RADIO TEST REPORT

Test Report No. : 13462774S-B-R1

Applicant	:	**Panasonic Corporation**
Type of EUT	:	**Car Navigation**
Model Number of EUT	:	**AT2105**
FCC ID	:	**ACJ932AT2105**
Test regulation	:	**FCC Part 15 Subpart C: 2020** ***Wireless LAN & Bluetooth Low Energy part**
Test Result	:	**Complied (Refer to SECTION 3.2)**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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6. This test report covers Radio technical requirements.
   It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. The all test items in this test report are conducted by UL Japan, Inc. Shonan EMC Lab.
8. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
9. The information provided from the customer for this report is identified in SECTION 1.
10. This report is a revised version of 13462774S-B. 13462774S-B is replaced with this report.

Date of test: August 18 to September 9, 2020

Representative test engineer:
Shiro Kobayashi
Engineer
Consumer Technology Division

Approved by:
Shinichi Takano
Engineer
Consumer Technology Division

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".

REVISION HISTORY

Original Test Report No.: 13462774S-B

Revision	Test report No.	Date	Page revised	Contents
- (Original)	13462774S-B	October 22, 2020	-	-
1	13462774S-B-R1	November 20, 2020	P.33	Adding comment: "* The above chart is obtained with the Maximum Packet Size set that can be by test software, and it is different from the maximum duty cycle of the product."
			P.35	Correction of comment: from "data communication mode" to "Advertising mode"
			P.107	Addition comment: *1)

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Reference: Abbreviations (Including words undescribed in this report)

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

CONTENTS **PAGE**

SECTION 1: Customer information

Company Name	:	Panasonic Corporation
Address	:	4261 Ikonobe-cho, Tsuzuki-ku, Yokohama-shi, Kanagawa-ken, 224-8520, Japan
Telephone Number	:	+81-50-3689-7112
Contact Person	:	Takahisa Sakai

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	:	Car Navigation
Model Number	:	AT2105
Serial Number	:	Refer to SECTION 4.2
Rating	:	DC 13.2 V
Receipt Date	:	July 31, 2020
Country of Mass-production	:	Japan, Mexico, Czech Republic
Condition	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	:	No Modification by the test lab.

2.2 Product Description

Model: AT2105 (referred to as the EUT in this report) is a Car Navigation.

Radio Specification

	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, 5745 MHz – 5825 MHz	5190 MHz, 5230 MHz, 5755 MHz, 5795 MHz
Channel spacing	5 MHz		2.4 GHz band: 5 MHz 5 GHz band: 20 MHz	40 MHz
Modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (64QAM, 16QAM, QPSK, BPSK)	OFDM (64QAM, 16QAM, QPSK, BPSK)	
	IEEE802.11a	**IEEE802.11ac (20 MHz band)**	**IEEE802.11ac (40 MHz band)**	**IEEE802.11ac (80 MHz band)**
Frequency of operation	5180 MHz – 5240 MHz, 5745 MHz – 5825 MHz	5180 MHz – 5240 MHz, 5745 MHz – 5825 MHz	5190 MHz, 5230 MHz, 5755 MHz, 5795 MHz	5210 MHz, 5775 MHz
Channel spacing	20 MHz		40 MHz	80 MHz
Modulation	OFDM (64QAM, 16QAM, QPSK, BPSK)	OFDM (256QAM,16QAM,QPSK,BPSK)		

	Bluetooth (BR/EDR)	**Bluetooth Low Energy**	
Frequency of operation	2402 MHz – 2480 MHz	2402 MHz – 2480 MHz	
Channel spacing	1 MHz	2 MHz	
Modulation	FHSS, GFSK, π/4DQPSK, 8DPSK	FHSS, GFSK	
Antenna type	Inverted F type antenna		
Antenna Gain	RF0	2.4 GHz WLAN	-1.44 dBi
		U-NII-1	-1.25 dBi
		U-NII-3	0.24 dBi
	RF1	BT, BT LE	0.05 dBi
		U-NII-1	0.33 dBi
		U-NII-3	0.01 dBi
Antenna Connector type	HFC IV Coaxial connector		
Operating Temperature	-30 deg. C to + 65 deg. C		

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
FCC Part 15 final revised on October 13, 2020
* The revision does not affect the test result conducted before its effective date.

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

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

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	**FCC:** ANSI C63.10-2013 6. Standard test methods	**FCC:** Section 15.207	-	N/A *1)	-
	ISED: RSS-Gen 8.8	**ISED:** RSS-Gen 8.8			
6 dB Bandwidth	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05r02	**FCC:** Section 15.247(a)(2)	See data.	Complied a)	Conducted
	ISED: -	**ISED:** RSS-247 5.2(a)			
Maximum Peak Output Power	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05r02	**FCC:** Section 15.247(b)(3)		Complied b)	Conducted
	ISED: RSS-Gen 6.12	**ISED:** RSS-247 5.4(d)			
Power Density	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05r02	**FCC:** Section 15.247(e)		Complied c)	Conducted
	ISED: -	**ISED:** RSS-247 5.2(b)			
Spurious Emission Restricted Band Edges	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05r02	**FCC:** Section15.247(d)	3.6 dB 2390.000 MHz, AV, Hori, Mode: Tx 11g 2417 MHz	Complied# d) ,e)	Conducted (below 30 MHz)/ Radiated (above 30 MHz) *2)
	ISED: RSS-Gen 6.13	**ISED:** RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10			

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.
*1) The test is not applicable since the EUT does not have AC Mains
*2) 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 6 dB Bandwidth and 99 % Occupied Bandwidth)
b) Refer to APPENDIX 1 (data of Maximum Peak Output Power)
c) Refer to APPENDIX 1 (data of Power Density)
d) Refer to APPENDIX 1 (data of Conducted Spurious Emission)
e) Refer to APPENDIX 1 (data of Radiated Spurious Emission)

Symbols:
Complied The data of this test item has enough margin, more than the measurement uncertainty.
Complied# The data of this test item meets the limits unless the measurement uncertainty is taken into consideration.

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

FCC Part 15.31 (e)

The EUT provides stable voltage constantly to the RF Part regardless of input voltage.
Instead of a new battery, DC power supply was used for the test. That does not affect the test result, therefore the EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

The EUT has a unique antenna connector (HFC IV Coaxial connector). Therefore the equipment complies with the requirement of 15.203.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99 % Occupied Bandwidth	**ISED:** RSS-Gen 6.7	**ISED:** -	N/A	- a)	Conducted
a) 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 $k = 2$.

Shonan EMC Lab.

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	2.5 dB	2.6 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.0 dB	3.0 dB	3.0 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	4.9 dB	4.9 dB	4.9 dB	-
	6 GHz-18 GHz	5.5 dB	5.5 dB	5.5 dB	-
	18 GHz-40 GHz	5.4 dB	5.4 dB	5.4 dB	-
Radiated emission (Measurement distance: 1 m)	1 GHz-18 GHz	5.8 dB	5.8 dB	5.8 dB	-
	18 GHz-40 GHz	5.7 dB	5.7 dB	5.7 dB	-

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector)_SPM-06	0.98 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-06	1.75 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.89 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-07	1.12 dB
Power Measurement above 1 GHz (Average Detector)_SPM-13	1.06 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-13	1.24 dB
Spurious emission (Conducted) below 1GHz	0.9 dB
Spurious emission (Conducted) 1 GHz-3 GHz	0.9 dB
Spurious emission (Conducted) 3 GHz-18 GHz	2.9 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.6 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.0 dB
Bandwidth Measurement	0.07 %
Duty cycle and Time Measurement	0.262 %
Temperature	0.95 deg.C.
Voltage	0.83 %

3.5 Test Location

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A2LA Certificate Number: 1266.03 (FCC Test Firm Registration Number: 626366, ISED Lab Company Number: 2973D)

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.

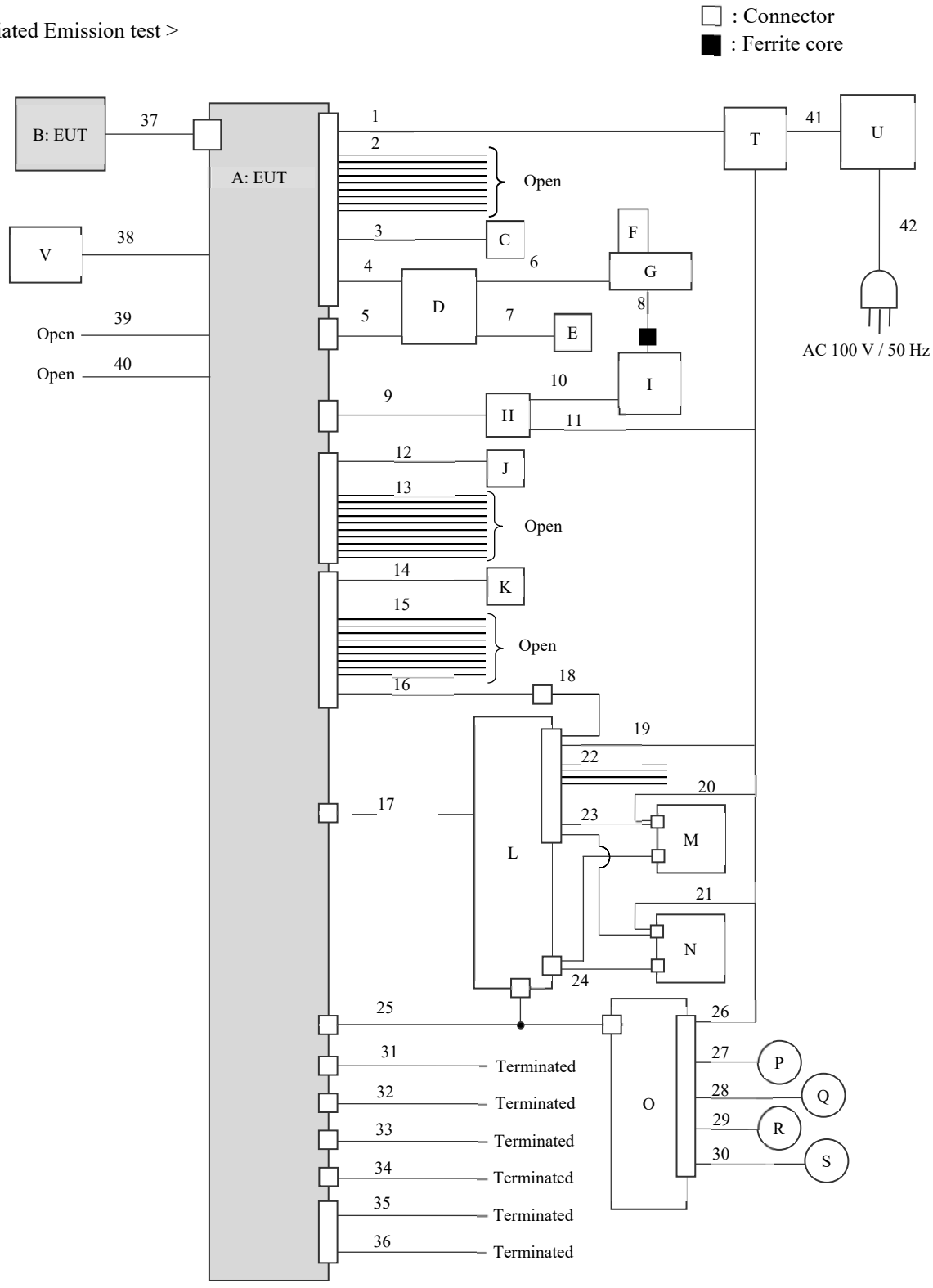
Mode	Remarks*
IEEE 802.11b (11b)	1 Mbps, PN9
IEEE 802.11g (11g)	54 Mbps, PN9
IEEE 802.11n SISO 20 MHz BW (11n-20)	MCS 7, PN9
Bluetooth (BT) Low Energy (LE)	Uncoded 1 M-PHY, Maximum Packet Size, PRBS9
	Uncoded 2 M-PHY, Maximum Packet Size, PRBS9
*The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)	
*Power of the EUT was set by the software as follows; Power settings: 11b : 13 dBm, 11g: 11 dBm (2412 MHz, 2462 MHz), 13 dBm (2417 MHz to 2457 MHz) 11n-20: 10 dBm (2412 MHz, 2462 MHz), 12 dBm (2417 MHz to 2457 MHz) BT LE 1 M-PHY: Fixed BT LE 2 M-PHY: Fixed Software: Labtool Version: 2.0.0.71 (Date: 2020.05.29, Storage location: EUT memory) *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.	

*The details of Operating mode(s)

Test Item	Operating Mode	Tested frequency
Conducted Spurious Emission	Tx, 11n-20	2437 MHz
	Tx BT LE 1 M-PHY, Tx BT LE 2 M-PHY	2402 MHz 2440 MHz 2480 MHz
Radiated Spurious Emission (Below 1 GHz)	Tx, 11n-20	2437 MHz
	Tx BT LE 1 M-PHY, Tx BT LE 2 M-PHY	2402 MHz 2440 MHz 2480 MHz
Radiated Spurious Emission (Above 1 GHz)	Tx, 11b, Tx, 11b with Tx 11ac-20 CDD 5240 MHz	2412 MHz 2437 MHz 2462 MHz
	Tx, 11g, Tx, 11n-20, Tx, 11g with Tx 11ac-20 CDD 5240 MHz, Tx, 11n-20 with Tx 11ac-20 CDD 5240 MHz	2412 MHz 2417 MHz 2437 MHz 2457 MHz 2462 MHz
	Tx BT LE 1 M-PHY, Tx BT LE 2 M-PHY	2402 MHz 2440 MHz 2480 MHz
6 dB Bandwidth Maximum Peak Output Power Power Density 99 % Occupied Bandwidth	Tx, 11b Tx, 11g Tx, 11n-20	2412 MHz 2437 MHz 2462 MHz
	Tx BT LE 1 M-PHY, Tx BT LE 2 M-PHY	2402 MHz 2440 MHz 2480 MHz

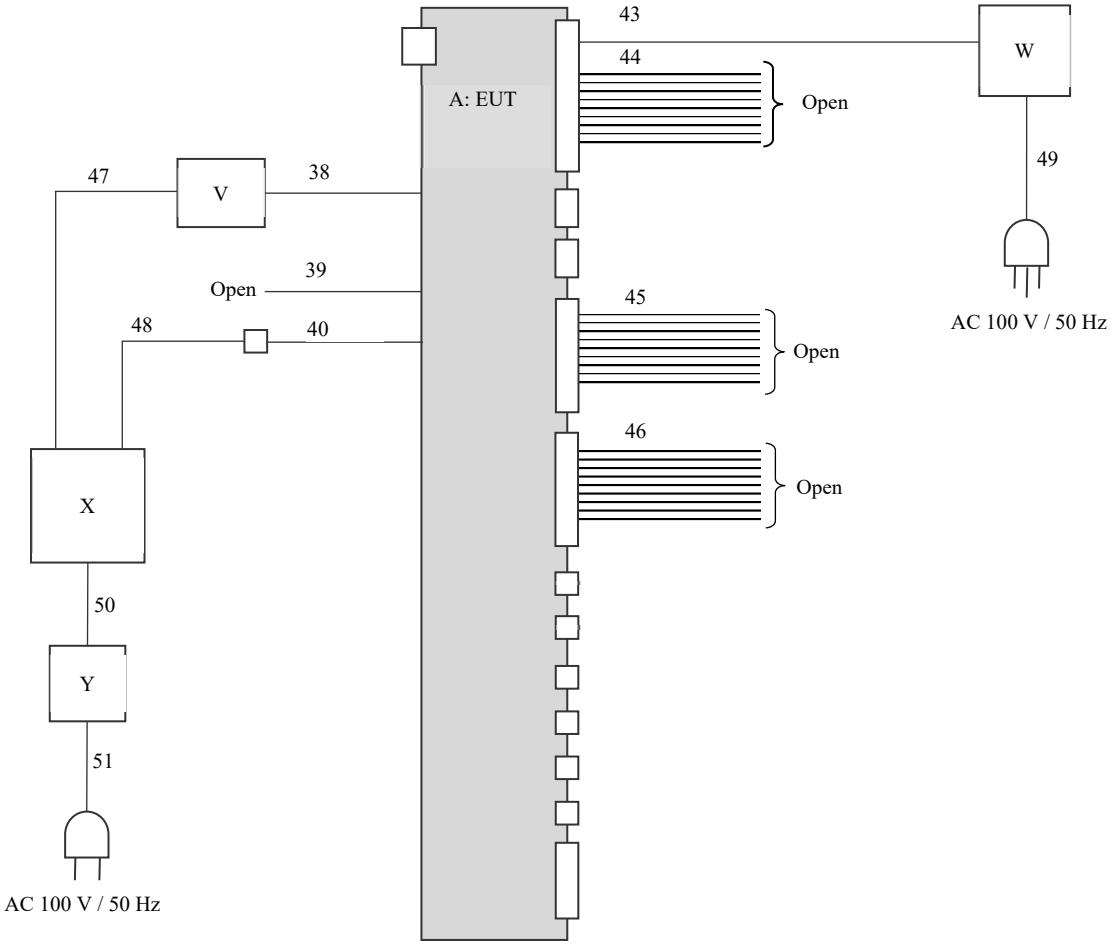
4.2 Configuration and peripherals

< Radiated Emission test >



* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.
*It was preliminary confirmed that there was no difference in emission level due to a standard ferrite core.

< Antenna Terminal Conducted test >



Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Car Navigation	AT2105	002 *1) 001 *2)	Panasonic Corporation	EUT
B	Antenna	CA-AL8BX0AJ	001	Panasonic Corporation	EUT
C	Steering Switch	-	1142	Panasonic Corporation	-
D	IF Box	DEP32-10078	033	Panasonic Corporation	-
E	Bluetooth Speaker	SRS-X11	2154715	Sony Corporation	-
F	USB memory	USM4GU	-	Sony Corporation	-
G	USB Hub	U3H-A422BX	0600341	ELECOM	-
H	JIG Bord	GVIF2HDJIG	16	Panasonic Corporation	-
I	Separate Display	On-Lap 1102I	11102100908028	TEKWIND	-
J	Mic	GP-SDA3510A	0DC062856	Panasonic Corporation	-
K	Mic	GP-SDA3510A	0DC062519	Panasonic Corporation	-
L	RSE ECU	CR-EL3BX0AJ	1S-188	Panasonic Corporation	-
M	RSE Display	CR-FL3BJ0AJ	107	Panasonic Corporation	-
N	RSE Display	CR-FL3BJ0AJ	108	Panasonic Corporation	-
O	MOST AMP	CL-DL47X2AJ	-	Panasonic Corporation	-
P	Speaker	KFC-RS160	-	KENWOOD	-
Q	Speaker	KFC-RS160	-	KENWOOD	-
R	Speaker	KFC-RS160	-	KENWOOD	-
S	Speaker	KFC-RS160	-	KENWOOD	-
T	Terminal Block	-	-	-	-
U	Power Supply (DC)	PAN35-10A	DE001677	KIKUSUI	-
V	Jig board	RCarDBG_JTAG2	WR19-4014 *1) WR12-3224 *2)	WESTEK	-
W	Power Supply (DC)	PAN35-10A	ML002085	KIKUSUI	-
X	Laptop Computer	7666-77J	LV-B8R1X 08/05	Lenovo	-
Y	AC Adapter	42T4422	11S92P1154Z1DXF 1DBFDN	Lenovo	-

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

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC	2.0	Unshielded	Unshielded	-
2	Signal	2.0	Unshielded	Unshielded	-
3	Signal	2.0 + 0.1	Unshielded	Unshielded	-
4	IF Box Power	2.0 + 0.3	Unshielded	Unshielded	-
5	Signal	2.0	Unshielded	Unshielded	-
6	USB	0.07	Shielded	Shielded	-
7	USB type C	0.9	Shielded	Shielded	-
8	USB	2.0	Shielded	Shielded	-
9	GVIF(Separate Display)	2.5	Shielded	Shielded	-
10	HDMI	1.2	Shielded	Shielded	-
11	DC	1.0	Unshielded	Unshielded	-
12	Mic	2.0 + 0.5	Unshielded	Unshielded	-
13	Signal	2.0	Unshielded	Unshielded	-
14	Mic	2.0 + 0.5	Unshielded	Unshielded	-
15	Signal	2.0	Unshielded	Unshielded	-
16	Signal	2.0	Unshielded	Unshielded	-
17	RSE	3.0	Shielded	Shielded	-
18	Signal	1.0	Unshielded	Unshielded	-
19	DC	1.0	Unshielded	Unshielded	-
20	DC	2.0	Unshielded	Unshielded	-
21	DC	2.0	Unshielded	Unshielded	-
22	Signal	1.0	Unshielded	Unshielded	-
23	Main(RSE)	1.0	Shielded	Shielded	-
24	RSE DISP-ECU	2.0	Unshielded	Unshielded	-
25	MOST AMP	2.5	Unshielded	Unshielded	-
26	DC	1.0	Unshielded	Unshielded	-
27	Speaker	1.0	Unshielded	Unshielded	-
28	Speaker	1.0	Unshielded	Unshielded	-
29	Speaker	1.0	Unshielded	Unshielded	-
30	Speaker	1.0	Unshielded	Unshielded	-
31	A2B	3.0	Unshielded	Unshielded	-
32	DCM	3.0	Shielded	Shielded	-
33	GPS	0.12 + 1.5	Shielded	Shielded	-
34	Sirius XM	2.5	Unshielded	Unshielded	-
35	FM	1.5	Shielded	Shielded	-
36	FM	1.5	Shielded	Shielded	-
37	BT/WLAN Antenna	0.3	Shielded	Shielded	-
38	Signal	0.1	Unshielded	Unshielded	*3)
39	Signal	0.2	Unshielded	Unshielded	*3)
40	UART	0.3	Unshielded	Unshielded	*3)
41	DC	2.4	Unshielded	Unshielded	-
42	AC	2.0	Unshielded	Unshielded	-
43	DC	1.0	Unshielded	Unshielded	-
44	Signal	0.2	Unshielded	Unshielded	-
45	Signal	0.2	Unshielded	Unshielded	-
46	Signal	0.2	Unshielded	Unshielded	-
47	USB	1.5	Shielded	Shielded	-
48	UART-USB	1.8	Shielded	Shielded	-
49	AC	2.0	Unshielded	Unshielded	-
50	DC	1.8	Unshielded	Unshielded	-
51	AC	0.9	Unshielded	Unshielded	-

*3) This cable is for testing and is not included with products.

SECTION 5: Radiated Spurious Emission

Test Procedure

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

[For below 1 GHz]
EUT was placed on a urethane platform of nominal size, 1.0 m by 2.0 m, raised 0.8 m above the conducting ground plane.
The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

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

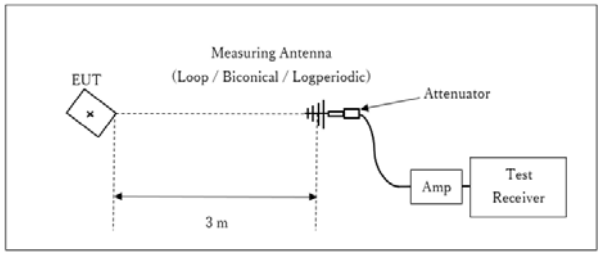
20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9(ISED) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (ISED).

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV *1), *2)	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.
*2) In unwanted emission derived from BT LE carrier, measurement with Average detector was not performed.
The limit for Average detector is applied to the measurement value with Peak detector used Duty cycle correction factor (DCCF).

Figure 1: Test Setup

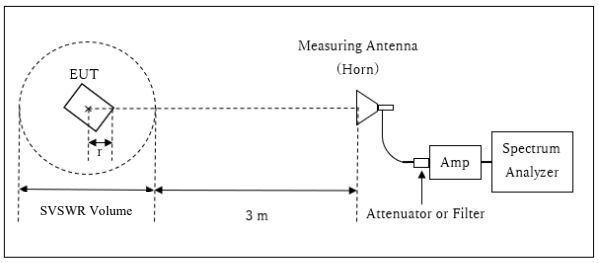
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz - 10 GHz

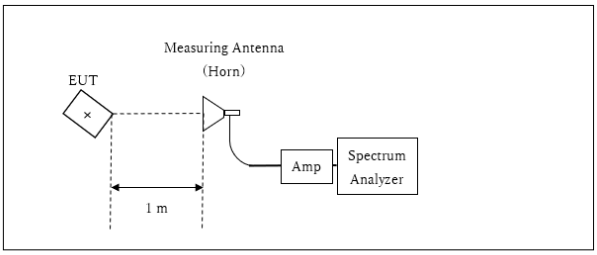


r : Radius of an outer periphery of EUT
× : Center of turn table

Distance Factor: 20 x log (3.82 m / 3.0 m) = 2.10 dB
* Test Distance: (3 + SVSWR Volume /2) - r = 3.82 m

SVSWR Volume : 2.0 m
(SVSWR Volume has been calibrated based on CISPR 16-1-4.)
r = 0.18 m

10 GHz - 40 GHz



× : Center of turn table

Distance Factor: 20 x log (1.0 m / 3.0 m) = -9.54 dB
*Test Distance: 1 m

- The carrier level and noise levels were confirmed at each position of 0 deg and 30 deg of EUT and -90 deg, 0 deg and 90 deg of Antenna to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Worst case:
<WLAN >
EUT

Antenna polarization	Carrier (Band edge)	Spurious				
		Below 1 GHz	Above 1 GHz			
			1 GHz - 2.8 GHz	2.8 GHz - 10 GHz	10 GHz - 18 GHz	18 GHz - 26.5 GHz
Horizontal	0 deg.	0 deg.	0 deg.	0 deg.	0 deg.	0 deg.
Vertical	0 deg.	0 deg.	0 deg.	0 deg.	0 deg.	0 deg.

Antenna

Antenna polarization	Carrier (Band edge)	Spurious				
		Below 1 GHz	Above 1 GHz			
			1 GHz - 2.8 GHz	2.8 GHz - 10 GHz	10 GHz - 18 GHz	18 GHz - 26.5 GHz
Horizontal	0 deg.	0 deg.	0 deg.	0 deg.	0 deg.	0 deg.
Vertical	-90 deg.	0 deg.	-90 deg.	0 deg.	0 deg.	0 deg.

<BT LE >

EUT

Antenna polarization	Carrier (Band edge)	Spurious				
		Below 1 GHz	Above 1 GHz			
			1 GHz - 2.8 GHz	2.8 GHz - 10 GHz	10 GHz - 18 GHz	18 GHz - 26.5 GHz
Horizontal	0 deg.	0 deg.	0 deg.	0 deg.	0 deg.	0 deg.
Vertical	0 deg.	0 deg.	0 deg.	0 deg.	0 deg.	0 deg.

Antenna

Antenna polarization	Carrier (Band edge)	Spurious				
		Below 1 GHz	Above 1 GHz			
			1 GHz - 2.8 GHz	2.8 GHz - 10 GHz	10 GHz - 18 GHz	18 GHz - 26.5 GHz
Horizontal	-90 deg.	0 deg.	-90 deg.	-90 deg.	0 deg.	0 deg.
Vertical	-90 deg.	0 deg.	-90 deg.	-90 deg.	0 deg.	0 deg.

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

SECTION 6: Antenna Terminal Conducted Tests

Test Procedure

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

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
6 dB Bandwidth	50 MHz, 10 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99 % Occupied Bandwidth *1)	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	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 low enough 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 Ohmes. 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

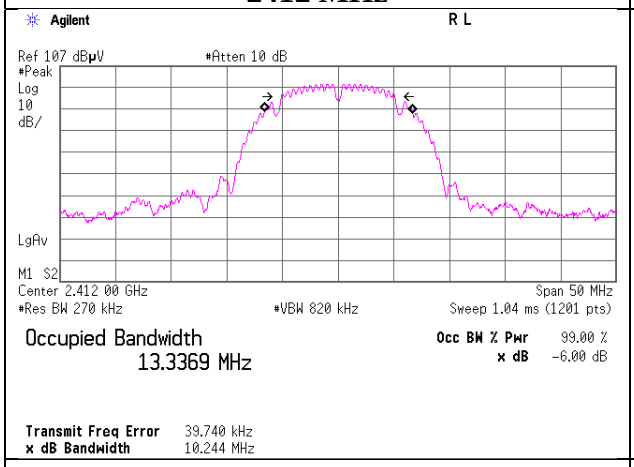
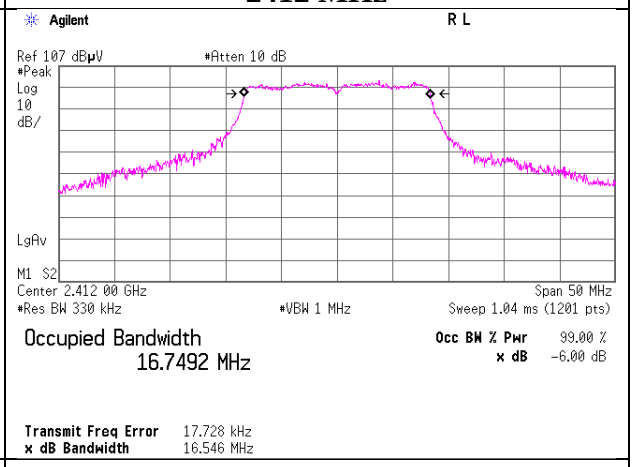
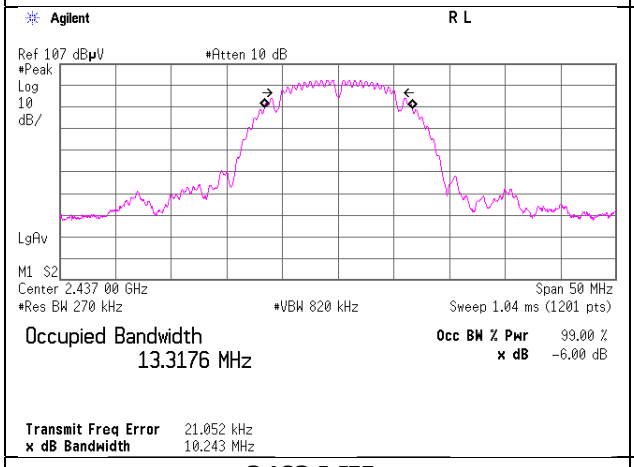
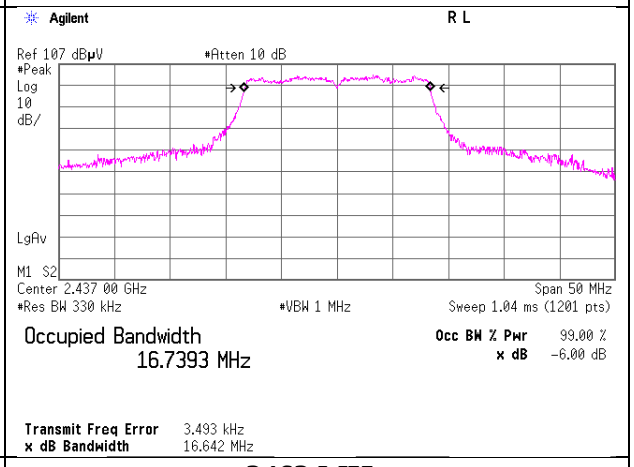
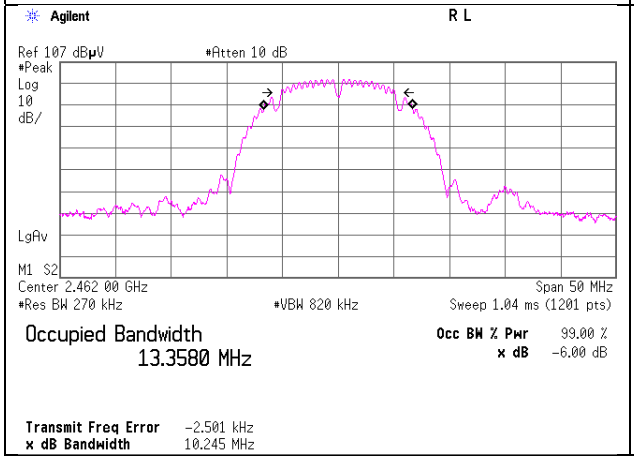
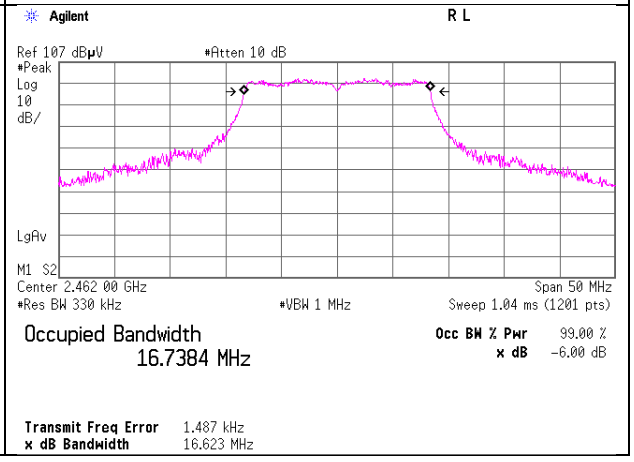
APPENDIX 1: Test data

