

RADIO TEST REPORT

Test Report No. 14926039S-B-R1

Customer	OM Digital Solutions Corporation
Description of EUT	Wireless LAN / Bluetooth Module
Model Number of EUT	S0123WIFI-PCA
FCC ID	YSKW123
Test Regulation	FCC Part 15 Subpart C
Test Result	Complied
Issue Date	November 14, 2023
Remarks	-

Representative Test EngineerShiro Kobayashi
Engineer**Approved By**Toyokazu Imamura
Leader

CERTIFICATE 1266.03

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

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- The information provided from the customer for this report is identified in Section 1.
- For test report(s) referred in this report, the latest version (including any revisions) is always referred.

REVISION HISTORY

Original Test Report No.: 14926039S-B

This report is a revised version of 14926039S-B. 14926039S-B is replaced with this report.

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	14926039S-B	November 6, 2023	-
1	14926039S-B-R1	November 14, 2023	P.5 Correction of Rating: From: "DC 3.8 V (3.2 V to 4.2 V), DC 1.8 V (1.71 V to 3.63 V)" To: "DC 3.8 V (3.35 V to 4.2 V), DC 1.8 V (1.782 V to 1.818 V)" P.9 Correction of Worst Data Rate: 11g: From "9 Mbps" to "12 Mbps" 11n-20: "MCS 2 (Long GI, 3 Streams)" to "MCS 2" Correction of Power Setting: From "DC 8.4 V" To "WLAN: 10, BT LE: Fixed" Correction of Date of Software: From "2023.08.25" To "2022.03.29" Correction of Operation Mode of Conducted Spurious Emission: From "Tx BT LE, 1M-PHY *2)" to "Tx BT LE, 1M-PHY" P.10 Correction of Supply Voltage for Radiated Emission test and Conducted Emission test: From "AC 100 V / 50 Hz" to "AC 120 V / 60 Hz" P.12 Correction of IF Bandwidth of Above 1 GHz AV: From: <u>11.12.2.5.2</u> To: <u>11.12.2.5.1</u> RBW: 1 MHz RBW: 1 MHz VBW: 3 MHz VBW: 3 MHz Detector: Detector: Power Averaging (Linear voltage) Power Averaging (Linear voltage) Trace: 100 traces Trace: 100 traces Duty factor was added to the results. <u>11.12.2.5.2</u> Integration Method: The duty cycle was less than 98% for detected noise, a duty factor was added to the 11.12.2.5.1 results. P.22 Correction of Sample Calculation: Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss e.i.r.p. Result = Conducted Power Result + Antenna Gain P.37, 39, 40 Correction of Data: Duty Factor is excluded from average measurement value at about 1.5 times the Tx frequency.

Reference: Abbreviations (Including words undescribed in this report)

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

CONTENTS	PAGE
SECTION 1: Customer Information	5
SECTION 2: Equipment Under Test (EUT).....	5
SECTION 3: Test Specification, Procedures & Results	6
SECTION 4: Operation of EUT during testing	9
SECTION 5: Conducted Emission.....	11
SECTION 6: Radiated Spurious Emission.....	12
SECTION 7: Antenna Terminal Conducted Tests	14
APPENDIX 1: Test Data	15
Conducted Emission	15
99 % Occupied Bandwidth and 6 dB Bandwidth.....	17
Maximum Peak Output Power	22
Average Output Power.....	24
Burst rate confirmation.....	26
Radiated Spurious Emission.....	27
Conducted Spurious Emission.....	49
Power Density	53
APPENDIX 2: Test Instruments	56
APPENDIX 3: Photographs of Test Setup	58
Conducted Emission	58
Radiated Spurious Emission.....	59
Pre-check of Worst Case Position	61
Antenna Terminal Conducted Tests	62

SECTION 1: Customer Information

Company Name	OM Digital Solutions Corporation
Address	49-3 Takakura-machi, Hachioji-shi, Tokyo 192-0033, Japan
Telephone Number	+81-42-642-2457
Contact Person	Kenichi Aoki

The information provided from the customer is as follows;

- Customer, Description 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 and Test 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

Description	Wireless LAN / Bluetooth Module
Model Number	S0123WIFI-PCA
Serial Number	Refer to SECTION 4.2
Condition	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	No Modification by the test lab
Receipt Date	August 10, 2023
Test Date	August 21 to October 9, 2023

2.2 Product Description

General Specification

Rating	DC 3.8 V (3.35 V to 4.2 V), DC 1.8 V (1.782 V to 1.818 V)
Operating Temperature	-10 deg. C to +42 deg. C

Radio Specification

WLAN (IEEE802.11b/11g/11n-20)

Equipment Type	Transceiver
Frequency of Operation	2412 MHz to 2462 MHz
Type of Modulation	DSSS/CCK, OFDM
Antenna Gain: G _{ANT}	-2.4 dBi

Bluetooth (Low Energy)

Equipment Type	Transceiver
Frequency of Operation	2402 MHz to 2480 MHz
Type of Modulation	GFSK
Antenna Gain	-2.4 dBi

* WLAN and Bluetooth do not transmit simultaneously.

SECTION 3: Test Specification, Procedures & Results

3.1 Test Specification

Test Specification	FCC Part 15 Subpart C The latest version on the first day of the testing period
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

3.2 Procedures and Results

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.10-2013 6. Standard test methods ISED: RSS-Gen 8.8	FCC: Section 15.207 ISED: RSS-Gen 8.8	18.5 dB Mode: Tx 11n-20 2462 MHz 1) 0.40150 MHz, QP, N 2) 0.40230 MHz, QP, L1	Complied	-
6 dB Bandwidth	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section 15.247(a)(2) ISED: RSS-247 5.2(a)	See data.	Complied	Conducted
Maximum Peak Output Power	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: RSS-Gen 6.12	FCC: Section 15.247(b)(3) ISED: RSS-247 5.4(d)		Complied	Conducted
Power Density	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section 15.247(e) ISED: RSS-247 5.2(b)		Complied	Conducted
Spurious Emission Restricted Band Edges	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: RSS-Gen 6.13	FCC: Section 15.247(d) ISED: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	1.7 dB 4804.000 MHz, AV, Vertical Mode: Tx.BT.LE.2402 MHz	Complied	Conducted (below 30 MHz)/ Radiated (above 30 MHz) *1)
Note: UL Japan, Inc.'s EMI Work Procedures: Work Instructions-ULID-003591 and Work Instructions-ULID-003593. * In case any questions arise about test procedure, ANSI C63.10: 2013 is also referred. *1) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05r02 8.5 and 8.6.					

FCC Part 15.31 (e)

The RF Module has its own regulator.

The RF Module is constantly provided with voltage through the regulator regardless of input voltage.

Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

The antenna is not removable from the EUT.

Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.3 Addition to Standard

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
99 % Occupied Bandwidth	ISED: RSS-Gen 6.7	ISED: -	N/A	-	Conducted

Other than above, no addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

Measurement uncertainty is not taken into account when stating conformity with a specified requirement.
Note: When margins obtained from test results are less than the measurement uncertainty, the test results may exceed the limit.

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

Item	Frequency range	Uncertainty (+/-)
Conducted Emission (AC Mains) LISN	150 kHz-30 MHz	3.2 dB
Radiated Emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.3 dB
	30 MHz-200 MHz	4.9 dB
	200 MHz-1 GHz	6.2 dB
	1 GHz-6 GHz	4.7 dB
	6 GHz-18 GHz	5.3 dB
	18 GHz-40 GHz	5.5 dB
Radiated Emission (Measurement distance: 1 m)	1 GHz-18 GHz	5.6 dB
	18 GHz-40 GHz	5.8 dB

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector) SPM-06	1.1 dB
Power Measurement above 1 GHz (Peak Detector) SPM-06	1.8 dB
Power Measurement above 1 GHz (Average Detector) SPM-07	1.0 dB
Power Measurement above 1 GHz (Peak Detector) SPM-07	1.2 dB
Power Measurement above 1 GHz (Average Detector) SPM-13	0.81 dB
Power Measurement above 1 GHz (Peak Detector) SPM-13	1.1 dB
Spurious Emission (Conducted) below 1 GHz	0.91 dB
Conducted Emissions Power Density Measurement 1 GHz-3 GHz	1.3 dB
Conducted Emissions Power Density Measurement 3 GHz-18 GHz	2.5 dB
Spurious Emission (Conducted) 18 GHz-26.5 GHz	2.8 dB
Spurious Emission (Conducted) 26.5 GHz-40 GHz	2.6 dB
Bandwidth Measurement	0.012 %
Duty Cycle and Time Measurement	0.27 %
Temperature_SCH-01	0.96 deg.C.
Humidity_SCH-01	4.0 %
Temperature_SCH-02	2.2 deg.C.
Voltage	0.74 %

3.5 Test Location

UL Japan, Inc. Shonan EMC Lab.

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

Telephone: +81-463-50-6400

A2LA Certificate Number: 1266.03

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

Test room	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Semi-anechoic chamber (SAC1)	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.2 Semi-anechoic chamber (SAC2)	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.3 Semi-anechoic chamber (SAC3)	12.7 x 7.7 x 5.35	12.7 x 7.7	5 m
No.4 Semi-anechoic chamber (SAC4)	8.1 x 5.1 x 3.55	8.1 x 5.1	-
Wireless anechoic chamber 1 (WAC1)	9.5 x 6.0 x 5.4	9.5 x 6.0	3 m
Wireless anechoic chamber 2 (WAC2)	9.5 x 6.0 x 5.4	9.5 x 6.0	3 m
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	-	-
No.2 Measurement room	4.5 x 3.5 x 2.5	-	-
Wireless shielded room 1	3.0 x 4.5 x 2.7	3.0 x 4.5	-
Wireless shielded room 2	3.0 x 4.5 x 2.7	3.0 x 4.5	-

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)

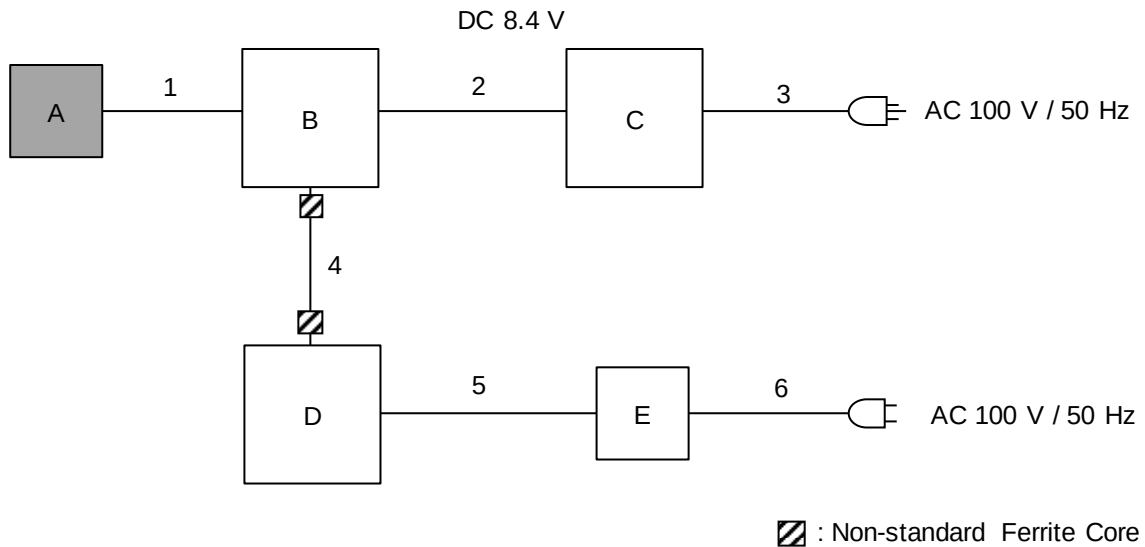
Mode	Remarks*
IEEE 802.11b (11b)	11 Mbps, PN9
IEEE 802.11g (11g)	12 Mbps, PN9
IEEE 802.11n 20 MHz BW (11n-20)	MCS 2, PN9
Bluetooth Low Energy (BT LE)	1M-PHY Uncoded PHY (1M-PHY), Maximum Packet Size, PRBS9
*The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)	
*Power of the EUT was set by the software as follows; Power Setting: WLAN: 10, BT LE: Fixed Software: Wireless Test Version: 1.1.0.3 (Date: 2022.03.29, Storage location: Driven by connected PC) *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product. 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.	

*The Details of Operating Mode(s)

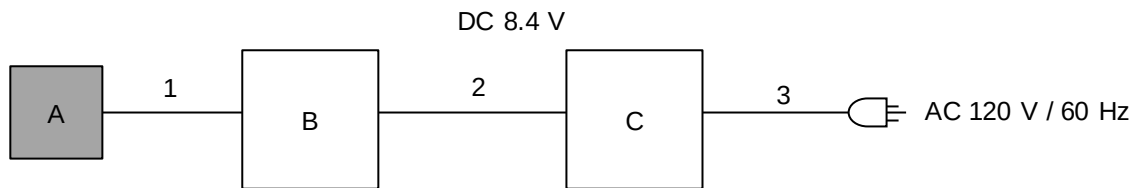
The Details of Operating Mode(s)		
Test Item	Operating Mode	Tested Frequency
Conducted Emission, Radiated Spurious Emission (Below 1 GHz)	Tx 11n-20 *1)	2462 MHz
	Tx BT LE, 1M-PHY *2)	2480 MHz
Conducted Spurious Emission	Tx 11n-20 *1)	2462 MHz
	Tx BT LE, 1M-PHY	2402 MHz
		2440 MHz
		2480 MHz
Radiated Spurious Emission (Above 1 GHz), 6 dB Bandwidth, Maximum Peak Output Power, Power Density, 99 % Occupied Bandwidth	Tx 11b	2412 MHz
	Tx 11g	2437 MHz
	Tx 11n-20	2462 MHz
	Tx BT LE, 1M-PHY	2402 MHz
		2440 MHz
2480 MHz		
*1) The mode was tested as a representative, because it had the highest power at antenna terminal test.		
*2) Conducted emissions and Spurious emissions for frequencies below 1 GHz were limited to the channel that had the highest power during the antenna terminal test, as preliminary testing indicated that changing the operating frequency had no significant impact on the emissions in those frequency bands.		

4.2 Configuration and Peripherals

For Antenna Terminal Conducted test



For Radiated Emission test and Conducted Emission test



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

Description of EUT and Support Equipment

No.	Item	Model number	Serial Number	Manufacturer	Remarks
A	Wireless LAN / Bluetooth Module	S0123WIFI-PCA	J001 *1) J002 *2)	OM Digital Solutions Corporation	EUT
B	Jig Board	-	-	OM Digital Solutions Corporation	-
C	Power Supply(DC)	PAN35-10A	ML002085	KIKUSUI	-
D	Laptop Computer	ThinkPad L580	PF-1LTWLZ	LENOVO	-
E	AC Adapter	ADLX45YLC2A	8SSA10E75842L1CZ94J0D3R	LENOVO	-

*1) Used for Antenna Terminal conducted test

*2) Used for Conducted Emission test and Radiated Emission test

List of Cables Used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Signal	0.1	Unshielded	Unshielded	-
2	DC	0.1 + 2.0	Unshielded	Unshielded	-
3	AC	1.8	Unshielded	Unshielded	-
4	USB	1.0	Shielded	Shielded	-
5	DC	1.8	Unshielded	Unshielded	-
6	AC	0.9	Unshielded	Unshielded	-

SECTION 5: Conducted Emission

Test Procedure and Conditions

EUT was placed on a urethane platform table of nominal size, 1.0 m by 2.0 m, raised 0.8 m above the conducting ground plane.

The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT, including peripherals was aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80 cm from a Line Impedance Stabilization Network (LISN) / Artificial mains Network (AMN) and excess AC cable was bundled in center.

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

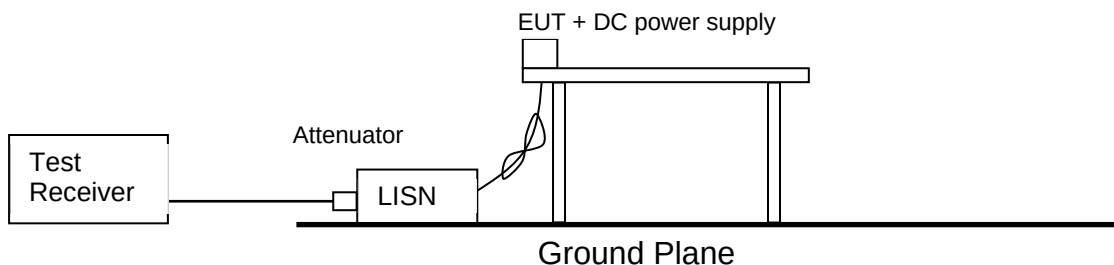
The EUT was connected to a LISN (AMN) via DC power supply.

An overview sweep with peak detection has been performed.

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

Detector	: QP and CISPR AV
Measurement Range	: 0.15 MHz to 30 MHz
Test Data	: APPENDIX
Test Result	: Pass

Figure 1: Test Setup



SECTION 6: Radiated Spurious Emission

Test Procedure

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

[For below 1 GHz]

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

[For above 1 GHz]

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

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

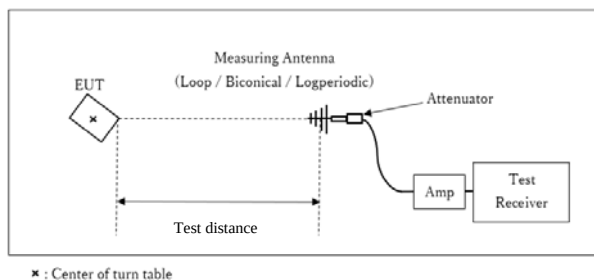
In any 100 kHz bandwidth outside the restricted band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired 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	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	<u>11.12.2.5.1</u> RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (Linear voltage) Trace: 100 traces <u>11.12.2.5.2</u> The duty cycle was less than 98% for detected noise, a duty factor was added to the 11.12.2.5.1 results.	RBW: 100 kHz VBW: 300 kHz

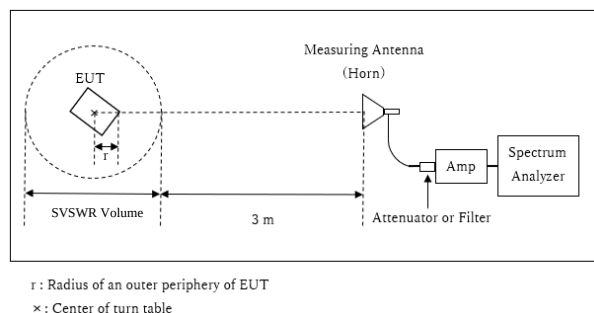
Figure 2: Test Setup

Below 1 GHz



Test Distance: 3 m

1 GHz to 10 GHz

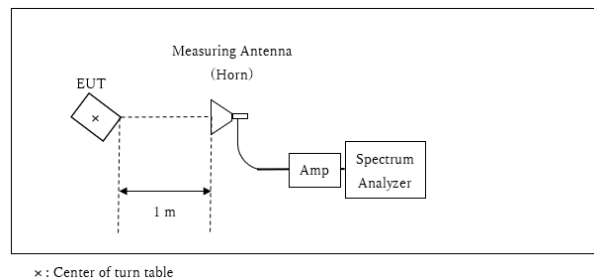


Distance Factor: $20 \times \log (4.0 \text{ m} / 3.0 \text{ m}) = 2.50 \text{ dB}$
* Test Distance: $(3 + \text{SVSWR Volume} / 2) - r = 4.0 \text{ m}$

SVSWR Volume : 2.0 m
(SVSWR Volume has been calibrated based on CISPR 16-1-4.)
 $r = 0.0 \text{ m}$

* The test was performed with $r = 0.0 \text{ m}$ since EUT is small and it was the rather conservative condition.

