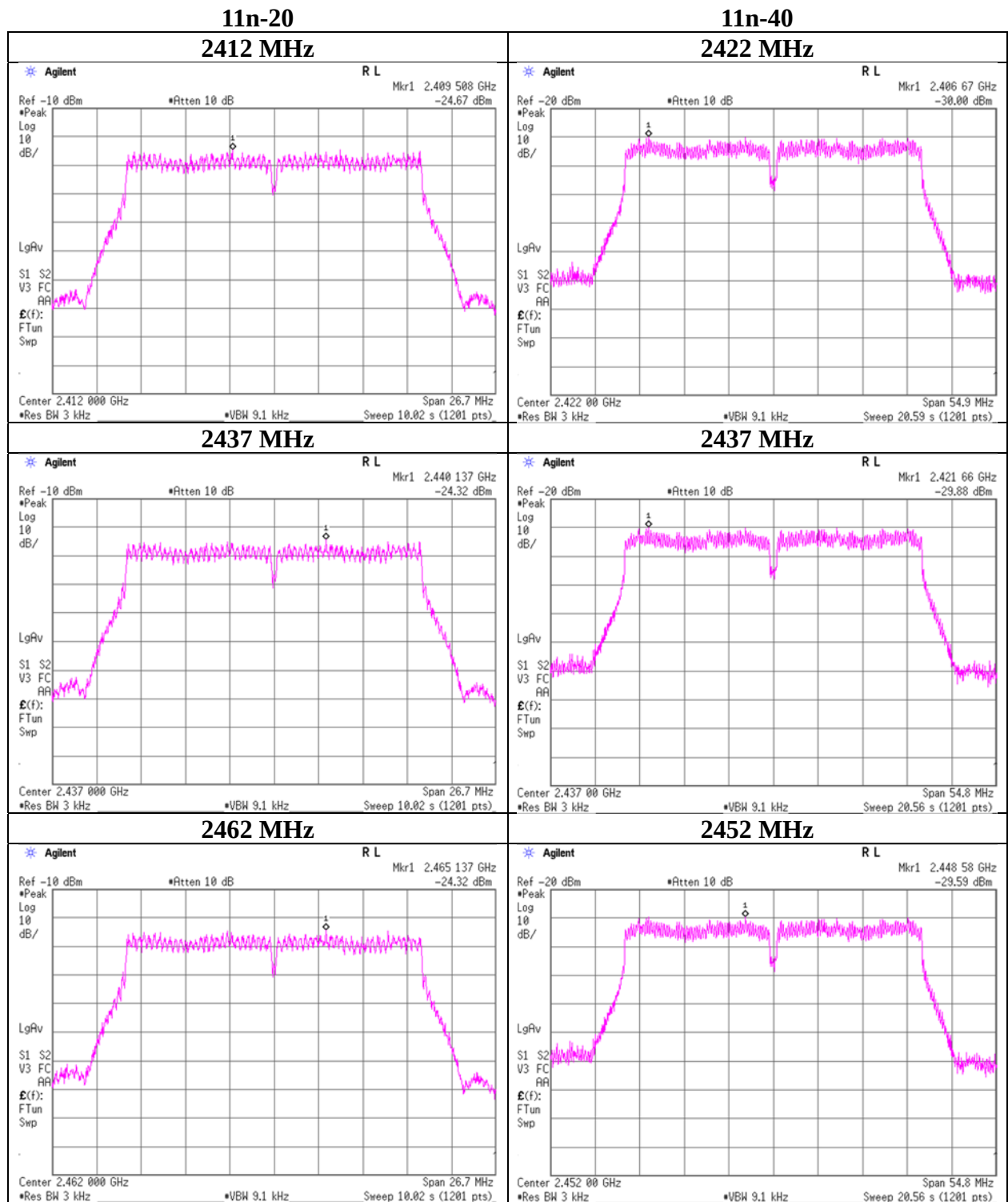
Result = Reading + Cable Loss + Attenuator Loss

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

Power Density



Power Density



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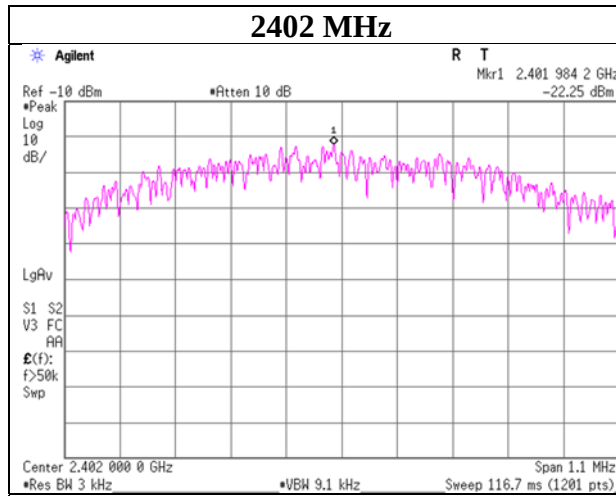
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