6 dB Bandwidth and 99 % Occupied Bandwidth

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	September 4, 2020
Temperature / Humidity	23 deg. C / 54 % RH
Engineer	Toshinori Yamada
Mode	Tx

Mode	Frequency [MHz]	99% Occupied Bandwidth [kHz]	6dB Bandwidth [MHz]	Limit for 6dB Bandwidth [MHz]
11b	2412	13336.9	10.095	> 0.5000
	2437	13317.6	10.104	> 0.5000
	2462	13358.0	10.091	> 0.5000
11g	2412	16749.2	16.490	> 0.5000
	2437	16739.3	16.515	> 0.5000
	2462	16738.4	16.520	> 0.5000
11n-20	2412	17804.4	17.709	> 0.5000
	2437	17828.3	17.726	> 0.5000
	2462	17789.0	17.727	> 0.5000
BT LE 1 M-PHY	2402	1038.8	0.712	> 0.5000
	2440	1039.0	0.715	> 0.5000
	2480	1039.0	0.721	> 0.5000
BT LE 2 M-PHY	2402	2074.5	1.256	> 0.5000
	2440	2073.8	1.233	> 0.5000
	2480	2076.3	1.309	> 0.5000

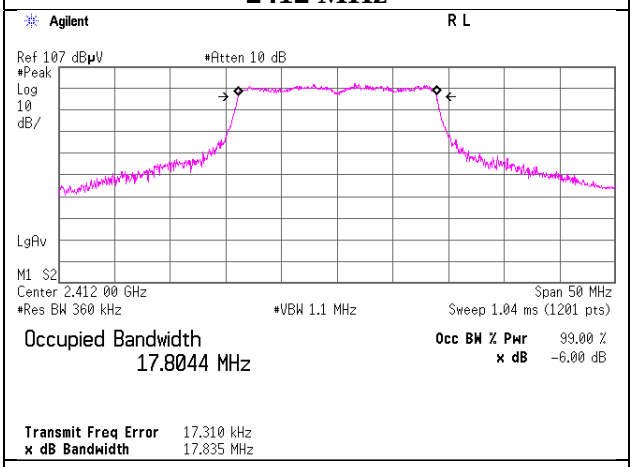
99 % Occupied Bandwidth

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

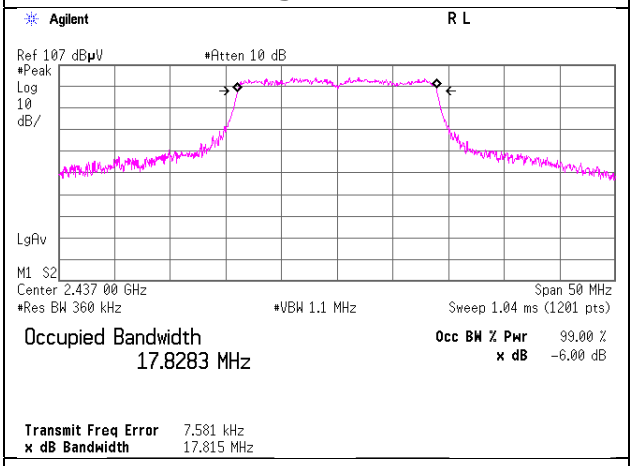
99 % Occupied Bandwidth

11n-20

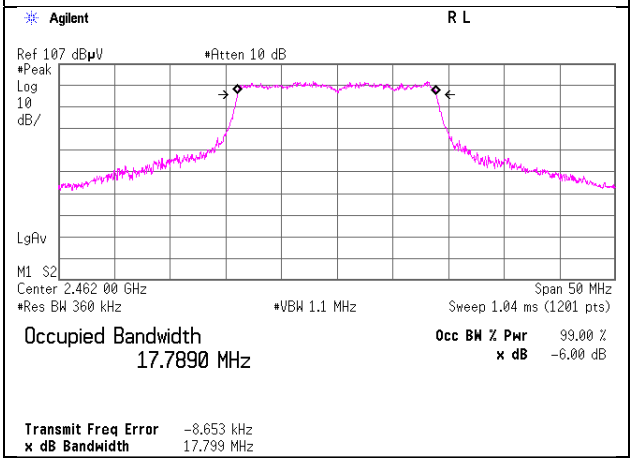
2412 MHz



2437 MHz



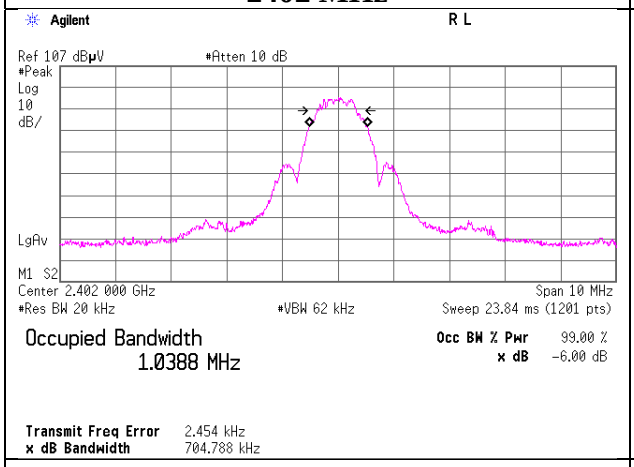
2462 MHz



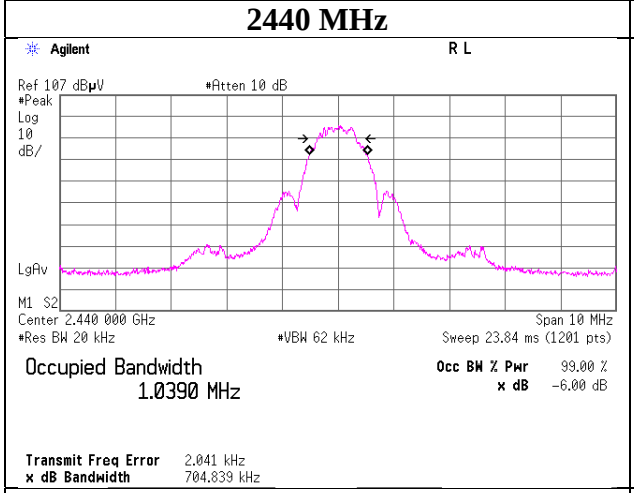
99 % Occupied Bandwidth

BT LE 1 M-PHY

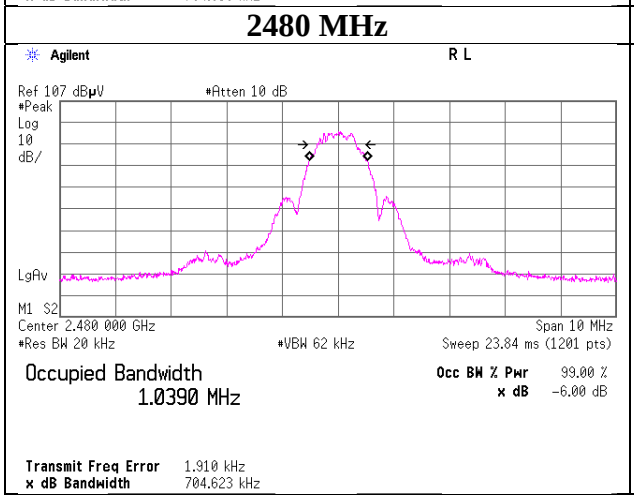
2402 MHz



2440 MHz

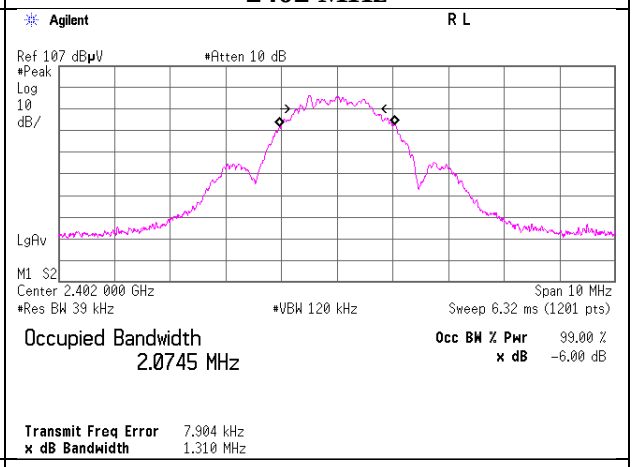


2480 MHz

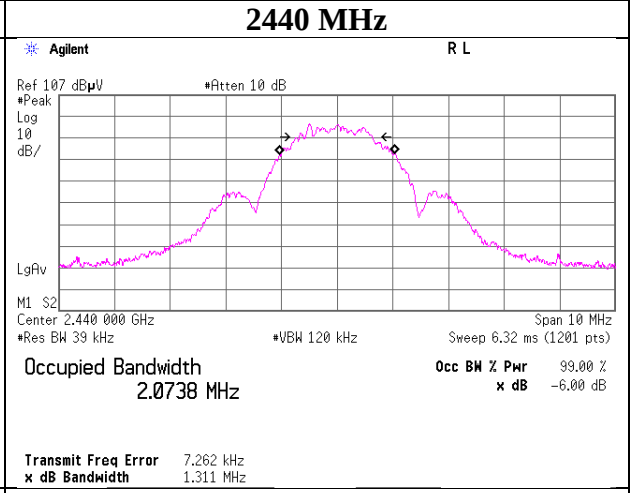


BT LE 2 M-PHY

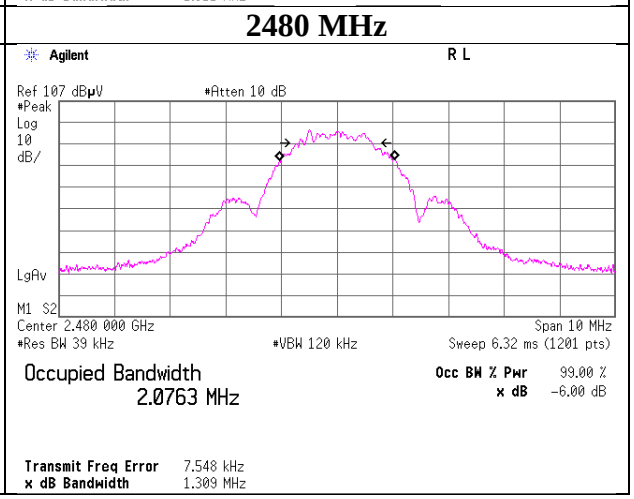
2402 MHz



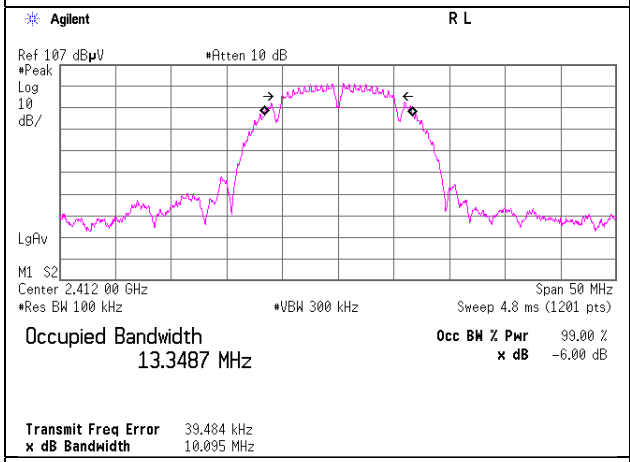
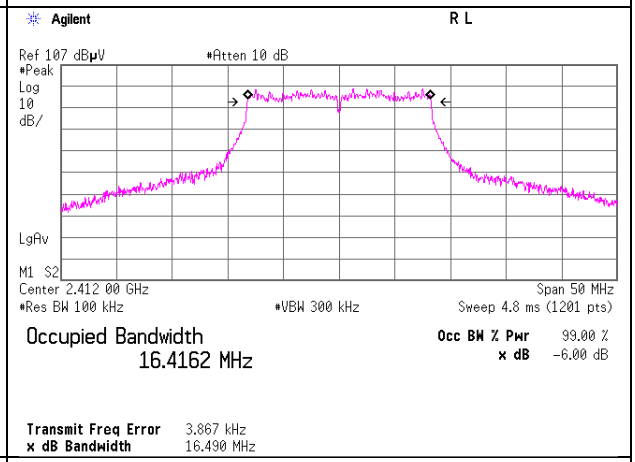
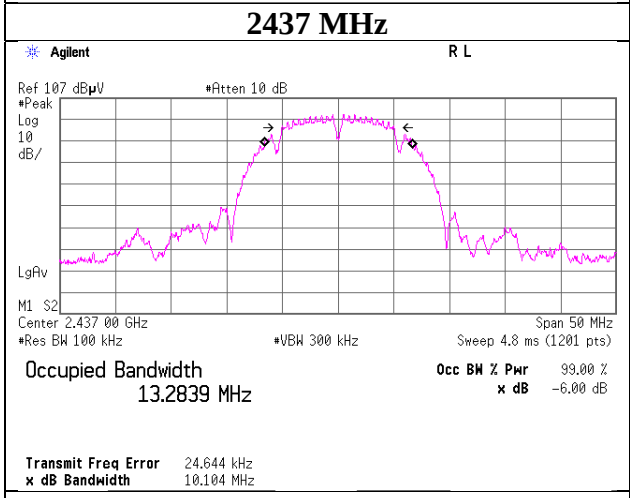
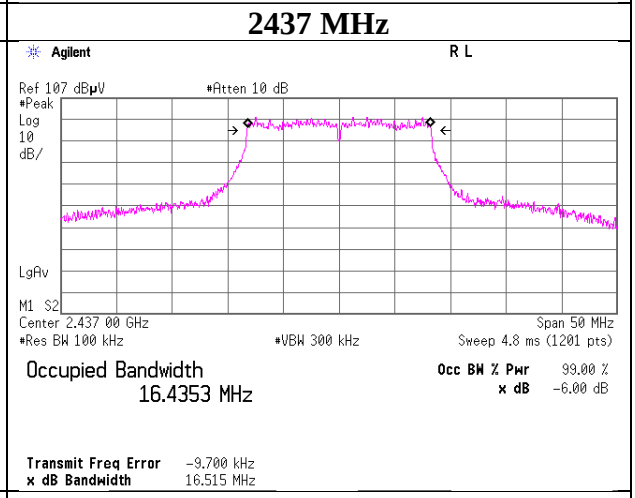
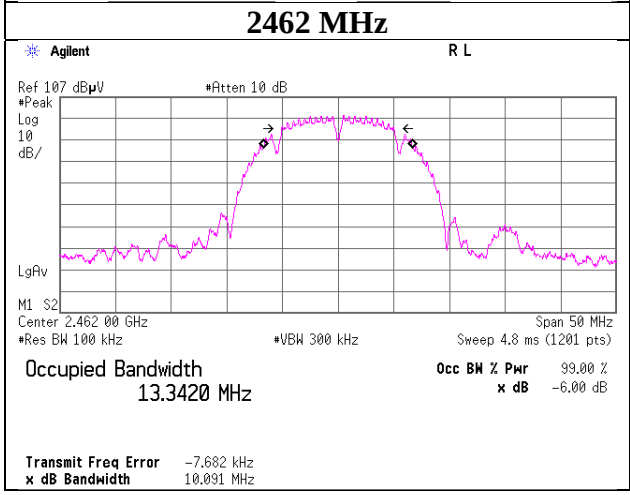
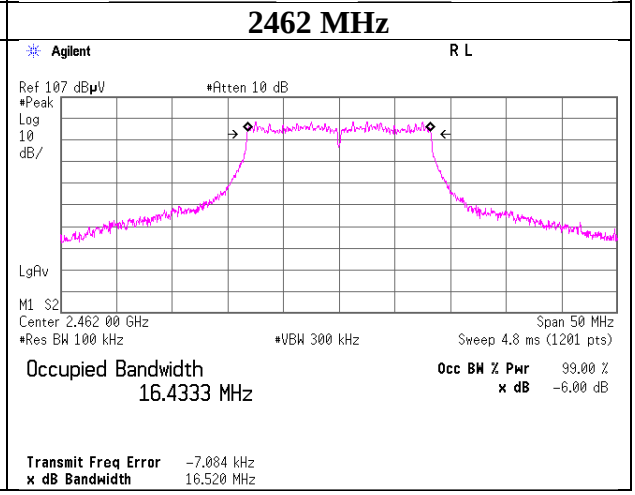
2440 MHz



2480 MHz



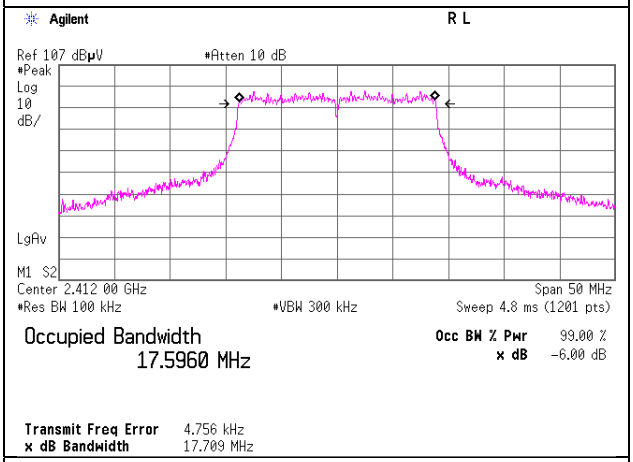
6 dB Bandwidth

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

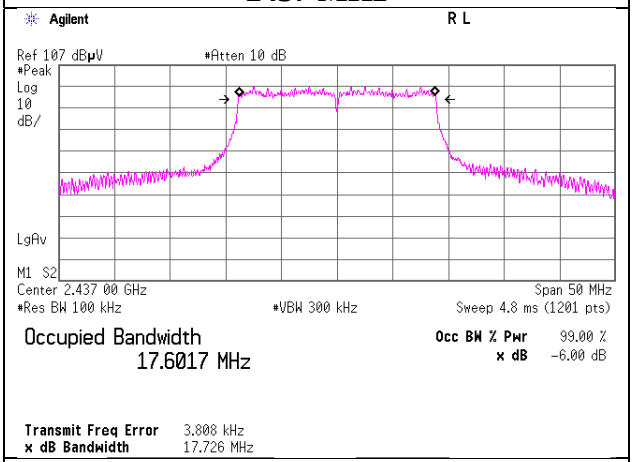
6 dB Bandwidth

11n-20

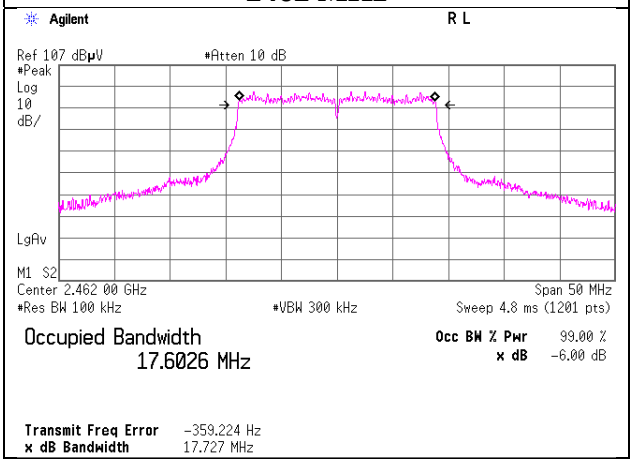
2412 MHz



2437 MHz



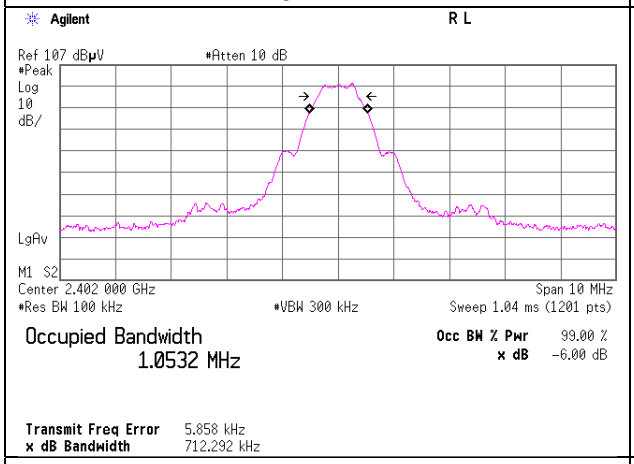
2462 MHz



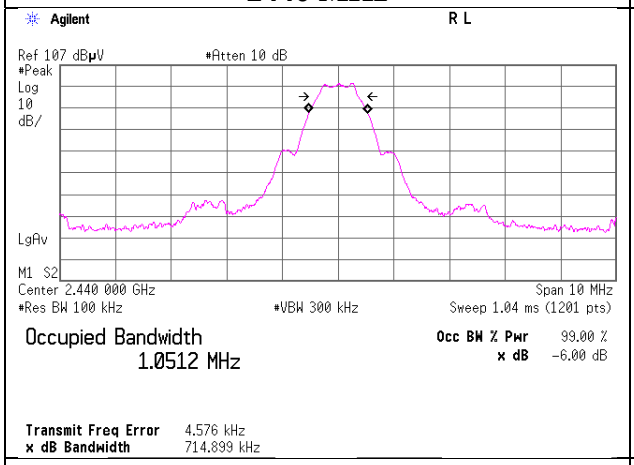
6 dB Bandwidth

BT LE 1 M-PHY

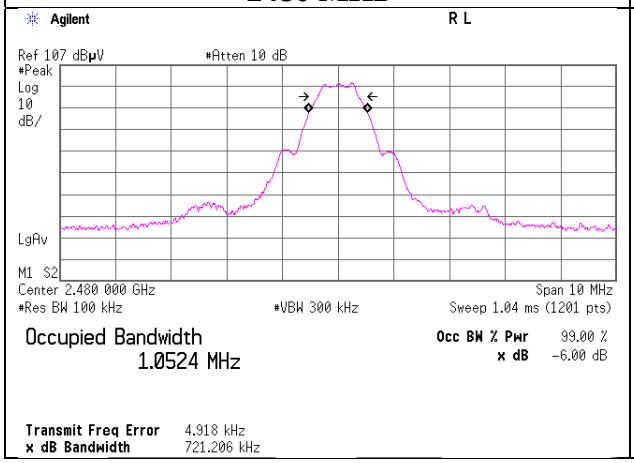
2402 MHz



2440 MHz

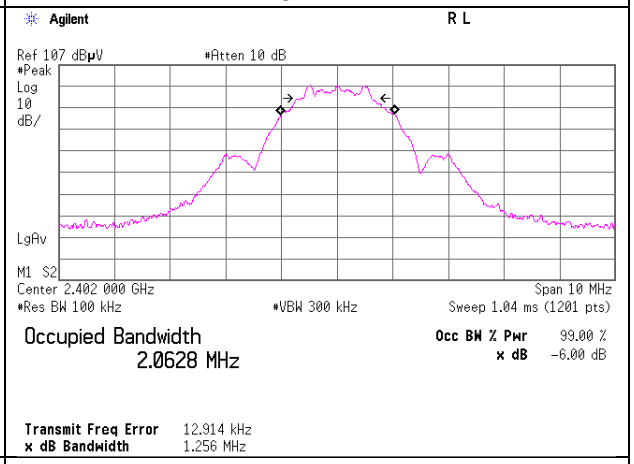


2480 MHz

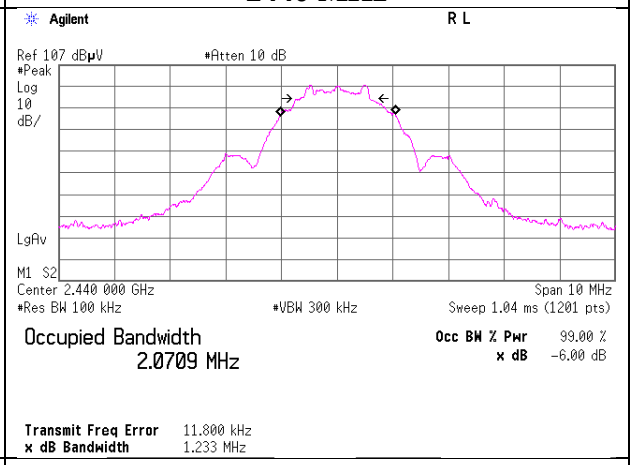


BT LE 2 M-PHY

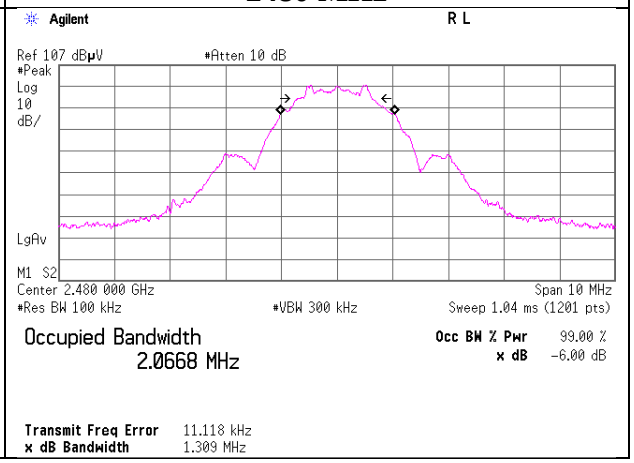
2402 MHz



2440 MHz



2480 MHz



Maximum Peak Output Power

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 18, 2020
Temperature / Humidity	24 deg. C / 40 % RH
Engineer	Shiro Kobayashi
Mode	Tx 11b

				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	3.98	2.10	9.81	15.89	38.82	30.00	1000	14.11	-1.44	14.45	27.86	36.02	4000	21.57
2437	4.40	2.10	9.82	16.32	42.85	30.00	1000	13.68	-1.44	14.88	30.76	36.02	4000	21.14
2462	3.68	2.11	9.82	15.61	36.39	30.00	1000	14.39	-1.44	14.17	26.12	36.02	4000	21.85

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.

2437MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
1	4.40	*
2	4.38	
5.5	4.39	
11	4.38	

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

Maximum Peak Output Power

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 18, 2020
Temperature / Humidity	24 deg. C / 40 % RH
Engineer	Shiro Kobayashi
Mode	Tx 11g

				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	10.09	2.10	9.81	22.00	158.49	30.00	1000	8.00	-1.44	20.56	113.76	36.02	4000	15.46
2437	10.45	2.10	9.82	22.37	172.58	30.00	1000	7.63	-1.44	20.93	123.88	36.02	4000	15.09
2462	9.85	2.11	9.82	21.78	150.66	30.00	1000	8.22	-1.44	20.34	108.14	36.02	4000	15.68

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.

2437 MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
6	10.39	
9	10.40	
12	10.38	
18	10.41	
24	10.39	
36	10.41	
48	10.44	
54	10.45	*

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

Maximum Peak Output Power

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	June 18, 2020
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Shiro Kobayashi
Mode	Tx 11n-20

				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	9.56	2.10	9.81	21.47	140.28	30.00	1000	8.53	-1.44	20.03	100.69	36.02	4000	15.99
2437	10.46	2.10	9.82	22.38	172.98	30.00	1000	7.62	-1.44	20.94	124.17	36.02	4000	15.08
2462	9.22	2.11	9.82	21.15	130.32	30.00	1000	8.85	-1.44	19.71	93.54	36.02	4000	16.31

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.

2437 MHz

MCS Number [MCS]	Reading [dBm]	Remark
0	10.44	
1	10.45	
2	10.45	
3	10.40	
4	10.44	
5	10.44	
6	10.45	
7	10.46	*

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

Maximum Peak Output Power

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	June 18, 2020
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Shiro Kobayashi
Mode	Tx BT LE

1 M-PHY				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]
2402	-8.58	2.10	9.88	3.40	2.19	30.00	1000	26.60	0.05	3.45	2.21	36.02	4000	32.57
2440	-8.31	2.11	9.88	3.68	2.33	30.00	1000	26.32	0.05	3.73	2.36	36.02	4000	32.29
2480	-8.32	2.12	9.88	3.68	2.33	30.00	1000	26.32	0.05	3.73	2.36	36.02	4000	32.29

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss
e.i.r.p. Result = Conducted Power Result + Antenna Gain

2440 MHz

Mode	Data rate [bps]	Reading [dBm]	Remark
1 M-PHY	1 M	-8.31	*
Coded-PHY(S=8)	125 k	-8.33	
Coded-PHY(S=2)	500 k	-8.32	

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

2 M-PHY				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]
2402	-8.56	2.10	9.88	3.42	2.20	30.00	1000	26.58	0.05	3.47	2.22	36.02	4000	32.55
2440	-8.31	2.11	9.88	3.68	2.33	30.00	1000	26.32	0.05	3.73	2.36	36.02	4000	32.29
2480	-8.33	2.12	9.88	3.67	2.33	30.00	1000	26.33	0.05	3.72	2.36	36.02	4000	32.30

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.

Average Output Power
(Reference data for RF Exposure)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 18, 2020
Temperature / Humidity	24 deg. C / 40 % RH
Engineer	Shiro Kobayashi
Mode	Tx

11b **2 Mbps**

Freq.	Reading	Cable Loss	Atten. Loss	Result (Time average)		Duty factor	Result (Burst power average)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2412	0.94	2.10	9.81	12.85	19.28	0.11	12.96	19.77
2437	1.48	2.10	9.82	13.40	21.88	0.11	13.51	22.44
2462	0.77	2.11	9.82	12.70	18.62	0.11	12.81	19.10

11g **54 Mbps**

Freq.	Reading	Cable Loss	Atten. Loss	Result (Time average)		Duty factor	Result (Burst power average)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2412	-2.59	2.10	9.81	9.32	8.55	1.92	11.24	13.30
2437	-0.07	2.10	9.82	11.85	15.31	1.92	13.77	23.82
2462	-2.45	2.11	9.82	9.48	8.87	1.92	11.40	13.80

11n-20 **MCS 7**

Freq.	Reading	Cable Loss	Atten. Loss	Result (Time average)		Duty factor	Result (Burst power average)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2412	-3.23	2.10	9.81	8.68	7.38	2.03	10.71	11.78
2437	-1.07	2.10	9.82	10.85	12.16	2.03	12.88	19.41
2462	-3.49	2.11	9.82	8.44	6.98	2.03	10.47	11.14

BT LE **1 M-PHY**

Freq.	Reading	Cable Loss	Atten. Loss	Result (Time average)		Duty factor	Result (Burst power average)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2402	-9.58	2.10	9.88	2.40	1.74	0.68	3.08	2.03
2440	-9.29	2.11	9.88	2.70	1.86	0.68	3.38	2.18
2480	-9.31	2.12	9.88	2.69	1.86	0.68	3.37	2.17

BT LE **2 M-PHY**

Freq.	Reading	Cable Loss	Atten. Loss	Result (Time average)		Duty factor	Result (Burst power average)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2402	-12.55	2.10	9.88	-0.57	0.88	3.63	3.06	2.02
2440	-12.25	2.11	9.88	-0.26	0.94	3.63	3.37	2.17
2480	-12.29	2.12	9.88	-0.29	0.94	3.63	3.34	2.16

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

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

Average Output Power
(Reference data for RF Exposure)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 18, 2020
Temperature / Humidity	24 deg. C / 40 % RH
Engineer	Shiro Kobayashi
Mode	Tx

2437 MHz

Mode	Rate [Mbps]	Reading [dBm]	Duty factor [dB]	Burst power [dBm]	Remarks
11b	1	1.52	0.05	1.57	
	2	1.48	0.11	1.59	*
	5.5	1.31	0.27	1.58	
	11	1.09	0.49	1.58	
11g	6	1.43	0.30	1.73	
	9	1.28	0.44	1.72	
	12	1.15	0.57	1.72	
	18	0.98	0.81	1.79	
	24	0.73	1.04	1.77	
	36	0.41	1.43	1.84	
	48	0.06	1.78	1.84	
	54	-0.07	1.92	1.85	*

Mode	MCS Number [MCS]	Reading [dBm]	Duty factor [dB]	Burst power [dBm]	Remarks
11n-20	0	0.50	0.32	0.82	
	1	0.32	0.60	0.92	
	2	0.10	0.84	0.94	
	3	-0.20	1.07	0.87	
	4	-0.54	1.45	0.91	
	5	-0.80	1.76	0.96	
	6	-0.92	1.88	0.96	
	7	-1.04	2.03	0.99	*

BT LE, 2440 MHz

Mode	Data rate [bps]	Reading [dBm]	Duty factor [dB]	Burst power [dBm]	Remarks
1 M-PHY	1 M	-9.27	0.68	-8.59	*
Coded-PHY(S=8)	125 k	-9.30	0.69	-8.61	
Coded-PHY(S=2)	500 k	-9.01	0.40	-8.61	

* Worst rate

Sample Calculation:

Burst power = Reading (timed average) + Duty factor

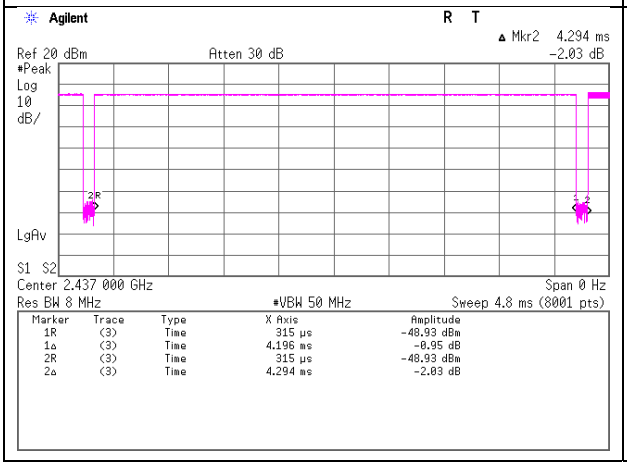
All comparison were carried out on same frequency and measurement factors.