10 GHz to 26.5 GHz



Distance Factor: $20 \times \log (1.0 \text{ m} / 3.0 \text{ m}) = -9.54 \text{ dB}$
*Test Distance: 1 m

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

IEEE 802.11:

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

BT LE:

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

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

Measurement Range : 30 MHz to 26.5 GHz
Test Data : APPENDIX
Test Result : Pass

SECTION 7: Antenna Terminal Conducted Tests

Test Procedure

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

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument Used
6 dB Bandwidth	50 MHz, 3 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 Ohms. For example, the measurement at frequency 9 kHz resulted in a level of 45.5 dBuV/m, which is equivalent to $45.5 - 51.5 = -6.0$ dBuA/m, which has the same margin, 3 dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

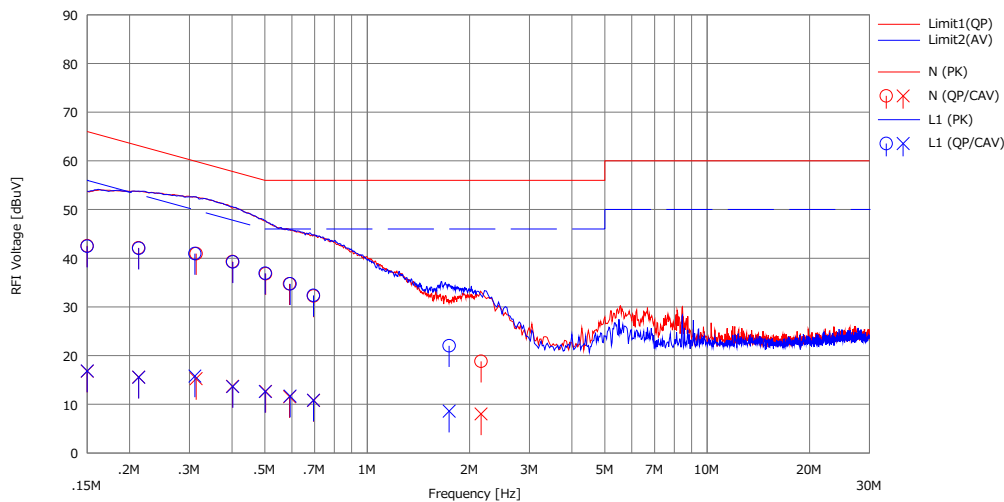
The test results and limit are rounded off to two decimals place, so some differences might be observed.
The equipment and cables were not used for factor 0 dB of the data sheets.

Test Data : APPENDIX
Test Result : Pass

APPENDIX 1: Test Data

Conducted Emission

Test place Shonan EMC Lab. No.3 Shielded Room
Date September 8, 2023
Temperature / Humidity 24 deg. C / 46 % RH
Engineer Shiro Kobayashi
Mode Tx 11n-20 2462 MHz

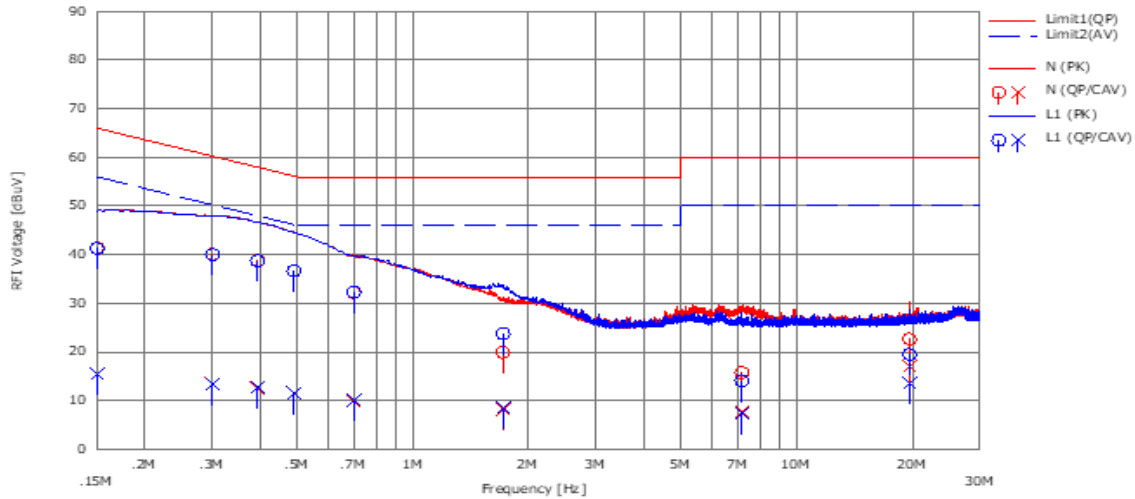


No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP>	<CAV>		<QP>	<CAV>	<QP>	<AV>	<QP>	<AV>		
		[dBuV]	[dBuV]		[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	30.11	4.38	12.42	42.53	16.80	66.00	56.00	23.4	39.2	N	
2	0.21245	29.70	3.15	12.42	42.12	15.57	63.11	53.11	20.9	37.5	N	
3	0.31399	28.49	2.82	12.45	40.94	15.27	59.86	49.86	18.9	34.5	N	
4	0.40150	26.84	1.22	12.45	39.29	13.67	57.82	47.82	18.5	34.1	N	
5	0.50260	24.36	0.20	12.46	36.82	12.66	56.00	46.00	19.1	33.3	N	
6	0.59081	22.25	-0.93	12.47	34.72	11.54	56.00	46.00	21.2	34.4	N	
7	0.69500	19.73	-1.71	12.49	32.22	10.78	56.00	46.00	23.7	35.2	N	
8	2.16180	6.24	-4.56	12.58	18.82	8.02	56.00	46.00	37.1	37.9	N	
9	0.15000	30.02	4.40	12.43	42.45	16.83	66.00	56.00	23.5	39.1	L1	
10	0.21286	29.61	3.13	12.43	42.04	15.56	63.09	53.09	21.0	37.5	L1	
11	0.31127	28.51	3.35	12.44	40.95	15.79	59.94	49.94	18.9	34.1	L1	
12	0.40230	26.78	1.17	12.46	39.24	13.63	57.81	47.81	18.5	34.1	L1	
13	0.50120	24.44	0.14	12.47	36.91	12.61	56.00	46.00	19.0	33.3	L1	
14	0.59291	22.23	-0.82	12.49	34.72	11.67	56.00	46.00	21.2	34.3	L1	
15	0.69461	19.86	-1.67	12.50	32.36	10.83	56.00	46.00	23.6	35.1	L1	
16	1.74230	9.47	-3.96	12.55	22.02	8.59	56.00	46.00	33.9	37.4	L1	

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

Conducted Emission

Test place Shonan EMC Lab. No.2 Shielded Room
Date October 9, 2023
Temperature / Humidity 22 deg. C / 53 % RH
Engineer Akihiro Oda
Mode Tx BT LE 2480 MHz



No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		(QP) [dBuV]	(CAV) [dBuV]		(QP) [dBuV]	(CAV) [dBuV]	(QP) [dBuV]	(AV) [dBuV]	(QP) [dB]	(AV) [dB]		
1	0.15004	28.96	3.09	12.41	41.37	15.50	66.00	56.00	24.6	40.5	II	
2	0.30009	27.63	1.05	12.43	40.06	13.48	60.24	50.24	20.1	36.7	II	
3	0.39331	26.35	0.19	12.43	38.78	12.62	57.99	47.99	19.2	35.3	II	
4	0.48950	24.22	-0.86	12.44	36.66	11.58	56.18	46.18	19.5	34.6	II	
5	0.70004	19.76	-2.48	12.47	32.23	9.99	56.00	46.00	23.7	36.0	II	
6	1.71407	7.37	-4.39	12.52	19.89	8.13	56.00	46.00	36.1	37.8	II	
7	7.19245	2.90	-5.18	12.85	15.75	7.67	60.00	50.00	44.2	42.3	II	
8	19.66521	9.34	3.78	13.31	22.65	17.09	60.00	50.00	37.3	32.9	II	
9	0.15004	28.91	3.09	12.37	41.28	15.46	66.00	56.00	24.7	40.5	L1	
10	0.30009	27.60	1.00	12.41	40.01	13.41	60.24	50.24	20.2	36.8	L1	
11	0.39331	26.32	0.23	12.42	38.74	12.65	57.99	47.99	19.2	35.3	L1	
12	0.48950	24.24	-0.86	12.42	36.66	11.56	56.18	46.18	19.5	34.6	L1	
13	0.70004	19.87	-2.37	12.44	32.31	10.07	56.00	46.00	23.6	35.9	L1	
14	1.71407	11.26	-3.94	12.51	23.77	8.57	56.00	46.00	32.2	37.4	L1	
15	7.19245	1.26	-5.42	12.80	14.06	7.38	60.00	50.00	45.9	42.6	L1	
16	19.66521	6.43	0.49	13.05	19.48	13.54	60.00	50.00	40.5	36.4	L1	

Calculation: Result[dBuV]=Reading[dBuV]+C.Fac(LISN(AMN))+ Cable+ ATT)[dB]
LISN(AMN):SLS-04

99 % Occupied Bandwidth and 6 dB Bandwidth

Test place	Shonan EMC Lab. No.5 Shielded Room	
Date	August 28, 2023	August 29, 2023
Temperature / Humidity	25 deg. C / 33 % RH	23 deg. C / 47 % RH
Engineer	Hiromasa Sato	Shiro Kobayashi
Mode	Tx	

11b

Frequency [MHz]	99 % Occupied Bandwidth [kHz]	6 dB Bandwidth [MHz]	Limit for 6 dB Bandwidth [MHz]
2412	12368.3	6.673	> 0.5000
2437	12400.1	6.947	> 0.5000
2462	12329.9	6.758	> 0.5000

11g

Frequency [MHz]	99 % Occupied Bandwidth [kHz]	6 dB Bandwidth [MHz]	Limit for 6 dB Bandwidth [MHz]
2412	16668.6	15.141	> 0.5000
2437	16668.0	15.124	> 0.5000
2462	16661.2	15.134	> 0.5000

11n-20 (SISO)

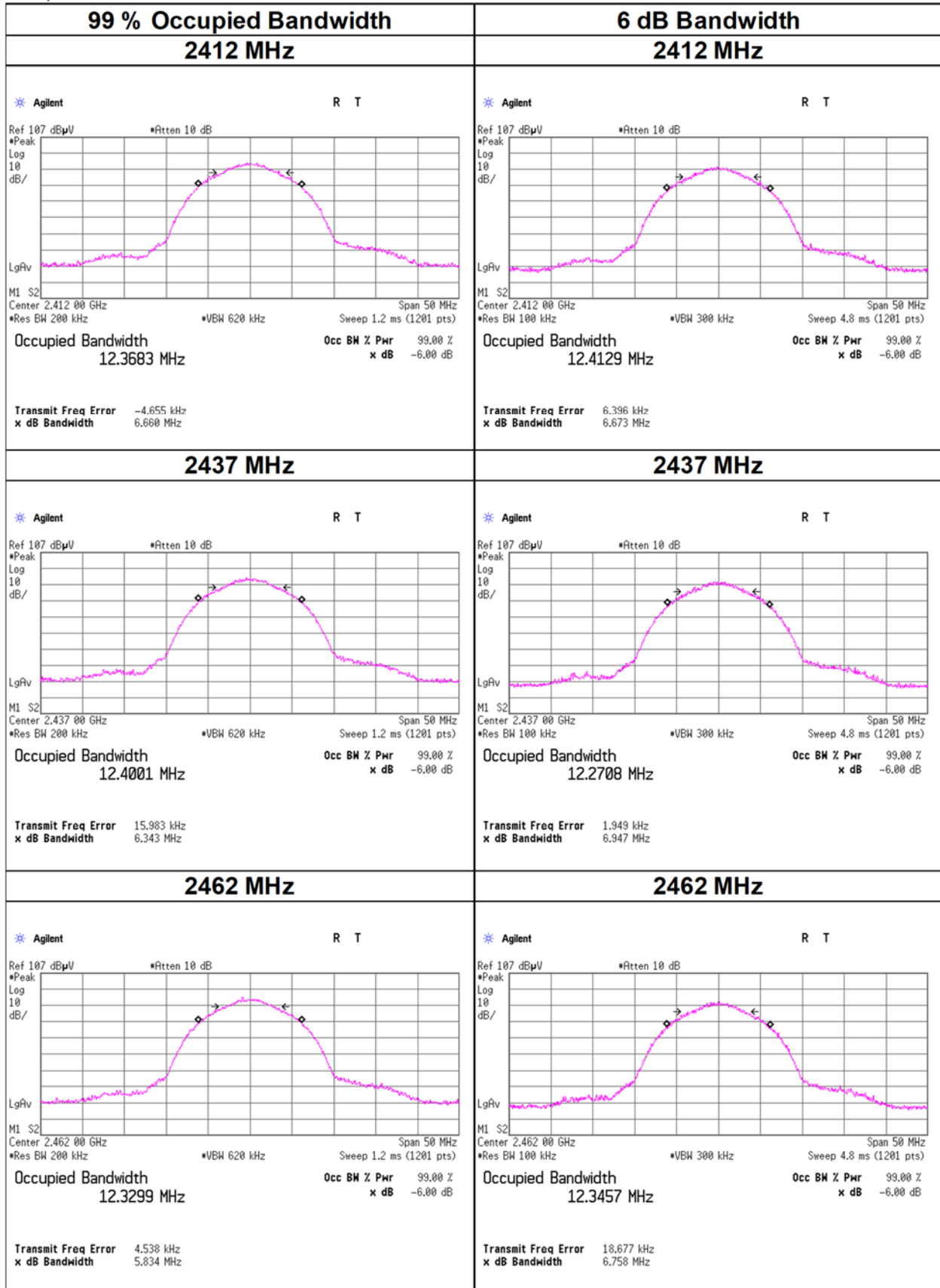
Frequency [MHz]	99 % Occupied Bandwidth [kHz]	6 dB Bandwidth [MHz]	Limit for 6 dB Bandwidth [MHz]
2412	17721.7	15.157	> 0.5000
2437	17725.9	15.128	> 0.5000
2462	17718.5	15.139	> 0.5000

BT LE 1M-PHY

Frequency [MHz]	99 % Occupied Bandwidth [kHz]	6 dB Bandwidth [MHz]	Limit for 6 dB Bandwidth [MHz]
2402	1063.6	0.729	> 0.5000
2440	1063.6	0.728	> 0.5000
2480	1064.0	0.730	> 0.5000

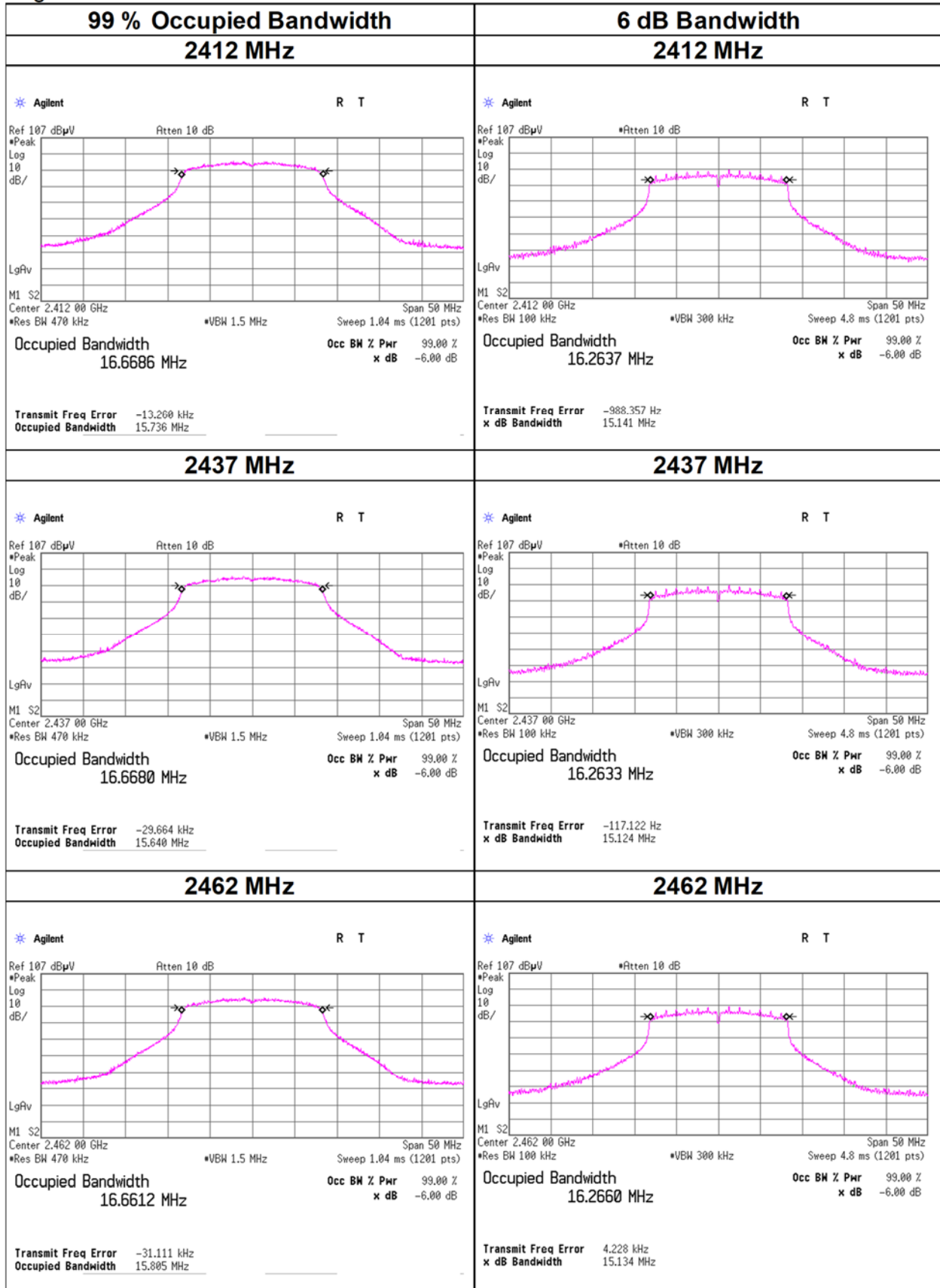
99 % Occupied Bandwidth and 6 dB Bandwidth