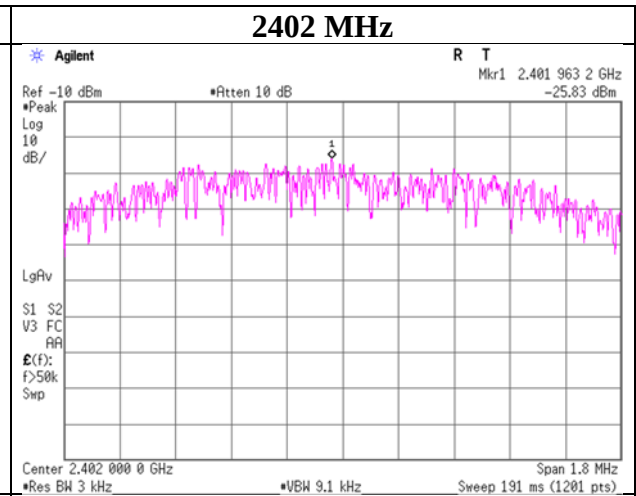
Facsimile : +81 463 50 6401

Power Density

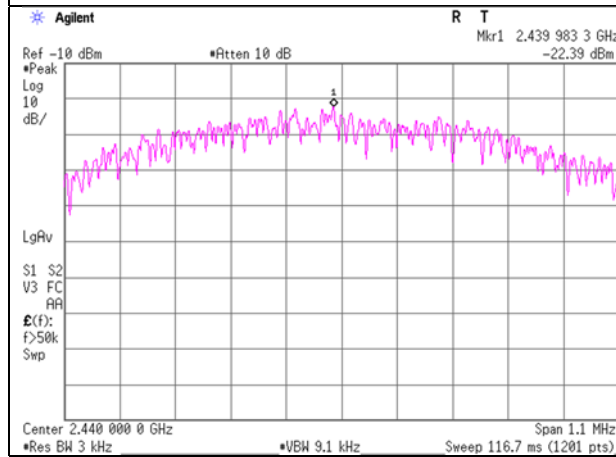
BT LE 1 M-PHY



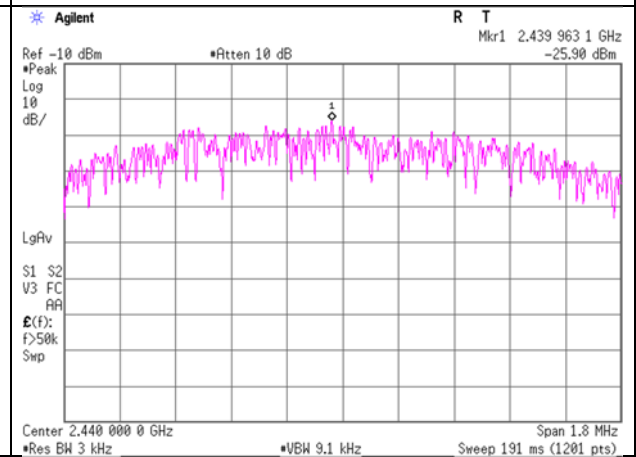
BT LE 2 M-PHY



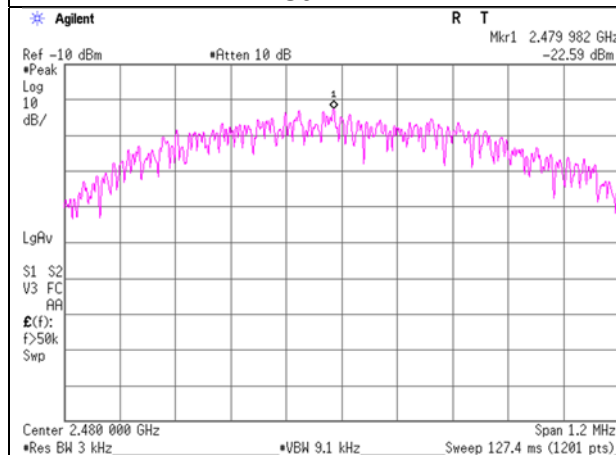
2440 MHz



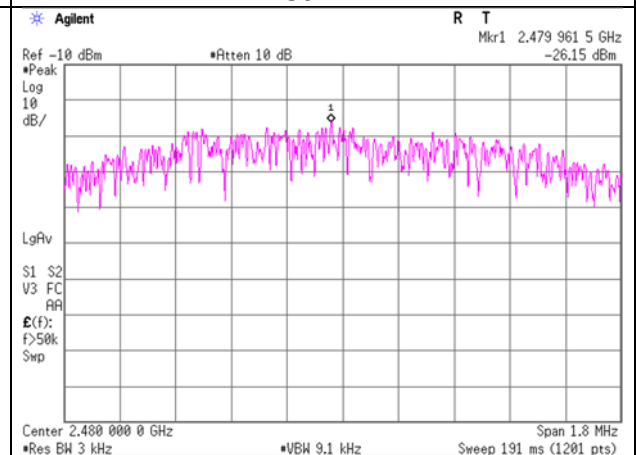
2440 MHz



2480 MHz



2480 MHz



APPENDIX 2: Test instruments

Test equipment(1/3)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
AT	KTS-07	145111	Digital Tester	SANWA	PC500	7019232	2020/10/21	12
AT	SAT10-14	154591	Attenuator	Weinschel Corp.	54A-10	81595	2021/04/08	12
AT	SCC-G12	145040	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	2021/03/04	12
AT	SCC-G13	145166	Coaxial Cable	Suhner	SUCOFLEX 102	31599/2	2020/12/21	12
AT	SCC-H21	197395	Microwave cable	RS Pro	R-132G7210 100CO	-	2021/04/08	12
AT	SCC-H22	197396	Microwave cable	RS Pro	R-132G7210 100CO	-	2021/04/08	12
AT	SOS-27	191845	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2020/09/29	12
AT	SPM-13	169910	Power Meter	Keysight Technologies Inc	8990B	MY51000448	2021/01/25	12
AT	SPSS-06	169911	Power sensor	Keysight Technologies Inc	N1923A	MY57270004	2021/01/25	12
AT	SRENT-15	160899	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46185516	2021/01/26	12
AT	STM-G10	171617	Terminator	Weinschel - API Technologies Corp	M1459A	92420	2021/05/18	12
AT,RE	SAT10-05	145136	Attenuator	Keysight Technologies Inc	8493C-010	74864	2020/10/05	12
AT,RE	SAT10-15	160493	Attenuator	Weinschel Corp.	54A-10	83406	2020/12/21	12