Burst rate confirmation (for Average Output Power)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 18, 2020
Temperature / Humidity	24 deg. C / 40 % RH
Engineer	Shiro Kobayashi
Mode	Tx

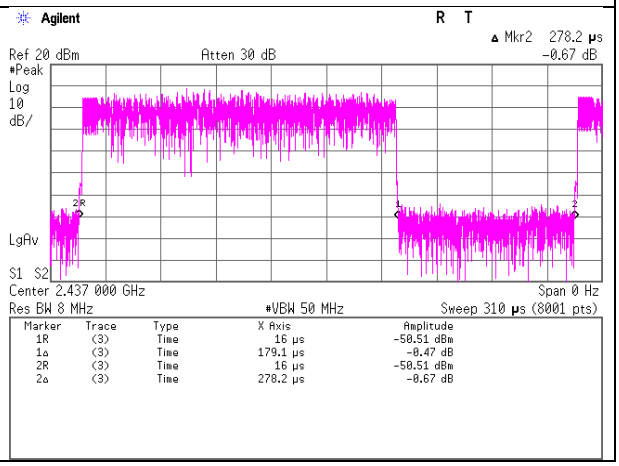
11b 2 Mbps

Tx on / (Tx on + Tx off) = 0.977
Tx on / (Tx on + Tx off) * 100 = 97.7 %
Duty factor = 10 * log (4.294 / 4.196) = 0.11 dB



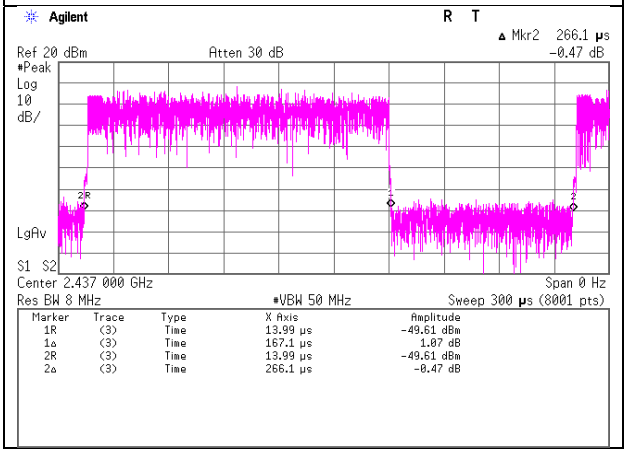
11g 54 Mbps

Tx on / (Tx on + Tx off) = 0.644
Tx on / (Tx on + Tx off) * 100 = 64.4 %
Duty factor = 10 * log (0.2782 / 0.1791) = 1.92 dB



11n-20 MCS 7

Tx on / (Tx on + Tx off) = 0.628
Tx on / (Tx on + Tx off) * 100 = 62.8 %
Duty factor = 10 * log (0.2661 / 0.1671) = 2.03 dB

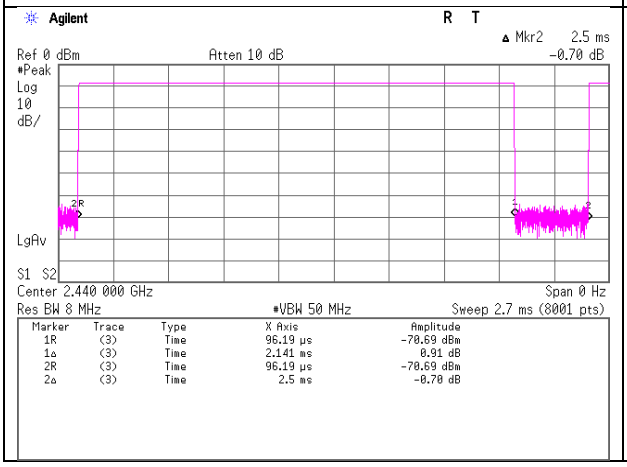


Burst rate confirmation (for Average Output Power)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	June 18, 2020
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Shiro Kobayashi
Mode	Tx

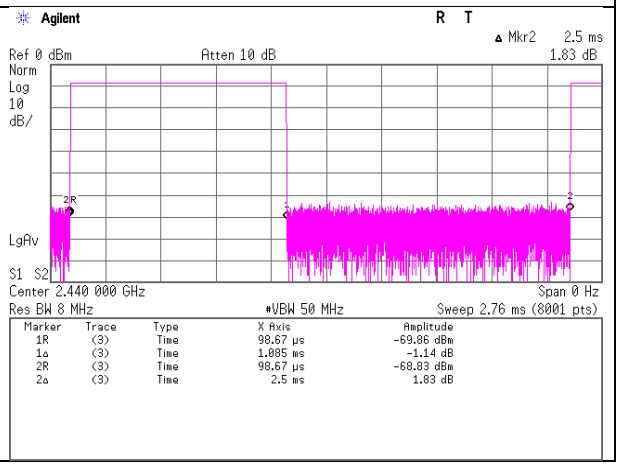
BT LE 1 M-PHY

Tx on / (Tx on + Tx off) =	**0.856**
Tx on / (Tx on + Tx off) * 100 =	**85.6 %**
Duty factor = 10 * log (2.5 / 2.141) =	**0.68 dB**



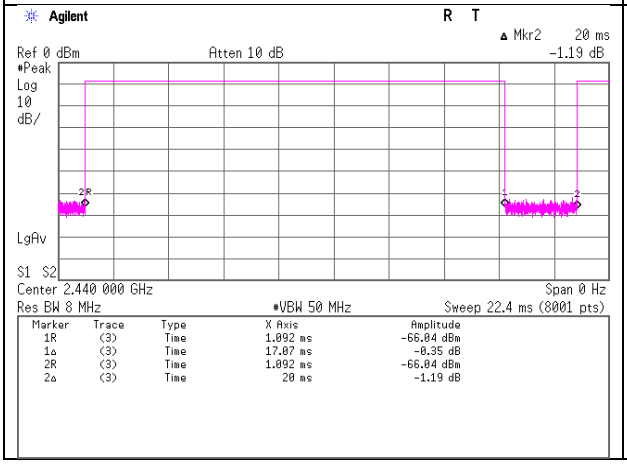
BT LE 2 M-PHY

Tx on / (Tx on + Tx off) =	**0.434**
Tx on / (Tx on + Tx off) * 100 =	**43.4 %**
Duty factor = 10 * log (2.5 / 1.085) =	**3.63 dB**



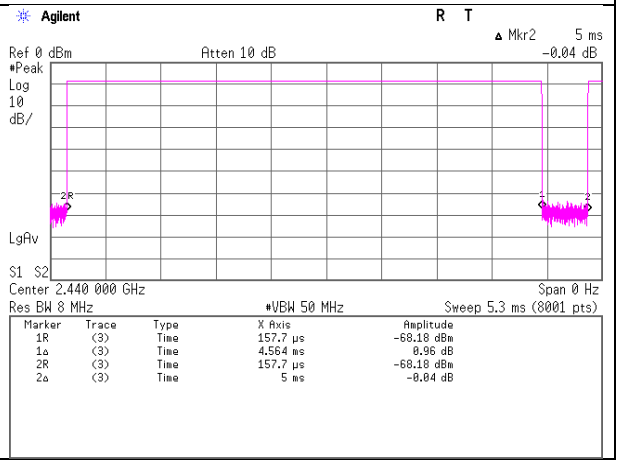
BT LE Coded-PHY(S=8)

Tx on / (Tx on + Tx off) =	**0.854**
Tx on / (Tx on + Tx off) * 100 =	**85.4 %**
Duty factor = 10 * log (20 / 17.07) =	**0.69 dB**



BT LE Coded-PHY(S=2)

Tx on / (Tx on + Tx off) =	**0.913**
Tx on / (Tx on + Tx off) * 100 =	**91.3 %**
Duty factor = 10 * log (5 / 4.564) =	**0.40 dB**



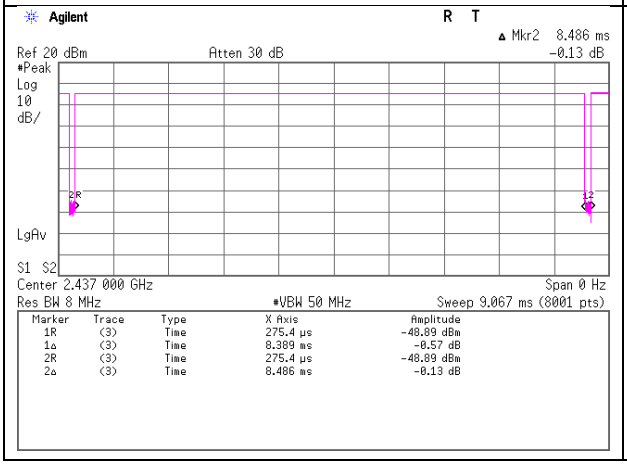
* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.
* The above chart is obtained with the Maximum Packet Size set that can be by test software, and it is different from the maximum duty cycle of the product."

Burst rate confirmation (for Radiated Spurious Emission)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 18, 2020
Temperature / Humidity	24 deg. C / 40 % RH
Engineer	Shiro Kobayashi
Mode	Tx

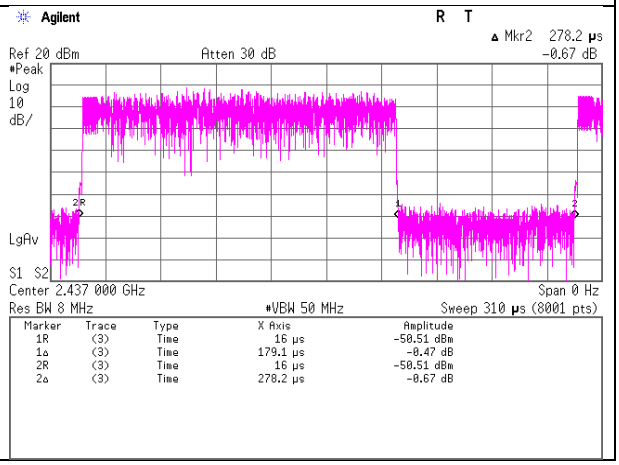
11b 1 Mbps

Tx on / (Tx on + Tx off) =	**0.989**
Tx on / (Tx on + Tx off) * 100 =	**98.9 %**
Duty factor = 20 * log (8.486 / 8.389) =	**0.10 dB**
	(> 98 %)



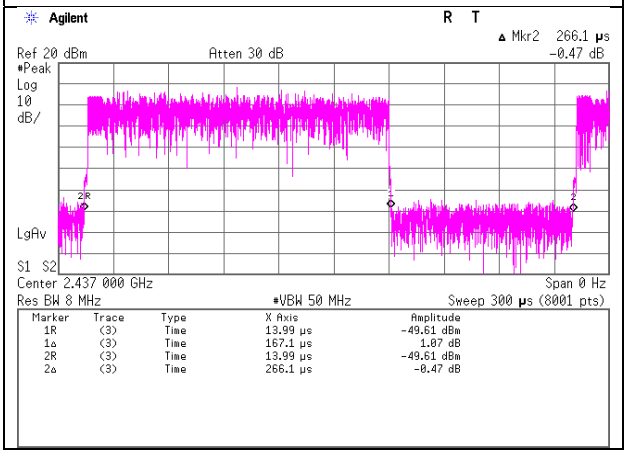
11g 54 Mbps

Tx on / (Tx on + Tx off) =	**0.644**
Tx on / (Tx on + Tx off) * 100 =	**64.4 %**
Duty factor = 20 * log (0.2782 / 0.1791) =	**3.83 dB**



11n-20 MCS 7

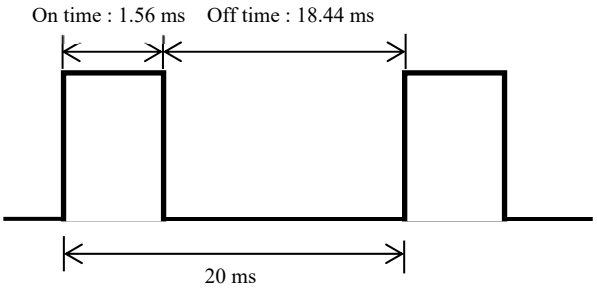
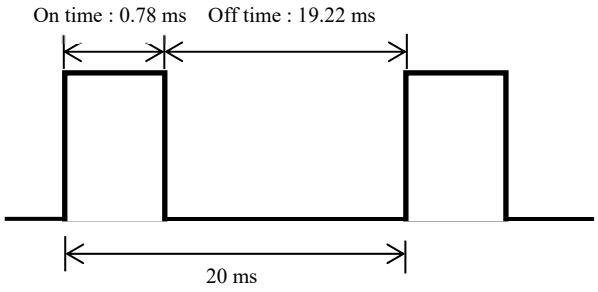
Tx on / (Tx on + Tx off) =	**0.628**
Tx on / (Tx on + Tx off) * 100 =	**62.8 %**
Duty factor = 20 * log (0.2661 / 0.1671) =	**4.05 dB**



Duty cycle correction factor

The information provided from the applicant.

(Reference chart)

1 M-PHY	2 M-PHY
	

(for Duty cycle correction factor for Radiated Spurious Emission)
Worst 100 ms case

1 M-PHY	2 M-PHY
DCCF = 20 log(1.56 x 5 / 100) = -22.15 dB	DCCF = 20 log(0.78 x 5 / 100) = -28.17 dB

*Since the burst rate is not different between the channels, the data has been obtained on the representative channel.
*Worst TX Duty cycle BLE is Advertising mode.
The actual measurement value was applied as Duty Cycle Correction factor.

Radiated Spurious Emission

Report No.	13462774S-B-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	2	2	3
Date	August 31, 2020	August 31, 2020	August 24, 2020
Temperature / Humidity	26 deg.C / 62 %RH	25 deg.C / 66 %RH	25 deg. C / 60 % RH
Engineer	Yosuke Murakami	Kazuya Noda	Yohsuke Matsuzawa
	(1 GHz - 2.8 GHz)	(2.8 GHz - 10 GHz)	(10 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.	2385.607	PK	46.56	28.57	14.03	38.68	2.10	52.58	73.9	21.3	220	43	-
Hori.	2390.000	PK	44.82	28.56	14.03	38.68	2.10	50.83	73.9	23.0	220	43	-
Hori.	4824.000	PK	46.15	31.60	6.44	38.54	2.10	47.75	73.9	26.1	146	140	-
Hori.	7236.000	PK	45.55	37.65	7.93	39.17	2.10	54.06	73.9	19.8	150	0	-
Hori.	2385.607	AV	37.75	28.57	14.03	38.68	2.10	43.77	53.9	10.1	220	43	-
Hori.	2390.000	AV	35.81	28.56	14.03	38.68	2.10	41.82	53.9	12.0	220	43	-
Hori.	4824.000	AV	36.88	31.60	6.44	38.54	2.10	38.48	53.9	15.4	146	140	-
Hori.	7236.000	AV	36.50	37.65	7.93	39.17	2.10	45.01	53.9	**8.8**	150	0	Floor noise
Vert.	2385.333	PK	45.51	28.57	14.03	38.68	2.10	51.53	73.9	22.3	317	99	-
Vert.	2390.000	PK	45.09	28.56	14.03	38.68	2.10	51.10	73.9	22.8	317	99	-
Vert.	4824.000	PK	47.67	31.60	6.44	38.54	2.10	49.27	73.9	24.6	172	350	-
Vert.	7236.000	PK	44.71	37.65	7.93	39.17	2.10	53.22	73.9	20.6	150	0	-
Vert.	2385.333	AV	37.31	28.57	14.03	38.68	2.10	43.33	53.9	10.5	317	99	-
Vert.	2390.000	AV	36.08	28.56	14.03	38.68	2.10	42.09	53.9	11.8	317	99	-
Vert.	4824.000	AV	38.15	31.60	6.44	38.54	2.10	39.75	53.9	14.1	172	350	-
Vert.	7236.000	AV	36.36	37.65	7.93	39.17	2.10	44.87	53.9	9.0	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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	92.05	28.52	14.04	38.66	2.10	98.05	-	-	Carrier
Hori.	2398.200	PK	45.42	28.54	14.03	38.67	2.10	51.42	78.0	26.5	-
Hori.	2400.000	PK	37.98	28.54	14.04	38.67	2.10	43.99	78.0	34.0	-
Vert.	2412.000	PK	91.47	28.52	14.04	38.66	2.10	97.47	-	-	Carrier
Vert.	2398.267	PK	46.08	28.54	14.03	38.67	2.10	52.08	77.4	25.3	-
Vert.	2400.000	PK	37.77	28.54	14.04	38.67	2.10	43.78	77.4	33.6	-

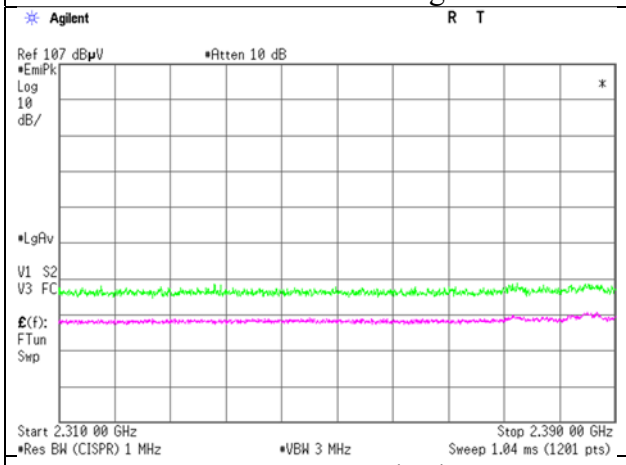
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	August 31, 2020
Temperature / Humidity	26 deg.C / 62 %RH
Engineer	Yosuke Murakami
Mode	Tx 11b 2412 MHz

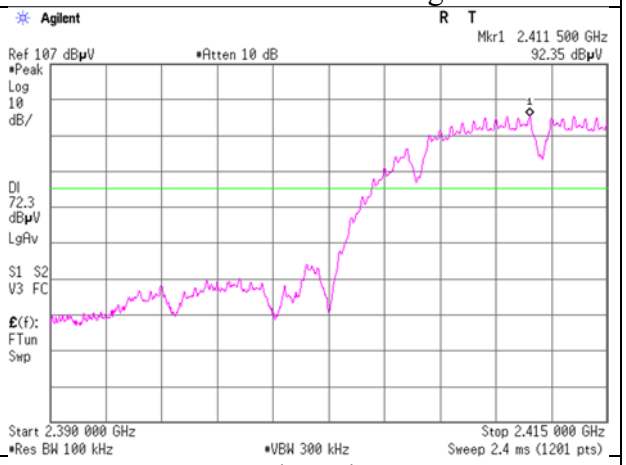
Horizontal

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

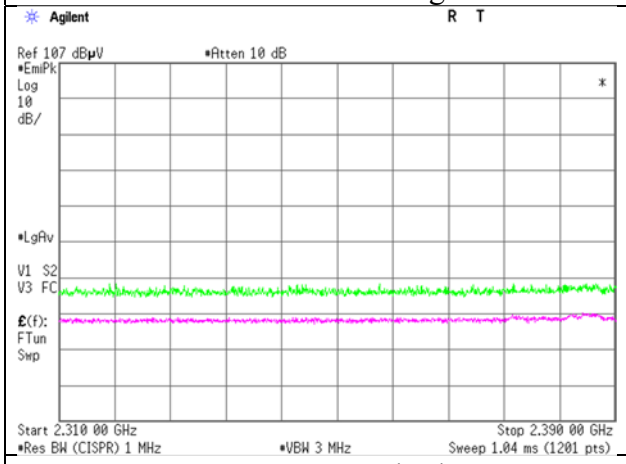
Authorized-band band-edge Plot



20dBc Plot

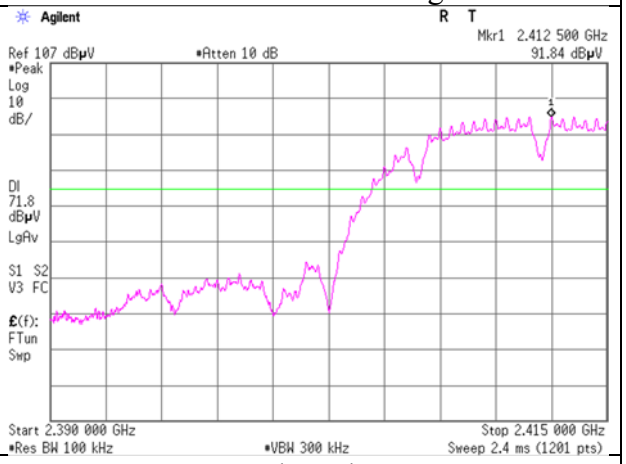
Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Authorized-band band-edge Plot



20dBc Plot

* 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.	13462774S-B-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	2	2	3
Date	August 31, 2020	August 31, 2020	August 24, 2020
Temperature / Humidity	26 deg.C / 62 %RH	25 deg.C / 66 %RH	25 deg. C / 60 % RH
Engineer	Yosuke Murakami	Kazuya Noda	Yohsuke Matsuzawa
	(1 GHz - 2.8 GHz)	(2.8 GHz - 10 GHz)	(10 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	45.91	31.58	6.47	38.54	2.10	47.52	73.9	26.3	201	153	-
Hori.	7311.000	PK	44.99	37.71	7.96	39.27	2.10	53.49	73.9	20.4	150	0	-
Hori.	4874.000	AV	37.92	31.58	6.47	38.54	2.10	39.53	53.9	14.3	201	153	-
Hori.	7311.000	AV	35.08	37.71	7.96	39.27	2.10	43.58	53.9	10.3	150	0	Floor noise
Vert.	4874.000	PK	47.06	31.58	6.47	38.54	2.10	48.67	73.9	25.2	195	3	-
Vert.	7311.000	PK	45.15	37.71	7.96	39.27	2.10	53.65	73.9	20.2	150	0	-
Vert.	4874.000	AV	38.08	31.58	6.47	38.54	2.10	39.69	53.9	14.2	195	3	-
Vert.	7311.000	AV	35.75	37.71	7.96	39.27	2.10	44.25	53.9	**9.6**	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Report No.	13462774S-B-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	2	2	3
Date	August 31, 2020	August 31, 2020	August 24, 2020
Temperature / Humidity	26 deg.C / 62 %RH	25 deg.C / 66 %RH	25 deg. C / 60 % RH
Engineer	Yosuke Murakami	Kazuya Noda	Yohsuke Matsuzawa
	(1 GHz - 2.8 GHz)	(2.8 GHz - 10 GHz)	(10 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	45.09	28.40	14.12	38.62	2.10	51.09	73.9	22.8	154	35	-
Hori.	4924.000	PK	46.95	31.63	6.50	38.54	2.10	48.64	73.9	25.2	113	158	-
Hori.	7386.000	PK	44.42	37.79	8.02	39.36	2.10	52.97	73.9	20.9	150	0	-
Hori.	2483.500	AV	36.02	28.40	14.12	38.62	2.10	42.02	53.9	11.8	154	35	-
Hori.	4924.000	AV	38.38	31.63	6.50	38.54	2.10	40.07	53.9	13.8	113	158	-
Hori.	7386.000	AV	35.25	37.79	8.02	39.36	2.10	43.80	53.9	10.1	150	0	Floor noise
Vert.	2483.500	PK	44.24	28.40	14.12	38.62	2.10	50.24	73.9	23.6	218	180	-
Vert.	4924.000	PK	47.31	31.63	6.50	38.54	2.10	49.00	73.9	24.9	183	8	-
Vert.	7386.000	PK	44.87	37.79	8.02	39.36	2.10	53.42	73.9	20.4	150	0	-
Vert.	2483.500	AV	36.18	28.40	14.12	38.62	2.10	42.18	53.9	11.7	218	180	-
Vert.	4924.000	AV	38.78	31.63	6.50	38.54	2.10	40.47	53.9	13.4	183	8	-
Vert.	7386.000	AV	35.31	37.79	8.02	39.36	2.10	43.86	53.9	**10.0**	150	0	Floor noise

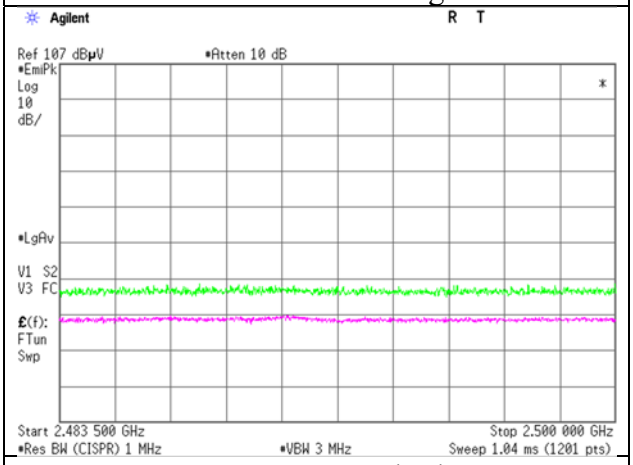
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	August 31, 2020
Temperature / Humidity	26 deg.C / 62 %RH
Engineer	Yosuke Murakami
Mode	Tx 11b 2462 MHz

Horizontal

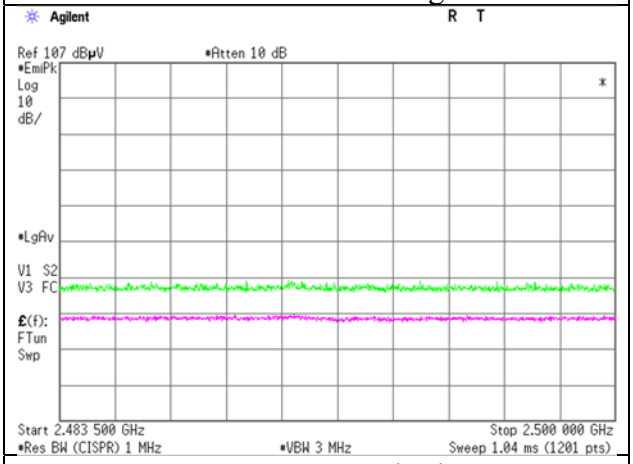
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission

Report No.	13462774S-B-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	2	2	3
Date	August 31, 2020	August 31, 2020	August 24, 2020
Temperature / Humidity	26 deg.C / 62 %RH	25 deg.C / 66 %RH	25 deg. C / 60 % RH
Engineer	Yosuke Murakami	Kazuya Noda	Yohsuke Matsuzawa
	(1 GHz - 2.8 GHz)	(2.8 GHz - 10 GHz)	(10 GHz - 26.5 GHz)
Mode	Tx 11g 2412 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	57.40	28.56	14.03	38.68	2.10	63.41	73.9	10.4	149	16	-
Hori.	4824.000	PK	45.68	31.60	6.44	38.54	2.10	47.28	73.9	26.6	146	143	-
Hori.	7236.000	PK	45.95	37.65	7.93	39.17	2.10	54.46	73.9	19.4	150	0	-
Hori.	7236.000	AV	36.38	37.65	7.93	39.17	2.10	44.89	53.9	9.0	150	0	Floor noise
Vert.	2390.000	PK	56.80	28.56	14.03	38.68	2.10	62.81	73.9	11.0	154	180	-
Vert.	4824.000	PK	46.90	31.60	6.44	38.54	2.10	48.50	73.9	25.4	177	351	-
Vert.	7236.000	PK	45.66	37.65	7.93	39.17	2.10	54.17	73.9	19.7	150	0	-
Vert.	7236.000	AV	36.30	37.65	7.93	39.17	2.10	44.81	53.9	9.0	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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	39.94	28.56	14.03	38.68	3.83	2.10	49.78	53.9	**4.1**	*1)
Hori.	4824.000	AV	36.98	31.60	6.44	38.54	3.83	2.10	42.41	53.9	11.4	-
Vert.	2390.000	AV	38.87	28.56	14.03	38.68	3.83	2.10	48.71	53.9	5.1	*1)
Vert.	4824.000	AV	38.18	31.60	6.44	38.54	3.83	2.10	43.61	53.9	10.2	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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)

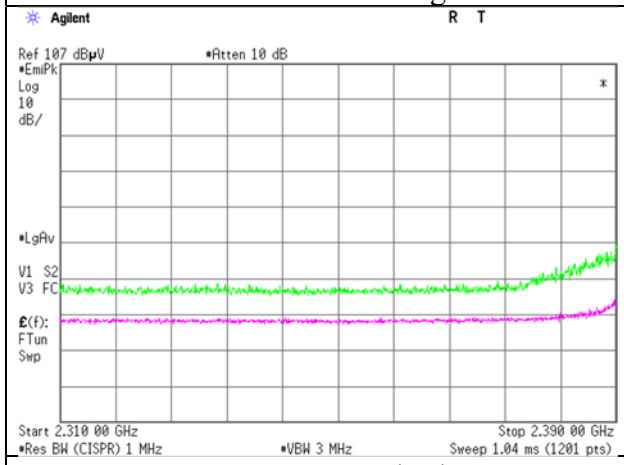
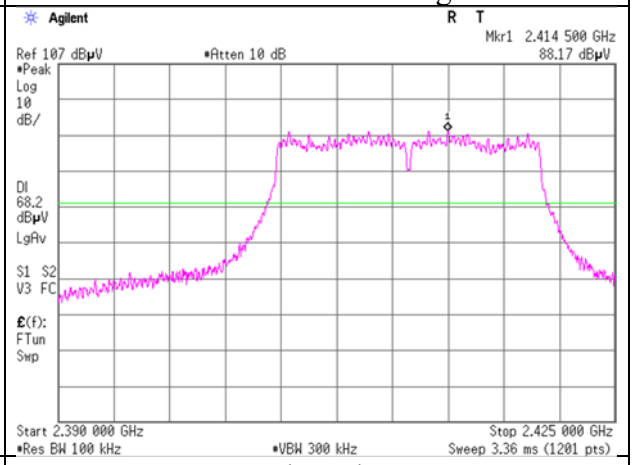
20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