11b,



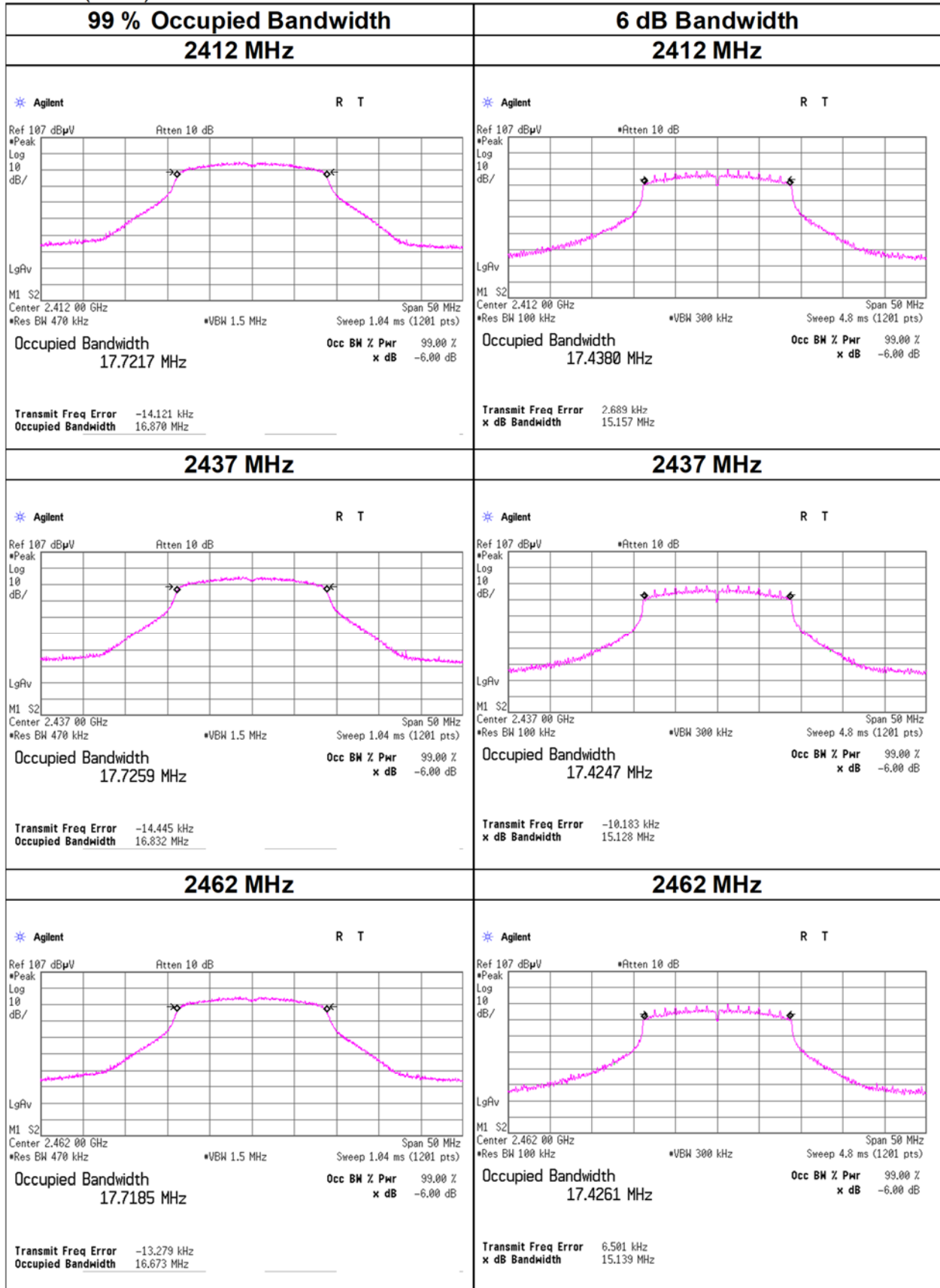
99 % Occupied Bandwidth and 6 dB Bandwidth

11g



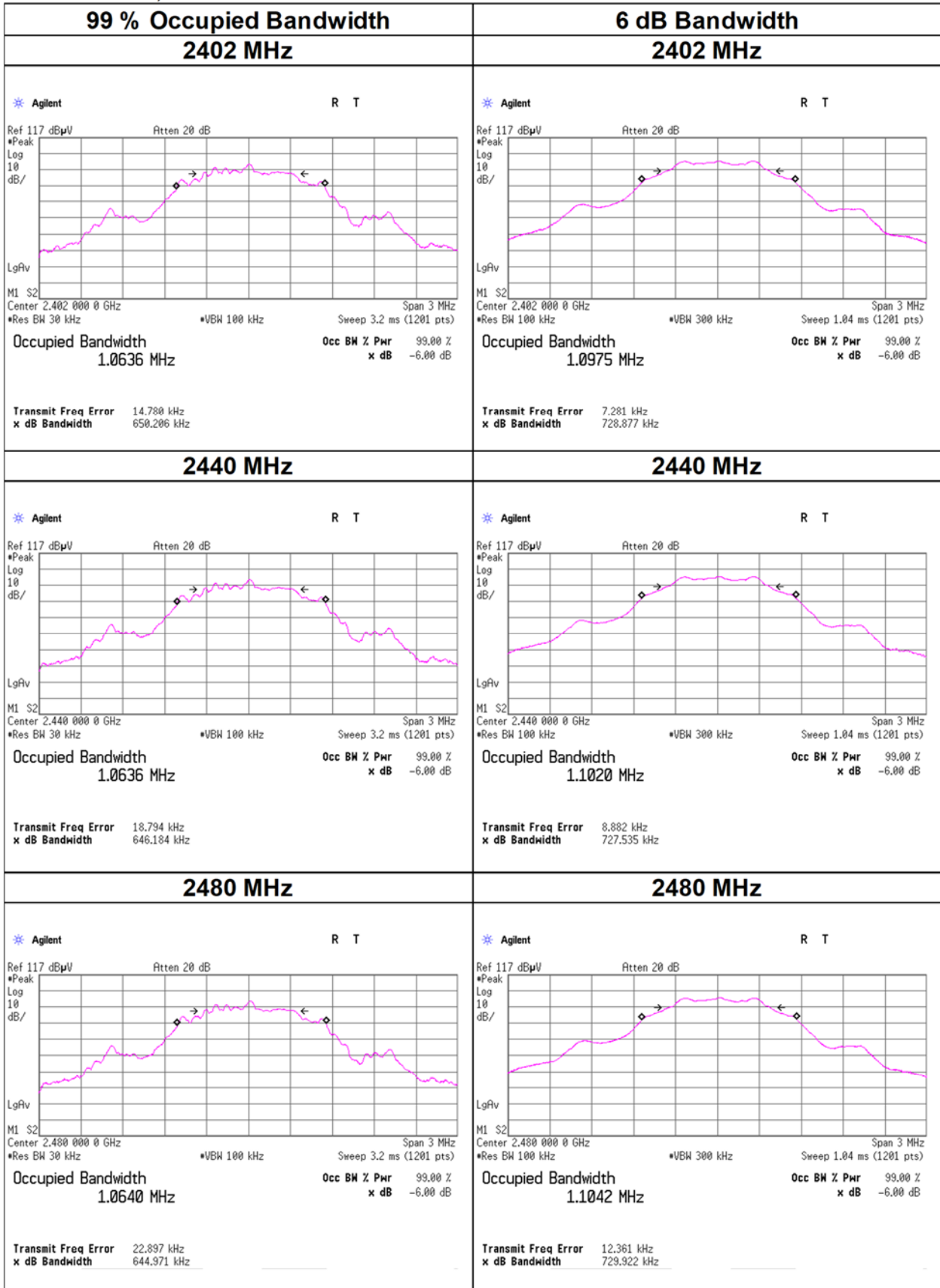
99 % Occupied Bandwidth and 6 dB Bandwidth

11n-20 (SISO)



99 % Occupied Bandwidth and 6 dB Bandwidth

BT LE 1M-PHY,



Maximum Peak Output Power

Test place Shonan EMC Lab. No.5 Shielded Room
Date August 24, 2023 August 28, 2023
Temperature / Humidity 24 deg. C / 48 % RH 25 deg. C / 33 % RH
Engineer Miku Ikudome Miku Ikudome
Mode Tx

11b

Maximum peak output power

11 Mbps (worst)

Maximum peak output power:				11 Mbps (Wired)					e.i.r.p. for RSS-247						
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]	
				[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]				
				2412	-6.95	1.29	20.27	14.61		28.91	30.00	1000	15.39		-2.4
2437	-6.64	1.29	20.27	14.92	31.05	30.00	1000	15.08	-2.4	12.52	17.86	36.02	4000	23.50	
2462	-6.78	1.30	20.27	14.79	30.13	30.00	1000	15.21	-2.4	12.39	17.34	36.02	4000	23.63	

11g

Maximum peak output power

12 Mbps (worst)

Maximum peak output power				12 Mbps (Worst)					e.i.r.p. for RSS-247					
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]			
				2412	0.32	1.29	20.27	21.88		154.17	30.00	1000	8.12	
2437	0.81	1.29	20.27	22.37	172.58	30.00	1000	7.63	-2.4	19.97	99.31	36.02	4000	16.05
2462	0.30	1.30	20.27	21.87	153.82	30.00	1000	8.13	-2.4	19.47	88.51	36.02	4000	16.55

11n-20 (SISO)

Maximum peak output power

MCS 2 (worst)

Maximum peak output power				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	1.11	1.29	20.27	22.67	184.93	30.00	1000	7.33	-2.4	20.27	106.41	36.02	4000	15.75
2437	0.77	1.29	20.27	22.33	171.00	30.00	1000	7.67	-2.4	19.93	98.40	36.02	4000	16.09
2462	1.94	1.30	20.27	23.51	224.39	30.00	1000	6.49	-2.4	21.11	129.12	36.02	4000	14.91

BT LE 1M-PHY

Maximum peak output power

Maximum peak output power				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	-3.63	1.29	10.18	7.84	6.08	30.00	1000	22.16	-2.4	5.44	3.50	36.02	4000	30.58
2440	-3.57	1.30	10.18	7.91	6.18	30.00	1000	22.09	-2.4	5.51	3.56	36.02	4000	30.51
2480	-3.21	1.30	10.18	8.27	6.71	30.00	1000	21.73	-2.4	5.87	3.86	36.02	4000	30.15

Sample Calculation:

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

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

Maximum Peak Output Power

Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 28, 2023
Temperature / Humidity	24 deg. C / 48 % RH
Engineer	Miku Ikudome
Mode	Tx

(Peak)

11b 2437 MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
1	-7.17	*
2	-7.30	
5.5	-7.03	
11	-6.64	

*: Worst Rate

11g 2437 MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
6	0.31	*
9	0.79	
12	0.81	
18	0.07	
24	0.32	
36	0.04	
48	0.28	
54	0.35	

*: Worst Rate

11n-20 (SISO) 2437 MHz

MCS	Reading	Remark
	[dBm]	
0	0.46	*
1	0.66	
2	0.77	
3	0.61	
4	0.33	
5	0.76	
6	0.59	
7	0.30	

*: Worst Rate

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

* All comparisons were carried out on same frequency and measurement factors.

* This result value is not the final data and does not include cable attenuation or attenuation of attenuators.

Average Output Power (Reference data for RF Exposure)

Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 24, 2023
Temperature / Humidity	24 deg. C / 48 % RH
Engineer	Miku Ikudome
Mode	Tx

11b

Average power 5.5 Mbps (worst)

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Burst power average)	
				[dBm]	[mW]
2412	-10.46	1.29	20.27	11.10	12.88
2437	-10.45	1.29	20.27	11.11	12.91
2462	-10.57	1.30	20.27	11.00	12.59

11g

Average power 12 Mbps (worst)

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Burst power average)	
				[dBm]	[mW]
2412	-9.70	1.29	20.27	11.86	15.35
2437	-9.86	1.29	20.27	11.70	14.79
2462	-9.95	1.30	20.27	11.62	14.52

11n-20 (SISO)

Average power MCS 7 (worst)

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Burst power average)	
				[dBm]	[mW]
2412	-9.83	1.29	20.27	11.73	14.89
2437	-9.87	1.29	20.27	11.69	14.76
2462	-9.97	1.30	20.27	11.60	14.45

BT LE 1M-PHY

Average power

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Burst power average)	
				[dBm]	[mW]
2402	-3.90	1.29	10.18	7.57	5.71
2440	-3.80	1.30	10.18	7.68	5.86
2480	-3.69	1.30	10.18	7.79	6.01

Sample Calculation:

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

*) Power was measured with using the gate function of power meter.

Average Output Power **(Reference data for RF Exposure)**

Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 24, 2023
Temperature / Humidity	24 deg. C / 48 % RH
Engineer	Miku Ikudome
Mode	Tx

(Average)

11b 2412 MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
1	-10.87	*
2	-10.51	
5.5	-10.46	
11	-10.47	

*: Worst Rate

11g 2412 MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
6	-9.88	*
9	-9.90	
12	-9.70	
18	-9.90	
24	-9.87	
36	-9.85	
48	-9.88	
54	-9.82	

*: Worst Rate

11n-20 (SISO) 2412 MHz

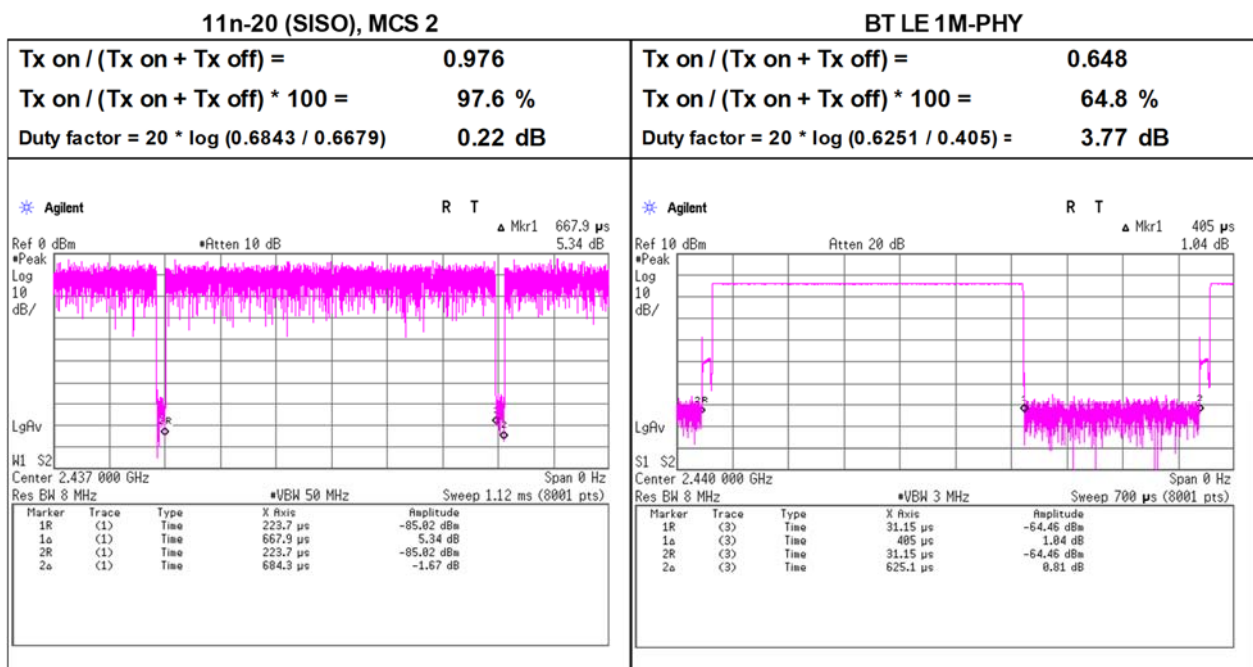
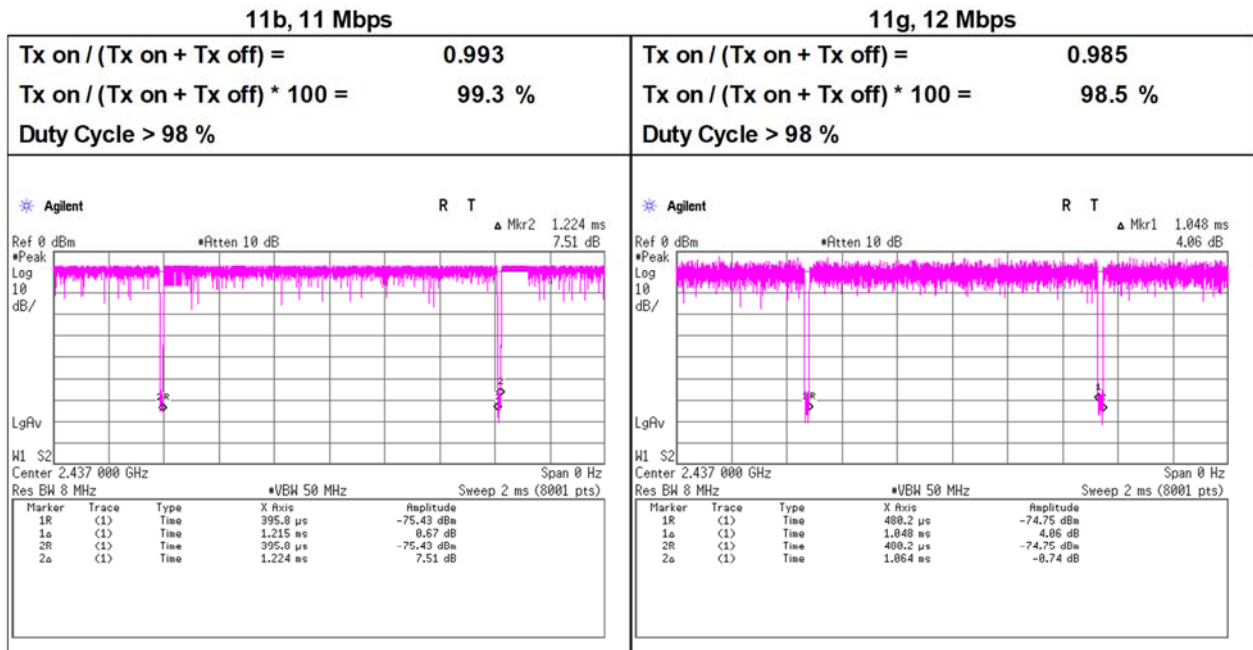
MCS	Reading	Remark
	[dBm]	
0	-10.15	
1	-10.12	
2	-10.04	
3	-10.09	
4	-9.98	
5	-9.92	
6	-9.89	
7	-9.83	

*: Worst Rate

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

Burst rate confirmation

Test place	Shonan EMC Lab. No.5 Shielded Room	
Date	August 28, 2023	August 29, 2023
Temperature / Humidity	25 deg. C / 33 % RH	23 deg. C / 47 % RH
Engineer	Hirosama Sato	Shiro Kobayashi
Mode	Tx	