AT,RE	SSA-02	145800	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY48250106	2021/04/13	12
CE	SAT3-10	144960	Attenuator	JFW	50HF-003N	-	2020/08/18	12
CE	SCC-C9/C10/SRSE-03	145036	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4 906	-/0901-271(RF Selector)	2021/04/12	12
CE	SLS-02	145539	LISN	Rohde & Schwarz	ENV216	100512	2021/02/24	12
CE	SLS-05	145542	LISN	Rohde & Schwarz	ENV216	100516	2021/02/12	12
CE	SOS-06	146294	Humidity Indicator	A&D Company	AD-5681	4062118	-	-
CE	STM-23	146200	Terminator	TME	CT-01 BP	-	2021/01/26	12
CE,RE	COTS-SEMI-5	170932	EMI Software	TSJ (Techno Science Japan)	TEPTO-DV3(RE,CE,ME,PE)	-	-	-
CE,RE	KJM-02	146432	Measure	TAJIMA	GL19-55	-	-	-
CE,RE	STR-08	150463	Test Receiver	Rohde & Schwarz	ESW44	101581	2020/12/02	12
CE,RE	STS-03	146210	Digital Hitester	HIOKI E.E. CORPORATION	3805-50	80997823	2020/10/19	12
RE	KBA-01	146343	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	BBA9106	1748	2021/06/12	12
RE	KJM-09	145929	Measure	KOMELON	KMC-36	-	-	-
RE	KJM-10	146454	Measure	KOMELON	KMC-36	-	-	-
RE	KSA-08	145089	Spectrum Analyzer	Keysight Technologies Inc	E4446A	MY46180525	2020/11/24	12
RE	SAEC-01(SVSWR)	145561	Semi-Anechoic Chamber	TDK	SAEC-01(SVSWR)	1	2021/05/09	12
RE	SAEC-02(SVSWR)	145598	Semi-Anechoic Chamber	TDK	SAEC-02(SVSWR)	2	2021/05/20	12
RE	SAEC-03(NSA)	145565	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	2021/04/27	12
RE	SAEC-03(SVSWR)	145566	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	2021/05/21	12