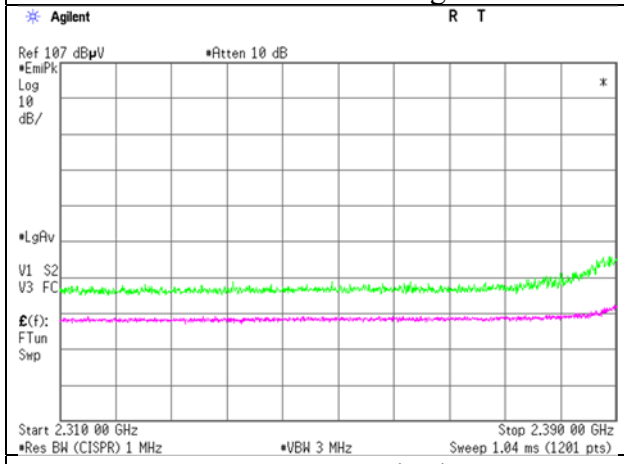
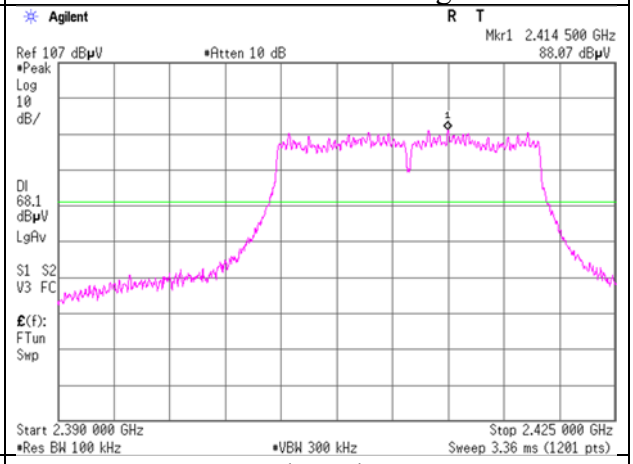
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	87.95	28.52	14.04	38.66	2.10	93.95	-	-	Carrier
Hori.	2400.000	PK	50.20	28.54	14.04	38.67	2.10	56.21	73.9	17.6	-
Vert.	2412.000	PK	87.77	28.52	14.04	38.66	2.10	93.77	-	-	Carrier
Vert.	2400.000	PK	50.29	28.54	14.04	38.67	2.10	56.30	73.7	17.4	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	August 31, 2020
Temperature / Humidity	26 deg.C / 62 %RH
Engineer	Yosuke Murakami
Mode	Tx 11g 2412 MHz

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

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

* 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.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	August 31, 2020
Temperature / Humidity	26 deg.C / 62 %RH
Engineer	Yosuke Murakami
	(1 GHz - 2.8 GHz)
Mode	Tx 11g 2417 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	58.13	28.56	14.03	38.68	2.10	64.14	73.9	9.7	153	14	-
Vert.	2390.000	PK	56.81	28.56	14.03	38.68	2.10	62.82	73.9	11.0	152	181	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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	40.37	28.56	14.03	38.68	3.83	2.10	50.21	53.9	**3.6**	*1)
Vert.	2390.000	AV	40.06	28.56	14.03	38.68	3.83	2.10	49.90	53.9	3.9	*1)

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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.	2417.000	PK	89.95	28.51	14.06	38.66	2.10	95.96	-	-	Carrier
Hori.	2400.000	PK	49.82	28.54	14.04	38.67	2.10	55.83	75.9	20.0	-
Vert.	2417.000	PK	89.38	28.51	14.06	38.66	2.10	95.39	-	-	Carrier
Vert.	2400.000	PK	48.55	28.54	14.04	38.67	2.10	54.56	75.3	20.7	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

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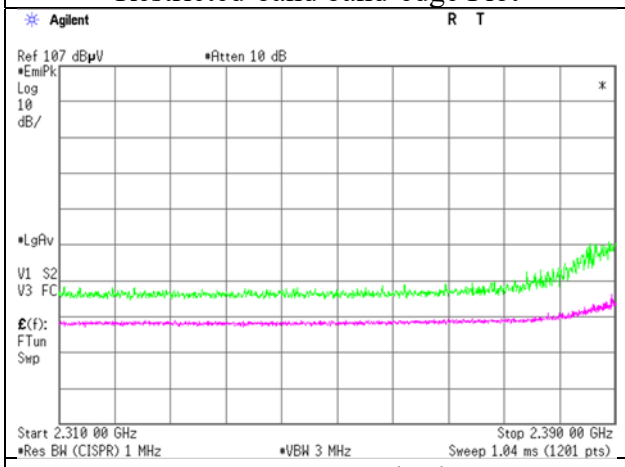
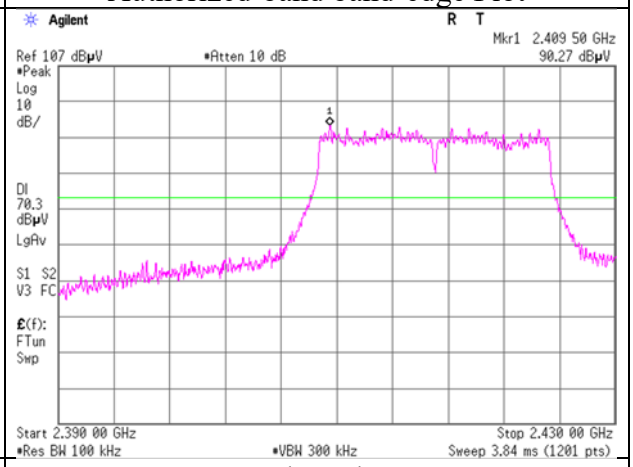
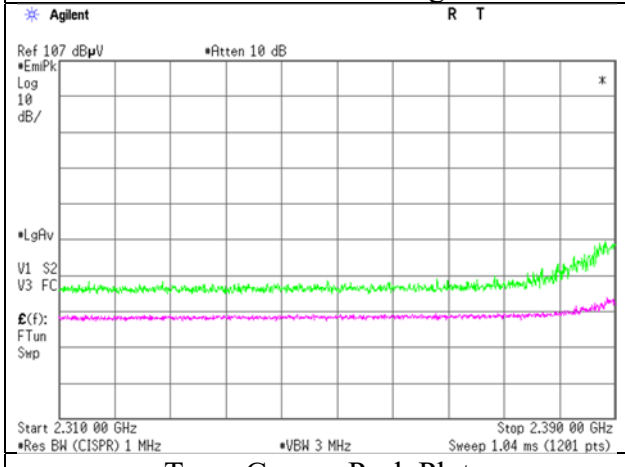
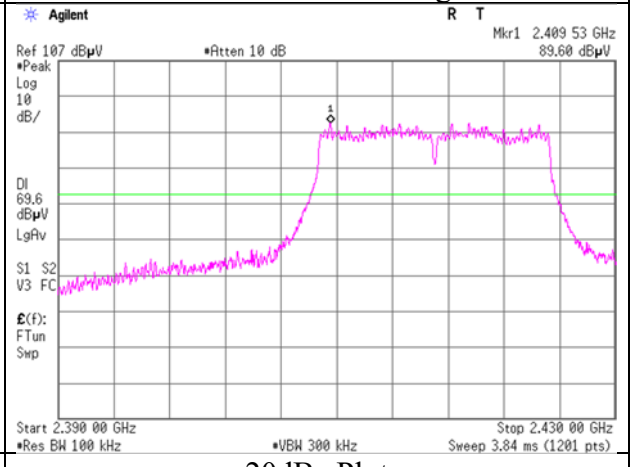
Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	August 31, 2020
Temperature / Humidity	26 deg.C / 62 %RH
Engineer	Yosuke Murakami
Mode	Tx 11g 2417 MHz

Horizontal

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

Vertical

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

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

Radiated Spurious Emission

Report No.	13462774S-B-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	2	2	3
Date	August 31, 2020	August 31, 2020	August 24, 2020
Temperature / Humidity	26 deg.C / 62 %RH	25 deg.C / 66 %RH	25 deg. C / 60 % RH
Engineer	Yosuke Murakami	Kazuya Noda	Yohsuke Matsuzawa
	(1 GHz - 2.8 GHz)	(2.8 GHz - 10 GHz)	(10 GHz - 26.5 GHz)
Mode	Tx 11g 2437 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4874.000	PK	45.05	31.58	6.47	38.54	2.10	46.66	73.9	27.2	232	143	-
Hori.	7311.000	PK	44.41	37.71	7.96	39.27	2.10	52.91	73.9	20.9	150	0	-
Hori.	7311.000	AV	35.62	37.71	7.96	39.27	2.10	44.12	53.9	**9.7**	150	0	Floor noise
Vert.	4874.000	PK	47.34	31.58	6.47	38.54	2.10	48.95	73.9	24.9	189	6	-
Vert.	7311.000	PK	45.46	37.71	7.96	39.27	2.10	53.96	73.9	19.9	150	0	-
Vert.	7311.000	AV	35.60	37.71	7.96	39.27	2.10	44.10	53.9	9.8	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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.	4874.000	AV	37.08	31.58	6.47	38.54	3.83	2.10	42.52	53.9	11.3	-
Vert.	4874.000	AV	38.09	31.58	6.47	38.54	3.83	2.10	43.53	53.9	10.3	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Burst rate confirmation" sheet.

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Radiated Spurious Emission

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	August 31, 2020
Temperature / Humidity	25 deg.C / 66 %RH
Engineer	Kazuya Noda
	(1 GHz - 2.8 GHz)
Mode	Tx 11g 2457 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	54.53	28.40	14.12	38.62	2.10	60.53	73.9	13.3	157	37	-
Vert.	2483.500	PK	52.02	28.40	14.12	38.62	2.10	58.02	73.9	15.8	153	257	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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.	2483.500	AV	38.11	28.40	14.12	38.62	3.83	2.10	47.94	53.9	**5.9**	*1)
Vert.	2483.500	AV	37.59	28.40	14.12	38.62	3.83	2.10	47.42	53.9	6.4	*1)

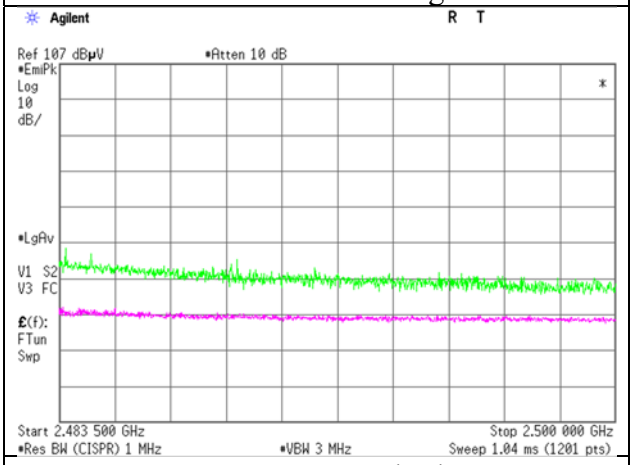
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Burst rate confirmation" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	August 31, 2020
Temperature / Humidity	25 deg.C / 66 %RH
Engineer	Kazuya Noda
Mode	Tx 11g 2457 MHz

Horizontal

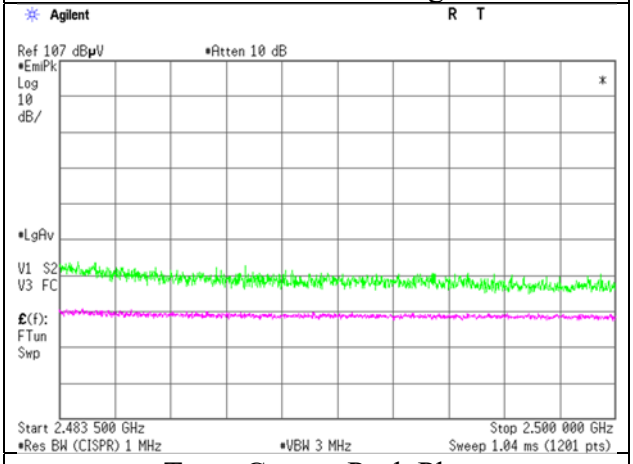
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission

Report No.	13462774S-B-R1	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	2	3
Date	August 31, 2020	August 24, 2020
Temperature / Humidity	25 deg.C / 66 %RH	25 deg. C / 60 % RH
Engineer	Kazuya Noda	Yohsuke Matsuzawa
	(1 GHz - 10 GHz)	(10 GHz - 26.5 GHz)
Mode	Tx 11g 2462 MHz	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	57.28	28.40	14.12	38.62	2.10	63.28	73.9	10.6	151	34	-
Hori.	4924.000	PK	45.15	31.63	6.50	38.54	2.10	46.84	73.9	27.0	233	150	-
Hori.	7386.000	PK	43.67	37.79	8.02	39.36	2.10	52.22	73.9	21.6	150	0	-
Hori.	7386.000	AV	35.29	37.79	8.02	39.36	2.10	43.84	53.9	10.0	150	0	Floor noise
Vert.	2483.500	PK	53.52	28.40	14.12	38.62	2.10	59.52	73.9	14.3	152	260	-
Vert.	4924.000	PK	48.04	31.63	6.50	38.54	2.10	49.73	73.9	24.1	185	8	-
Vert.	7386.000	PK	44.57	37.79	8.02	39.36	2.10	53.12	73.9	20.7	150	0	-
Vert.	7386.000	AV	35.00	37.79	8.02	39.36	2.10	43.55	53.9	10.3	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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.	2483.500	AV	37.15	28.40	14.12	38.62	3.83	2.10	46.98	53.9	**6.9**	*1)
Hori.	4924.000	AV	37.10	31.63	6.50	38.54	3.83	2.10	42.62	53.9	11.2	-
Vert.	2483.500	AV	36.71	28.40	14.12	38.62	3.83	2.10	46.54	53.9	7.3	*1)
Vert.	4924.000	AV	38.75	31.63	6.50	38.54	3.83	2.10	44.27	53.9	9.6	-

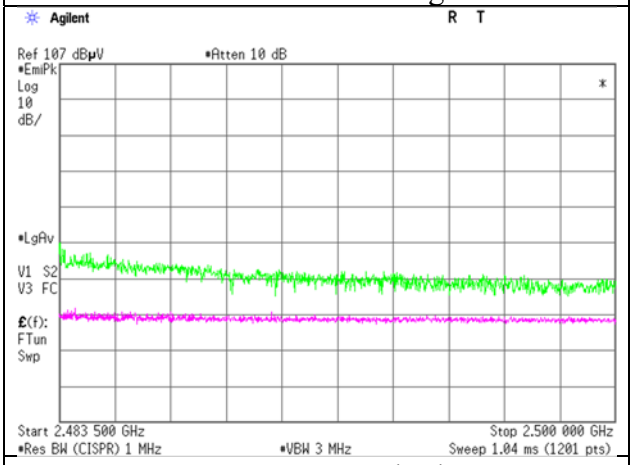
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Burst rate confirmation" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	August 31, 2020
Temperature / Humidity	25 deg.C / 66 %RH
Engineer	Kazuya Noda
Mode	Tx 11g 2462 MHz

Horizontal

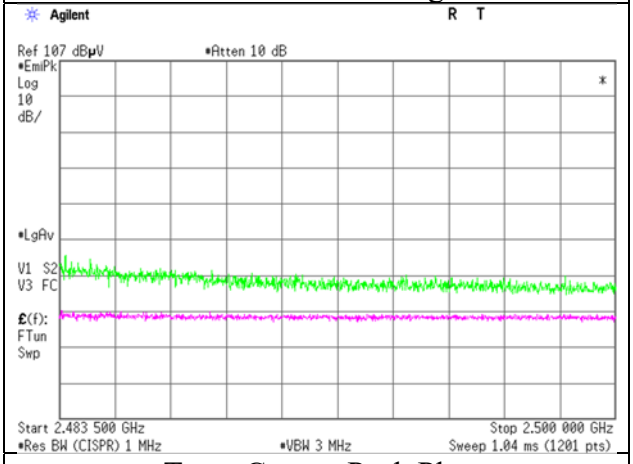
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

* 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.	13462774S-B-R1	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	2	3
Date	August 31, 2020	August 24, 2020
Temperature / Humidity	25 deg.C / 66 %RH	25 deg. C / 60 % RH
Engineer	Kazuya Noda	Yohsuke Matsuzawa
	(1 GHz - 10 GHz)	(10 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	54.00	28.56	14.03	38.68	2.10	60.01	73.9	13.8	153	14	-
Hori.	4824.000	PK	46.82	31.60	6.44	38.54	2.10	48.42	73.9	25.4	187	139	-
Hori.	7236.000	PK	45.90	37.65	7.93	39.17	2.10	54.41	73.9	19.4	150	0	-
Hori.	7236.000	AV	36.12	37.65	7.93	39.17	2.10	44.63	53.9	9.2	150	0	Floor noise
Vert.	2390.000	PK	52.01	28.56	14.03	38.68	2.10	58.02	73.9	15.8	152	310	-
Vert.	4824.000	PK	47.02	31.60	6.44	38.54	2.10	48.62	73.9	25.2	167	350	-
Vert.	7236.000	PK	45.56	37.65	7.93	39.17	2.10	54.07	73.9	19.8	150	0	-
Vert.	7236.000	AV	36.29	37.65	7.93	39.17	2.10	44.80	53.9	9.1	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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	39.36	28.56	14.03	38.68	4.05	2.10	49.42	53.9	**4.4**	*1)
Hori.	4824.000	AV	36.73	31.60	6.44	38.54	4.05	2.10	42.38	53.9	11.5	-
Vert.	2390.000	AV	38.76	28.56	14.03	38.68	4.05	2.10	48.82	53.9	5.0	*1)
Vert.	4824.000	AV	38.26	31.60	6.44	38.54	4.05	2.10	43.91	53.9	9.9	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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.	2412.000	PK	86.51	28.52	14.04	38.66	2.10	92.51	-	-	Carrier
Hori.	2400.000	PK	49.50	28.54	14.04	38.67	2.10	55.51	72.5	16.9	-
Vert.	2412.000	PK	84.96	28.52	14.04	38.66	2.10	90.96	-	-	Carrier
Vert.	2400.000	PK	48.61	28.54	14.04	38.67	2.10	54.62	70.9	16.2	-

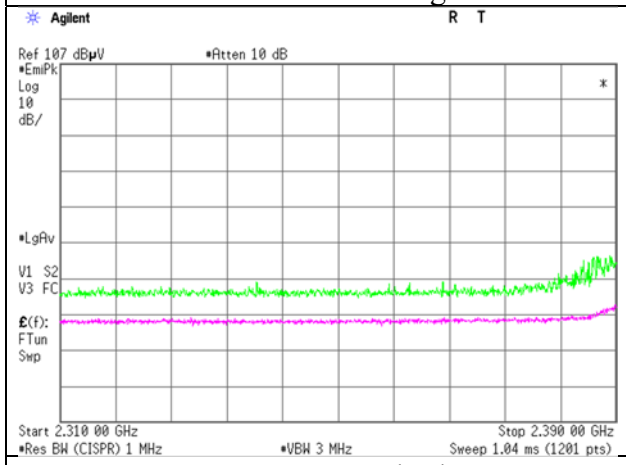
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	August 31, 2020
Temperature / Humidity	25 deg.C / 66 %RH
Engineer	Kazuya Noda
Mode	Tx 11n-20 2412 MHz

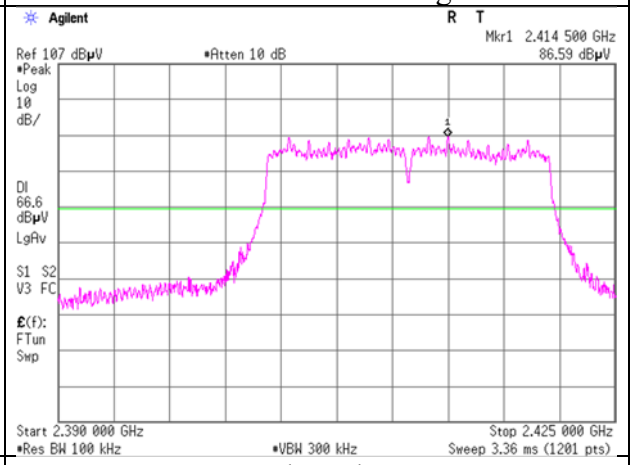
Horizontal

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

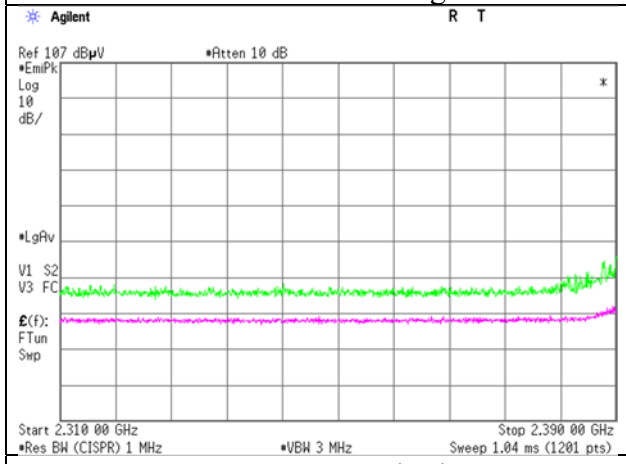
Authorized-band band-edge Plot



20dBc Plot

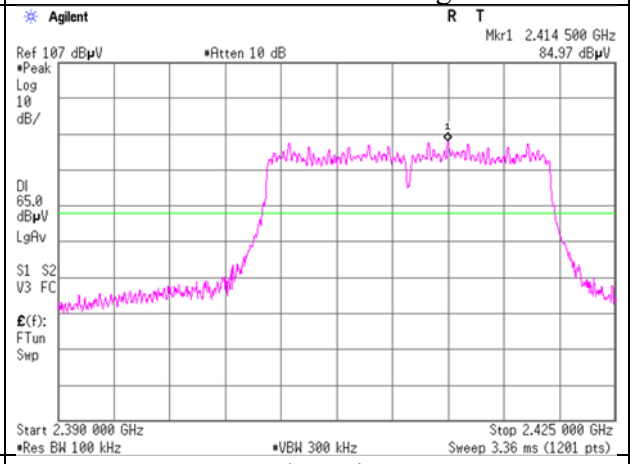
Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Authorized-band band-edge Plot



20dBc Plot

* 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.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	August 31, 2020
Temperature / Humidity	25 deg.C / 66 %RH
Engineer	Kazuya Noda
	(1 GHz - 2.8 GHz)
Mode	Tx 11n-20 2417 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	58.19	28.56	14.03	38.68	2.10	64.20	73.9	9.7	235	28	-
Vert.	2390.000	PK	57.59	28.56	14.03	38.68	2.10	63.60	73.9	10.3	141	254	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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	39.42	28.56	14.03	38.68	4.05	2.10	49.48	53.9	**4.4**	*1)
Vert.	2390.000	AV	38.85	28.56	14.03	38.68	4.05	2.10	48.91	53.9	4.9	*1)

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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.	2417.000	PK	90.93	28.51	14.06	38.66	2.10	96.94	-	-	Carrier
Hori.	2400.000	PK	54.32	28.54	14.04	38.67	2.10	60.33	76.9	16.5	-
Vert.	2417.000	PK	88.53	28.51	14.06	38.66	2.10	94.54	-	-	Carrier
Vert.	2400.000	PK	48.39	28.54	14.04	38.67	2.10	54.40	74.5	20.1	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

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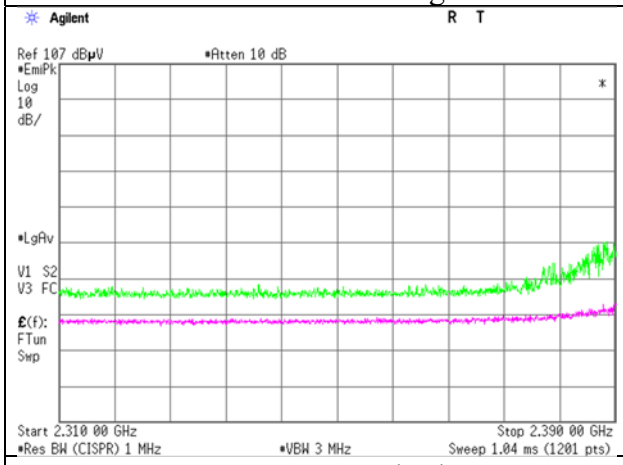
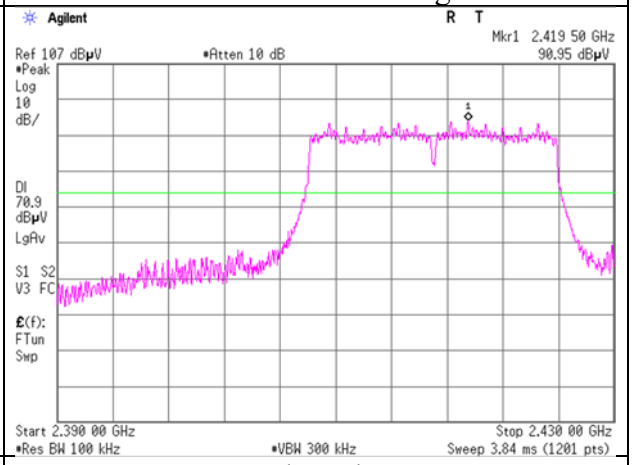
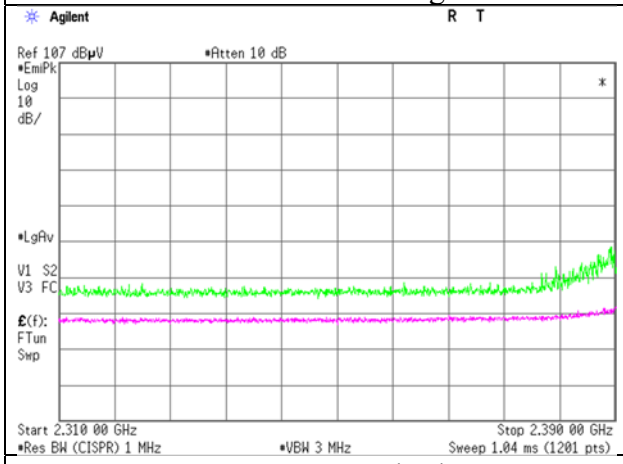
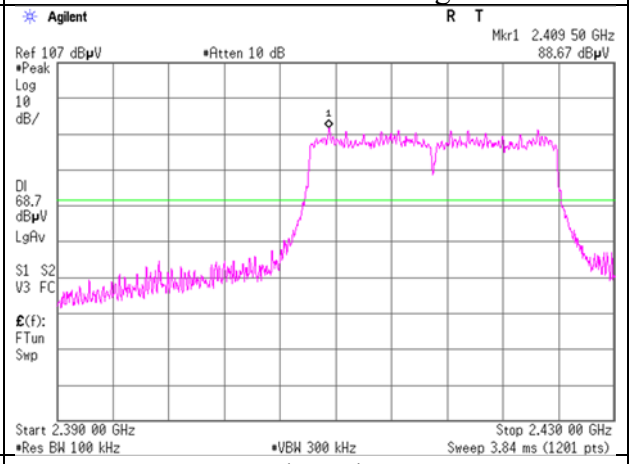
Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	August 31, 2020
Temperature / Humidity	25 deg.C / 66 %RH
Engineer	Kazuya Noda
Mode	Tx 11n-20 2417 MHz

Horizontal

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

Vertical

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

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

Radiated Spurious Emission

Report No.	13462774S-B-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	3	2	2	3
Date	August 26, 2020	August 31, 2020	September 1, 2020	August 24, 2020
Temperature / Humidity	23 deg. C / 60 % RH	25 deg.C / 66 %RH	26 deg.C / 65 %RH	25 deg. C / 60 % RH
Engineer	Yohsuke Matsuzawa	Kazuya Noda	Yosuke Murakami	Yohsuke Matsuzawa
	(30 MHz - 1 GHz)	(1 GHz - 2.8 GHz)	(2.8 GHz - 10 GHz)	(10 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.	175.006	QP	39.30	15.73	7.81	32.06	0.00	30.78	43.5	12.7	185	223	-
Hori.	214.737	QP	44.60	11.23	8.06	32.03	0.00	31.86	43.5	11.6	158	353	-
Hori.	240.010	QP	48.40	11.57	8.20	32.00	0.00	36.17	46.0	9.8	131	331	-
Hori.	375.008	QP	44.00	15.11	8.89	31.93	0.00	36.07	46.0	9.9	100	42	-
Hori.	425.013	QP	41.30	16.06	9.12	31.94	0.00	34.54	46.0	11.4	100	287	-
Hori.	519.743	QP	41.00	17.68	9.49	31.95	0.00	36.22	46.0	9.7	100	344	-
Hori.	776.193	QP	37.60	20.43	10.42	31.70	0.00	36.75	46.0	9.2	100	8	-
Hori.	870.348	QP	38.40	21.99	10.73	31.21	0.00	39.91	46.0	**6.0**	100	234	-
Hori.	4874.000	PK	44.93	31.58	6.61	38.54	2.10	46.68	73.9	27.2	204	154	-
Hori.	7311.000	PK	44.39	37.71	8.19	39.27	2.10	53.12	73.9	20.7	150	0	-
Hori.	7311.000	AV	35.34	37.71	8.19	39.27	2.10	44.07	53.9	9.8	150	0	Floor noise
Vert.	56.533	QP	36.90	9.06	6.67	32.16	0.00	20.47	40.0	19.5	100	295	-
Vert.	782.672	QP	35.20	20.53	10.44	31.69	0.00	34.48	46.0	11.5	100	150	-
Vert.	4874.000	PK	47.38	31.58	6.61	38.54	2.10	49.13	73.9	24.7	190	12	-
Vert.	7311.000	PK	44.45	37.71	8.19	39.27	2.10	53.18	73.9	20.7	150	0	-
Vert.	7311.000	AV	35.39	37.71	8.19	39.27	2.10	44.12	53.9	9.7	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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.	4874.000	AV	35.87	31.58	6.61	38.54	4.05	2.10	41.67	53.9	12.2	-
Vert.	4874.000	AV	38.11	31.58	6.61	38.54	4.05	2.10	43.91	53.9	9.9	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Burst rate confirmation" sheet.