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

Radiated Spurious Emission

Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	SAC3	SAC3	SAC3
Date	August 21, 2023	September 2, 2023	September 8, 2023
Temperature / Humidity	24 deg.C, 53 %RH	21 deg.C, 52 %RH	21 deg.C, 55 %RH
Engineer	Hiromasa Sato	Miku Ikudome	Shiro Kobayashi
	(1 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx 11b 2412 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	47.61	27.98	14.49	41.61	2.50	50.97	73.9	22.9	151	14	-
Hori.	3618.163	PK	51.64	29.30	6.57	42.19	2.50	47.82	73.9	26.0	103	204	-
Hori.	4824.000	PK	48.28	31.41	7.06	42.87	2.50	46.38	73.9	27.5	150	0	Floor noise
Hori.	7236.000	PK	49.09	37.15	8.48	43.36	2.50	53.86	73.9	20.0	164	34	-
Hori.	9648.000	PK	47.52	38.72	9.70	43.09	2.50	55.35	73.9	18.5	150	0	Floor noise
Hori.	19296.000	PK	44.61	40.29	13.90	47.52	-9.54	41.74	73.9	32.1	148	358	-
Hori.	2390.000	AV	38.23	27.98	14.49	41.61	2.50	41.59	53.9	12.3	151	14	-
Hori.	3618.163	AV	46.48	29.30	6.57	42.19	2.50	42.66	53.9	11.2	103	204	-
Hori.	4824.000	AV	39.32	31.41	7.06	42.87	2.50	37.42	53.9	16.4	150	0	Floor noise
Hori.	7236.000	AV	41.91	37.15	8.48	43.36	2.50	46.68	53.9	7.2	164	34	-
Hori.	9648.000	AV	39.07	38.72	9.70	43.09	2.50	46.90	53.9	7.0	150	0	Floor noise
Hori.	19296.000	AV	38.43	40.29	13.90	47.52	-9.54	35.56	53.9	18.3	148	358	-
Vert.	2390.000	PK	48.36	27.98	14.49	41.61	2.50	51.72	73.9	22.1	150	179	-
Vert.	3618.000	PK	54.51	29.30	6.57	42.19	2.50	50.69	73.9	23.2	129	190	-
Vert.	4824.000	PK	48.66	31.41	7.06	42.87	2.50	46.76	73.9	27.1	150	0	Floor noise
Vert.	7236.000	PK	49.67	37.15	8.48	43.36	2.50	54.44	73.9	19.4	329	189	-
Vert.	9648.000	PK	47.66	38.72	9.70	43.09	2.50	55.49	73.9	18.4	150	0	Floor noise
Vert.	19296.000	PK	43.37	40.29	13.90	47.52	-9.54	40.50	73.9	33.4	143	34	-
Vert.	2390.000	AV	39.06	27.98	14.49	41.61	2.50	42.42	53.9	11.4	150	179	-
Vert.	3618.000	AV	51.22	29.30	6.57	42.19	2.50	47.40	53.9	6.5	129	190	-
Vert.	4824.000	AV	39.17	31.41	7.06	42.87	2.50	37.27	53.9	16.6	150	0	Floor noise
Vert.	7236.000	AV	41.70	37.15	8.48	43.36	2.50	46.47	53.9	7.4	329	189	-
Vert.	9648.000	AV	39.10	38.72	9.70	43.09	2.50	46.93	53.9	6.9	150	0	Floor noise
Vert.	19296.000	AV	34.85	40.29	13.90	47.52	-9.54	31.98	53.9	21.9	143	34	-

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

Distance factor : 1 GHz - 10 GHz : 20log (4.00 m / 3.0 m) = 2.50 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	98.30	27.95	14.52	41.61	2.50	101.66	-	-	Carrier
Hori.	2400.000	PK	45.55	27.97	14.50	41.61	2.50	48.91	81.6	32.6	-
Vert.	2412.000	PK	102.84	27.95	14.52	41.61	2.50	106.20	-	-	Carrier
Vert.	2400.000	PK	49.61	27.97	14.50	41.61	2.50	52.97	86.2	33.2	-

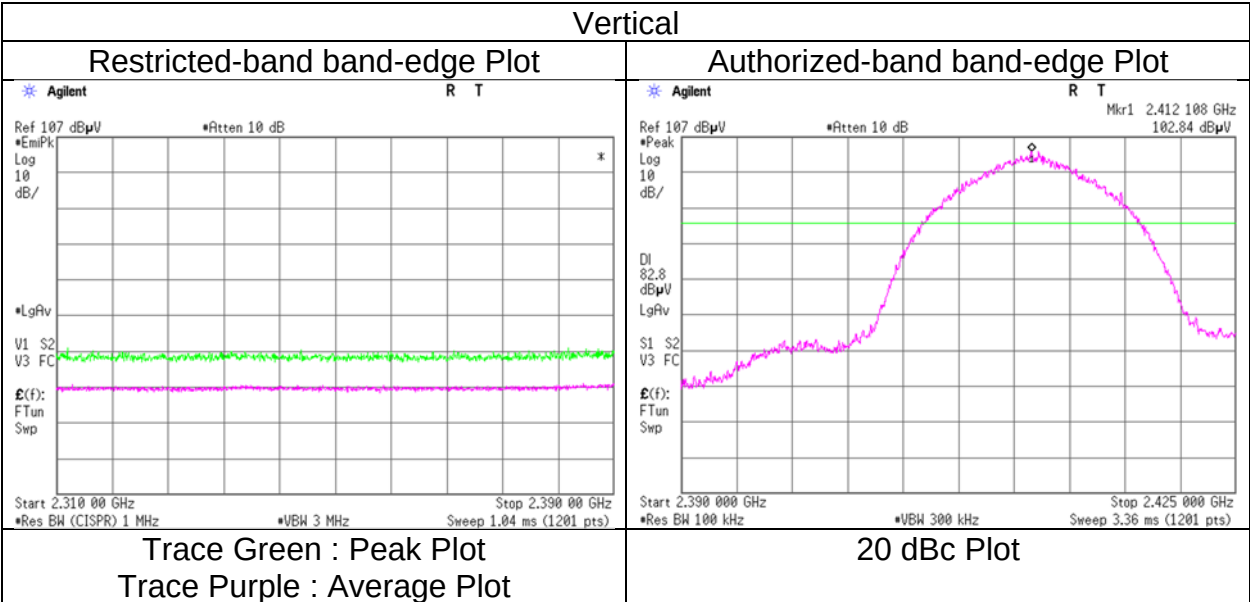
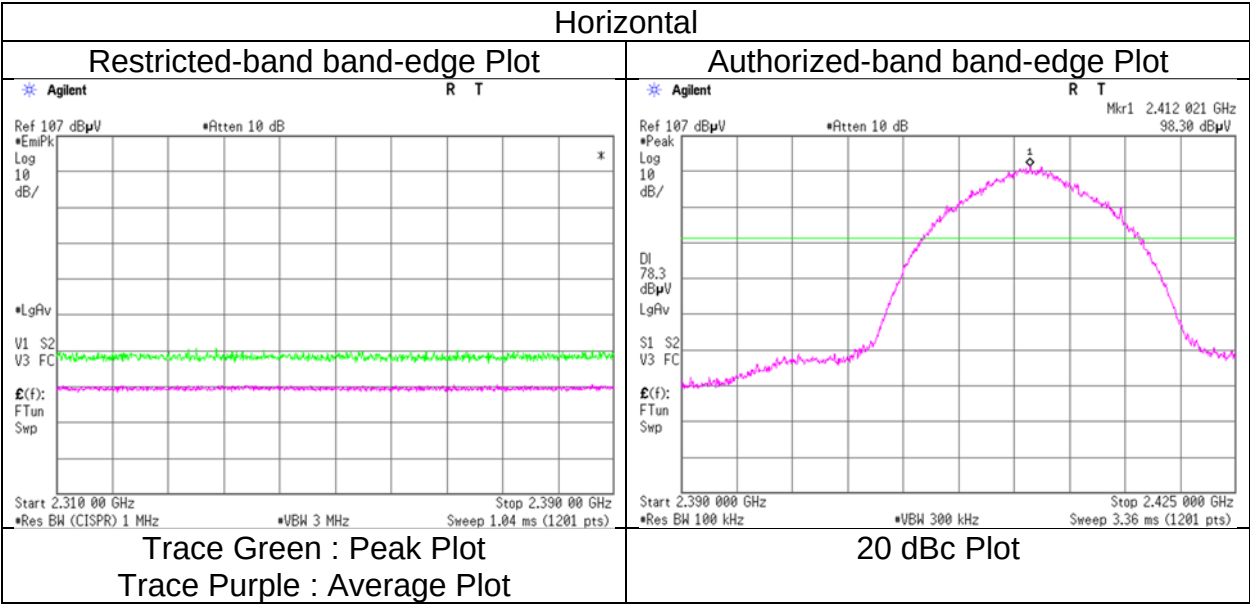
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : 20log (4.00 m / 3.0 m) = 2.50 dB

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

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Shonan EMC Lab.
Semi Anechoic Chamber	SAC3
Date	August 21, 2023
Temperature / Humidity	24 deg.C, 53 %RH
Engineer	Hiromasa Sato
	(1 GHz -10 GHz)
Mode	Tx 11b 2412 MHz



* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.

Final result of restricted band edge and authorized band edge were shown in tabular data.

Radiated Spurious Emission

Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	SAC3	SAC3	SAC3
Date	August 21, 2023	September 2, 2023	September 8, 2023
Temperature / Humidity	24 deg.C, 53 %RH	21 deg.C, 52 %RH	21 deg.C, 55 %RH
Engineer	Hiromasa Sato (1 GHz -10 GHz)	Miku Ikudome (10 GHz -18 GHz)	Shiro Kobayashi (18 GHz -26.5 GHz)
Mode	Tx 11b 2437 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	3655.625	PK	52.94	29.37	6.57	42.20	2.50	49.18	73.9	24.7	142	322	-
Hori.	4874.000	PK	47.77	31.50	7.09	42.88	2.50	45.98	73.9	27.9	150	0	Floor noise
Hori.	7311.000	PK	49.21	37.24	8.51	43.41	2.50	54.05	73.9	19.8	178	186	-
Hori.	9748.000	PK	48.01	39.00	9.74	43.02	2.50	56.23	73.9	17.6	150	0	Floor noise
Hori.	19496.000	PK	44.89	40.30	14.02	47.11	-9.54	42.56	73.9	31.3	145	326	-
Hori.	3655.625	AV	49.18	29.37	6.57	42.20	2.50	45.42	53.9	8.4	142	322	-
Hori.	4874.000	AV	39.10	31.50	7.09	42.88	2.50	37.31	53.9	16.5	150	0	Floor noise
Hori.	7311.000	AV	41.19	37.24	8.51	43.41	2.50	46.03	53.9	7.8	178	186	-
Hori.	9748.000	AV	38.90	39.00	9.74	43.02	2.50	47.12	53.9	6.7	150	0	Floor noise
Hori.	19496.000	AV	38.27	40.30	14.02	47.11	-9.54	35.94	53.9	17.9	145	326	-
Vert.	3655.625	PK	53.07	29.37	6.57	42.20	2.50	49.31	73.9	24.5	149	198	-
Vert.	4874.000	PK	48.06	31.50	7.09	42.88	2.50	46.27	73.9	27.6	150	0	Floor noise
Vert.	7311.000	PK	48.80	37.24	8.51	43.41	2.50	53.64	73.9	20.2	243	225	-
Vert.	9748.000	PK	48.40	39.00	9.74	43.02	2.50	56.62	73.9	17.2	150	0	Floor noise
Vert.	19496.000	PK	43.30	40.30	14.02	47.11	-9.54	40.97	73.9	32.9	149	43	-
Vert.	3655.625	AV	49.98	29.37	6.57	42.20	2.50	46.22	53.9	7.6	149	198	-
Vert.	4874.000	AV	38.92	31.50	7.09	42.88	2.50	37.13	53.9	16.7	150	0	Floor noise
Vert.	7311.000	AV	40.89	37.24	8.51	43.41	2.50	45.73	53.9	8.1	243	225	-
Vert.	9748.000	AV	39.28	39.00	9.74	43.02	2.50	47.50	53.9	6.4	150	0	Floor noise
Vert.	19496.000	AV	33.79	40.30	14.02	47.11	-9.54	31.46	53.9	22.4	149	43	-

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

Distance factor : 1 GHz - 10 GHz : 20log (4.00 m / 3.0 m) = 2.50 dB

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

Radiated Spurious Emission

Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	SAC3	SAC3	SAC3
Date	August 21, 2023	September 2, 2023	September 8, 2023
Temperature / Humidity	24 deg.C, 53 %RH	21 deg.C, 52 %RH	21 deg.C, 55 %RH
Engineer	Hiromasa Sato (1 GHz -10 GHz)	Miku Ikudome (10 GHz -18 GHz)	Shiro Kobayashi (18 GHz -26.5 GHz)
Mode	Tx 11b 2462 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2483.500	PK	47.72	27.89	14.60	41.64	2.50	51.07	73.9	22.8	243	9	-
Hori.	3693.087	PK	53.74	29.46	6.57	42.21	2.50	50.06	73.9	23.8	139	325	-
Hori.	4924.000	PK	48.24	31.61	7.12	42.89	2.50	46.58	73.9	27.3	150	0	Floor noise
Hori.	7386.000	PK	50.37	37.36	8.54	43.46	2.50	55.31	73.9	18.5	145	189	-
Hori.	9848.000	PK	48.54	39.06	9.80	42.94	2.50	56.96	73.9	16.9	150	0	Floor noise
Hori.	19696.000	PK	45.62	40.27	14.05	47.30	-9.54	43.10	73.9	30.8	144	327	-
Hori.	2483.500	AV	37.97	27.89	14.60	41.64	2.50	41.32	53.9	12.5	243	9	-
Hori.	3693.087	AV	49.25	29.46	6.57	42.21	2.50	45.57	53.9	8.3	139	325	-
Hori.	4924.000	AV	39.20	31.61	7.12	42.89	2.50	37.54	53.9	16.3	150	0	Floor noise
Hori.	7386.000	AV	41.59	37.36	8.54	43.46	2.50	46.53	53.9	7.3	145	189	-
Hori.	9848.000	AV	39.18	39.06	9.80	42.94	2.50	47.60	53.9	6.3	150	0	Floor noise
Hori.	19696.000	AV	39.20	40.27	14.05	47.30	-9.54	36.68	53.9	17.2	144	327	-
Vert.	2483.500	PK	49.74	27.89	14.60	41.64	2.50	53.09	73.9	20.8	158	120	-
Vert.	3693.087	PK	53.20	29.46	6.57	42.21	2.50	49.52	73.9	24.3	140	193	-
Vert.	4924.000	PK	48.77	31.61	7.12	42.89	2.50	47.11	73.9	26.7	150	0	Floor noise
Vert.	7386.000	PK	48.37	37.36	8.54	43.46	2.50	53.31	73.9	20.5	139	186	-
Vert.	9848.000	PK	47.96	39.06	9.80	42.94	2.50	56.38	73.9	17.5	150	0	Floor noise
Vert.	19696.000	PK	43.14	40.27	14.05	47.30	-9.54	40.62	73.9	33.2	140	44	-
Vert.	2483.500	AV	38.24	27.89	14.60	41.64	2.50	41.59	53.9	12.3	158	120	-
Vert.	3693.087	AV	48.76	29.46	6.57	42.21	2.50	45.08	53.9	8.8	140	193	-
Vert.	4924.000	AV	39.09	31.61	7.12	42.89	2.50	37.43	53.9	16.4	150	0	Floor noise
Vert.	7386.000	AV	40.83	37.36	8.54	43.46	2.50	45.77	53.9	8.1	139	186	-
Vert.	9848.000	AV	39.20	39.06	9.80	42.94	2.50	47.62	53.9	6.2	150	0	Floor noise
Vert.	19696.000	AV	33.95	40.27	14.05	47.30	-9.54	31.43	53.9	22.4	140	44	-

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

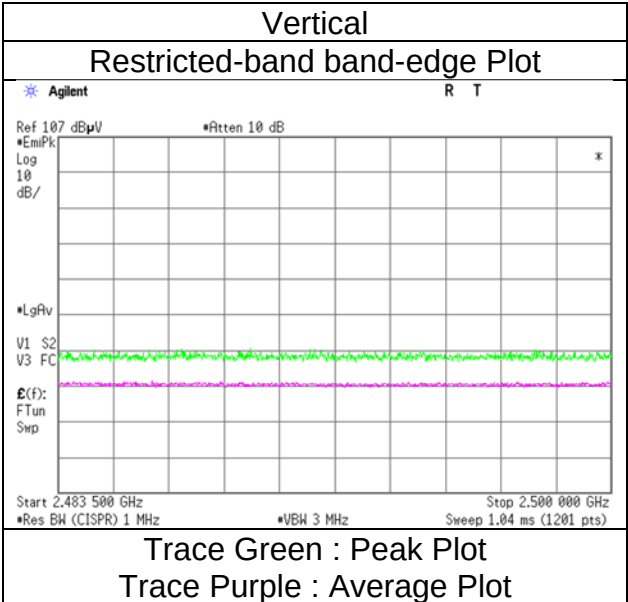
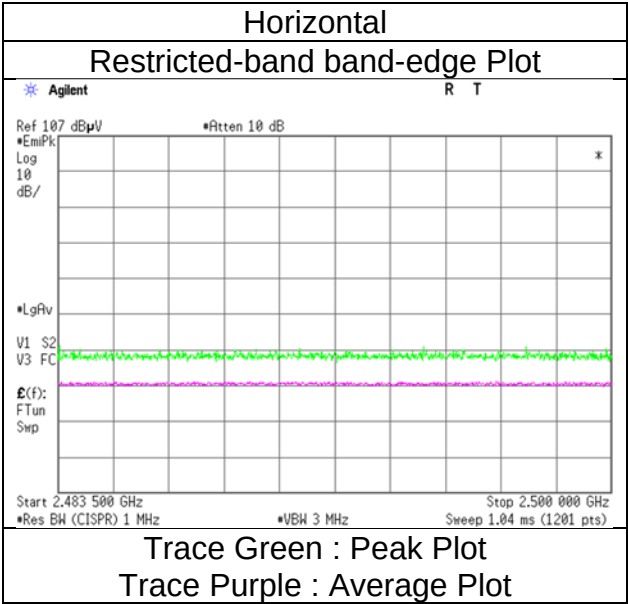
Distance factor : 1 GHz - 10 GHz : 20log (4.00 m / 3.0 m) = 2.50 dB

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

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer
Mode

Shonan EMC Lab.
SAC3
August 21, 2023
24 deg.C, 53 %RH
Hiromasa Sato
(1 GHz -10 GHz)
Tx 11b 2462 MHz