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Test equipment(2/3)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	SAF-03	145126	Pre Amplifier	SONOMA	310N	290213	2021/02/10	12
RE	SAF-04	145127	Pre Amplifier	Toyo Corporation	TPA0118-36	2072554	2021/05/17	12
RE	SAF-05	145128	Pre Amplifier	Toyo Corporation	TPA0118-36	1440490	2021/05/17	12
RE	SAF-06	145005	Pre Amplifier	Toyo Corporation	TPA0118-36	1440491	2021/02/08	12
RE	SAF-08	145007	Pre Amplifier	Toyo Corporation	HAP18-26W	19	2021/03/01	12
RE	SAJ-03	146105	Antenna Tilt Jig	Intelligent System Engineering Co., Ltd	Antenna Tilt Jig	T-S003	-	-
RE	SAT10-06	145137	Attenuator	Keysight Technologies Inc	8493C-010	74865	2020/10/05	12
RE	SAT6-13	167094	Attenuator	JFW	50HF-006N	-	2021/02/10	12
RE	SCC-C1/C2/C3/C4/C5/C10/SRSE-03	145171	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/T OYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	2021/04/12	12
RE	SCC-G05	145039	Coaxial Cable	Junkosha	J12J102207-00	APR-30-15-037	2021/01/26	12
RE	SCC-G15	145176	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	2021/03/01	12
RE	SCC-G40	166491	Coaxial Cable	Junkosha	MWX221-01000NFSNMS/B	1612S005	2021/01/19	12
RE	SCC-G41	151617	Coaxial Cable	Junkosha	MWX221-01000NFSNMS/B	1612S006	2021/01/19	12
RE	SCC-G43	156380	Coaxial Cable	Huber+Suhner	SUCOFLEX_104_E	SN MY 13406/4E	2021/05/17	12
RE	SCC-G45	168301	Coaxial Cable	Huber+Suhner	SUCOFLEX 102 E	800137/2EA	2021/03/01	12
RE	SCC-G50	178573	Coaxial Cable	Huber+Suhner	SUCOFLEX_104_E	MY13407/4E	2021/03/01	12
RE	SCC-G51	178572	Coaxial Cable	Huber+Suhner	SUCOFLEX 104	800288 /4A	2021/03/01	12
RE	SCC-G57	179540	Coaxial Cable	Huber+Suhner	SUCOFLEX 102	802815/2	2021/05/18	12
RE	SCC-G58	183047	Coaxial Cable	Huber+Suhner	SUCOFLEX 104	800287/4A	2021/05/17	12
RE	SCC-G62	196985	Coaxial Cable	Huber+Suhner	SUCOFLEX 102	803650/2	2021/03/01	12
RE	SCC-G69	200009	Coaxial Cable	Huber+Suhner	SUCOFLEX 104	575617/4	2020/07/07	12
RE	SCC-G70	200010	Coaxial Cable	Huber+Suhner	SUCOFLEX 104	575618/4	2020/07/07	12
RE	SFL-02	145301	Highpass Filter	MICRO-TRONICS	HPM50111	51	2020/10/05	12
RE	SFL-03	145377	Highpass Filter	MICRO-TRONICS	HPM50112	28	2020/10/05	12
RE	SFL-18	145305	Highpass Filter	MICRO-TRONICS	HPM50111	119	2021/04/08	12
RE	SFL-25	202959	Highpass Filter	MICRO-TRONICS	HPM50107	G077	2020/11/20	12
RE	SHA-01	145383	Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	9120D-725	2021/05/20	12
RE	SHA-02	145384	Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	9120D-726	2021/06/14	12
RE	SHA-03	145501	Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	9120D-739	2021/06/14	12
RE	SHA-04	145512	Horn Antenna	ETS-Lindgren	3160-09	00094868	2021/06/14	12
RE	SHA-10	194685	Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA 9120 C	711	2021/03/03	12
RE	SLA-01	145531	Logperiodic Antenna	Schwarzbeck Mess-Elektronik OHG	UHALP9108A	UHALP 9108-A 0888	2021/06/12	12

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Test equipment(3/3)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	SOS-20	191837	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2020/09/28	12
RE	SOS-21	191838	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2020/09/28	12
RE	SOS-23	191840	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2020/09/28	12
RE	STR-07	146209	Test Receiver	Rohde & Schwarz	ESU26	100484	2020/09/07	12
RE	STS-01	145792	Digital Hitester	HIOKI E.E. CORPORATION	3805-50	80997812	2020/10/19	12
RE	STS-02	145793	Digital Hitester	HIOKI E.E. CORPORATION	3805-50	80997819	2021/04/28	12

***Hyphens for Last Calibration 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.

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

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

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