Radiated Spurious Emission

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	August 31, 2020
Temperature / Humidity	25 deg.C / 66 %RH
Engineer	Kazuya Noda
	(1 GHz - 2.8 GHz)
Mode	Tx 11n-20 2457 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	50.41	28.40	14.12	38.62	2.10	56.41	73.9	17.4	154	7	-
Vert.	2483.500	PK	50.14	28.40	14.12	38.62	2.10	56.14	73.9	17.7	139	257	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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.	2483.500	AV	36.24	28.40	14.12	38.62	4.05	2.10	46.29	53.9	7.6	*1)
Vert.	2483.500	AV	36.48	28.40	14.12	38.62	4.05	2.10	46.53	53.9	**7.3**	*1)

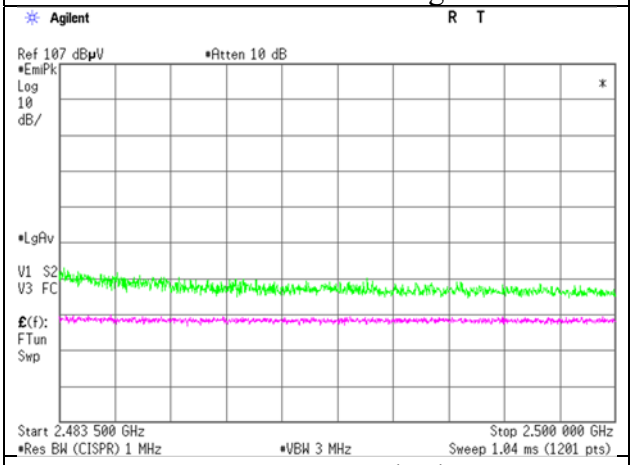
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Burst rate confirmation" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	August 31, 2020
Temperature / Humidity	25 deg.C / 66 %RH
Engineer	Kazuya Noda
Mode	Tx 11n-20 2457 MHz

Horizontal

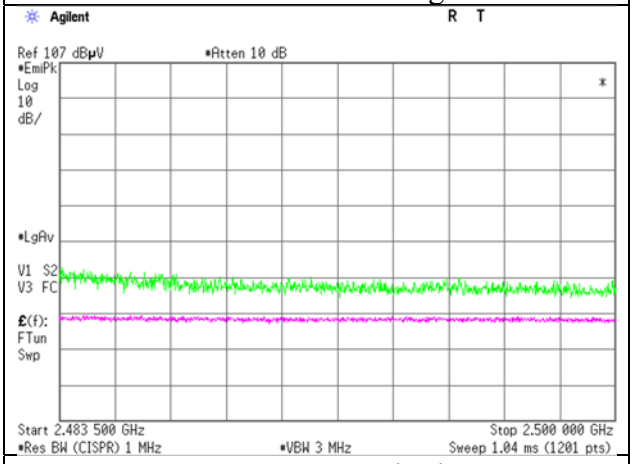
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission

Report No.	13462774S-B-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	2	2	3
Date	August 31, 2020	September 1, 2020	August 24, 2020
Temperature / Humidity	25 deg.C / 66 %RH	26 deg.C / 65 %RH	25 deg. C / 60 % RH
Engineer	Kazuya Noda	Yosuke Murakami	Yohsuke Matsuzawa
	(1 GHz - 2.8 GHz)	(2.8 GHz - 10 GHz)	(10 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	53.98	28.40	14.12	38.62	2.10	59.98	73.9	13.9	153	34	-
Hori.	4924.000	PK	45.13	31.63	6.65	38.54	2.10	46.97	73.9	26.9	237	149	-
Hori.	7386.000	PK	43.21	37.79	8.26	39.36	2.10	52.00	73.9	21.9	150	0	-
Hori.	7386.000	AV	35.01	37.79	8.26	39.36	2.10	43.80	53.9	10.1	150	0	Floor noise
Vert.	2483.500	PK	52.03	28.40	14.12	38.62	2.10	58.03	73.9	15.8	132	258	-
Vert.	4924.000	PK	47.16	31.63	6.65	38.54	2.10	49.00	73.9	24.9	181	13	-
Vert.	7386.000	PK	43.37	37.79	8.26	39.36	2.10	52.16	73.9	21.7	150	0	-
Vert.	7386.000	AV	34.73	37.79	8.26	39.36	2.10	43.52	53.9	10.3	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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.	2483.500	AV	36.63	28.40	14.12	38.62	4.05	2.10	46.68	53.9	7.2	*1)
Hori.	4924.000	AV	36.81	31.63	6.65	38.54	4.05	2.10	42.70	53.9	11.2	-
Vert.	2483.500	AV	36.93	28.40	14.12	38.62	4.05	2.10	46.98	53.9	**6.9**	*1)
Vert.	4924.000	AV	38.02	31.63	6.65	38.54	4.05	2.10	43.91	53.9	9.9	-

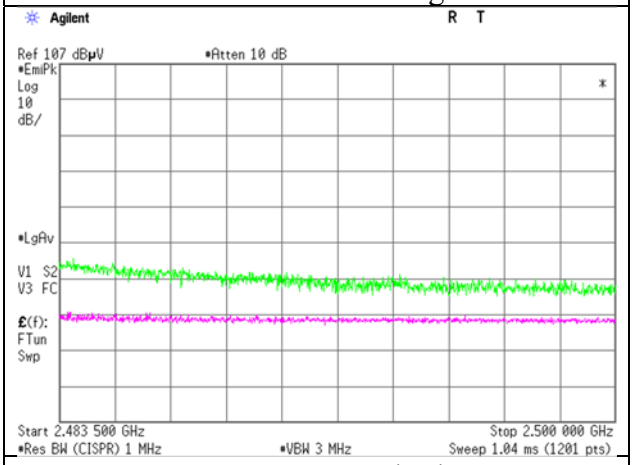
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Burst rate confirmation" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	August 31, 2020
Temperature / Humidity	25 deg.C / 66 %RH
Engineer	Kazuya Noda
Mode	Tx 11n-20 2462 MHz

Horizontal

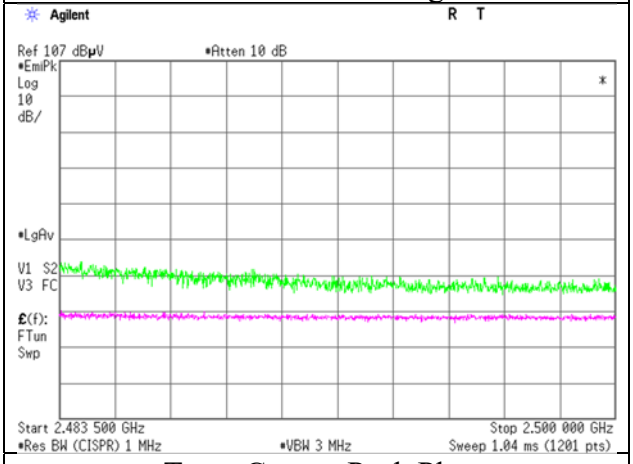
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot

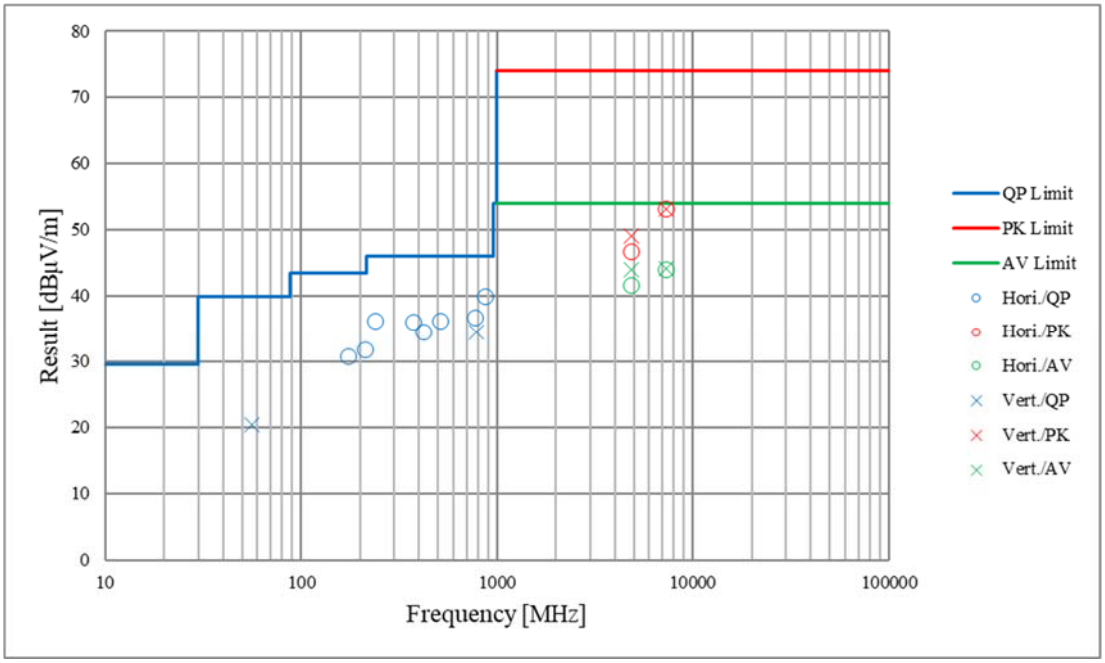


Trace Green : Peak Plot
Trace Purple : Average Plot

* 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.	13462774S-B-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	3	2	2	3
Date	August 26, 2020	August 31, 2020	September 1, 2020	August 24, 2020
Temperature / Humidity	23 deg. C / 60 % RH	25 deg.C / 66 %RH	26 deg.C / 65 %RH	25 deg. C / 60 % RH
Engineer	Yohsuke Matsuzawa	Kazuya Noda	Yosuke Murakami	Yohsuke Matsuzawa
	(30 MHz - 1 GHz)	(1 GHz - 2.8 GHz)	(2.8 GHz - 10 GHz)	(10 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

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	September 1, 2020
Temperature / Humidity	26 deg.C / 65 %RH
Engineer	Yosuke Murakami
	(1 GHz - 2.8 GHz)
Mode	Tx 11b 2412 MHz with 11ac-20 CDD 5240 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.	2385.650	PK	47.00	28.57	14.03	38.68	2.10	53.02	73.9	20.8	159	17	-
Hori.	2390.000	PK	46.23	28.56	14.03	38.68	2.10	52.24	73.9	21.6	159	17	-
Hori.	2385.650	AV	38.18	28.57	14.03	38.68	2.10	44.20	53.9	**9.7**	159	17	-
Hori.	2390.000	AV	36.83	28.56	14.03	38.68	2.10	42.84	53.9	11.0	159	17	-
Vert.	2385.646	PK	46.57	28.57	14.03	38.68	2.10	52.59	73.9	21.3	142	257	-
Vert.	2390.000	PK	45.73	28.56	14.03	38.68	2.10	51.74	73.9	22.1	142	257	-
Vert.	2385.646	AV	38.11	28.57	14.03	38.68	2.10	44.13	53.9	**9.7**	142	257	-
Vert.	2390.000	AV	36.99	28.56	14.03	38.68	2.10	43.00	53.9	10.9	142	257	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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	89.42	28.52	14.04	38.66	2.10	95.42	-	-	Carrier
Hori.	2398.508	PK	45.65	28.54	14.03	38.67	2.10	51.65	75.4	23.7	-
Hori.	2400.000	PK	37.42	28.54	14.04	38.67	2.10	43.43	75.4	31.9	-
Vert.	2412.000	PK	89.11	28.52	14.04	38.66	2.10	95.11	-	-	Carrier
Vert.	2398.499	PK	44.24	28.54	14.03	38.67	2.10	50.24	75.1	24.8	-
Vert.	2400.000	PK	36.63	28.54	14.04	38.67	2.10	42.64	75.1	32.4	-

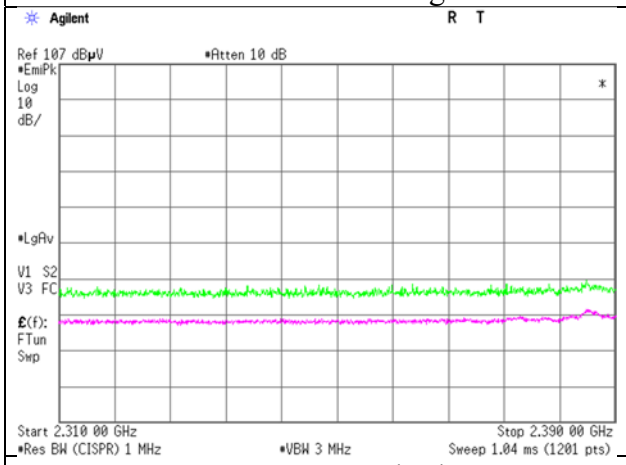
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	September 1, 2020
Temperature / Humidity	26 deg.C / 65 %RH
Engineer	Yosuke Murakami
Mode	Tx 11b 2412 MHz with 11ac-20 CDD 5240 MHz

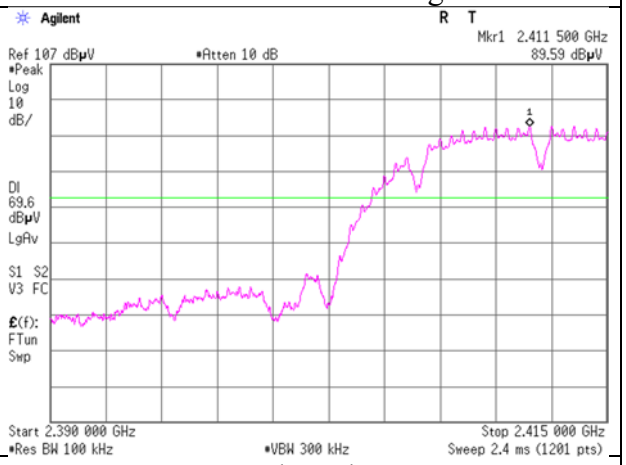
Horizontal

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

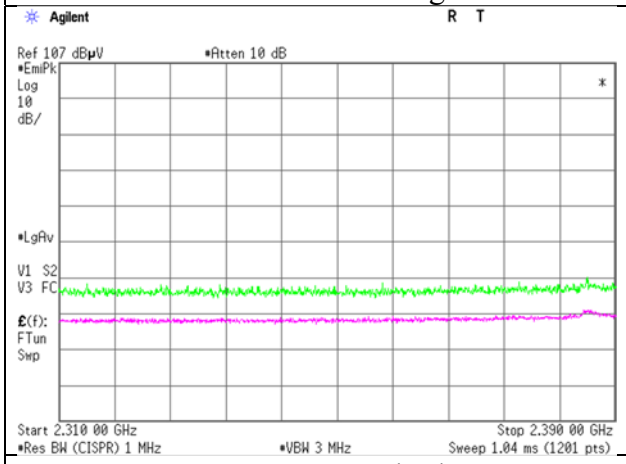
Authorized-band band-edge Plot



20dBc Plot

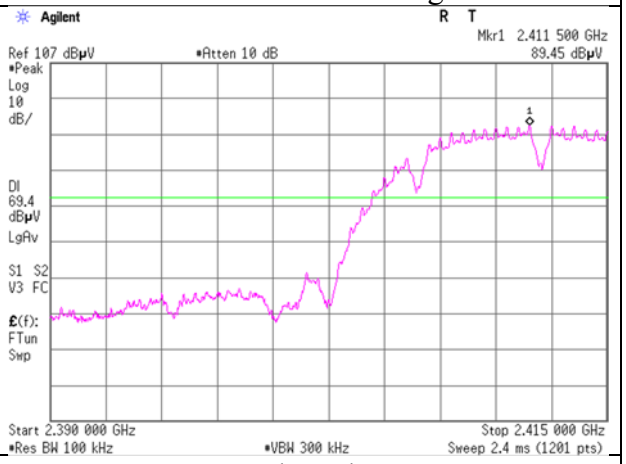
Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Authorized-band band-edge Plot



20dBc Plot

* 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.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	September 1, 2020
Temperature / Humidity	26 deg.C / 65 %RH
Engineer	Yosuke Murakami
	(1 GHz - 2.8 GHz)
Mode	Tx 11b 2462 MHz with 11ac-20 CDD 5240 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	45.04	28.40	14.12	38.62	2.10	51.04	73.9	22.8	153	36	-
Hori.	2483.500	AV	35.61	28.40	14.12	38.62	2.10	41.61	53.9	12.2	153	36	-
Vert.	2483.500	PK	45.67	28.40	14.12	38.62	2.10	51.67	73.9	22.2	154	182	-
Vert.	2483.500	AV	36.40	28.40	14.12	38.62	2.10	42.40	53.9	**11.5**	154	182	-

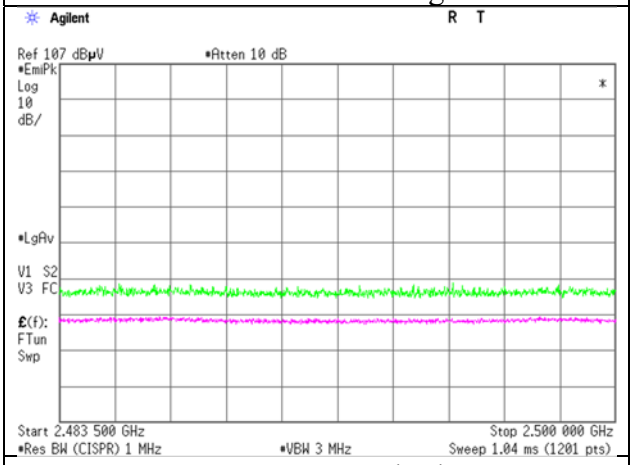
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	September 1, 2020
Temperature / Humidity	26 deg.C / 65 %RH
Engineer	Yosuke Murakami
Mode	Tx 11b 2462 MHz with 11ac-20 CDD 5240 MHz

Horizontal

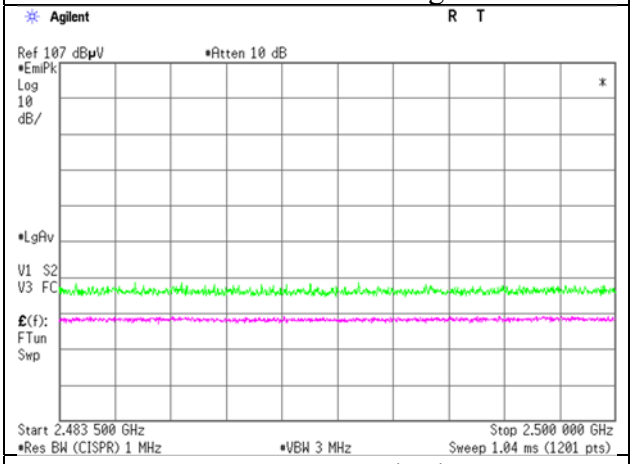
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	September 1, 2020
Temperature / Humidity	26 deg.C / 65 %RH
Engineer	Yosuke Murakami
	(1 GHz - 2.8 GHz)
Mode	Tx 11g 2412 MHz with 11ac-20 CDD 5240 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	54.94	28.56	14.03	38.68	2.10	60.95	73.9	12.9	155	16	-
Vert.	2390.000	PK	55.08	28.56	14.03	38.68	2.10	61.09	73.9	12.8	142	257	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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	38.23	28.56	14.03	38.68	3.83	2.10	48.07	53.9	**5.8**	*1)
Vert.	2390.000	AV	37.89	28.56	14.03	38.68	3.83	2.10	47.73	53.9	6.1	*1)

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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)**

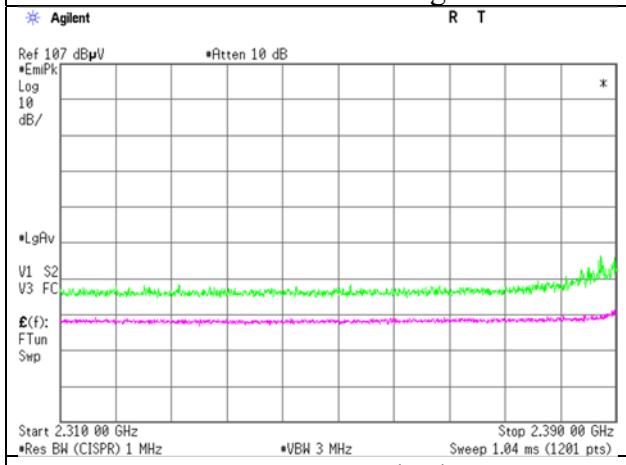
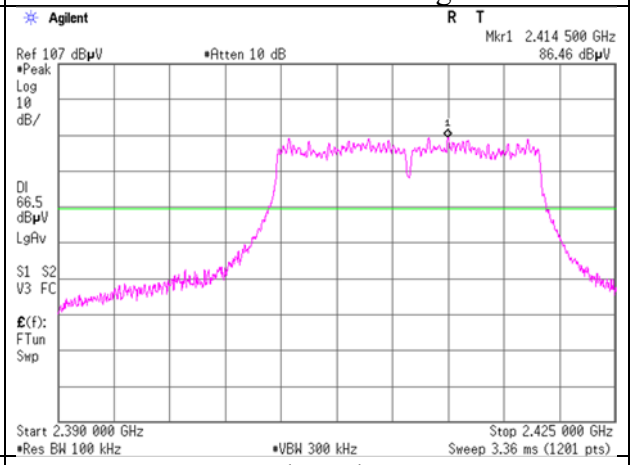
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	86.07	28.52	14.04	38.66	2.10	92.07	-	-	Carrier
Hori.	2400.000	PK	50.25	28.54	14.04	38.67	2.10	56.26	72.0	15.7	-
Vert.	2412.000	PK	86.15	28.52	14.04	38.66	2.10	92.15	-	-	Carrier
Vert.	2400.000	PK	49.29	28.54	14.04	38.67	2.10	55.30	72.1	16.8	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

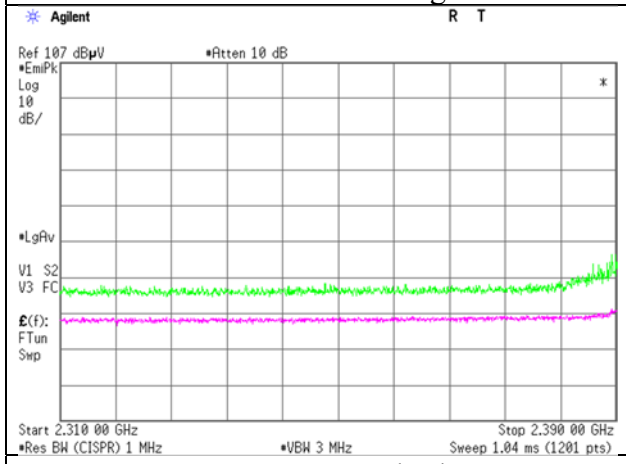
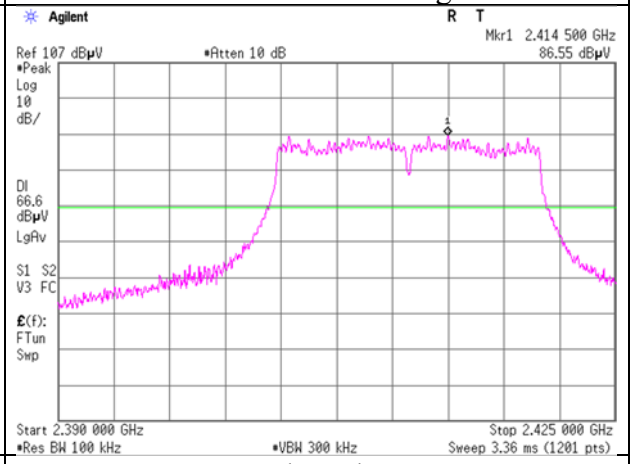
Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	September 1, 2020
Temperature / Humidity	26 deg.C / 65 %RH
Engineer	Yosuke Murakami
Mode	Tx 11g 2412 MHz with 11ac-20 CDD 5240 MHz

Horizontal

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

Vertical

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

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

Radiated Spurious Emission

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	September 1, 2020
Temperature / Humidity	26 deg.C / 65 %RH
Engineer	Yosuke Murakami
	(1 GHz - 2.8 GHz)
Mode	Tx 11g 2417 MHz with 11ac-20 CDD 5240 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	57.60	28.56	14.03	38.68	2.10	63.61	73.9	10.2	155	15	-
Vert.	2390.000	PK	57.83	28.56	14.03	38.68	2.10	63.84	73.9	10.0	131	180	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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	38.25	28.56	14.03	38.68	3.83	2.10	48.09	53.9	**5.8**	*1)
Vert.	2390.000	AV	37.92	28.56	14.03	38.68	3.83	2.10	47.76	53.9	6.1	*1)

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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)

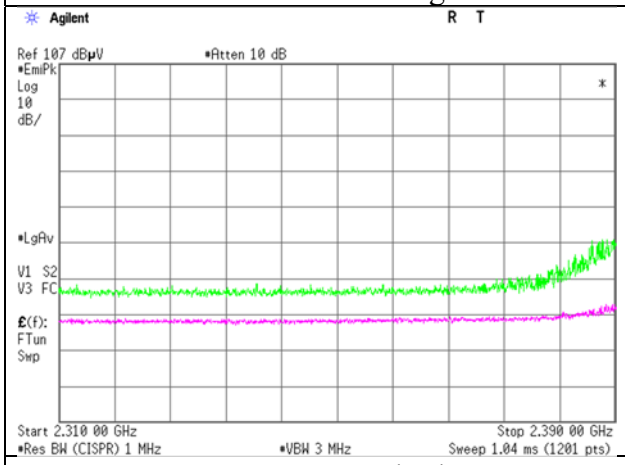
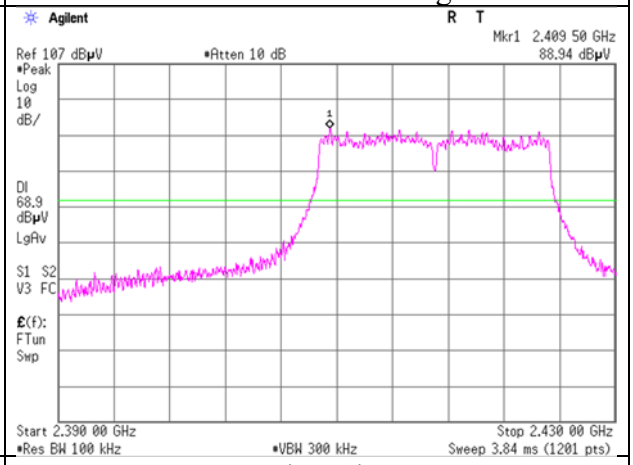
20 dBc Data Sheet **(RBW 100 kHz, VBW 300 kHz)**

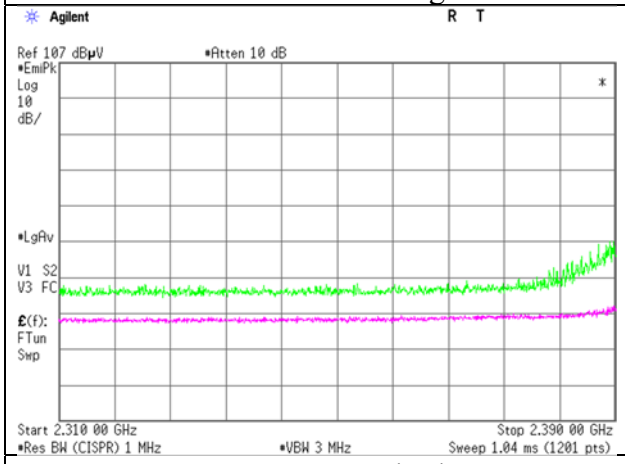
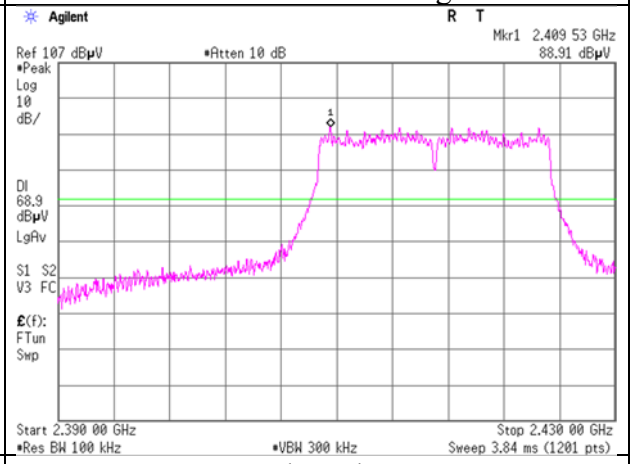
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2417.000	PK	88.54	28.51	14.06	38.66	2.10	94.55	-	-	Carrier
Hori.	2400.000	PK	48.89	28.54	14.04	38.67	2.10	54.90	74.5	19.6	-
Vert.	2417.000	PK	88.52	28.51	14.06	38.66	2.10	94.53	-	-	Carrier
Vert.	2400.000	PK	48.61	28.54	14.04	38.67	2.10	54.62	74.5	19.8	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	September 1, 2020
Temperature / Humidity	26 deg.C / 65 %RH
Engineer	Yosuke Murakami
Mode	Tx 11g 2417 MHz with 11ac-20 CDD 5240 MHz

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

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

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

Radiated Spurious Emission

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	September 1, 2020
Temperature / Humidity	26 deg.C / 65 %RH
Engineer	Yosuke Murakami
	(1 GHz - 2.8 GHz)
Mode	Tx 11g 2457 MHz with 11ac-20 CDD 5240 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	55.12	28.40	14.12	38.62	2.10	61.12	73.9	12.7	151	38	-
Vert.	2483.500	PK	50.46	28.40	14.12	38.62	2.10	56.46	73.9	17.4	154	182	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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.	2483.500	AV	37.60	28.40	14.12	38.62	3.83	2.10	47.43	53.9	**6.4**	*1)
Vert.	2483.500	AV	36.86	28.40	14.12	38.62	3.83	2.10	46.69	53.9	7.2	*1)

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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)

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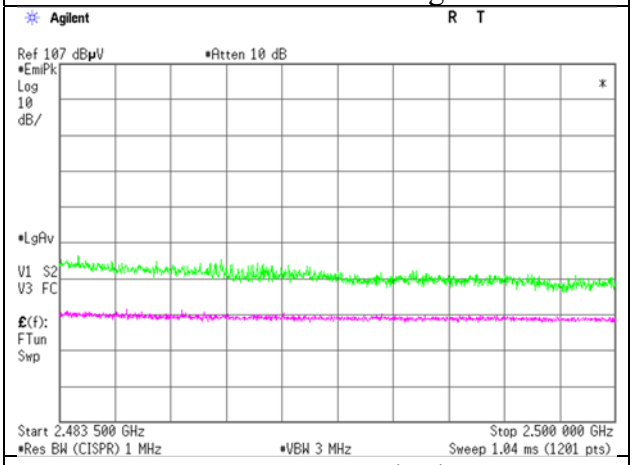
Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	September 1, 2020
Temperature / Humidity	26 deg.C / 65 %RH
Engineer	Yosuke Murakami
Mode	Tx 11g 2457 MHz with 11ac-20 CDD 5240 MHz

Horizontal

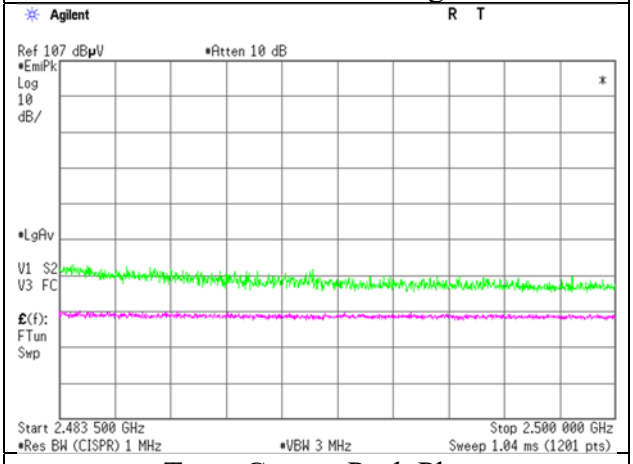
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	September 1, 2020
Temperature / Humidity	26 deg.C / 65 %RH
Engineer	Yosuke Murakami
	(1 GHz - 2.8 GHz)
Mode	Tx 11g 2462 MHz with 11ac-20 CDD 5240 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	54.53	28.40	14.12	38.62	2.10	60.53	73.9	13.3	153	37	-
Vert.	2483.500	PK	51.42	28.40	14.12	38.62	2.10	57.42	73.9	16.4	152	182	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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.	2483.500	AV	37.04	28.40	14.12	38.62	3.83	2.10	46.87	53.9	**7.0**	*1)
Vert.	2483.500	AV	36.33	28.40	14.12	38.62	3.83	2.10	46.16	53.9	7.7	*1)

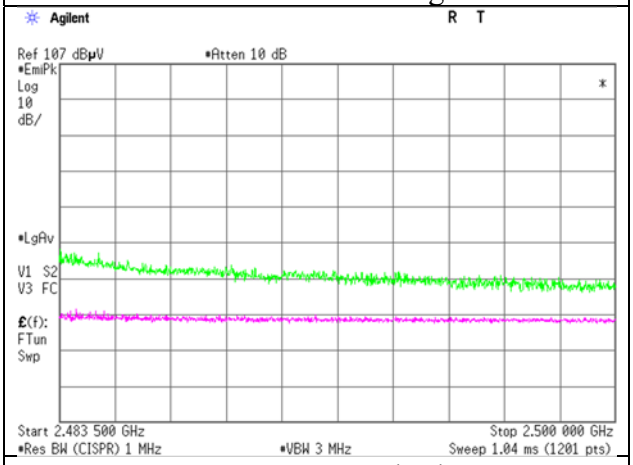
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Burst rate confirmation" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	September 1, 2020
Temperature / Humidity	26 deg.C / 65 %RH
Engineer	Yosuke Murakami
Mode	Tx 11g 2462 MHz with 11ac-20 CDD 5240 MHz

Horizontal

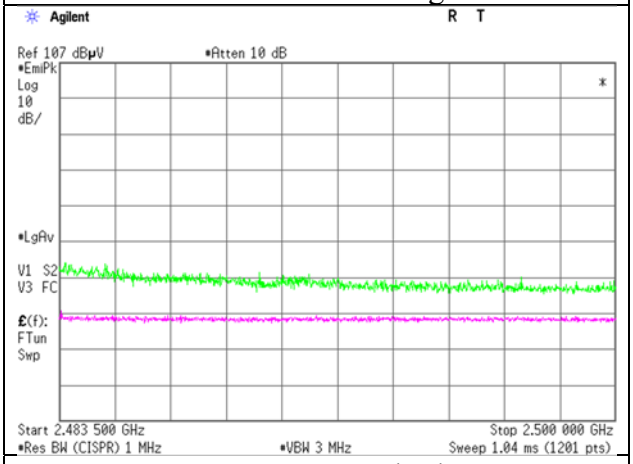
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	September 1, 2020
Temperature / Humidity	26 deg.C / 65 %RH
Engineer	Yosuke Murakami
	(1 GHz - 2.8 GHz)
Mode	Tx 11n-20 2412 MHz with 11ac-20 CDD 5240 MHz

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	53.33	28.56	14.03	38.68	2.10	59.34	73.9	14.5	189	44	-
Vert.	2390.000	PK	52.74	28.56	14.03	38.68	2.10	58.75	73.9	15.1	145	257	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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	39.21	28.56	14.03	38.68	4.05	2.10	49.27	53.9	**4.6**	*1)
Vert.	2390.000	AV	38.76	28.56	14.03	38.68	4.05	2.10	48.82	53.9	5.0	*1)

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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)**