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

Radiated Spurious Emission

Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	SAC3	SAC3	SAC3
Date	August 21, 2023	September 2, 2023	September 8, 2023
Temperature / Humidity	24 deg.C, 53 %RH	21 deg.C, 52 %RH	21 deg.C, 55 %RH
Engineer	Hiromasa Sato (1 GHz -10 GHz)	Miku Ikudome (10 GHz -18 GHz)	Shiro Kobayashi (18 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	57.81	27.98	14.49	41.61	2.50	61.17	73.9	12.7	146	15	-
Hori.	3618.163	PK	53.98	29.30	6.57	42.19	2.50	50.16	73.9	23.7	109	332	-
Hori.	4824.000	PK	48.22	31.41	7.06	42.87	2.50	46.32	73.9	27.5	150	0	Floor noise
Hori.	7236.000	PK	49.19	37.15	8.48	43.36	2.50	53.96	73.9	19.9	139	172	-
Hori.	9648.000	PK	48.58	38.72	9.70	43.09	2.50	56.41	73.9	17.4	150	0	Floor noise
Hori.	19296.000	PK	45.25	40.29	13.90	47.52	-9.54	42.38	73.9	31.5	146	336	-
Hori.	2390.000	AV	44.14	27.98	14.49	41.61	2.50	47.50	53.9	6.4	146	15	-
Hori.	3618.163	AV	49.71	29.30	6.57	42.19	2.50	45.89	53.9	8.0	109	332	-
Hori.	4824.000	AV	38.86	31.41	7.06	42.87	2.50	36.96	53.9	16.9	150	0	Floor noise
Hori.	7236.000	AV	41.10	37.15	8.48	43.36	2.50	45.87	53.9	8.0	139	172	-
Hori.	9648.000	AV	38.58	38.72	9.70	43.09	2.50	46.41	53.9	7.4	150	0	Floor noise
Hori.	19296.000	AV	37.34	40.29	13.90	47.52	-9.54	34.47	53.9	19.4	146	336	-
Vert.	2390.000	PK	61.71	27.98	14.49	41.61	2.50	65.07	73.9	8.8	149	179	-
Vert.	3618.163	PK	53.17	29.30	6.57	42.19	2.50	49.35	73.9	24.5	157	185	-
Vert.	4824.000	PK	48.64	31.41	7.06	42.87	2.50	46.74	73.9	27.1	150	0	Floor noise
Vert.	7236.000	PK	49.36	37.15	8.48	43.36	2.50	54.13	73.9	19.7	333	194	-
Vert.	9648.000	PK	47.86	38.72	9.70	43.09	2.50	55.69	73.9	18.2	150	0	Floor noise
Vert.	19296.000	PK	44.32	40.29	13.90	47.52	-9.54	41.45	73.9	32.4	143	36	-
Vert.	2390.000	AV	48.02	27.98	14.49	41.61	2.50	51.38	53.9	2.5	149	179	-
Vert.	3618.163	AV	49.41	29.30	6.57	42.19	2.50	45.59	53.9	8.3	157	185	-
Vert.	4824.000	AV	39.16	31.41	7.06	42.87	2.50	37.26	53.9	16.6	150	0	Floor noise
Vert.	7236.000	AV	41.32	37.15	8.48	43.36	2.50	46.09	53.9	7.8	333	194	-
Vert.	9648.000	AV	39.01	38.72	9.70	43.09	2.50	46.84	53.9	7.0	150	0	Floor noise
Vert.	19296.000	AV	35.95	40.29	13.90	47.52	-9.54	33.08	53.9	20.8	143	36	-

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

Distance factor : 1 GHz - 10 GHz : 20log (4.00 m / 3.0 m) = 2.50 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	95.46	27.95	14.52	41.61	2.50	98.82	-	-	Carrier
Hori.	2400.000	PK	60.51	27.97	14.50	41.61	2.50	63.87	78.8	14.9	-
Vert.	2412.000	PK	100.47	27.95	14.52	41.61	2.50	103.83	-	-	Carrier
Vert.	2400.000	PK	65.10	27.97	14.50	41.61	2.50	68.46	83.8	15.3	-

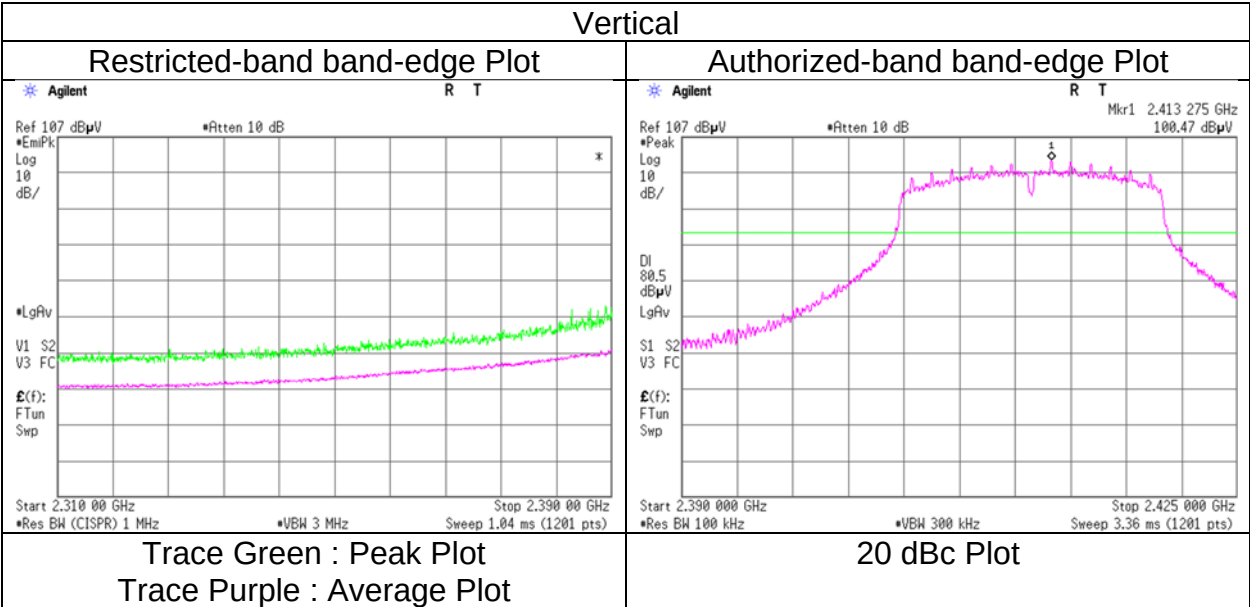
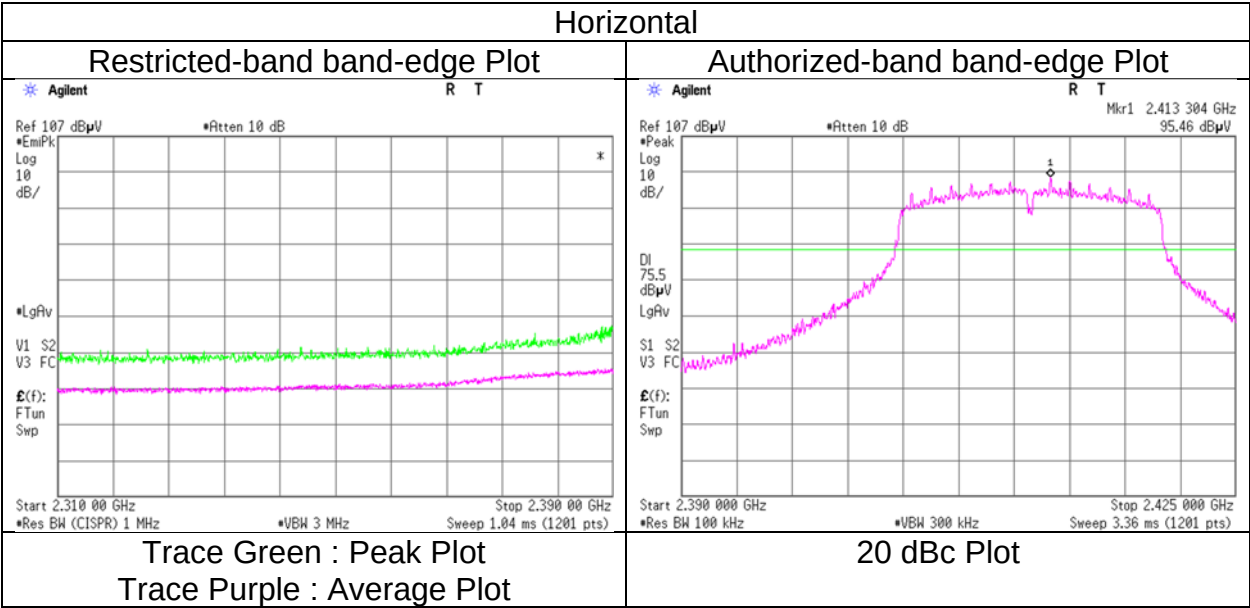
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : 20log (4.00 m / 3.0 m) = 2.50 dB

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

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Shonan EMC Lab.
Semi Anechoic Chamber	SAC3
Date	August 21, 2023
Temperature / Humidity	24 deg.C, 53 %RH
Engineer	Hiromasa Sato
	(1 GHz -10 GHz)
Mode	Tx 11g 2412 MHz



* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.

Final result of restricted band edge and authorized band edge were shown in tabular data.

Radiated Spurious Emission

Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	SAC3	SAC3	SAC3
Date	August 21, 2023	September 2, 2023	September 8, 2023
Temperature / Humidity	24 deg.C, 53 %RH	21 deg.C, 52 %RH	21 deg.C, 55 %RH
Engineer	Hiromasa Sato (1 GHz -10 GHz)	Miku Ikudome (10 GHz -18 GHz)	Shiro Kobayashi (18 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.	3655.625	PK	52.54	29.37	6.57	42.20	2.50	48.78	73.9	25.1	143	326	-
Hori.	4874.000	PK	48.25	31.50	7.09	42.88	2.50	46.46	73.9	27.4	150	0	Floor noise
Hori.	7311.000	PK	48.66	37.24	8.51	43.41	2.50	53.50	73.9	20.4	155	176	-
Hori.	9748.000	PK	48.97	39.00	9.74	43.02	2.50	57.19	73.9	16.7	150	0	Floor noise
Hori.	19496.000	PK	45.29	40.30	14.02	47.11	-9.54	42.96	73.9	30.9	148	326	-
Hori.	3655.625	AV	48.39	29.37	6.57	42.20	2.50	44.63	53.9	9.2	143	326	-
Hori.	4874.000	AV	39.01	31.50	7.09	42.88	2.50	37.22	53.9	16.6	150	0	Floor noise
Hori.	7311.000	AV	39.08	37.24	8.51	43.41	2.50	43.92	53.9	9.9	155	176	-
Hori.	9748.000	AV	38.95	39.00	9.74	43.02	2.50	47.17	53.9	6.7	150	0	Floor noise
Hori.	19496.000	AV	38.23	40.30	14.02	47.11	-9.54	35.90	53.9	18.0	148	326	-
Vert.	3655.625	PK	53.01	29.37	6.57	42.20	2.50	49.25	73.9	24.6	125	197	-
Vert.	4874.000	PK	48.57	31.50	7.09	42.88	2.50	46.78	73.9	27.1	150	0	Floor noise
Vert.	7311.000	PK	47.93	37.24	8.51	43.41	2.50	52.77	73.9	21.1	147	172	-
Vert.	9748.000	PK	47.86	39.00	9.74	43.02	2.50	56.08	73.9	17.8	150	0	Floor noise
Vert.	19496.000	PK	43.49	40.30	14.02	47.11	-9.54	41.16	73.9	32.7	147	42	-
Vert.	3655.625	AV	49.07	29.37	6.57	42.20	2.50	45.31	53.9	8.5	125	197	-
Vert.	4874.000	AV	39.08	31.50	7.09	42.88	2.50	37.29	53.9	16.6	150	0	Floor noise
Vert.	7311.000	AV	40.63	37.24	8.51	43.41	2.50	45.47	53.9	8.4	147	172	-
Vert.	9748.000	AV	29.29	39.00	9.74	43.02	2.50	37.51	53.9	16.3	150	0	Floor noise
Vert.	19496.000	AV	33.82	40.30	14.02	47.11	-9.54	31.49	53.9	22.4	147	42	-

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

Distance factor : 1 GHz - 10 GHz : 20log (4.00 m / 3.0 m) = 2.50 dB

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

Radiated Spurious Emission

Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	SAC3	SAC3	SAC3
Date	August 21, 2023	September 2, 2023	September 8, 2023
Temperature / Humidity	24 deg.C, 53 %RH	21 deg.C, 52 %RH	21 deg.C, 55 %RH
Engineer	Hiromasa Sato	Miku Ikudome	Shiro Kobayashi
	(1 GHz -10 GHz)	(10 GHz -18 GHz)	(18 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	52.92	27.89	14.60	41.64	2.50	56.27	73.9	17.6	243	6	-
Hori.	3693.087	PK	52.53	29.46	6.57	42.21	2.50	48.85	73.9	25.0	131	126	-
Hori.	4924.000	PK	48.56	31.61	7.12	42.89	2.50	46.90	73.9	27.0	150	0	Floor noise
Hori.	7386.000	PK	49.76	37.36	8.54	43.46	2.50	54.70	73.9	19.2	146	333	-
Hori.	9848.000	PK	48.51	39.06	9.80	42.94	2.50	56.93	73.9	16.9	150	0	Floor noise
Hori.	19696.000	PK	45.36	40.27	14.05	47.30	-9.54	42.84	73.9	31.0	146	338	-
Hori.	2483.500	AV	41.35	27.89	14.60	41.64	2.50	44.70	53.9	9.2	243	6	-
Hori.	3693.087	AV	48.52	29.46	6.57	42.21	2.50	44.84	53.9	9.0	131	126	-
Hori.	4924.000	AV	39.24	31.61	7.12	42.89	2.50	37.58	53.9	16.3	150	0	Floor noise
Hori.	7386.000	AV	41.53	37.36	8.54	43.46	2.50	46.47	53.9	7.4	146	333	-
Hori.	9848.000	AV	39.29	39.06	9.80	42.94	2.50	47.71	53.9	6.1	150	0	Floor noise
Hori.	19696.000	AV	38.24	40.27	14.05	47.30	-9.54	35.72	53.9	18.1	146	338	-
Vert.	2483.500	PK	56.52	27.89	14.60	41.64	2.50	59.87	73.9	14.0	143	281	-
Vert.	3693.087	PK	53.77	29.46	6.57	42.21	2.50	50.09	73.9	23.8	176	188	-
Vert.	4924.000	PK	48.23	31.61	7.12	42.89	2.50	46.57	73.9	27.3	150	0	Floor noise
Vert.	7386.000	PK	49.86	37.36	8.54	43.46	2.50	54.80	73.9	19.1	267	207	-
Vert.	9848.000	PK	48.36	39.06	9.80	42.94	2.50	56.78	73.9	17.1	150	0	Floor noise
Vert.	19696.000	PK	43.85	40.27	14.05	47.30	-9.54	41.33	73.9	32.5	144	39	-
Vert.	2483.500	AV	43.25	27.89	14.60	41.64	2.50	46.60	53.9	7.3	143	281	-
Vert.	3693.087	AV	47.99	29.46	6.57	42.21	2.50	44.31	53.9	9.5	176	188	-
Vert.	4924.000	AV	39.33	31.61	7.12	42.89	2.50	37.67	53.9	16.2	150	0	Floor noise
Vert.	7386.000	AV	41.06	37.36	8.54	43.46	2.50	46.00	53.9	7.9	267	207	-
Vert.	9848.000	AV	39.20	39.06	9.80	42.94	2.50	47.62	53.9	6.2	150	0	Floor noise
Vert.	19696.000	AV	34.35	40.27	14.05	47.30	-9.54	31.83	53.9	22.0	144	39	-

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

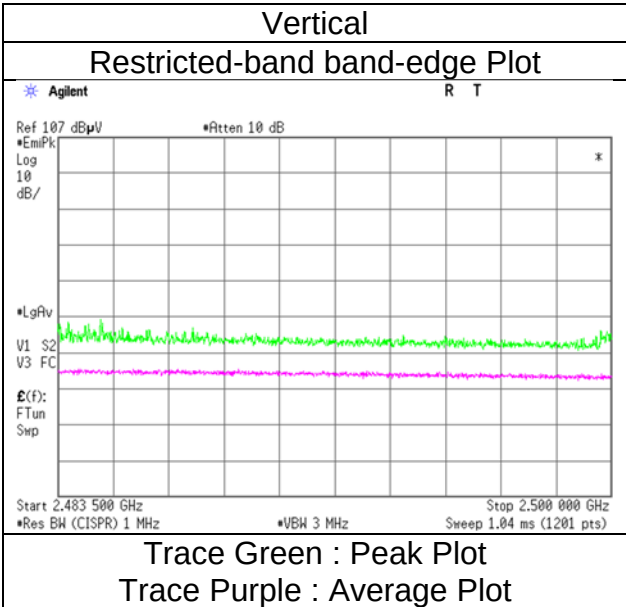
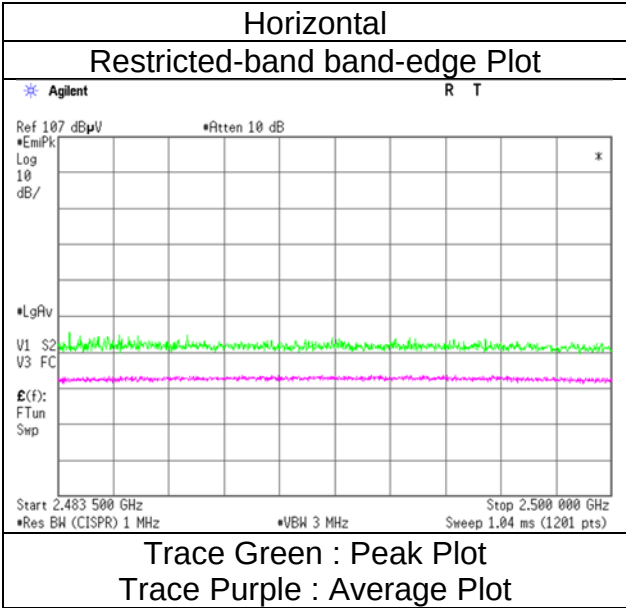
Distance factor : 1 GHz - 10 GHz : 20log (4.00 m / 3.0 m) = 2.50 dB

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

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer
Mode

Shonan EMC Lab.
SAC3
August 21, 2023
24 deg.C, 53 %RH
Hiromasa Sato
(1 GHz -10 GHz)
Tx 11g 2462 MHz



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

Radiated Spurious Emission

Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	SAC3	SAC3	SAC3
Date	August 21, 2023	September 2, 2023	September 8, 2023
Temperature / Humidity	24 deg.C, 53 %RH	21 deg.C, 52 %RH	21 deg.C, 55 %RH
Engineer	Hiromasa Sato	Miku Ikudome	Shiro Kobayashi
	(1 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx 11n-20 2412 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	61.05	27.98	14.49	41.61	2.50	64.41	73.9	9.4	150	209	-
Hori.	3618.163	PK	53.03	29.30	6.57	42.19	2.50	49.21	73.9	24.6	144	334	-
Hori.	4824.000	PK	48.43	31.41	7.06	42.87	2.50	46.53	73.9	27.3	150	0	Floor noise
Hori.	7236.000	PK	48.32	37.15	8.48	43.36	2.50	53.09	73.9	20.8	200	189	-
Hori.	9648.000	PK	46.97	38.72	9.70	43.09	2.50	54.80	73.9	19.1	150	0	Floor noise
Hori.	19296.000	PK	45.13	40.29	13.90	47.52	-9.54	42.26	73.9	31.6	148	336	-
Hori.	3618.163	AV	49.27	29.30	6.57	42.19	2.50	45.45	53.9	8.4	144	334	-
Hori.	4824.000	AV	39.17	31.41	7.06	42.87	2.50	37.27	53.9	16.6	150	0	Floor noise
Hori.	9648.000	AV	38.93	38.72	9.70	43.09	2.50	46.76	53.9	7.1	150	0	Floor noise
Vert.	2390.000	PK	60.64	27.98	14.49	41.61	2.50	64.00	73.9	9.9	155	178	-
Vert.	3618.163	PK	53.94	29.30	6.57	42.19	2.50	50.12	73.9	23.7	158	183	-
Vert.	4824.000	PK	48.25	31.41	7.06	42.87	2.50	46.35	73.9	27.5	150	0	Floor noise
Vert.	7236.000	PK	48.73	37.15	8.48	43.36	2.50	53.50	73.9	20.4	385	194	-
Vert.	9648.000	PK	47.83	38.72	9.70	43.09	2.50	55.66	73.9	18.2	150	0	Floor noise
Vert.	19296.000	PK	44.52	40.29	13.90	47.52	-9.54	41.65	73.9	32.2	143	34	-
Vert.	3618.163	AV	50.14	29.30	6.57	42.19	2.50	46.32	53.9	7.5	158	183	-
Vert.	4824.000	AV	39.14	31.41	7.06	42.87	2.50	37.24	53.9	16.6	150	0	Floor noise
Vert.	9648.000	AV	39.18	38.72	9.70	43.09	2.50	47.01	53.9	6.8	150	0	Floor noise

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

Distance factor : 1 GHz - 10 GHz : 20log (4.00 m / 3.0 m) = 2.50 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	43.09	27.98	14.49	41.61	0.22	2.50	46.67	53.9	7.2	*1)
Hori.	7236.000	AV	41.24	37.15	8.48	43.36	0.22	2.50	46.23	53.9	7.6	-
Hori.	19296.000	AV	37.10	40.29	13.90	47.52	0.22	-9.54	34.45	53.9	19.4	-
Vert.	2390.000	AV	48.14	27.98	14.49	41.61	0.22	2.50	51.72	53.9	2.1	*1)
Vert.	7236.000	AV	41.00	37.15	8.48	43.36	0.22	2.50	45.99	53.9	7.9	-
Vert.	19296.000	AV	35.80	40.29	13.90	47.52	0.22	-9.54	33.15	53.9	20.7	-

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

Distance factor : 1 GHz - 10 GHz : 20log (4.00 m / 3.0 m) = 2.50 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	95.42	27.95	14.52	41.61	2.50	98.78	-	-	Carrier
Hori.	2400.000	PK	59.33	27.97	14.50	41.61	2.50	62.69	78.7	16.0	-
Vert.	2412.000	PK	99.76	27.95	14.52	41.61	2.50	103.12	-	-	Carrier
Vert.	2400.000	PK	63.76	27.97	14.50	41.61	2.50	67.12	83.1	15.9	-

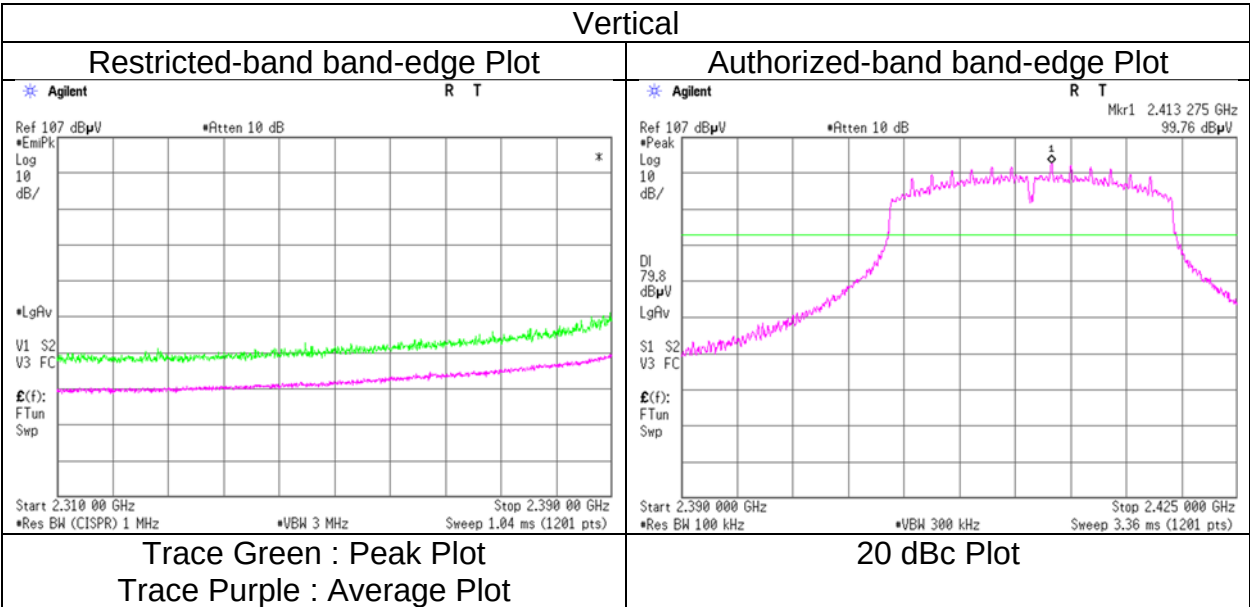
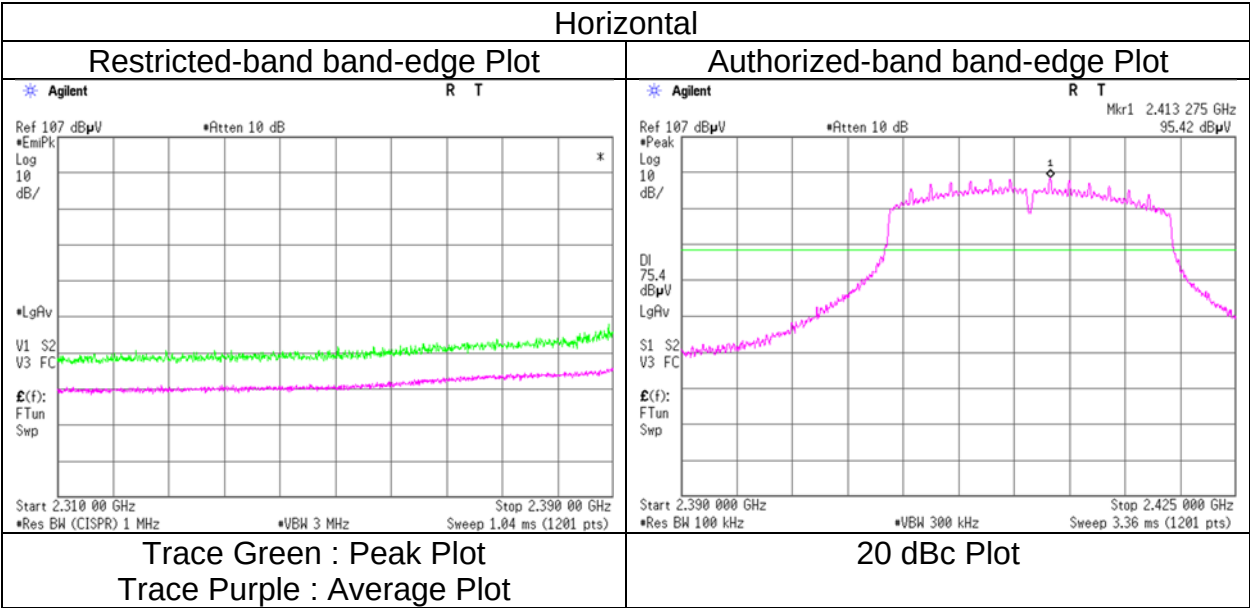
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : 20log (4.00 m / 3.0 m) = 2.50 dB

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

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Shonan EMC Lab.
Semi Anechoic Chamber	SAC3
Date	August 21, 2023
Temperature / Humidity	24 deg.C, 53 %RH
Engineer	Hiromasa Sato
	(1 GHz -10 GHz)
Mode	Tx 11n-20 2412 MHz



* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.

Final result of restricted band edge and authorized band edge were shown in tabular data.

Radiated Spurious Emission

Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	SAC3	SAC3	SAC3
Date	August 21, 2023	September 2, 2023	September 8, 2023
Temperature / Humidity	24 deg.C, 53 %RH	21 deg.C, 52 %RH	21 deg.C, 55 %RH
Engineer	Hiromasa Sato	Miku Ikudome	Shiro Kobayashi
	(1 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx 11n-20 2437 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	3655.625	PK	53.22	29.37	6.57	42.20	2.50	49.46	73.9	24.4	140	322	-
Hori.	4874.000	PK	47.29	31.50	7.09	42.88	2.50	45.50	73.9	28.4	150	0	Floor noise
Hori.	7311.000	PK	48.68	37.24	8.51	43.41	2.50	53.52	73.9	20.3	144	299	-
Hori.	9748.000	PK	47.49	39.00	9.74	43.02	2.50	55.71	73.9	18.1	150	0	Floor noise
Hori.	19496.000	PK	45.33	40.30	14.02	47.11	-9.54	43.00	73.9	30.9	147	328	-
Hori.	3655.625	AV	49.16	29.37	6.57	42.20	2.50	45.40	53.9	8.5	140	322	-
Hori.	4874.000	AV	39.94	31.50	7.09	42.88	2.50	38.15	53.9	15.7	150	0	Floor noise
Hori.	9748.000	AV	39.41	39.00	9.74	43.02	2.50	47.63	53.9	6.2	150	0	Floor noise
Vert.	3655.625	PK	53.15	29.37	6.57	42.20	2.50	49.39	73.9	24.5	146	203	-
Vert.	4874.000	PK	47.79	31.50	7.09	42.88	2.50	46.00	73.9	27.9	150	0	Floor noise
Vert.	7311.000	PK	48.21	37.24	8.51	43.41	2.50	53.05	73.9	20.8	233	219	-
Vert.	9748.000	PK	47.46	39.00	9.74	43.02	2.50	55.68	73.9	18.2	150	0	Floor noise
Vert.	19496.000	PK	43.90	40.30	14.02	47.11	-9.54	41.57	73.9	32.3	143	42	-
Vert.	3655.625	AV	49.27	29.37	6.57	42.20	2.50	45.51	53.9	8.3	146	203	-
Vert.	4874.000	AV	40.65	31.50	7.09	42.88	2.50	38.86	53.9	15.0	150	0	Floor noise
Vert.	9748.000	AV	40.00	39.00	9.74	43.02	2.50	48.22	53.9	5.6	150	0	Floor noise

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

Distance factor : 1 GHz - 10 GHz : 20log (4.00 m / 3.0 m) = 2.50 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.	7311.000	AV	41.42	37.24	8.51	43.41	0.22	2.50	46.48	53.9	7.4	-
Hori.	19496.000	AV	38.30	40.30	14.02	47.11	0.22	-9.54	36.19	53.9	17.7	-
Vert.	7311.000	AV	40.68	37.24	8.51	43.41	0.22	2.50	45.74	53.9	8.1	-
Vert.	19496.000	AV	34.06	40.30	14.02	47.11	0.22	-9.54	31.95	53.9	21.9	-

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

Distance factor : 1 GHz - 10 GHz : 20log (4.00 m / 3.0 m) = 2.50 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

Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	SAC3	SAC3	SAC3
Date	September 8, 2023	September 1, 2023	September 2, 2023
Temperature / Humidity	21 deg.C, 55 %RH	21 deg.C, 49 %RH	21 deg.C, 52 %RH
Engineer	Shiro Kobayashi (30 MHz -1 GHz, 18 GHz -26.5 GHz)	Shiro Kobayashi (1 GHz -10 GHz)	Miku Ikudome (10 GHz -18 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.	347.202	QP	41.76	15.28	8.83	31.96	0.00	33.91	46.0	12.0	107	212	-
Hori.	446.402	QP	47.68	16.53	9.27	31.95	0.00	41.53	46.0	4.4	100	215	-
Hori.	545.603	QP	39.99	17.78	9.67	31.99	0.00	35.45	46.0	10.5	206	221	-
Hori.	595.203	QP	37.48	19.27	9.88	31.95	0.00	34.68	46.0	11.3	171	220	-
Hori.	644.803	QP	34.55	19.19	10.06	31.94	0.00	31.86	46.0	14.1	151	207	-
Hori.	2483.500	PK	56.23	27.89	14.60	41.64	2.50	59.58	73.9	14.3	192	197	-
Hori.	3693.087	PK	52.89	29.46	6.57	42.21	2.50	49.21	73.9	24.6	145	96	-
Hori.	4924.000	PK	48.53	31.61	7.12	42.89	2.50	46.87	73.9	27.0	150	0	Floor noise
Hori.	7386.000	PK	50.81	37.36	8.54	43.46	2.50	55.75	73.9	18.1	118	295	-
Hori.	9848.000	PK	48.08	39.06	9.80	42.94	2.50	56.50	73.9	17.4	150	0	Floor noise
Hori.	19696.000	PK	46.12	40.27	14.05	47.30	-9.54	43.60	73.9	30.3	147	337	-
Hori.	3693.087	AV	48.37	29.46	6.57	42.21	2.50	44.69	53.9	9.2	145	96	-
Hori.	4924.000	AV	40.35	31.61	7.12	42.89	2.50	38.69	53.9	15.2	150	0	Floor noise
Hori.	9848.000	AV	39.94	39.06	9.80	42.94	2.50	48.36	53.9	5.5	150	0	Floor noise
Vert.	148.801	QP	40.76	14.82	7.77	32.10	0.00	31.25	43.5	12.2	100	278	-
Vert.	248.001	QP	49.96	11.97	8.30	32.01	0.00	38.22	46.0	7.7	100	226	-
Vert.	347.202	QP	49.76	15.28	8.83	31.96	0.00	41.91	46.0	4.0	159	86	-
Vert.	446.402	QP	49.95	16.53	9.27	31.95	0.00	43.80	46.0	2.2	122	334	-
Vert.	496.002	QP	40.05	17.85	9.46	31.93	0.00	35.43	46.0	10.5	100	340	-
Vert.	545.603	QP	39.26	17.78	9.67	31.99	0.00	34.72	46.0	11.2	100	131	-
Vert.	595.203	QP	36.78	19.27	9.88	31.95	0.00	33.98	46.0	12.0	100	206	-
Vert.	2483.500	PK	59.27	27.89	14.60	41.64	2.50	62.62	73.9	11.2	140	171	-
Vert.	3693.087	PK	53.80	29.46	6.57	42.21	2.50	50.12	73.9	23.7	148	195	-
Vert.	4924.000	PK	47.72	31.61	7.12	42.89	2.50	46.06	73.9	27.8	150	0	Floor noise
Vert.	7386.000	PK	48.44	37.36	8.54	43.46	2.50	53.38	73.9	20.5	157	162	-
Vert.	9848.000	PK	48.74	39.06	9.80	42.94	2.50	57.16	73.9	16.7	150	0	Floor noise
Vert.	19696.000	PK	43.89	40.27	14.05	47.30	-9.54	41.37	73.9	32.5	143	44	-
Vert.	3693.087	AV	50.18	29.46	6.57	42.21	2.50	46.50	53.9	7.4	148	195	-
Vert.	4924.000	AV	39.99	31.61	7.12	42.89	2.50	38.33	53.9	15.5	150	0	Floor noise
Vert.	9848.000	AV	40.08	39.06	9.80	42.94	2.50	48.50	53.9	5.4	150	0	Floor noise

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

Distance factor : 1 GHz - 10 GHz : 20log (4.00 m / 3.0 m) = 2.50 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	43.48	27.89	14.60	41.64	0.22	2.50	47.05	53.9	6.8	*1)
Hori.	7386.000	AV	42.46	37.36	8.54	43.46	0.22	2.50	47.62	53.9	6.2	-
Hori.	19696.000	AV	39.04	40.27	14.05	47.30	0.22	-9.54	36.74	53.9	17.1	-
Vert.	2483.500	AV	44.92	27.89	14.60	41.64	0.22	2.50	48.49	53.9	5.4	*1)
Vert.	7386.000	AV	41.73	37.36	8.54	43.46	0.22	2.50	46.89	53.9	7.0	-
Vert.	19696.000	AV	34.50	40.27	14.05	47.30	0.22	-9.54	32.20	53.9	21.7	-

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

Distance factor : 1 GHz - 10 GHz : 20log (4.00 m / 3.0 m) = 2.50 dB

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

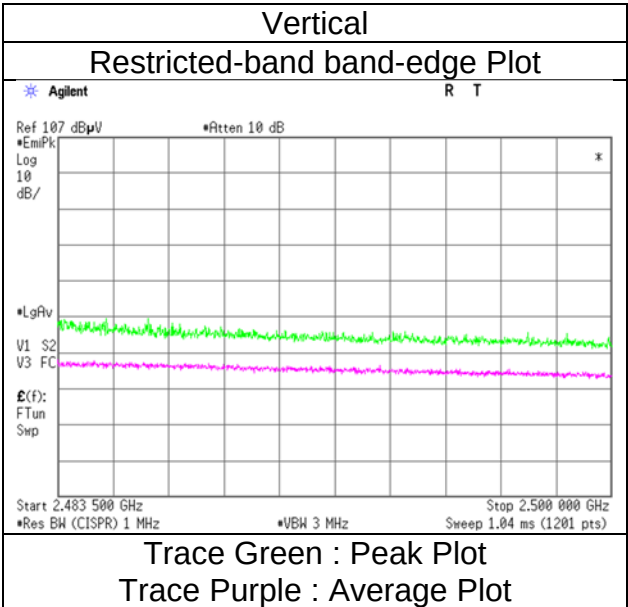
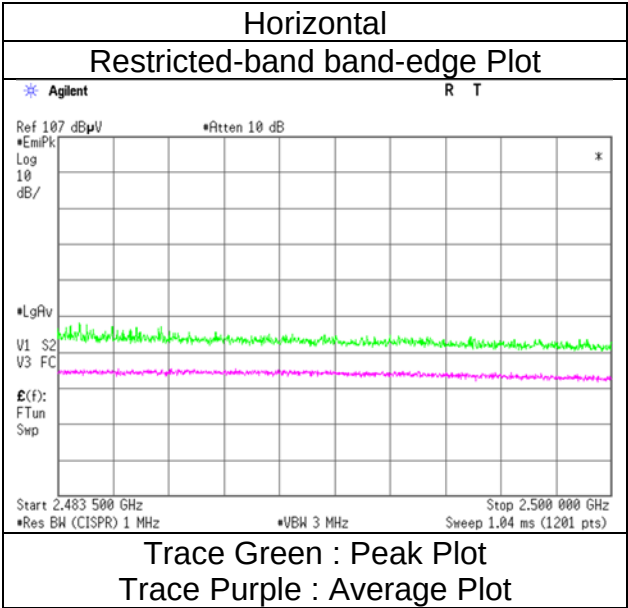
Duty factor refer to "Burst rate confirmation" sheet.