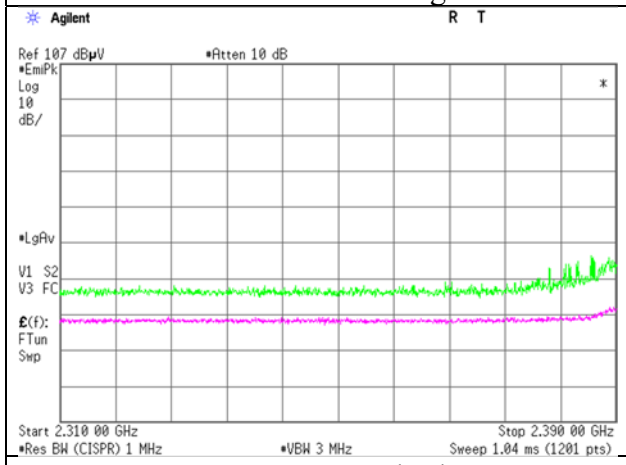
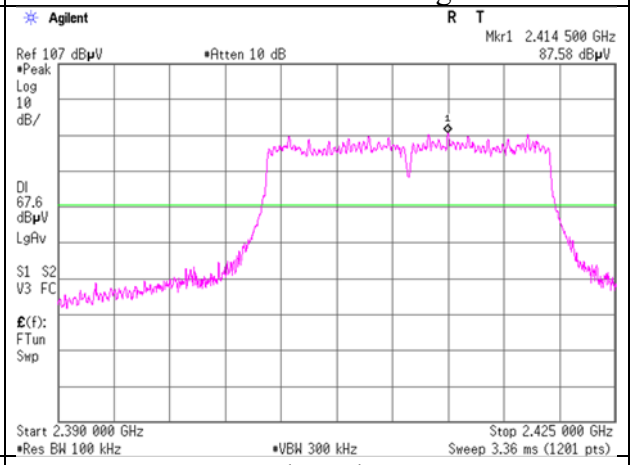
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	87.21	28.52	14.04	38.66	2.10	93.21	-	-	Carrier
Hori.	2400.000	PK	50.71	28.54	14.04	38.67	2.10	56.72	73.2	16.4	-
Vert.	2412.000	PK	85.04	28.52	14.04	38.66	2.10	91.04	-	-	Carrier
Vert.	2400.000	PK	46.95	28.54	14.04	38.67	2.10	52.96	71.0	18.0	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

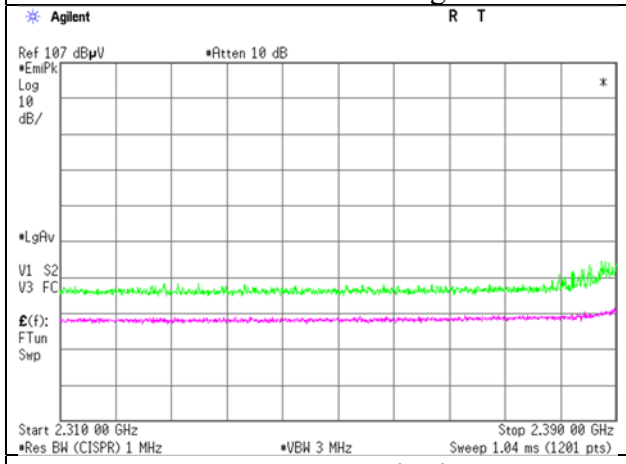
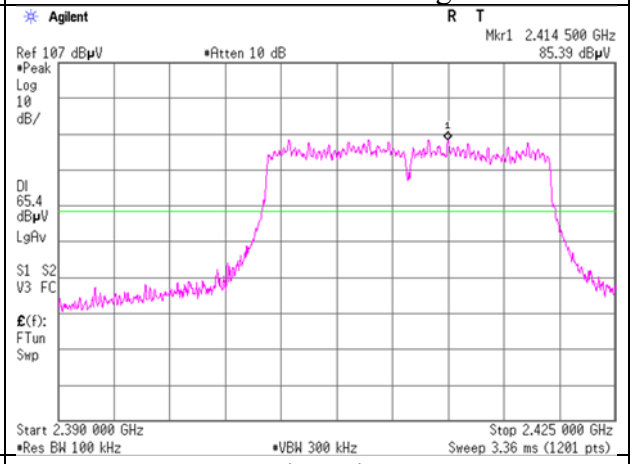
Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	September 1, 2020
Temperature / Humidity	26 deg.C / 65 %RH
Engineer	Yosuke Murakami
Mode	Tx 11n-20 2412 MHz with 11ac-20 CDD 5240 MHz

Horizontal

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

Vertical

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

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

Radiated Spurious Emission

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	September 1, 2020
Temperature / Humidity	26 deg.C / 65 %RH
Engineer	Yosuke Murakami
	(1 GHz - 2.8 GHz)
Mode	Tx 11n-20 2417 MHz with 11ac-20 CDD 5240 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	57.01	28.56	14.03	38.68	2.10	63.02	73.9	10.8	159	16	-
Vert.	2390.000	PK	56.44	28.56	14.03	38.68	2.10	62.45	73.9	11.4	184	247	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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	37.90	28.56	14.03	38.68	4.05	2.10	47.96	53.9	5.9	*1)
Vert.	2390.000	AV	37.95	28.56	14.03	38.68	4.05	2.10	48.01	53.9	**5.8**	*1)

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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.	2417.000	PK	87.69	28.51	14.06	38.66	2.10	93.70	-	-	Carrier
Hori.	2400.000	PK	45.33	28.54	14.04	38.67	2.10	51.34	73.7	22.3	-
Vert.	2417.000	PK	87.39	28.51	14.06	38.66	2.10	93.40	-	-	Carrier
Vert.	2400.000	PK	45.68	28.54	14.04	38.67	2.10	51.69	73.4	21.7	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

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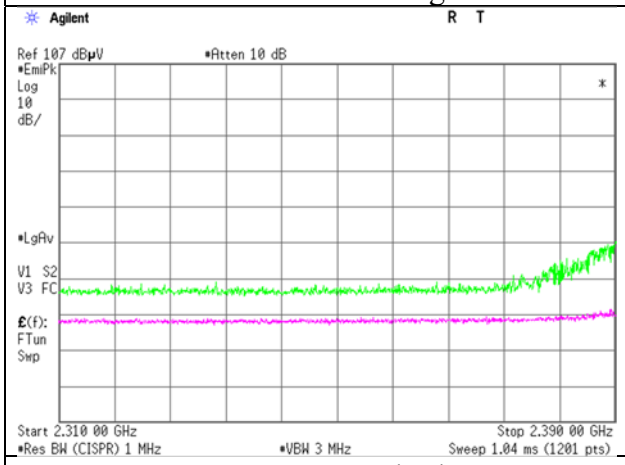
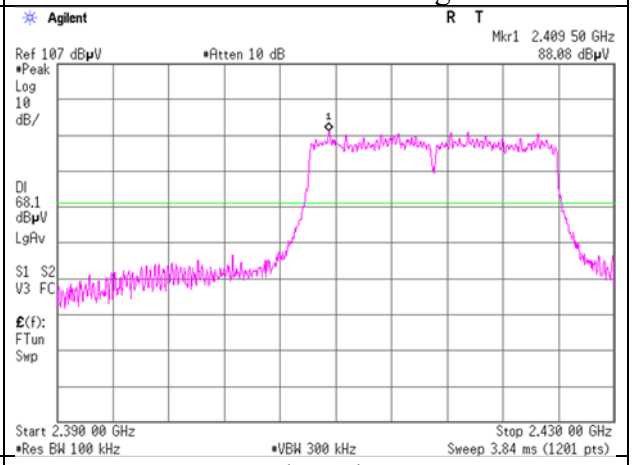
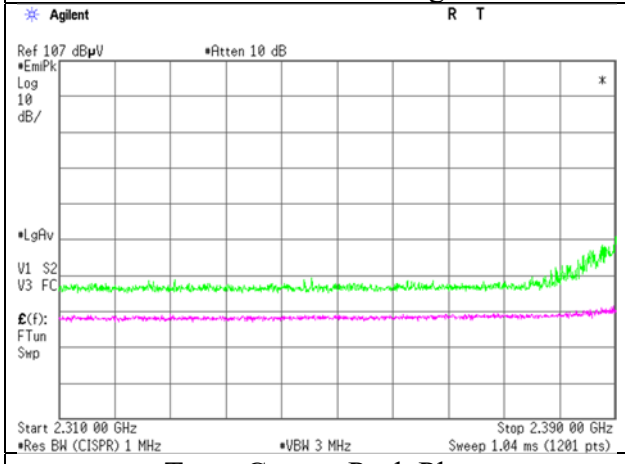
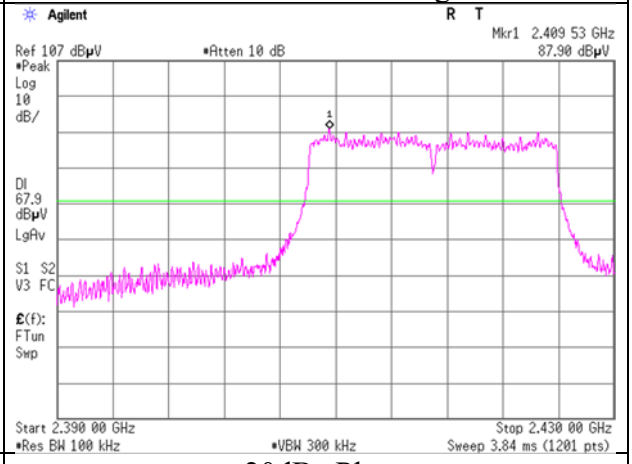
Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	September 1, 2020
Temperature / Humidity	26 deg.C / 65 %RH
Engineer	Yosuke Murakami
Mode	Tx 11n-20 2417 MHz with 11ac-20 CDD 5240 MHz

Horizontal

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

Vertical

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

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

Radiated Spurious Emission

Report No.	13462774S-B-R1				
Test place	Shonan EMC Lab.				
Semi Anechoic Chamber	3	2	2	2	2
Date	August 30, 2020	September 1, 2020	September 1, 2020	September 3, 2020	September 4, 2020
Temperature / Humidity	25 deg.C / 64 %RH	26 deg.C / 65 %RH	25 deg.C / 63 %RH	22 deg.C / 65 %RH	24 deg.C / 67 % RH
Engineer	Yosuke Murakami	Yosuke Murakami	Kazuya Noda	Kazuya Noda	Yosuke Murakami
	(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 11n-20 2437 MHz with 11ac-20 CDD 5240 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.	175.004	QP	40.49	15.73	7.81	32.06	0.00	31.97	43.5	11.5	189	6	-
Hori.	184.316	QP	34.02	16.14	7.79	32.06	0.00	25.89	43.5	17.6	180	350	-
Hori.	214.685	QP	41.56	11.23	8.06	32.03	0.00	28.82	43.5	14.6	154	355	-
Hori.	240.005	QP	48.81	11.57	8.20	32.00	0.00	36.58	46.0	9.4	140	343	-
Hori.	425.012	QP	42.56	16.06	9.12	31.94	0.00	35.80	46.0	10.2	100	349	-
Hori.	520.114	QP	35.88	17.67	9.49	31.95	0.00	31.09	46.0	14.9	100	54	-
Hori.	747.535	QP	36.43	20.15	10.33	31.74	0.00	35.17	46.0	10.8	100	27	-
Hori.	870.602	QP	37.12	22.00	10.73	31.21	0.00	38.64	46.0	**7.3**	135	275	-
Hori.	4874.000	PK	45.45	31.58	6.47	38.54	2.10	47.06	73.9	26.8	195	158	-
Hori.	7311.000	PK	44.24	37.71	7.96	39.27	2.10	52.74	73.9	21.1	150	0	-
Hori.	7311.000	AV	35.75	37.71	7.96	39.27	2.10	44.25	53.9	9.6	150	0	Floor noise
Vert.	57.114	QP	37.99	8.90	6.65	32.16	0.00	21.38	40.0	18.6	100	275	-
Vert.	520.085	QP	34.12	17.67	9.49	31.95	0.00	29.33	46.0	16.6	209	39	-
Vert.	745.144	QP	35.90	20.13	10.32	31.75	0.00	34.60	46.0	11.4	157	144	-
Vert.	870.661	QP	34.48	22.00	10.73	31.21	0.00	36.00	46.0	10.0	130	10	-
Vert.	4874.000	PK	46.16	31.58	6.47	38.54	2.10	47.77	73.9	26.1	196	5	-
Vert.	7311.000	PK	45.28	37.71	7.96	39.27	2.10	53.78	73.9	20.1	150	0	-
Vert.	7311.000	AV	35.51	37.71	7.96	39.27	2.10	44.01	53.9	9.8	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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.	4874.000	AV	35.98	31.58	6.47	38.54	4.05	2.10	41.64	53.9	12.2	-
Vert.	4874.000	AV	37.74	31.58	6.47	38.54	4.05	2.10	43.40	53.9	10.5	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Burst rate confirmation" sheet.

Radiated Spurious Emission

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	September 1, 2020
Temperature / Humidity	26 deg.C / 65 %RH
Engineer	Yosuke Murakami
	(1 GHz - 2.8 GHz)
Mode	Tx 11n-20 2457 MHz with 11ac-20 CDD 5240 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	52.86	28.40	14.12	38.62	2.10	58.86	73.9	15.0	153	36	-
Vert.	2483.500	PK	51.04	28.40	14.12	38.62	2.10	57.04	73.9	16.8	129	258	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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.	2483.500	AV	36.80	28.40	14.12	38.62	4.05	2.10	46.85	53.9	**7.0**	*1)
Vert.	2483.500	AV	36.44	28.40	14.12	38.62	4.05	2.10	46.49	53.9	7.4	*1)

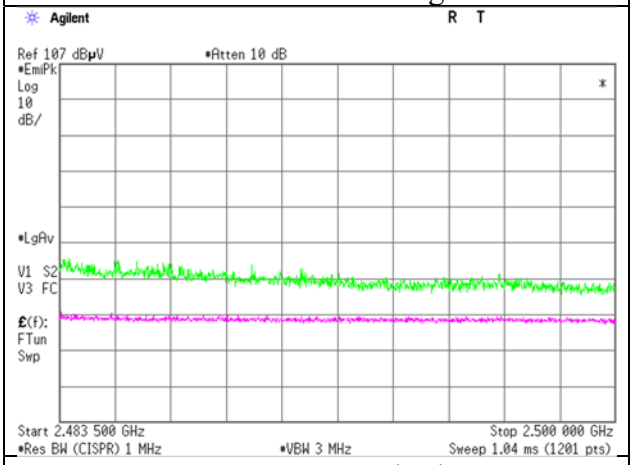
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Burst rate confirmation" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	September 1, 2020
Temperature / Humidity	26 deg.C / 65 %RH
Engineer	Yosuke Murakami
Mode	Tx 11n-20 2457 MHz with 11ac-20 CDD 5240 MHz

Horizontal

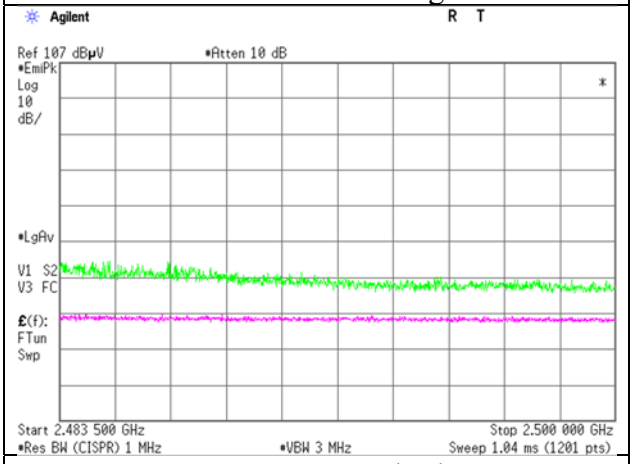
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	September 1, 2020
Temperature / Humidity	26 deg.C / 65 %RH
Engineer	Yosuke Murakami
	(1 GHz - 2.8 GHz)
Mode	Tx 11n-20 2462 MHz with 11ac-20 CDD 5240 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	52.77	28.40	14.12	38.62	2.10	58.77	73.9	15.1	153	36	-
Vert.	2483.500	PK	50.27	28.40	14.12	38.62	2.10	56.27	73.9	17.6	155	182	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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.	2483.500	AV	36.75	28.40	14.12	38.62	4.05	2.10	46.80	53.9	**7.0**	*1)
Vert.	2483.500	AV	36.29	28.40	14.12	38.62	4.05	2.10	46.34	53.9	7.5	*1)

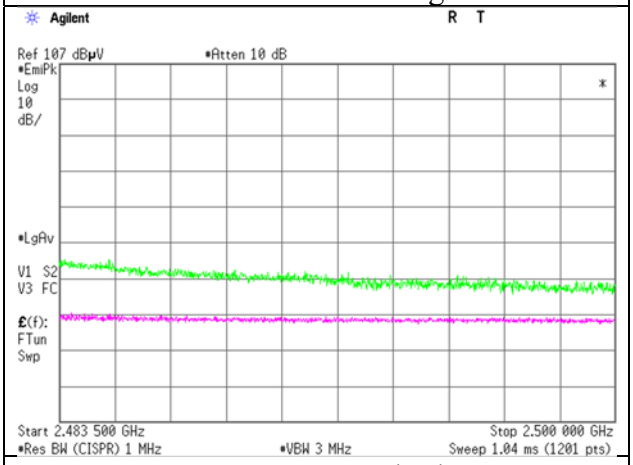
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Burst rate confirmation" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	2
Date	September 1, 2020
Temperature / Humidity	26 deg.C / 65 %RH
Engineer	Yosuke Murakami
Mode	Tx 11n-20 2462 MHz with 11ac-20 CDD 5240 MHz

Horizontal

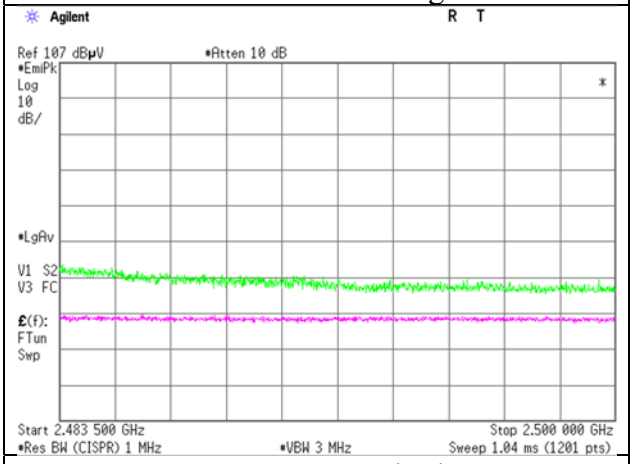
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot

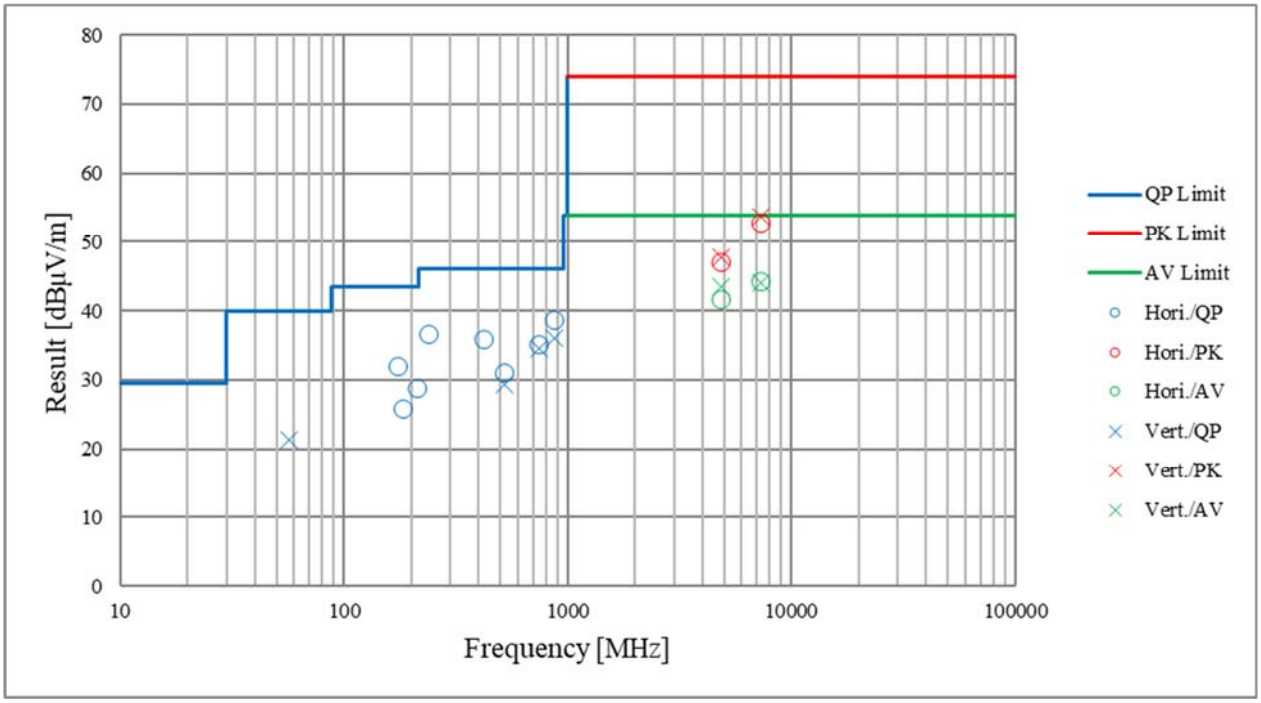


Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission
(Plot data, Worst case)

Report No.	13462774S-B-R1				
Test place	Shonan EMC Lab.				
Semi Anechoic Chamber	3	2	2	2	2
Date	August 30, 2020	September 1, 2020	September 1, 2020	September 3, 2020	September 4, 2020
Temperature / Humidity	25 deg.C / 64 %RH	26 deg.C / 65 %RH	25 deg.C / 63 %RH	22 deg.C / 65 %RH	24 deg.C / 67 % RH
Engineer	Yosuke Murakami	Yosuke Murakami	Kazuya Noda	Kazuya Noda	Yosuke Murakami
	(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 11n-20 2437 MHz with 11ac-20 CDD 5240 MHz				



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

Radiated Spurious Emission

Report No.	13462774S-B-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	3	3	3	3
Date	August 26, 2020	August 22, 2020	August 23, 2020	August 24, 2020
Temperature / Humidity	23 deg. C / 60 % RH	21 deg. C / 60 % RH	25 deg. C / 61 % RH	25 deg. C / 60 % RH
Engineer	Kazuya Noda	Yohsuke Matsuzawa	Yohsuke Matsuzawa	Yosuke Murakami
	(30 MHz - 1 GHz)	(1 GHz - 2.8 GHz)	(2.8 GHz - 10 GHz)	(10 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.	200.000	QP	39.10	16.56	7.83	32.04	0.00	31.45	43.5	12.0	161	316	- -
Hori.	214.881	QP	44.30	11.22	8.06	32.03	0.00	31.55	43.5	11.9	147	352	-
Hori.	240.010	QP	48.60	11.57	8.20	32.00	0.00	36.37	46.0	9.6	124	338	-
Hori.	375.011	QP	43.90	15.11	8.89	31.93	0.00	35.97	46.0	10.0	100	45	-
Hori.	519.753	QP	41.40	17.67	9.49	31.95	0.00	36.61	46.0	9.3	175	121	-
Hori.	762.804	QP	37.10	20.34	10.39	31.71	0.00	36.12	46.0	9.8	100	13	-
Hori.	870.295	QP	35.90	21.99	10.73	31.21	0.00	37.41	46.0	**8.5**	100	236	-
Hori.	2390.000	PK	49.37	28.41	14.22	41.66	2.10	52.44	73.9	21.4	105	106	-
Hori.	4804.000	PK	50.12	31.60	6.68	42.92	2.10	47.58	73.9	26.3	120	191	-
Hori.	7206.000	PK	52.49	37.60	8.16	43.39	2.10	56.96	73.9	16.9	127	223	-
Vert.	56.705	QP	36.50	9.01	6.66	32.16	0.00	20.01	40.0	19.9	100	252	-
Vert.	786.426	QP	36.20	20.60	10.45	31.68	0.00	35.57	46.0	10.4	100	153	-
Vert.	2390.000	PK	49.28	28.41	14.22	41.66	2.10	52.35	73.9	21.5	163	311	-
Vert.	4804.000	PK	52.92	31.60	6.68	42.92	2.10	50.38	73.9	23.5	158	182	-
Vert.	7206.000	PK	52.38	37.60	8.16	43.39	2.10	56.85	73.9	17.0	157	53	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Peak measurement value with Duty cycle correction factor (DCCF)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	DCCF [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	PK	49.37	28.41	14.22	41.66	-22.15	2.10	30.29	53.9	23.6	*1)
Hori.	4804.000	PK	50.12	31.60	6.68	42.92	-22.15	2.10	25.43	53.9	28.4	-
Hori.	7206.000	PK	52.49	37.60	8.16	43.39	-22.15	2.10	34.81	53.9	19.0	-
Vert.	2390.000	PK	49.28	28.41	14.22	41.66	-22.15	2.10	30.20	53.9	23.7	*1)
Vert.	4804.000	PK	52.92	31.60	6.68	42.92	-22.15	2.10	28.23	53.9	25.6	-
Vert.	7206.000	PK	52.38	37.60	8.16	43.39	-22.15	2.10	34.70	53.9	19.2	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + DCCF + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty cycle correction factor (DCCF) refer to "Duty cycle correction factor" sheet.
*1) Not out of band emission (Leakage Power)

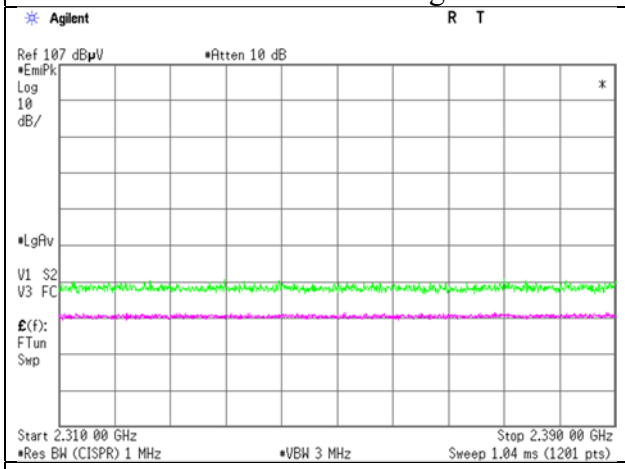
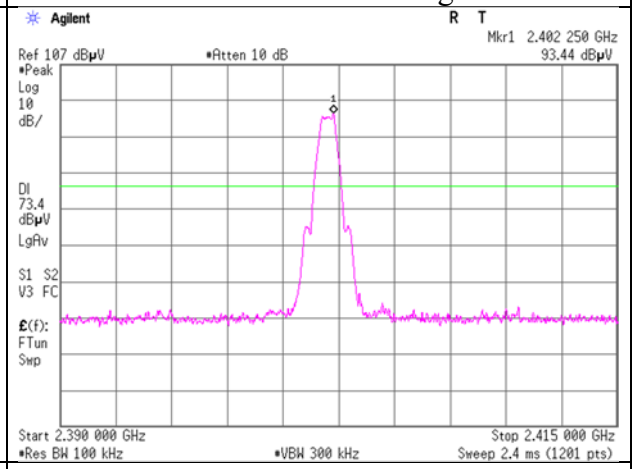
20 dBc Data Sheet **(RBW 100 kHz, VBW 300 kHz)**

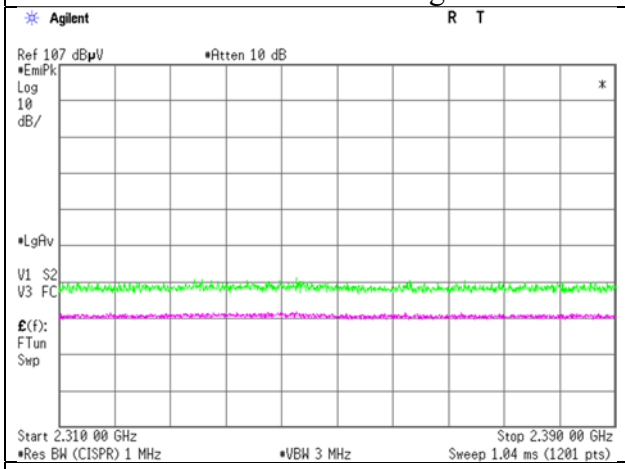
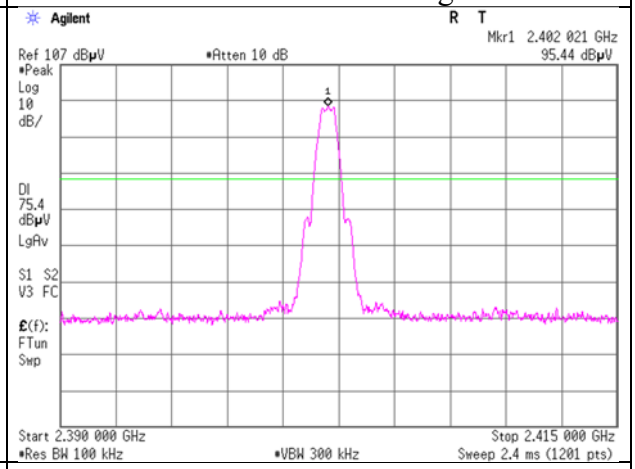
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	93.50	28.38	14.23	41.67	2.10	96.54	-	-	Carrier
Hori.	2400.000	PK	39.62	28.38	14.22	41.67	2.10	42.65	76.5	33.8	-
Vert.	2402.000	PK	96.00	28.38	14.23	41.67	2.10	99.04	-	-	Carrier
Vert.	2400.000	PK	41.41	28.38	14.22	41.67	2.10	44.44	79.0	34.5	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	August 22, 2020
Temperature / Humidity	21 deg. C / 60 % RH
Engineer	Yohsuke Matsuzawa
Mode	Tx BT LE 1 M-PHY 2402 MHz

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

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

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

Radiated Spurious Emission

Report No.	13462774S-B-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	3	3	3	3
Date	August 26, 2020	August 22, 2020	August 23, 2020	August 24, 2020
Temperature / Humidity	23 deg. C / 60 % RH	21 deg. C / 60 % RH	25 deg. C / 61 % RH	25 deg. C / 60 % RH
Engineer	Kazuya Noda	Yohsuke Matsuzawa	Yohsuke Matsuzawa	Yosuke Murakami
	(30 MHz - 1 GHz)	(1 GHz - 2.8 GHz)	(2.8 GHz - 10 GHz)	(10 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.	200.000	QP	39.20	16.56	7.83	32.04	0.00	31.55	43.5	11.9	166	311	-
Hori.	214.698	QP	44.50	11.23	8.06	32.03	0.00	31.76	43.5	11.7	157	351	-
Hori.	240.003	QP	48.80	11.57	8.20	32.00	0.00	36.57	46.0	9.4	132	337	-
Hori.	375.013	QP	44.60	15.11	8.89	31.93	0.00	36.67	46.0	9.3	100	43	-
Hori.	520.000	QP	41.20	17.67	9.49	31.95	0.00	36.41	46.0	9.5	178	125	-
Hori.	762.739	QP	37.50	20.33	10.39	31.71	0.00	36.51	46.0	9.4	100	11	-
Hori.	871.020	QP	36.10	22.01	10.73	31.20	0.00	37.64	46.0	**8.3**	100	235	-
Hori.	4880.000	PK	49.58	31.63	6.72	42.93	2.10	47.10	73.9	26.8	148	187	-
Hori.	7320.000	PK	49.67	37.71	8.21	43.49	2.10	54.20	73.9	19.7	144	328	-
Vert.	56.937	QP	35.70	8.94	6.65	32.16	0.00	19.13	40.0	20.8	100	247	-
Vert.	786.430	QP	36.20	20.60	10.45	31.68	0.00	35.57	46.0	10.4	100	152	-
Vert.	4880.000	PK	50.45	31.63	6.72	42.93	2.10	47.97	73.9	25.9	200	184	-
Vert.	7320.000	PK	50.04	37.71	8.21	43.49	2.10	54.57	73.9	19.3	182	127	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Peak measurement value with Duty cycle correction factor (DCCF)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	DCCF [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4880.000	PK	49.58	31.63	6.72	42.93	-22.15	2.10	24.95	53.9	28.9	-
Hori.	7320.000	PK	49.67	37.71	8.21	43.49	-22.15	2.10	32.05	53.9	21.8	-
Vert.	4880.000	PK	50.45	31.63	6.72	42.93	-22.15	2.10	25.82	53.9	28.0	-
Vert.	7320.000	PK	50.04	37.71	8.21	43.49	-22.15	2.10	32.42	53.9	21.4	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + DCCF + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty cycle correction factor (DCCF) refer to "Duty cycle correction factor" sheet.