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

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer
Mode

Shonan EMC Lab.
SAC3
August 21, 2023
24 deg.C, 53 %RH
Hiromasa Sato
(1 GHz -10 GHz)
Tx 11n-20 2462 MHz



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

Radiated Spurious Emission

Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	SAC3	SAC3	SAC3
Date	August 25, 2023	September 2, 2023	October 9, 2023
Temperature / Humidity	23 deg.C, 37 %RH	21 deg.C, 52 %RH	20 deg.C, 52 %RH
Engineer	Shiro Kobayashi	Miku Ikudome	Akihiro Oda
	(1 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx BT LE 2402 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2390.000	PK	48.80	27.98	14.49	41.61	2.50	52.16	73.9	21.7	136	201	-
Hori.	4804.000	PK	57.57	31.39	7.04	42.87	2.50	55.63	73.9	18.2	144	15	-
Hori.	7206.000	PK	50.79	37.12	8.47	43.34	2.50	55.54	73.9	18.3	204	196	-
Hori.	9608.000	PK	49.11	38.58	9.67	43.12	2.50	56.74	73.9	17.1	100	0	Floor Noise
Hori.	9608.000	AV	40.63	38.58	9.67	43.12	2.50	48.26	53.9	5.6	100	0	Floor Noise
Vert.	2390.000	PK	48.65	27.98	14.49	41.61	2.50	52.01	73.9	21.8	301	46	-
Vert.	4804.000	PK	57.77	31.39	7.04	42.87	2.50	55.83	73.9	18.0	327	141	-
Vert.	7206.000	PK	50.54	37.12	8.47	43.34	2.50	55.29	73.9	18.6	120	76	-
Vert.	9608.000	PK	49.36	38.58	9.67	43.12	2.50	56.99	73.9	16.9	150	0	Floor Noise
Vert.	9608.000	AV	40.42	38.58	9.67	43.12	2.50	48.05	53.9	5.8	150	0	Floor Noise

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

Distance factor : 1 GHz - 10 GHz : 20log (4.00 m / 3.0 m) = 2.50 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	38.06	27.98	14.49	41.61	3.77	2.50	45.19	53.9	8.7	*1)
Hori.	4804.000	AV	48.85	31.39	7.04	42.87	3.77	2.50	50.68	53.9	3.2	-
Hori.	7206.000	AV	40.71	37.12	8.47	43.34	3.77	2.50	49.23	53.9	4.6	-
Vert.	2390.000	AV	38.26	27.98	14.49	41.61	3.77	2.50	45.39	53.9	8.5	*1)
Vert.	4804.000	AV	50.34	31.39	7.04	42.87	3.77	2.50	52.17	53.9	1.7	-
Vert.	7206.000	AV	40.93	37.12	8.47	43.34	3.77	2.50	49.45	53.9	4.4	-

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

Distance factor : 1 GHz - 10 GHz : 20log (4.00 m / 3.0 m) = 2.50 dB

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

Duty factor refer to "Burst rate confirmation" sheet.

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

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	102.84	27.97	14.50	41.61	2.50	106.20	-	-	Carrier
Hori.	2400.000	PK	44.71	27.97	14.50	41.61	2.50	48.07	86.2	38.1	-
Vert.	2402.000	PK	102.22	27.97	14.50	41.61	2.50	105.58	-	-	Carrier
Vert.	2400.000	PK	44.29	27.97	14.50	41.61	2.50	47.65	85.5	37.8	-

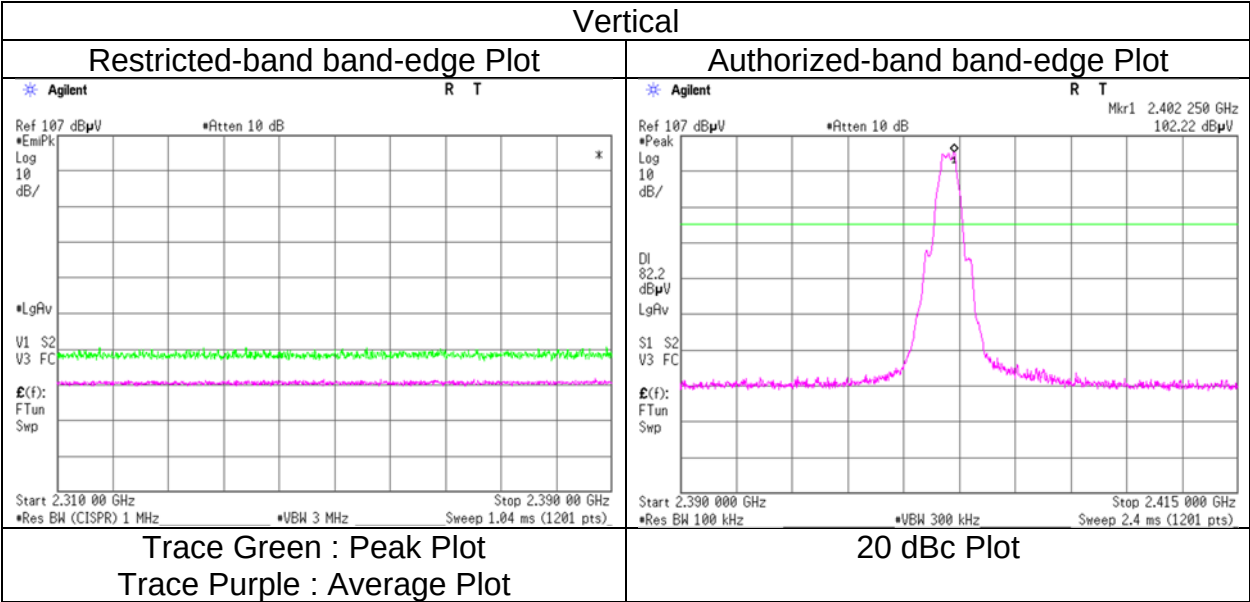
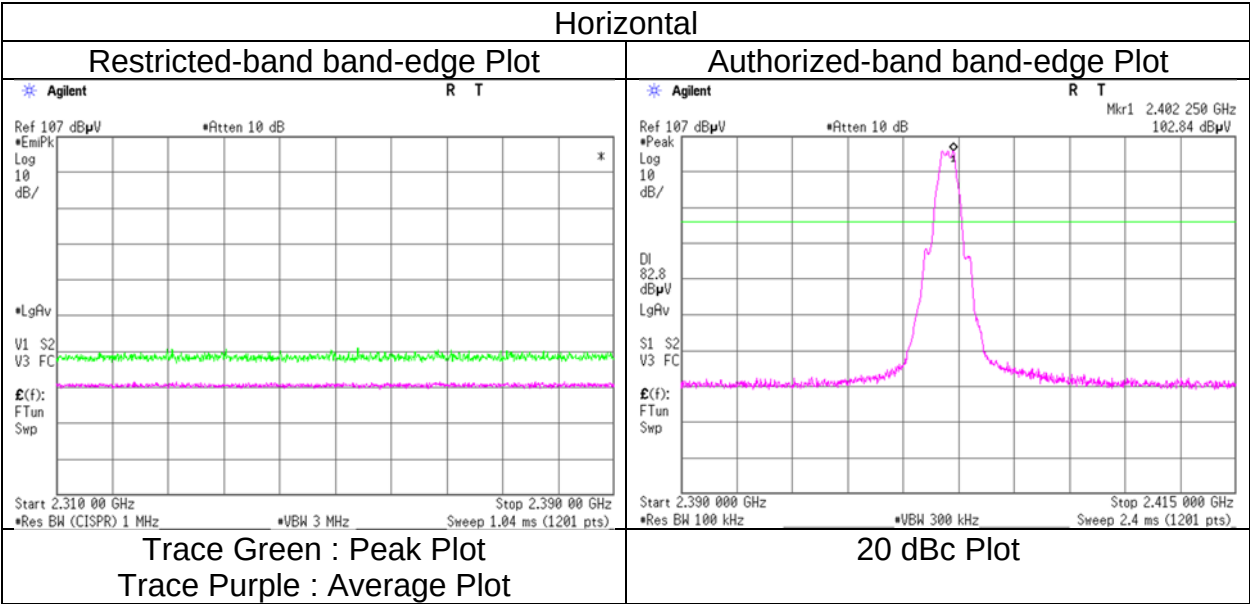
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : 20log (4.00 m / 3.0 m) = 2.50 dB

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

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Shonan EMC Lab.
Semi Anechoic Chamber	SAC3
Date	August 25, 2023
Temperature / Humidity	23 deg.C, 37 %RH
Engineer	Shiro Kobayashi
	(1 GHz -10 GHz)
Mode	Tx BT LE 2402 MHz



* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.

Final result of restricted band edge and authorized band edge were shown in tabular data.

Radiated Spurious Emission

Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	SAC3	SAC3	SAC3
Date	August 25, 2023	September 2, 2023	October 9, 2023
Temperature / Humidity	23 deg.C, 37 %RH	21 deg.C, 52 %RH	20 deg.C, 52 %RH
Engineer	Shiro Kobayashi	Miku Ikudome	Akihiro Oda
	(1 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx BT LE 2440 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	4880.000	PK	56.20	31.51	7.09	42.88	2.50	54.42	73.9	19.4	142	55	-
Hori.	7320.000	PK	51.49	37.25	8.51	43.42	2.50	56.33	73.9	17.5	129	348	-
Hori.	9760.000	PK	50.32	39.02	9.76	43.01	2.50	58.59	73.9	15.3	150	0	Floor Noise
Hori.	9760.000	AV	39.43	39.02	9.76	43.01	2.50	47.70	53.9	6.2	150	0	Floor Noise
Vert.	4880.000	PK	57.30	31.51	7.09	42.88	2.50	55.52	73.9	18.3	184	138	-
Vert.	7320.000	PK	52.00	37.25	8.51	43.42	2.50	56.84	73.9	17.0	122	127	-
Vert.	9760.000	PK	50.38	39.02	9.76	43.01	2.50	58.65	73.9	15.2	150	0	Floor Noise
Vert.	9760.000	AV	39.64	39.02	9.76	43.01	2.50	47.91	53.9	5.9	150	0	Floor Noise

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

Distance factor : 1 GHz - 10 GHz : 20log (4.00 m / 3.0 m) = 2.50 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.	4880.000	AV	47.70	31.51	7.09	42.88	3.77	2.50	49.69	53.9	4.2	-
Hori.	7320.000	AV	40.82	37.25	8.51	43.42	3.77	2.50	49.43	53.9	4.4	-
Vert.	4880.000	AV	49.12	31.51	7.09	42.88	3.77	2.50	51.11	53.9	2.7	-
Vert.	7320.000	AV	41.11	37.25	8.51	43.42	3.77	2.50	49.72	53.9	4.1	-

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

Distance factor : 1 GHz - 10 GHz : 20log (4.00 m / 3.0 m) = 2.50 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

Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	SAC2	SAC3	SAC3
Date	October 9, 2023	August 25, 2023	September 2, 2023
Temperature / Humidity	20 deg.C, 52 %RH	23 deg.C, 37 %RH	21 deg.C, 52 %RH
Engineer	Akihiro Oda	Shiro Kobayashi	Miku Ikudome
	(30 MHz -1 GHz)		
	(18 GHz – 26.5 GHz)	(1 GHz -10 GHz)	(10 GHz -18 GHz)
Mode	Tx BT LE 2480 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	125.410	QP	21.00	13.54	8.12	31.83	0.00	10.83	43.5	32.6	198	358	-
Hori.	175.028	QP	20.90	15.83	8.82	31.78	0.00	13.77	43.5	29.7	263	356	-
Hori.	466.198	QP	27.00	16.98	7.79	31.61	0.00	20.16	46.0	25.8	207	75	-
Hori.	835.253	QP	20.00	21.92	9.81	31.15	0.00	20.58	46.0	25.4	100	0	-
Hori.	2483.500	PK	57.16	27.89	14.60	41.64	2.50	60.51	73.9	13.3	133	191	-
Hori.	4960.000	PK	56.94	31.73	7.15	42.89	2.50	55.43	73.9	18.4	173	11	-
Hori.	7440.000	PK	52.31	37.42	8.57	43.50	2.50	57.30	73.9	16.6	196	222	-
Hori.	9920.000	PK	50.05	38.95	9.85	42.89	2.50	58.46	73.9	15.4	150	0	Floor Noise
Hori.	9920.000	AV	39.36	38.95	9.85	42.89	2.50	47.77	53.9	6.1	150	0	Floor Noise
Vert.	70.871	QP	32.40	6.44	7.43	31.88	0.00	14.39	40.0	25.6	100	0	-
Vert.	330.094	QP	37.10	13.78	6.83	31.64	0.00	26.07	46.0	19.9	103	236	-
Vert.	466.138	QP	30.40	16.98	7.79	31.61	0.00	23.56	46.0	22.4	117	90	-
Vert.	660.752	QP	20.60	20.07	8.86	31.58	0.00	17.95	46.0	28.0	100	60	-
Vert.	2483.500	PK	55.52	27.89	14.60	41.64	2.50	58.87	73.9	15.0	322	80	-
Vert.	4960.000	PK	57.64	31.73	7.15	42.89	2.50	56.13	73.9	17.7	310	132	-
Vert.	7440.000	PK	52.54	37.42	8.57	43.50	2.50	57.53	73.9	16.3	128	133	-
Vert.	9920.000	PK	49.97	38.95	9.85	42.89	2.50	58.38	73.9	15.5	150	0	Floor Noise
Vert.	9920.000	AV	39.62	38.95	9.85	42.89	2.50	48.03	53.9	5.8	150	0	Floor Noise

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

Distance factor : 1 GHz - 10 GHz : 20log (4.00 m / 3.0 m) = 2.50 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	39.79	27.89	14.60	41.64	3.77	2.50	46.91	53.9	6.9	*1)
Hori.	4960.000	AV	49.69	31.73	7.15	42.89	3.77	2.50	51.95	53.9	1.9	-
Hori.	7440.000	AV	41.71	37.42	8.57	43.50	3.77	2.50	50.47	53.9	3.4	-
Vert.	2483.500	AV	38.92	27.89	14.60	41.64	3.77	2.50	46.04	53.9	7.8	*1)
Vert.	4960.000	AV	49.38	31.73	7.15	42.89	3.77	2.50	51.64	53.9	2.2	-
Vert.	7440.000	AV	41.91	37.42	8.57	43.50	3.77	2.50	50.67	53.9	3.2	-

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

Distance factor : 1 GHz - 10 GHz : 20log (4.00 m / 3.0 m) = 2.50 dB

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

Duty factor refer to "Burst rate confirmation" sheet.

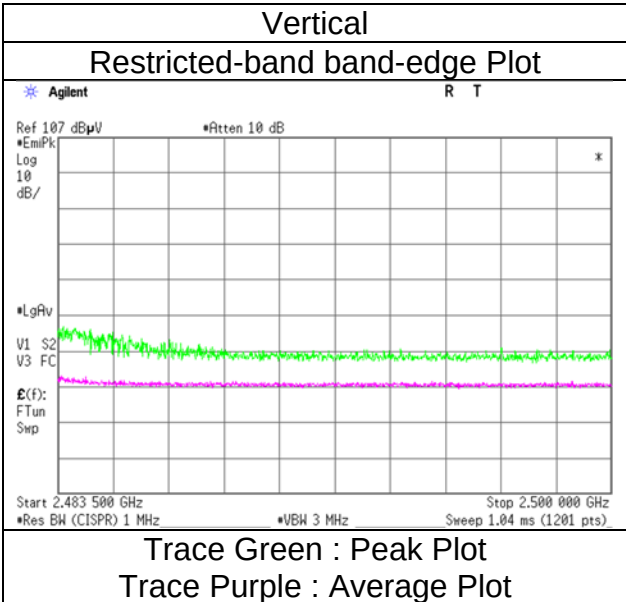
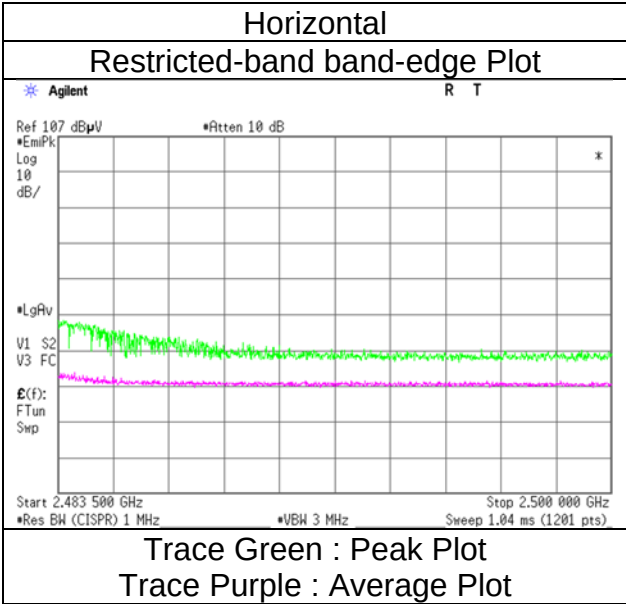
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer

Mode

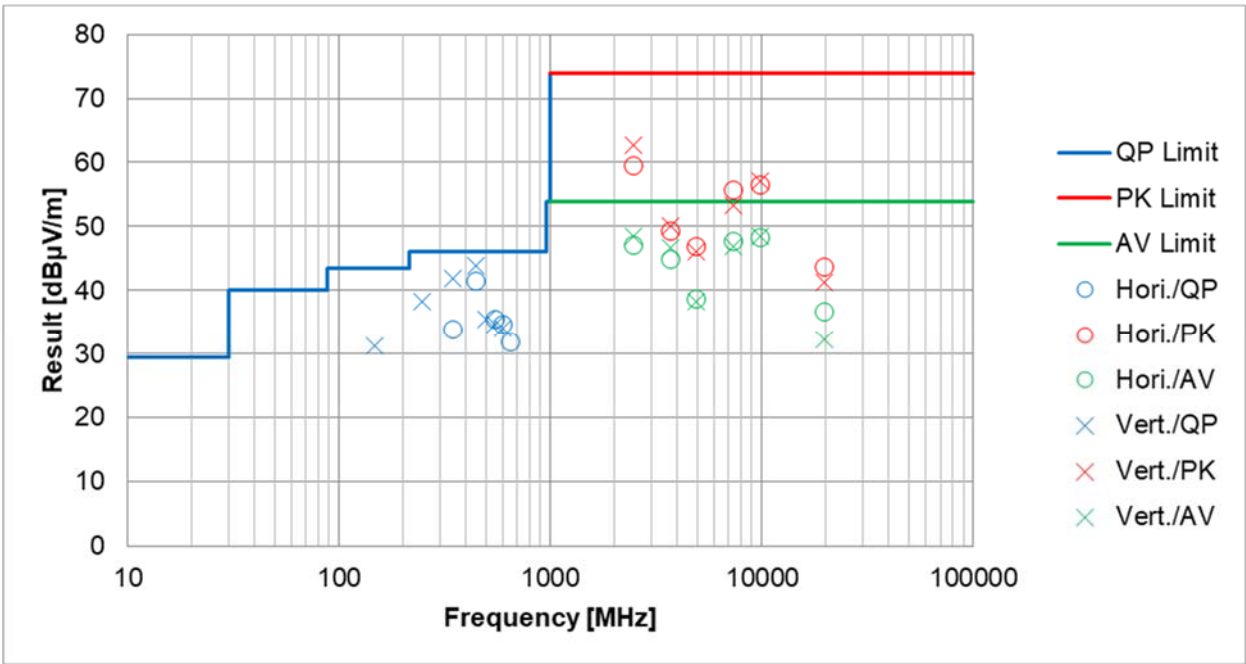
Shonan EMC Lab.
SAC3
August 25, 2023
23 deg.C, 37 %RH
Shiro Kobayashi
(1 GHz -10 GHz)
Tx BT LE 2480 MHz