Radiated Spurious Emission

Report No.	13462774S-B-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	3	3	3	3
Date	August 26, 2020	August 22, 2020	August 23, 2020	August 24, 2020
Temperature / Humidity	23 deg. C / 60 % RH	21 deg. C / 60 % RH	25 deg. C / 61 % RH	25 deg. C / 60 % RH
Engineer	Kazuya Noda	Yohsuke Matsuzawa	Yohsuke Matsuzawa	Yosuke Murakami
	(30 MHz - 1 GHz)	(1 GHz - 2.8 GHz)	(2.8 GHz - 10 GHz)	(10 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.	200.000	QP	39.10	16.56	7.83	32.04	0.00	31.45	43.5	12.0	161	312	-
Hori.	214.916	QP	44.40	11.22	8.06	32.03	0.00	31.65	43.5	11.8	147	353	-
Hori.	240.009	QP	48.70	11.57	8.20	32.00	0.00	36.47	46.0	9.5	170	333	-
Hori.	375.011	QP	44.00	15.11	8.89	31.93	0.00	36.07	46.0	9.9	100	40	-
Hori.	519.938	QP	41.10	17.67	9.49	31.95	0.00	36.31	46.0	9.6	175	124	-
Hori.	765.275	QP	37.00	20.37	10.39	31.71	0.00	36.05	46.0	9.9	100	10	-
Hori.	870.630	QP	35.80	22.00	10.73	31.21	0.00	37.32	46.0	**8.6**	100	231	-
Hori.	2483.500	PK	50.06	28.28	14.31	41.69	2.10	53.06	73.9	20.8	254	139	-
Hori.	4960.000	PK	49.89	31.79	6.79	42.94	2.10	47.63	73.9	26.2	149	73	-
Hori.	7440.000	PK	50.00	37.88	8.26	43.60	2.10	54.64	73.9	19.2	149	106	-
Vert.	56.697	QP	37.10	9.01	6.66	32.16	0.00	20.61	40.0	19.3	100	280	-
Vert.	84.005	QP	40.90	7.00	7.57	32.15	0.00	23.32	40.0	16.6	100	267	-
Vert.	786.422	QP	35.70	20.60	10.45	31.68	0.00	35.07	46.0	10.9	100	151	-
Vert.	2483.500	PK	50.00	28.28	14.31	41.69	2.10	53.00	73.9	20.9	153	312	-
Vert.	4960.000	PK	50.51	31.79	6.79	42.94	2.10	48.25	73.9	25.6	160	47	-
Vert.	7440.000	PK	50.91	37.88	8.26	43.60	2.10	55.55	73.9	18.3	151	8	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Peak measurement value with Duty cycle correction factor (DCCF)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	DCCF [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	PK	50.06	28.28	14.31	41.69	-22.15	2.10	30.91	53.9	22.9	*1)
Hori.	4960.000	PK	49.89	31.79	6.79	42.94	-22.15	2.10	25.48	53.9	28.4	-
Hori.	7440.000	PK	50.00	37.88	8.26	43.60	-22.15	2.10	32.49	53.9	21.4	-
Vert.	2483.500	PK	50.00	28.28	14.31	41.69	-22.15	2.10	30.85	53.9	23.0	*1)
Vert.	4960.000	PK	50.51	31.79	6.79	42.94	-22.15	2.10	26.10	53.9	27.8	-
Vert.	7440.000	PK	50.91	37.88	8.26	43.60	-22.15	2.10	33.40	53.9	20.5	-

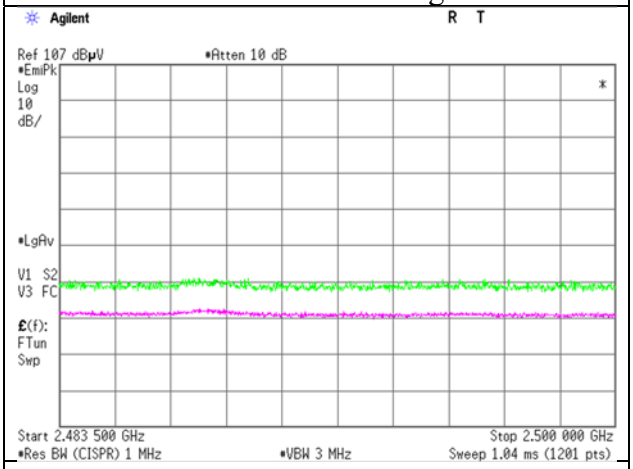
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + DCCF + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty cycle correction factor (DCCF) refer to "Duty cycle correction factor" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	August 22, 2020
Temperature / Humidity	21 deg. C / 60 % RH
Engineer	Yohsuke Matsuzawa
Mode	Tx BT LE 1 M-PHY 2480 MHz

Horizontal

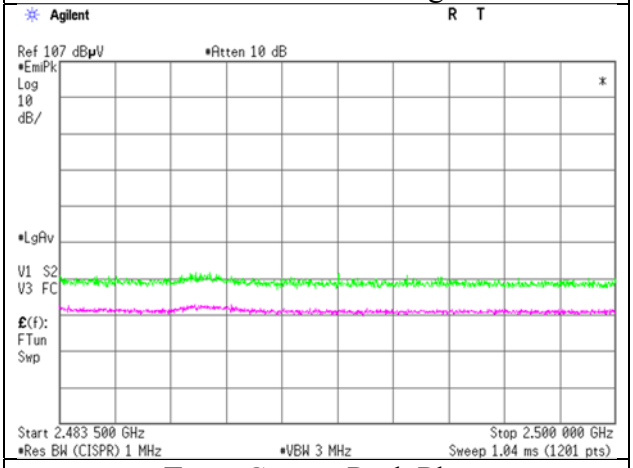
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission

Report No.	13462774S-B-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	3	3	3	3
Date	August 26, 2020	August 22, 2020	August 23, 2020	August 24, 2020
Temperature / Humidity	23 deg. C / 60 % RH	21 deg. C / 60 % RH	25 deg. C / 61 % RH	25 deg. C / 60 % RH
Engineer	Yohsuke Matsuzawa	Yohsuke Matsuzawa	Yohsuke Matsuzawa	Yosuke Murakami
	(30 MHz - 1 GHz)	(1 GHz - 2.8 GHz)	(2.8 GHz - 10 GHz)	(10 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.	200.000	QP	39.30	16.56	7.83	32.04	0.00	31.65	43.5	11.8	160	315	-
Hori.	214.899	QP	43.80	11.22	8.06	32.03	0.00	31.05	43.5	12.4	149	357	-
Hori.	240.010	QP	49.00	11.57	8.20	32.00	0.00	36.77	46.0	9.2	134	329	-
Hori.	375.018	QP	44.10	15.11	8.89	31.93	0.00	36.17	46.0	9.8	100	41	-
Hori.	425.017	QP	40.60	16.06	9.12	31.94	0.00	33.84	46.0	12.1	100	292	-
Hori.	520.028	QP	40.60	17.67	9.49	31.95	0.00	35.81	46.0	10.1	100	347	-
Hori.	777.428	QP	37.80	20.43	10.43	31.69	0.00	36.97	46.0	9.0	100	9	-
Hori.	871.083	QP	36.60	22.01	10.73	31.20	0.00	38.14	46.0	**7.8**	100	235	-
Hori.	2390.000	PK	49.53	28.41	14.22	41.66	2.10	52.60	73.9	21.3	156	144	-
Hori.	4804.000	PK	50.23	31.60	6.68	42.92	2.10	47.69	73.9	26.2	256	181	-
Hori.	7206.000	PK	50.35	37.60	8.16	43.39	2.10	54.82	73.9	19.0	151	208	-
Vert.	55.720	QP	36.00	9.29	6.70	32.16	0.00	19.83	40.0	20.1	100	289	-
Vert.	779.785	QP	37.00	20.48	10.43	31.69	0.00	36.22	46.0	9.7	100	156	-
Vert.	2390.000	PK	49.43	28.41	14.22	41.66	2.10	52.50	73.9	21.4	163	313	-
Vert.	4804.000	PK	52.90	31.60	6.68	42.92	2.10	50.36	73.9	23.5	163	183	-
Vert.	7206.000	PK	52.50	37.60	8.16	43.39	2.10	56.97	73.9	16.9	150	116	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Peak measurement value with Duty cycle correction factor (DCCF)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	DCCF [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	PK	49.53	28.41	14.22	41.66	-28.17	2.10	24.43	53.9	29.4	*1)
Hori.	4804.000	PK	50.23	31.60	6.68	42.92	-28.17	2.10	19.52	53.9	34.3	-
Hori.	7206.000	PK	50.35	37.60	8.16	43.39	-28.17	2.10	26.65	53.9	27.2	-
Vert.	2390.000	PK	49.43	28.41	14.22	41.66	-28.17	2.10	24.33	53.9	29.5	*1)
Vert.	4804.000	PK	52.90	31.60	6.68	42.92	-28.17	2.10	22.19	53.9	31.7	-
Vert.	7206.000	PK	52.50	37.60	8.16	43.39	-28.17	2.10	28.80	53.9	25.1	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + DCCF + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty cycle correction factor (DCCF) refer to "Duty cycle correction factor" sheet.
*1) Not out of band emission (Leakage Power)

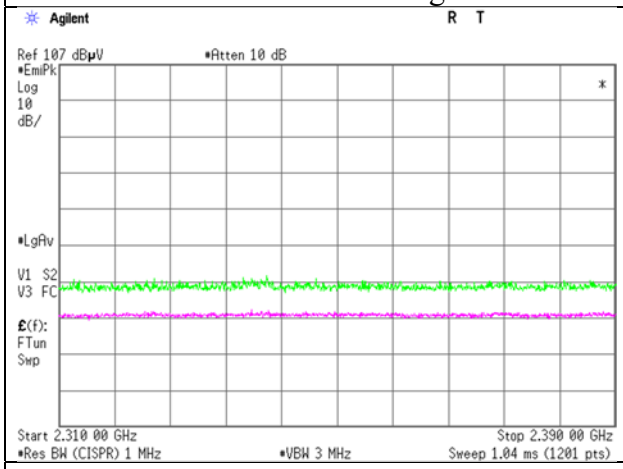
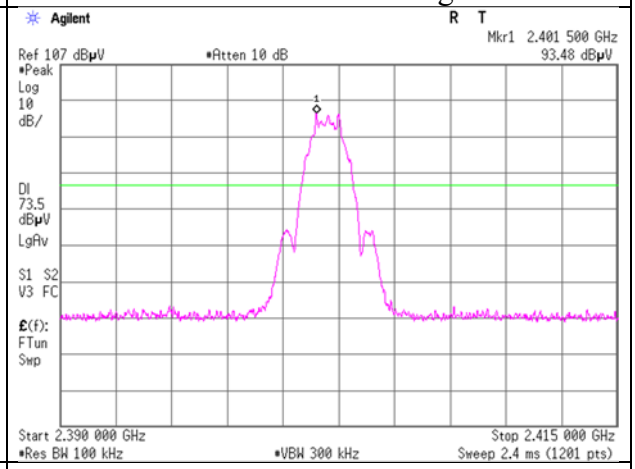
20 dBc Data Sheet **(RBW 100 kHz, VBW 300 kHz)**

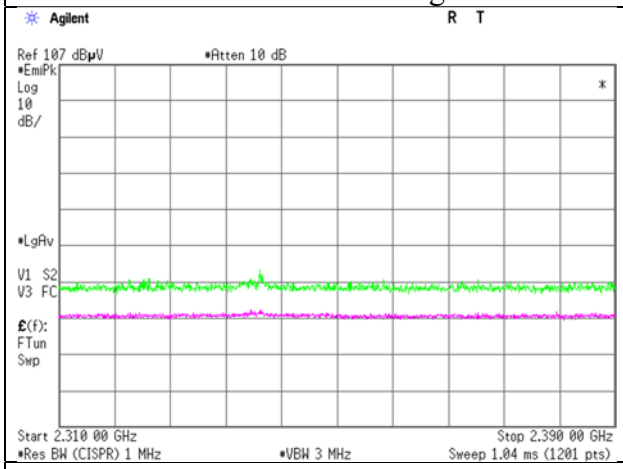
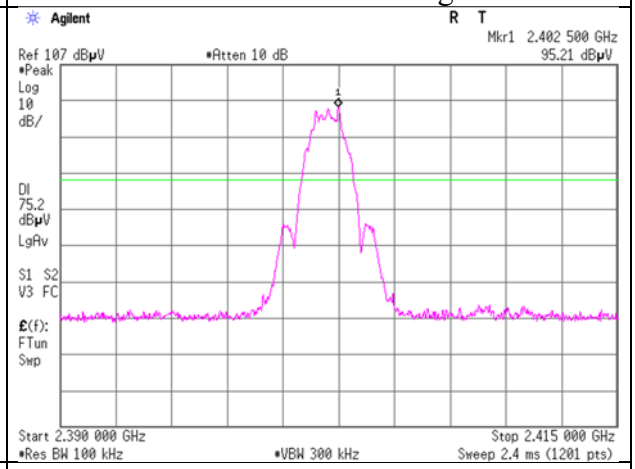
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	93.37	28.38	14.23	41.67	2.10	96.41	-	-	Carrier
Hori.	2400.000	PK	61.24	28.38	14.22	41.67	2.10	64.27	76.4	12.1	-
Vert.	2402.000	PK	95.00	28.38	14.23	41.67	2.10	98.04	-	-	Carrier
Vert.	2400.000	PK	63.02	28.38	14.22	41.67	2.10	66.05	78.0	11.9	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 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.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	August 22, 2020
Temperature / Humidity	21 deg. C / 60 % RH
Engineer	Yohsuke Matsuzawa
Mode	Tx BT LE 2 M-PHY 2402 MHz

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

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

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

Radiated Spurious Emission

Report No.	13462774S-B-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	3	3	3	3
Date	August 26, 2020	August 22, 2020	August 23, 2020	August 24, 2020
Temperature / Humidity	23 deg. C / 60 % RH	21 deg. C / 60 % RH	25 deg. C / 61 % RH	25 deg. C / 60 % RH
Engineer	Yohsuke Matsuzawa	Yohsuke Matsuzawa	Yohsuke Matsuzawa	Yosuke Murakami
	(30 MHz - 1 GHz)	(1 GHz - 2.8 GHz)	(2.8 GHz - 10 GHz)	(10 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.	175.001	QP	38.70	15.73	7.81	32.06	0.00	30.18	43.5	13.3	183	216	-
Hori.	225.008	QP	46.00	11.26	8.12	32.01	0.00	33.37	46.0	12.6	146	359	-
Hori.	240.008	QP	49.20	11.57	8.20	32.00	0.00	36.97	46.0	9.0	138	333	-
Hori.	375.006	QP	44.10	15.11	8.89	31.93	0.00	36.17	46.0	9.8	100	63	-
Hori.	425.009	QP	41.00	16.06	9.12	31.94	0.00	34.24	46.0	11.7	100	288	-
Hori.	519.745	QP	40.30	17.68	9.49	31.95	0.00	35.52	46.0	10.4	100	345	-
Hori.	762.898	QP	37.80	20.34	10.39	31.71	0.00	36.82	46.0	9.1	100	13	-
Hori.	870.524	QP	36.90	22.00	10.73	31.21	0.00	38.42	46.0	**7.5**	100	230	-
Hori.	4880.000	PK	49.92	31.63	6.72	42.93	2.10	47.44	73.9	26.4	148	185	-
Hori.	7320.000	PK	49.06	37.71	8.21	43.49	2.10	53.59	73.9	20.3	175	91	-
Vert.	56.456	QP	37.60	9.08	6.67	32.16	0.00	21.19	40.0	18.8	100	267	-
Vert.	781.622	QP	34.30	20.52	10.44	31.69	0.00	33.57	46.0	12.4	100	148	-
Vert.	4880.000	PK	51.48	31.63	6.72	42.93	2.10	49.00	73.9	24.9	159	180	-
Vert.	7320.000	PK	49.17	37.71	8.21	43.49	2.10	53.70	73.9	20.2	184	129	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Peak measurement value with Duty cycle correction factor (DCCF)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	DCCF [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4880.000	PK	49.92	31.63	6.72	42.93	-28.17	2.10	19.27	53.9	34.6	-
Hori.	7320.000	PK	49.06	37.71	8.21	43.49	-28.17	2.10	25.42	53.9	28.4	-
Vert.	4880.000	PK	51.48	31.63	6.72	42.93	-28.17	2.10	20.83	53.9	33.0	-
Vert.	7320.000	PK	49.17	37.71	8.21	43.49	-28.17	2.10	25.53	53.9	28.3	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + DCCF + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty cycle correction factor (DCCF) refer to "Duty cycle correction factor" sheet.

Radiated Spurious Emission

Report No.	13462774S-B-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	3	3	3	3
Date	August 26, 2020	August 22, 2020	August 23, 2020	August 24, 2020
Temperature / Humidity	23 deg. C / 60 % RH	21 deg. C / 60 % RH	25 deg. C / 61 % RH	25 deg. C / 60 % RH
Engineer	Yohsuke Matsuzawa	Yohsuke Matsuzawa	Yohsuke Matsuzawa	Yosuke Murakami
	(30 MHz - 1 GHz)	(1 GHz - 2.8 GHz)	(2.8 GHz - 10 GHz)	(10 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.	175.002	QP	38.60	15.73	7.81	32.06	0.00	30.08	43.5	13.4	184	215	-
Hori.	219.507	QP	46.20	11.21	8.09	32.02	0.00	33.48	46.0	12.5	148	356	-
Hori.	240.007	QP	49.20	11.57	8.20	32.00	0.00	36.97	46.0	9.0	138	338	-
Hori.	375.009	QP	44.20	15.11	8.89	31.93	0.00	36.27	46.0	9.7	100	59	-
Hori.	425.010	QP	41.00	16.06	9.12	31.94	0.00	34.24	46.0	11.7	100	289	-
Hori.	520.017	QP	40.40	17.67	9.49	31.95	0.00	35.61	46.0	10.3	200	343	-
Hori.	761.295	QP	38.10	20.31	10.38	31.72	0.00	37.07	46.0	8.9	100	19	-
Hori.	870.200	QP	37.30	21.99	10.73	31.21	0.00	38.81	46.0	**7.1**	100	230	-
Hori.	2483.500	PK	51.16	28.28	14.31	41.69	2.10	54.16	73.9	19.7	189	128	-
Hori.	4960.000	PK	49.90	31.79	6.79	42.94	2.10	47.64	73.9	26.2	114	211	-
Hori.	7440.000	PK	48.87	37.88	8.26	43.60	2.10	53.51	73.9	20.3	102	150	-
Vert.	56.885	QP	36.80	8.96	6.65	32.16	0.00	20.25	40.0	19.7	100	274	-
Vert.	772.200	QP	34.90	20.41	10.41	31.70	0.00	34.02	46.0	11.9	100	150	-
Vert.	2483.500	PK	50.95	28.28	14.31	41.69	2.10	53.95	73.9	19.9	155	311	-
Vert.	4960.000	PK	51.78	31.79	6.79	42.94	2.10	49.52	73.9	24.3	184	182	-
Vert.	7440.000	PK	50.07	37.88	8.26	43.60	2.10	54.71	73.9	19.1	154	7	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Peak measurement value with Duty cycle correction factor (DCCF)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	DCCF [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	PK	51.16	28.28	14.31	41.69	-28.17	2.10	25.99	53.9	27.9	*1)
Hori.	4960.000	PK	49.90	31.79	6.79	42.94	-28.17	2.10	19.47	53.9	34.4	-
Hori.	7440.000	PK	48.87	37.88	8.26	43.60	-28.17	2.10	25.34	53.9	28.5	-
Vert.	2483.500	PK	50.95	28.28	14.31	41.69	-28.17	2.10	25.78	53.9	28.1	*1)
Vert.	4960.000	PK	51.78	31.79	6.79	42.94	-28.17	2.10	21.35	53.9	32.5	-
Vert.	7440.000	PK	50.07	37.88	8.26	43.60	-28.17	2.10	26.54	53.9	27.3	-

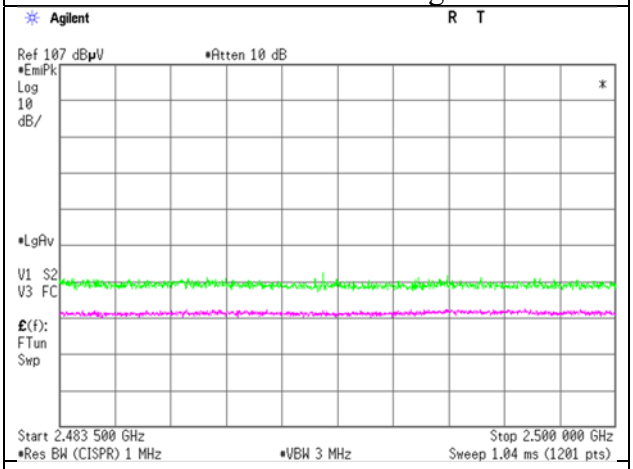
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + DCCF + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.82 m / 3.0 m) = 2.10 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty cycle correction factor (DCCF) refer to "Duty cycle correction factor" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	August 22, 2020
Temperature / Humidity	21 deg. C / 60 % RH
Engineer	Yohsuke Matsuzawa
Mode	Tx BT LE 2 M-PHY 2480 MHz

Horizontal

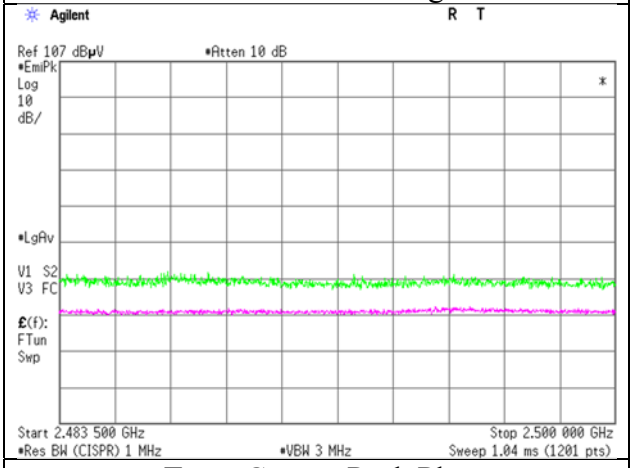
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot

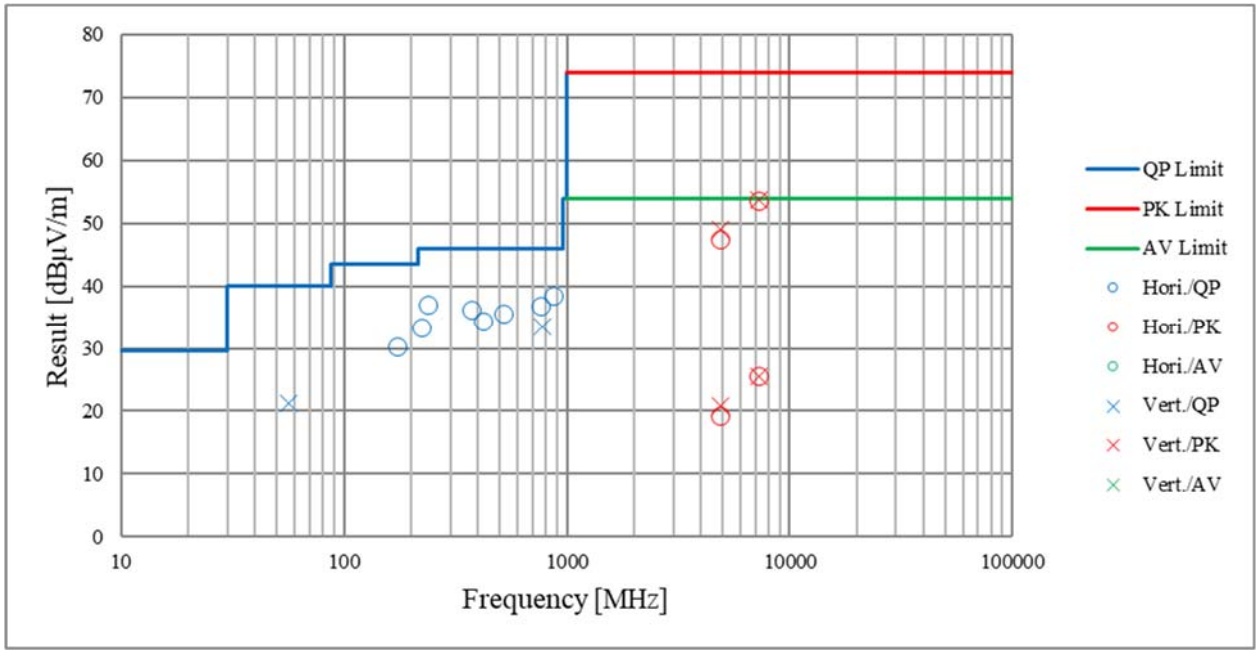


Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission
(Plot data, Worst case)

Report No.	13462774S-B-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	3	3	3	3
Date	August 26, 2020	August 22, 2020	August 23, 2020	August 24, 2020
Temperature / Humidity	23 deg. C / 60 % RH	21 deg. C / 60 % RH	25 deg. C / 61 % RH	25 deg. C / 60 % RH
Engineer	Yohsuke Matsuzawa	Yohsuke Matsuzawa	Yohsuke Matsuzawa	Yosuke Murakami
	(30 MHz - 1 GHz)	(1 GHz - 2.8 GHz)	(2.8 GHz - 10 GHz)	(10 GHz - 26.5 GHz)
Mode	Tx BT LE 2 M-PHY 2440 MHz			

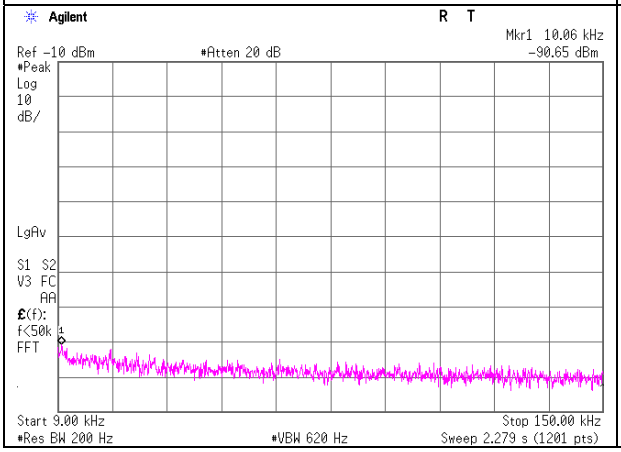


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

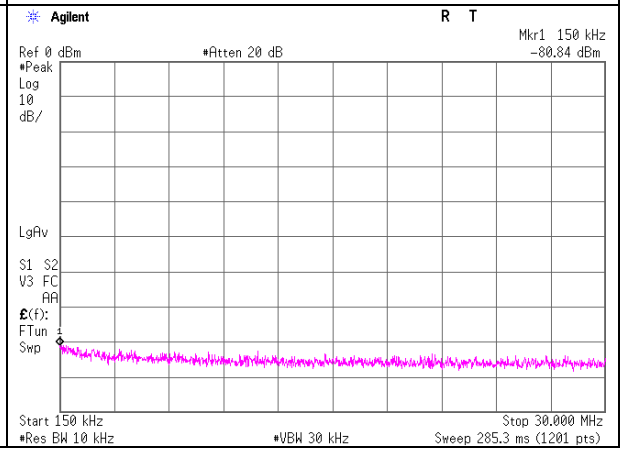
Conducted Spurious Emission

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	September 9, 2020
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Shiro Kobayashi
Mode	Tx 11n-20 2437 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator [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
10.06	-90.65	0.01	9.73	2.0	1	-78.9	300	6.0	-17.7	47.5	65.2	-
150.00	-80.84	0.01	9.73	2.0	1	-69.1	300	6.0	-7.8	24.0	31.8	-

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

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

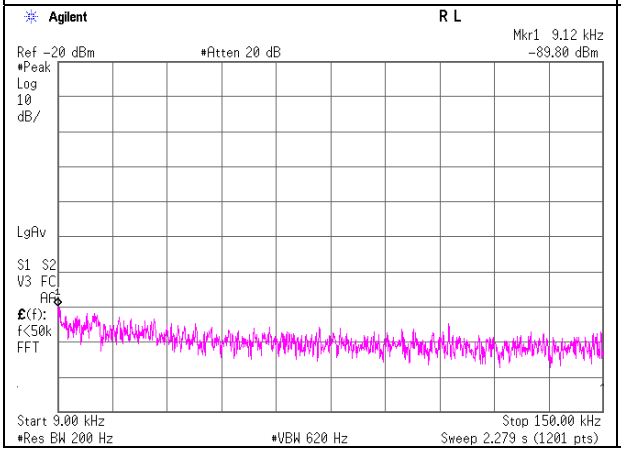
N: Number of output

*2.0 dBi was applied to the test result based on KDB 789033 since antenna gain was less than 2.0 dBi.

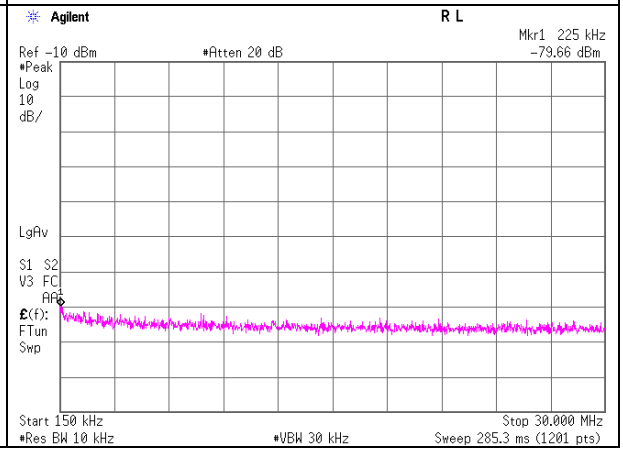
Conducted Spurious Emission

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	September 9, 2020
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Shiro Kobayashi
Mode	Tx BT LE 1 M-PHY 2402 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator [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
9.12	-89.80	0.01	9.81	2.0	1	-78.0	300	6.0	-16.7	48.4	65.1	-
225.00	-79.66	0.01	9.81	2.0	1	-67.8	300	6.0	-6.6	20.5	27.1	-

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

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

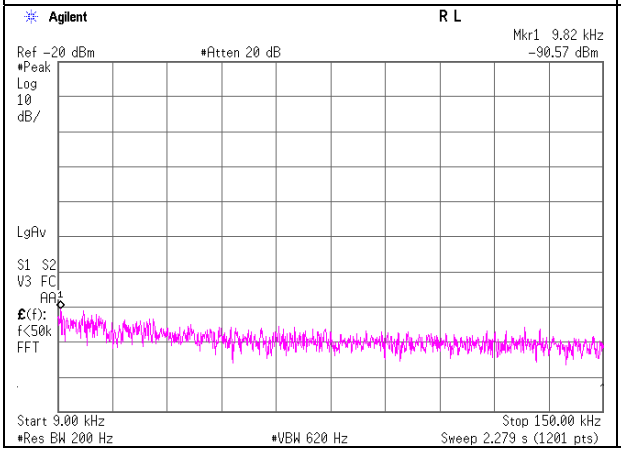
N: Number of output

*2.0 dBi was applied to the test result based on KDB 789033 since antenna gain was less than 2.0 dBi.

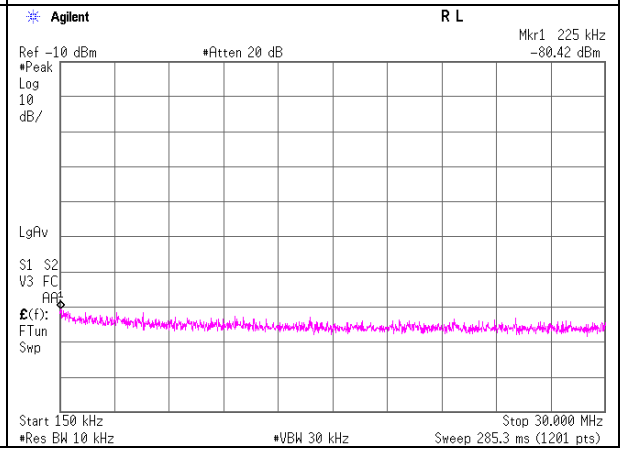
Conducted Spurious Emission

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	September 9, 2020
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Shiro Kobayashi
Mode	Tx BT LE 1 M-PHY 2440 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator [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
9.82	-90.57	0.01	9.81	2.0	1	-78.8	300	6.0	-17.5	47.7	65.2	-
225.00	-80.42	0.01	9.81	2.0	1	-68.6	300	6.0	-7.3	20.5	27.8	-

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

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

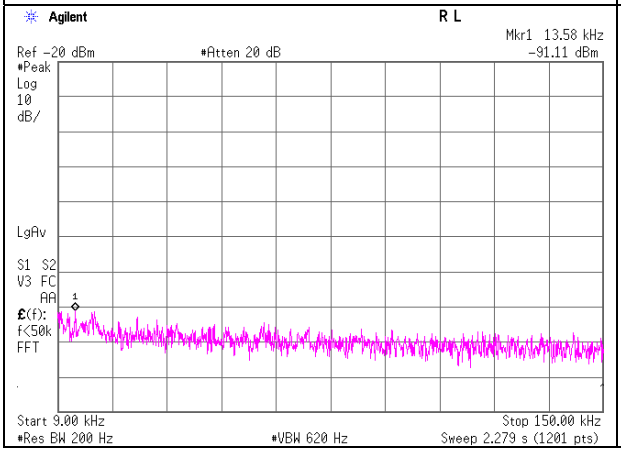
N: Number of output

*2.0 dBi was applied to the test result based on KDB 789033 since antenna gain was less than 2.0 dBi.

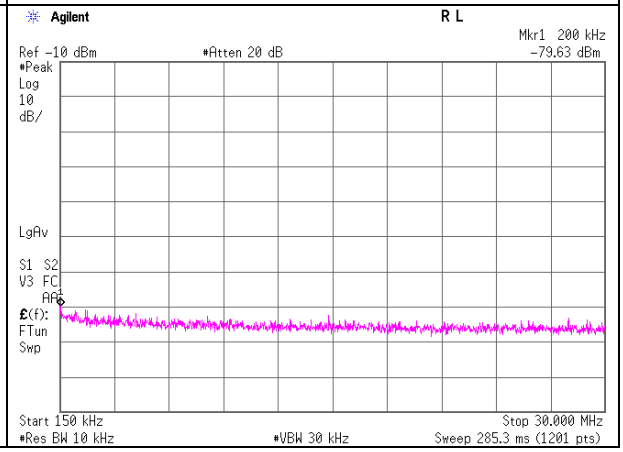
Conducted Spurious Emission

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	September 9, 2020
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Shiro Kobayashi
Mode	Tx BT LE 1 M-PHY 2480 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator [dB]	Antenna Gain* [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
13.58	-91.11	0.01	9.81	2.0	1	-79.3	300	6.0	-18.0	44.9	62.9	-
200.00	-79.63	0.01	9.81	2.0	1	-67.8	300	6.0	-6.6	21.5	28.1	-

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

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

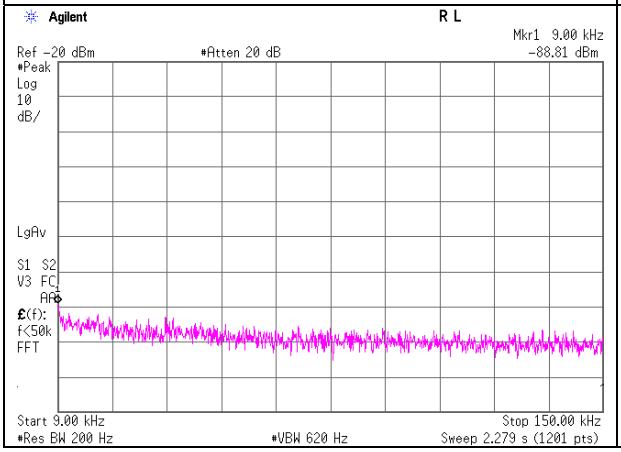
N: Number of output

*2.0 dBi was applied to the test result based on KDB 789033 since antenna gain was less than 2.0 dBi.

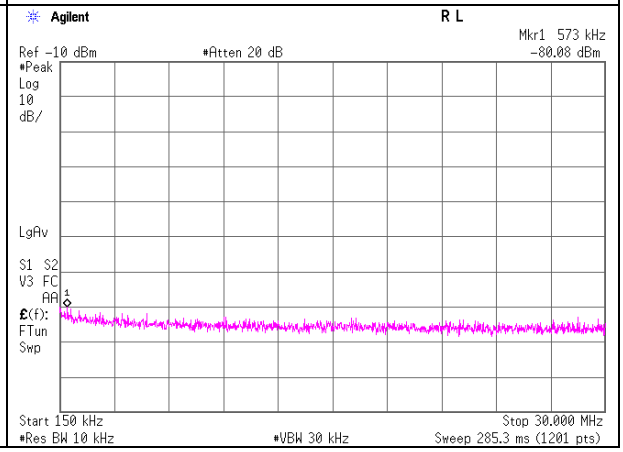
Conducted Spurious Emission

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	September 9, 2020
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Shiro Kobayashi
Mode	Tx BT LE 2 M-PHY 2402 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator [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
9.00	-88.81	0.01	9.81	2.0	1	-77.0	300	6.0	-15.7	48.5	64.2	-
573.00	-80.08	0.01	9.81	2.0	1	-68.3	30	6.0	13.0	32.4	19.4	-

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

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

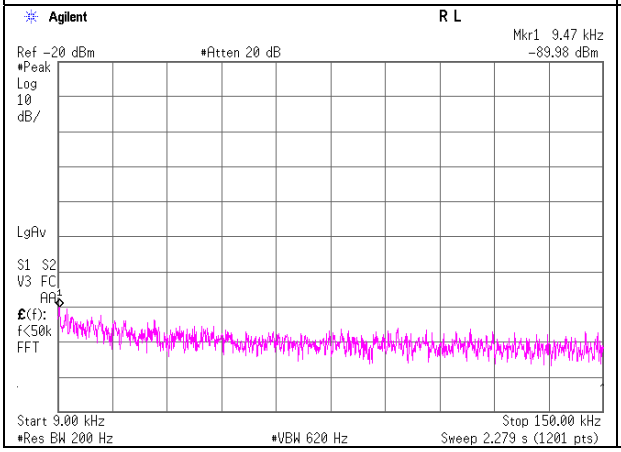
N: Number of output

*2.0 dBi was applied to the test result based on KDB 789033 since antenna gain was less than 2.0 dBi.

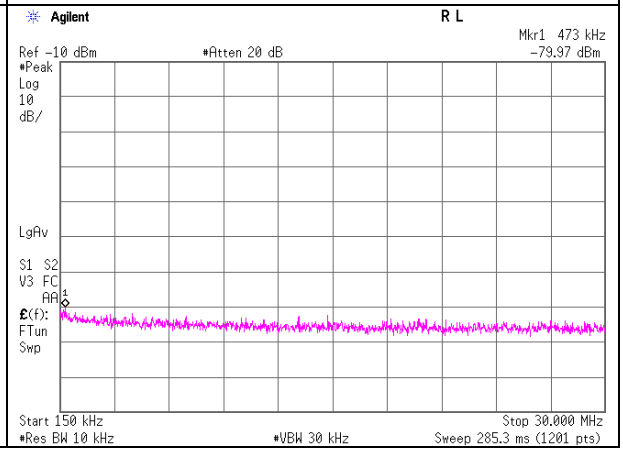
Conducted Spurious Emission

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	September 9, 2020
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Shiro Kobayashi
Mode	Tx BT LE 2 M-PHY 2440 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator [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
9.47	-89.98	0.01	9.81	2.0	1	-78.2	300	6.0	-16.9	48.0	64.9	-
473.00	-79.97	0.01	9.81	2.0	1	-68.2	300	6.0	-6.9	14.1	21.0	-

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

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

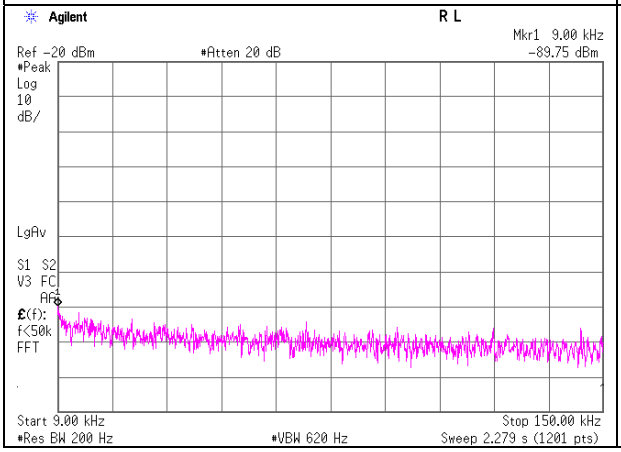
N: Number of output

*2.0 dBi was applied to the test result based on KDB 789033 since antenna gain was less than 2.0 dBi.

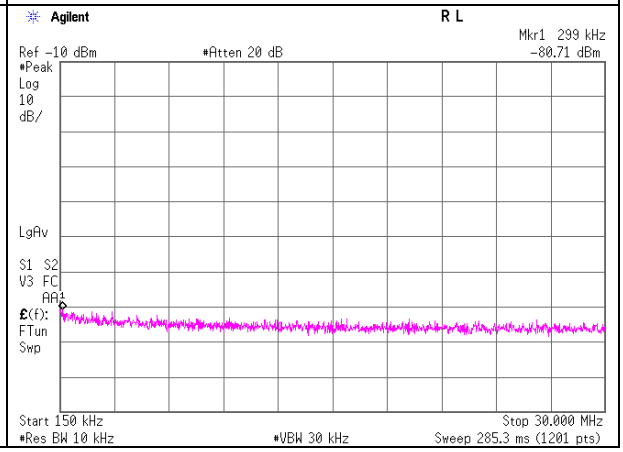
Conducted Spurious Emission

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	September 9, 2020
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Shiro Kobayashi
Mode	Tx BT LE 2 M-PHY 2480 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator [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
9.00	-89.75	0.01	9.81	2.0	1	-77.9	300	6.0	-16.7	48.5	65.2	-
299.00	-80.71	0.01	9.81	2.0	1	-68.9	300	6.0	-7.6	18.0	25.6	-

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

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

N: Number of output

*2.0 dBi was applied to the test result based on KDB 789033 since antenna gain was less than 2.0 dBi.

Power Density

Report No.	13462774S-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	September 4, 2020
Temperature / Humidity	24 deg. C / 54 % RH
Engineer	Toshinori Yamada
Mode	Tx

11b

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412	-17.93	2.10	9.81	-6.02	8.00	14.02
2437	-17.30	2.10	9.82	-5.38	8.00	13.38
2462	-18.57	2.11	9.82	-6.64	8.00	14.64

11g

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412	-26.35	2.10	9.81	-14.44	8.00	22.44
2437	-23.94	2.10	9.82	-12.02	8.00	20.02
2462	-26.42	2.11	9.82	-14.49	8.00	22.49

11n-20

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412	-26.81	2.10	9.81	-14.90	8.00	22.90
2437	-24.91	2.10	9.82	-12.99	8.00	20.99
2462	-27.42	2.11	9.82	-15.49	8.00	23.49

BT LE 1 M-PHY

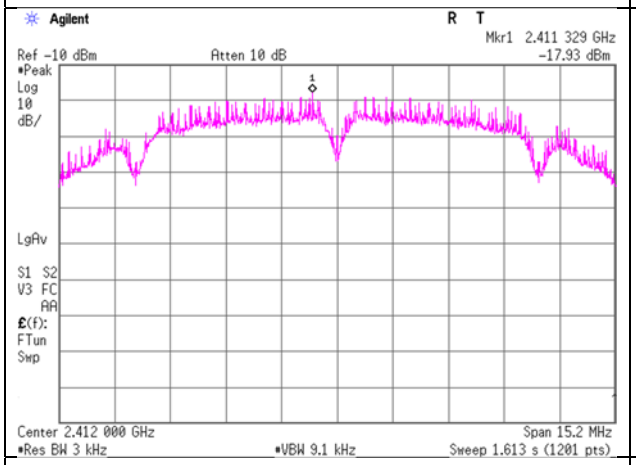
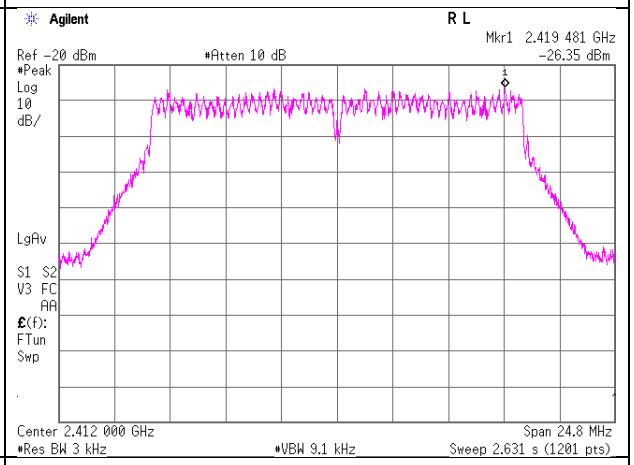
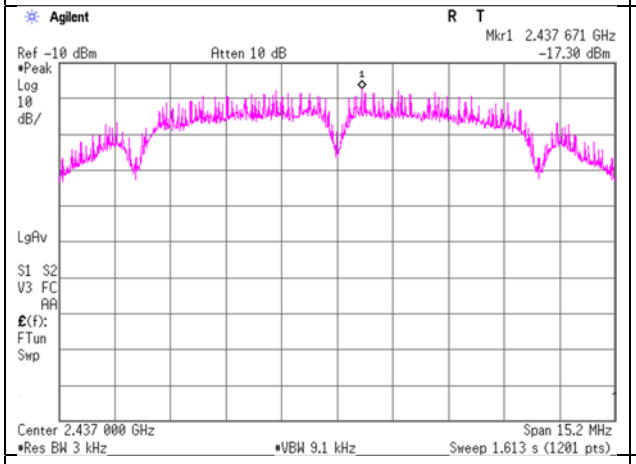
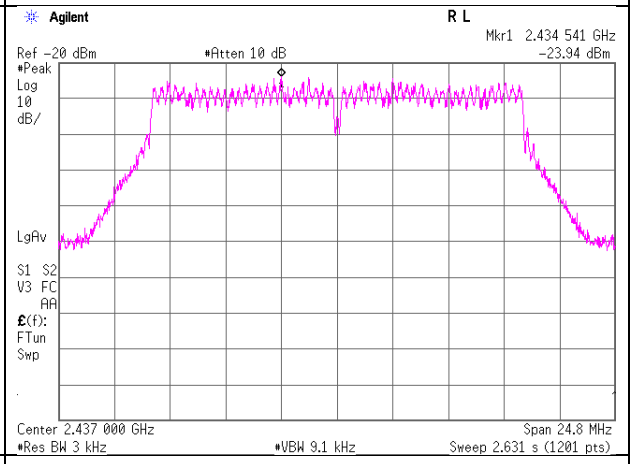
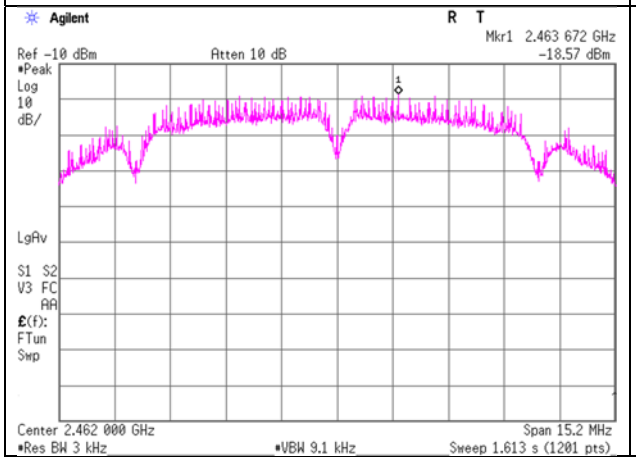
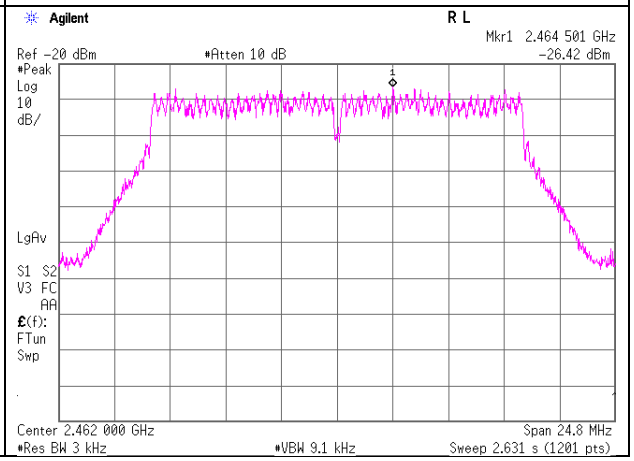
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2402	-23.01	2.10	9.88	-11.03	8.00	19.03
2440	-22.71	2.11	9.88	-10.72	8.00	18.72
2480	-22.69	2.12	9.88	-10.69	8.00	18.69

BT LE 2 M-PHY

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2402	-25.03	2.10	9.88	-13.05	8.00	21.05
2440	-25.53	2.11	9.88	-13.54	8.00	21.54
2480	-25.52	2.12	9.88	-13.52	8.00	21.52

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

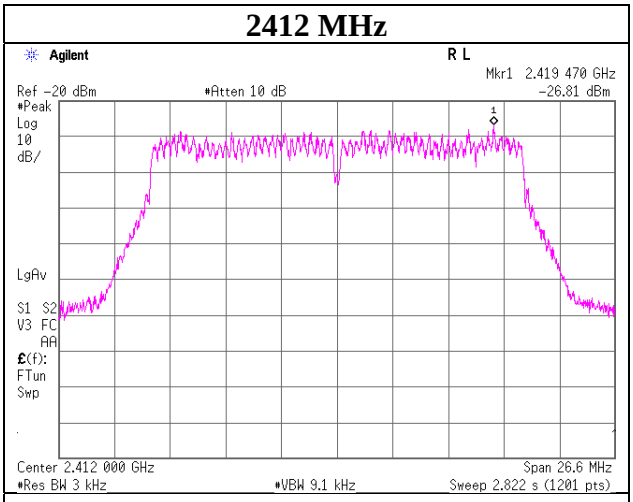
Power Density

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

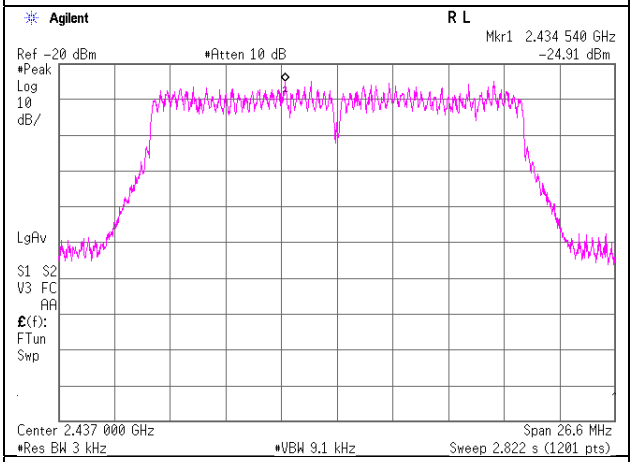
Power Density

11n-20

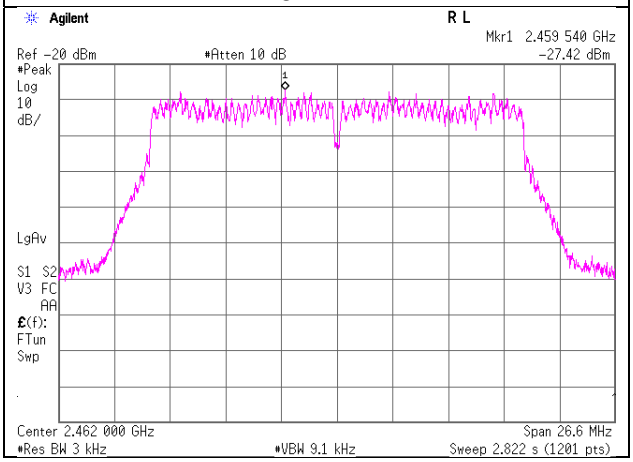
2412 MHz



2437 MHz



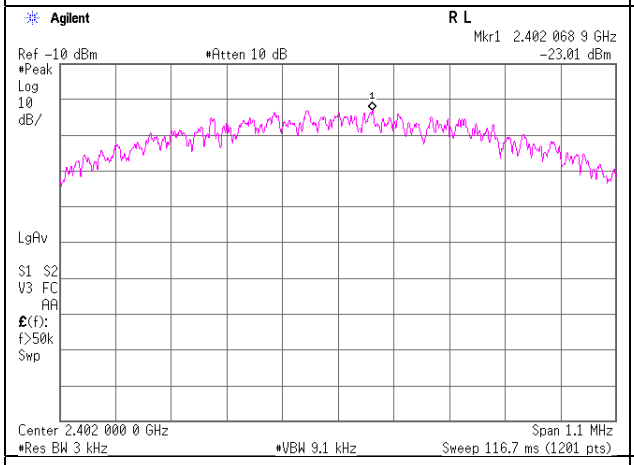
2462 MHz



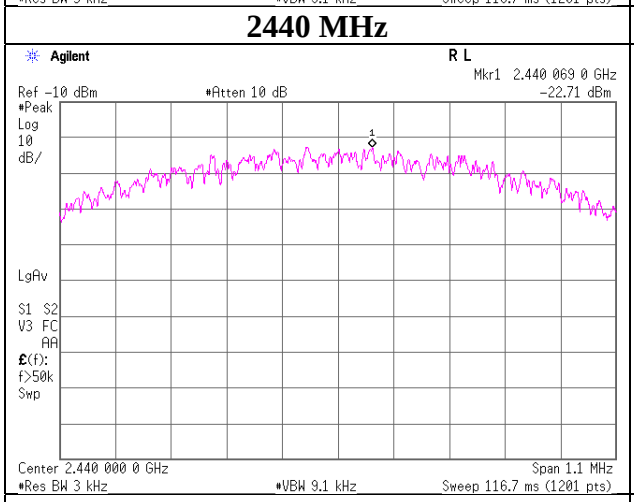
Power Density

BT LE 1 M-PHY

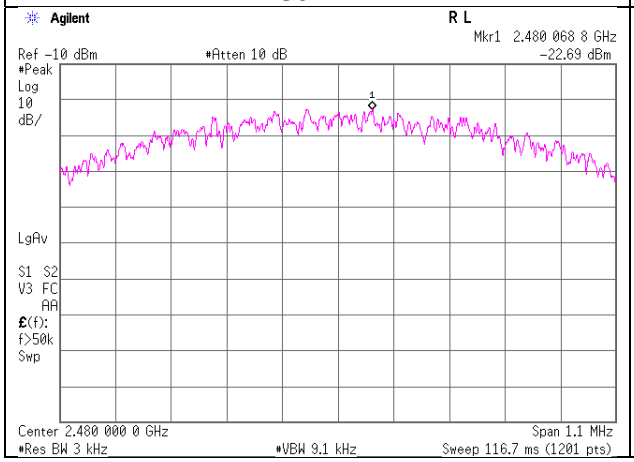
2402 MHz



2440 MHz

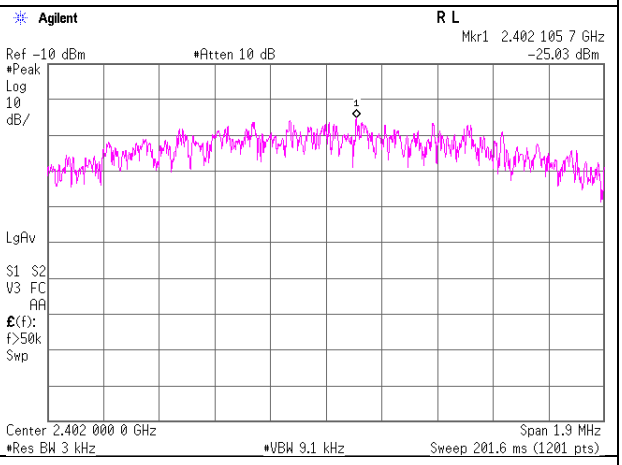


2480 MHz

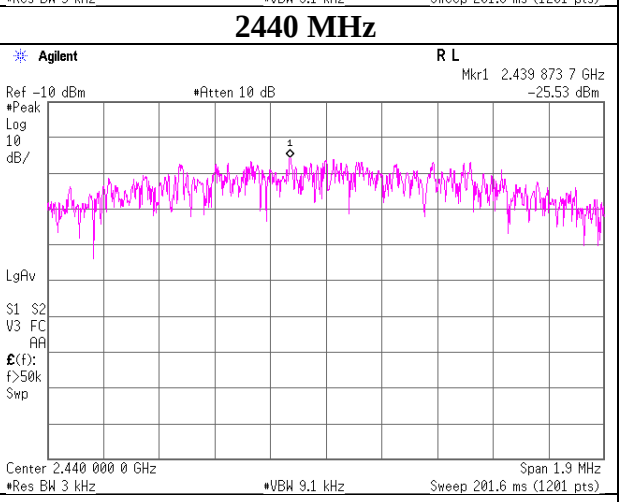


BT LE 2 M-PHY

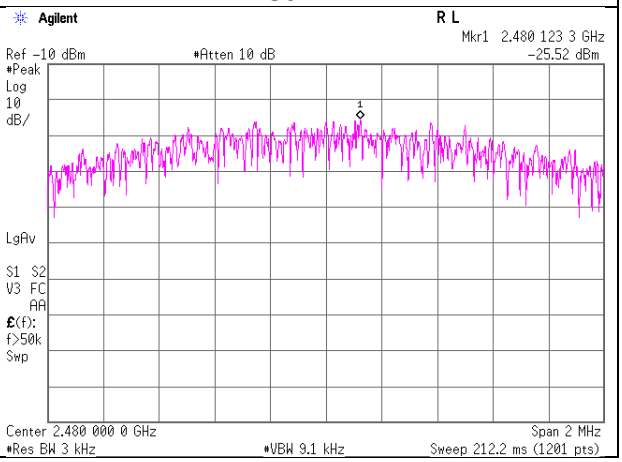
2402 MHz



2440 MHz



2480 MHz



APPENDIX 2: Test instruments

Test equipment [1/2]

Test Name	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Interval (Month)
AT	KSA-08	145089	Spectrum Analyzer	Keysight Technologies Inc	E4446A	MY46180525	2019/11/05	12
AT	KTS-07	145111	Digital Tester	SANWA	PC500	7019232	2019/10/01	12
AT	SAT10-14	154591	Attenuator	Weinschel Corp.	54A-10	81595	2020/04/01	12
AT	SAT10-16	160494	Attenuator	Weinschel Corp.	54A-10	83420	2019/12/12	12
AT	SCC-G66	196947	Coaxial Cable	HUBER+SUNER	SUCOFLEX 102	803478/2	2020/03/10	12
AT	SCC-G67	196949	Coaxial Cable	HUBER+SUNER	SUCOFLEX 102	803480/2	2020/03/10	12
AT	SOS-19	175823	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2019/12/19	12
AT	SPM-07	146247	Power Meter	Keysight Technologies Inc	8990B	MY5100272	2020/05/27	12
AT	SPSS-04	146310	Power sensor	Keysight Technologies Inc	N1923A	MY5326009	2020/05/27	12
AT	SPSS-05	146311	Power sensor	Keysight Technologies Inc	N1923A	MY5349008	2020/05/27	12
AT	STM-G6	146207	Terminator	JFW	50T-128	-	2019/11/05	12
AT,RE	SSA-02	145800	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY48250106	2020/04/16	12
RE	COTS-SEMI-5	170932	EMI Software	TSJ (Techno Science Japan)	TEPTO-DV3(RE,CE,ME,PE)	-	-	-
RE	KJM-02	146432	Measure	TAJIMA	GL19-55	-	-	-
RE	SAEC-02(SVSWR)	145598	Semi-Anechoic Chamber	TDK	SAEC-02(SVSWR)	2	2020/05/07	12
RE	SAEC-03(NSA)	145565	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	2020/04/12	12
RE	SAEC-03(SVSWR)	145566	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	2020/05/11	12
RE	SAF-03	145126	Pre Amplifier	SONOMA	310N	290213	2020/02/19	12
RE	SAF-05	145128	Pre Amplifier	Toyo Corporation	TPA0118-36	1440490	2020/06/03	12
RE	SAF-06	145005	Pre Amplifier	Toyo Corporation	TPA0118-36	1440491	2020/02/20	12
RE	SAF-08	145007	Pre Amplifier	Toyo Corporation	HAP18-26W	19	2020/03/03	12
RE	SAT10-05	145136	Attenuator(above1GHz)	Keysight Technologies Inc	8493C-010	74864	2019/11/06	12
RE	SAT6-13	167094	Attenuator	JFW	50HF-006N	-	2020/02/21	12
RE	SBA-03	145023	Biconical Antenna	Schwarzbeck Mess - Elektronik	BBA9106	91032666	2020/05/17	12
RE	SCC-C1/C2/C3/C4/C5/C10/SRSE-03	145171	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	2020/04/12	12
RE	SCC-G15	145176	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	2020/03/04	12
RE	SCC-G40	166491	Coaxial Cable	Junkosha	MWX221-01000NFSNMS/B	1612S005	2020/01/08	12
RE	SCC-G41	151617	Coaxial Cable	Junkosha	MWX221-01000NFSNMS/B	1612S006	2020/01/08	12
RE	SCC-G43	156380	Coaxial Cable	HUBER+SUNER	SUCOFLEX_104_E	SN MY 13406/4E	2020/06/04	12
RE	SCC-G50	178573	Coaxial Cable	HUBER+SUNER	SUCOFLEX_104_E	MY13407/4E	2020/03/09	12
RE	SCC-G51	178572	Coaxial Cable	HUBER+SUNER	SUCOFLEX 104	800288 /4A	2020/03/09	12
RE	SCC-G57	179540	Coaxial Cable	HUBER+SUNER	SUCOFLEX 102	802815/2	2020/05/12	12

Test equipment [2/2]

Test Name	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Interval (Month)
RE	SCC-G58	183047	Coaxial Cable	HUBER+SUNER	SUCOFLEX 104	800287/4A	2020/06/04	12
RE	SCC-G69	200009	Coaxial Cable	HUBER+SUNER	SUCOFLEX 104	575617/4	2020/07/07	12
RE	SCC-G70	200010	Coaxial Cable	HUBER+SUNER	SUCOFLEX 104	575618/4	2020/07/07	12
RE	SFL-02	145301	Highpass Filter	MICRO-TRONICS	HPM50111	51	2019/11/06	12
RE	SFL-03	145377	Highpass Filter	MICRO-TRONICS	HPM50112	28	2019/11/06	12
RE	SFL-18	145305	Highpass Filter	MICRO-TRONICS	HPM50111	119	2020/04/03	12
RE	SHA-02	145384	Horn Antenna	Schwarzbeck Mess - Elektronik	BBHA9120D	9120D-726	2020/06/15	12
RE	SHA-03	145501	Horn Antenna	Schwarzbeck Mess - Elektronik	BBHA9120D	9120D-739	2020/06/15	12
RE	SHA-04	145512	Horn Antenna	ETS LINDGREN	3160-09	00094868	2020/06/15	12
RE	SHA-06	145514	Horn Antenna	ETS LINDGREN	3160-10	00092383	2020/07/16	12
RE	SHA-09	194684	Horn Antenna	Schwarzbeck Mess - Elektronik	BBHA 9120 C	695	2020/02/17	12
RE	SHA-10	194685	Horn Antenna	Schwarzbeck Mess - Elektronik	BBHA 9120 C	711	2020/02/17	12
RE	SJM-09	145336	Measure	PROMART	SEN1935	-	-	-
RE	SLA-07	145529	Logperiodic Antenna	Schwarzbeck Mess - Elektronik	VUSLP9111B	196	2020/05/17	12
RE	SOS-21	191838	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2019/12/12	12
RE	SOS-23	191840	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2019/12/12	12
RE	STR-08	150463	Test Receiver	Rohde & Schwarz	ESW44	101581	2019/11/22	12
RE	STS-02	145793	Digital Hitester	Hioki	3805-50	80997819	2020/04/09	12
RE	STS-03	146210	Digital Hitester	Hioki	3805-50	80997823	2019/10/01	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: RE: Radiated Emission test
AT: Antenna Terminal Conducted test