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

Radiated Spurious Emission
(Plot data, Worst case mode for Maximum Peak Output Power)

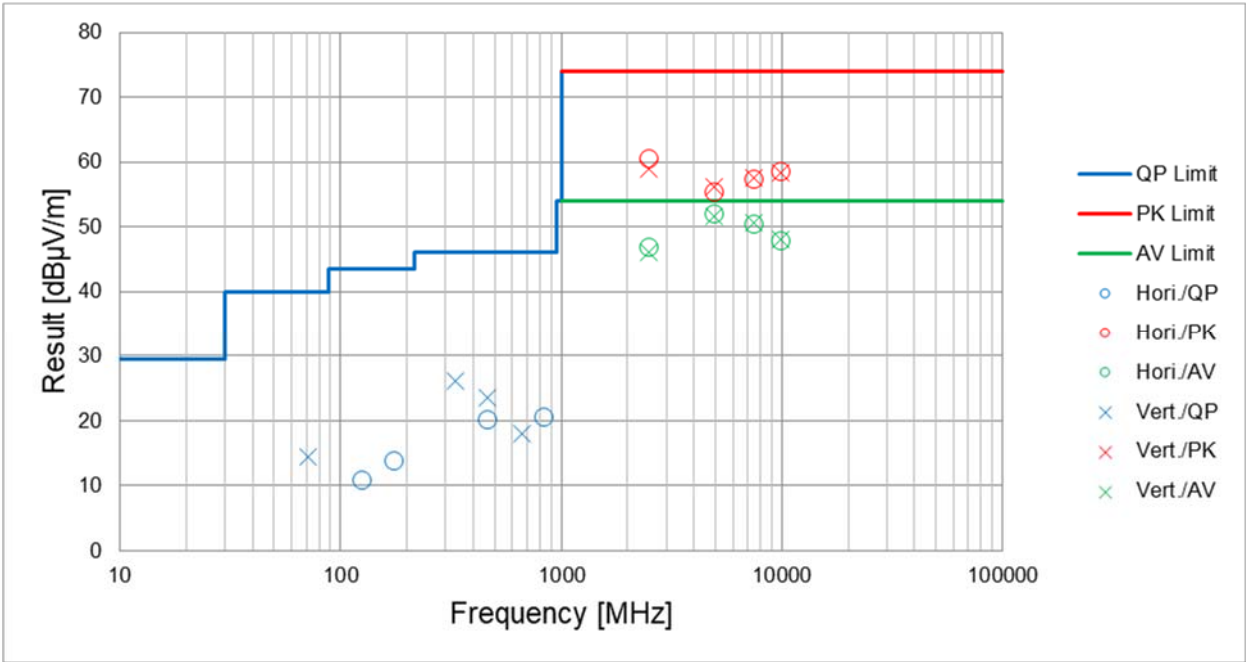
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	SAC3	SAC3	SAC3
Date	September 8, 2023	September 1, 2023	September 2, 2023
Temperature / Humidity	21 deg.C, 55 %RH	21 deg.C, 49 %RH	21 deg.C, 52 %RH
Engineer	Shiro Kobayashi (30 MHz -1 GHz, 18 GHz -26.5 GHz)	Shiro Kobayashi (1 GHz -10 GHz)	Miku Ikudome (10 GHz -18 GHz)
Mode	Tx 11n-20 2462 MHz		



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

Radiated Spurious Emission
(Plot data, Worst case mode for Maximum Peak Output Power)

Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	SAC2	SAC3	SAC3
Date	October 9, 2023	August 25, 2023	September 2, 2023
Temperature / Humidity	20 deg.C, 52 %RH	23 deg.C, 37 %RH	21 deg.C, 52 %RH
Engineer	Akihiro Oda (30 MHz -1 GHz)	Shiro Kobayashi (1 GHz -10 GHz)	Miku Ikudome (10 GHz -18 GHz)
Mode	(18 GHz – 26.5 GHz) Tx BT LE 2480 MHz		

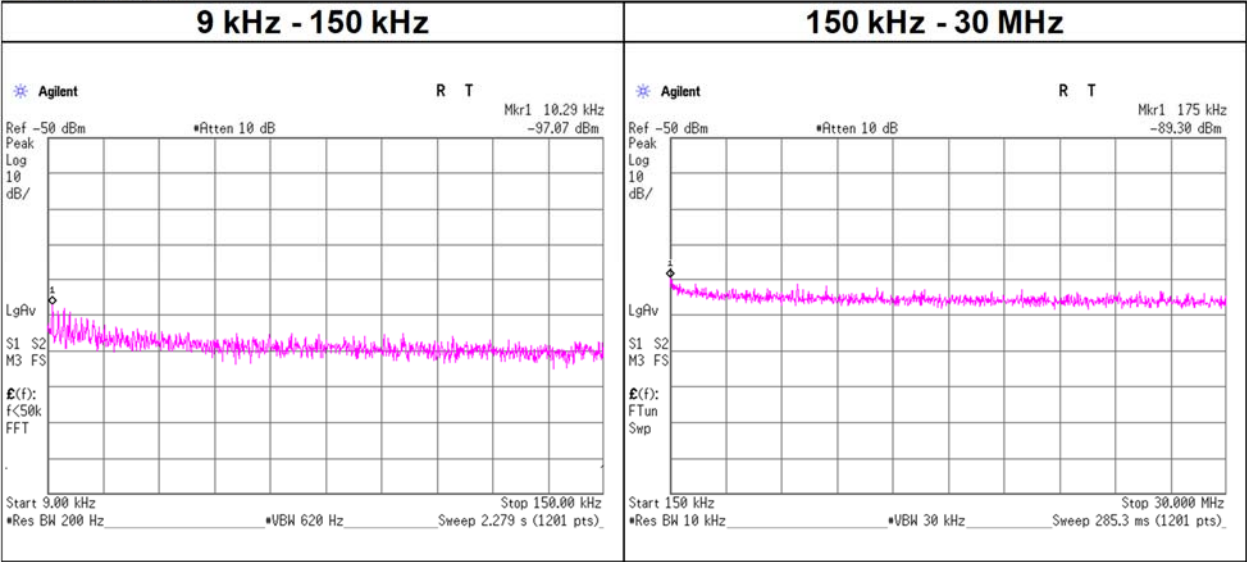


Conducted Spurious Emission

Test place
Date
Temperature / Humidity
Engineer
Mode

Shonan EMC Lab. No.5 Shielded Room
August 28, 2023
23 deg. C / 68 % RH
Hiromasa Sato
Tx 11n-20 2462 MHz

Tx, 2462 MHz



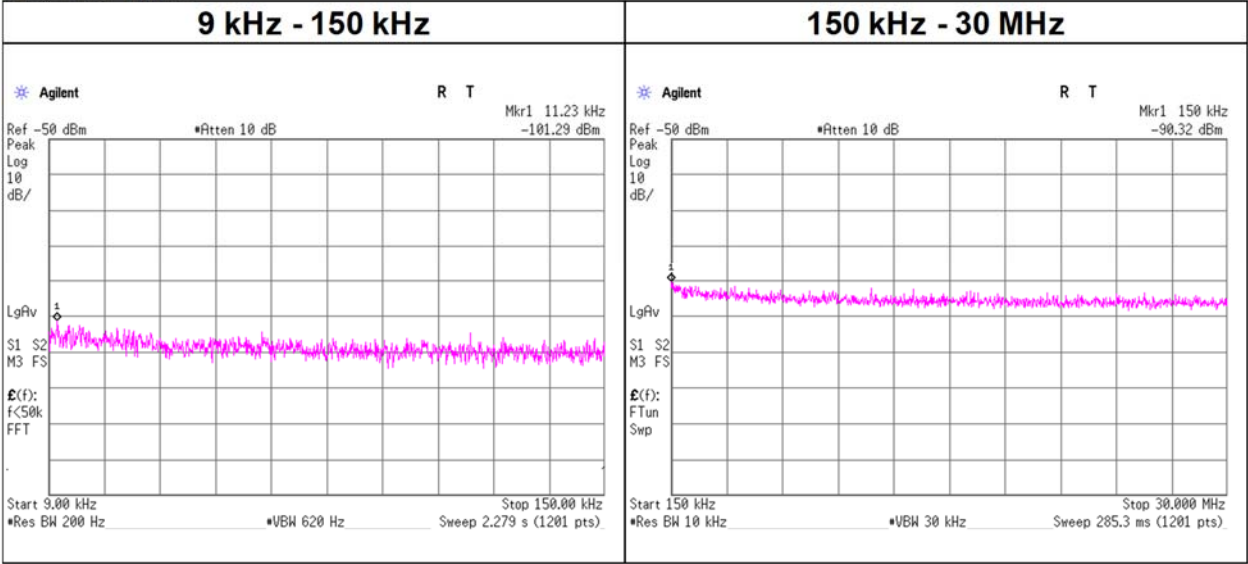
Frequency	Reading	Cable Loss	Attenuator Loss	Antenna Gain *	N (Number of Output)	EIRP	Distance	Ground bounce	E (field strength)	Limit	Margin	Remark
[kHz]	[dBm]	[dB]	[dB]	[dBi]		[dBm]	[m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
10.29	-97.1	0.5	20.2	2.0	1.0	-74.4	300	6.0	-13.1	47.3	60.4	-
175.00	-89.3	0.5	20.2	2.0	1.0	-66.6	300	6.0	-5.4	22.7	28.1	-

$E\text{ [dBuV/m]} = EIRP\text{ [dBm]} - 20\log(\text{Distance [m]}) + \text{Ground bounce [dB]} + 104.8\text{ [dBuV/m]}$
 $EIRP\text{[dBm]} = \text{Reading [dBm]} + \text{Cable loss [dB]} + \text{Attenuator Loss [dB]} + \text{Antenna gain [dBi]} + 10 * \log(N)$
N: Number of output
*2.0 dBi was applied to the test result based on ANSI C63.10 since antenna gain was less than 2.0 dBi.

Conducted Spurious Emission

Test place Shonan EMC Lab. No.5 Shielded Room
Date August 29, 2023
Temperature / Humidity 23 deg. C / 47 % RH
Engineer Shiro Kobayashi
Mode Tx BT LE 2402 MHz

Tx, 2402 MHz



Frequency	Reading	Cable Loss	Attenuator Loss	Antenna Gain *	N	EIRP	Distance	Ground bounce	E	Limit	Margin	Remark
[kHz]	[dBm]	[dB]	[dB]	[dBi]	(Number of Output)	[dBm]	[m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
11.23	-101.3	0.5	10.1	2.0	1.0	-88.7	300	6.0	-27.4	46.5	73.9	-
150.00	-90.3	0.5	10.1	2.0	1.0	-77.7	300	6.0	-16.5	24.0	40.5	-

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

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

N: Number of output

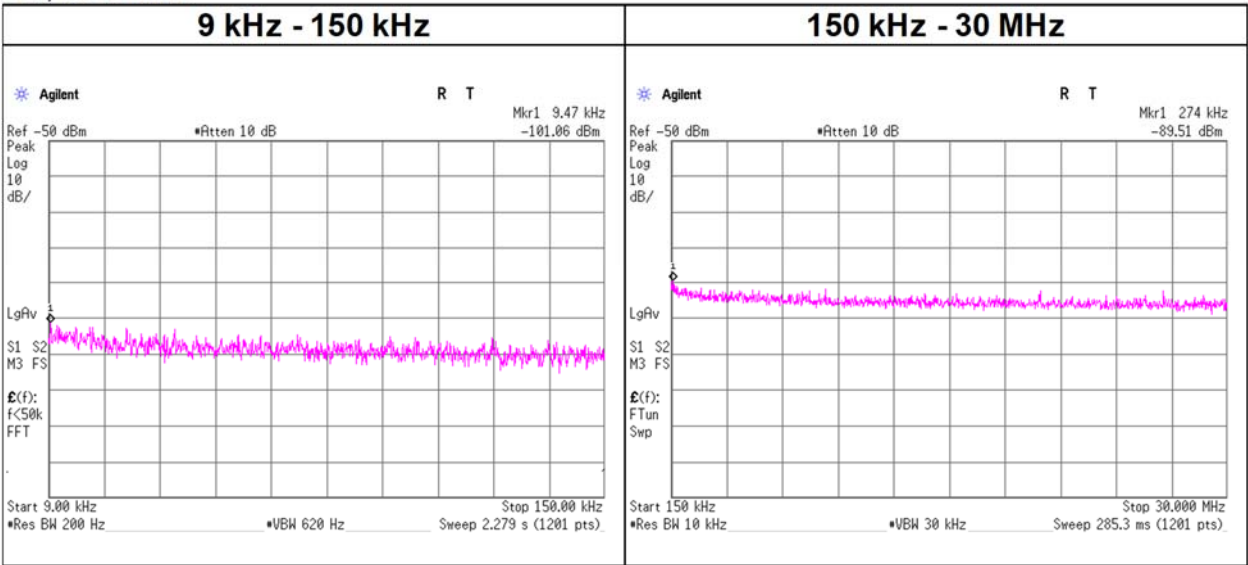
*2.0 dBi was applied to the test result based on ANSI C63.10 since antenna gain was less than 2.0 dBi.

Conducted Spurious Emission

Test place
Date
Temperature / Humidity
Engineer
Mode

Shonan EMC Lab. No.5 Shielded Room
August 29, 2023
23 deg. C / 47 % RH
Shiro Kobayashi
Tx BT LE 2440 MHz

Tx, 2440 MHz



Frequency	Reading	Cable Loss	Attenuator Loss	Antenna Gain *	N (Number of Output)	EIRP	Distance	Ground bounce	E (field strength)	Limit	Margin	Remark
[kHz]	[dBm]	[dB]	[dB]	[dBi]		[dBm]	[m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
9.47	-101.1	0.5	10.1	2.0	1.0	-88.5	300	6.0	-27.2	48.0	75.2	-
150.00	-89.5	0.5	10.1	2.0	1.0	-76.9	300	6.0	-15.7	24.0	39.7	-

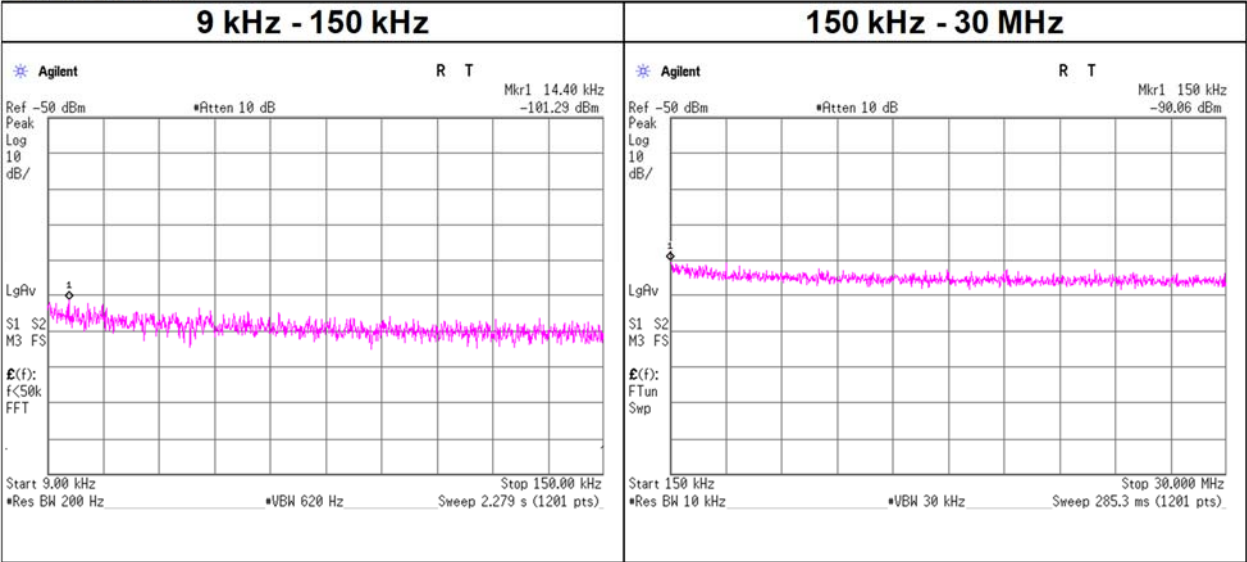
$E \text{ [dBuV/m]} = \text{EIRP [dBm]} - 20 \log (\text{Distance [m]}) + \text{Ground bounce [dB]} + 104.8 \text{ [dBuV/m]}$
 $\text{EIRP [dBm]} = \text{Reading [dBm]} + \text{Cable loss [dB]} + \text{Attenuator Loss [dB]} + \text{Antenna gain [dBi]} + 10 * \log (N)$
N: Number of output
*2.0 dBi was applied to the test result based on ANSI C63.10 since antenna gain was less than 2.0 dBi.

Conducted Spurious Emission

Test place
Date
Temperature / Humidity
Engineer
Mode

Shonan EMC Lab. No.5 Shielded Room
August 29, 2023
23 deg. C / 47 % RH
Shiro Kobayashi
Tx BT LE 2480 MHz

Tx, 2480 MHz



Frequency	Reading	Cable Loss	Attenuator Loss	Antenna Gain *	N (Number of Output)	EIRP	Distance	Ground bounce	E (field strength)	Limit	Margin	Remark
[kHz]	[dBm]	[dB]	[dB]	[dBi]		[dBm]	[m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
14.40	-101.3	0.5	10.1	2.0	1.0	-88.7	300	6.0	-27.4	44.4	71.8	-
150.00	-90.1	0.5	10.1	2.0	1.0	-77.5	300	6.0	-16.2	24.0	40.2	-

$E \text{ [dBuV/m]} = EIRP \text{ [dBm]} - 20 \log (\text{Distance [m]}) + \text{Ground bounce [dB]} + 104.8 \text{ [dBuV/m]}$
 $EIRP \text{ [dBm]} = \text{Reading [dBm]} + \text{Cable loss [dB]} + \text{Attenuator Loss [dB]} + \text{Antenna gain [dBi]} + 10 * \log (N)$
N: Number of output
*2.0 dBi was applied to the test result based on ANSI C63.10 since antenna gain was less than 2.0 dBi.

Power Density

Test place	Shonan EMC Lab. No.5 Shielded Room	
Date	August 28, 2023	August 29, 2023
Temperature / Humidity	25 deg. C / 33 % RH	23 deg. C / 47 % RH
Engineer	Hiomasa Sato	Shiro Kobayashi
Mode	Tx	

11b

Frequency [MHz]	Measured Frequency [MHz]	Reading [dBm/3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm/3 kHz]	Limit [dBm/3 kHz]	Margin [dB]
2412	2411.470	-30.97	1.29	20.27	-9.41	8.00	17.41
2437	2436.806	-31.79	1.29	20.27	-10.23	8.00	18.23
2462	2462.699	-32.86	1.30	20.27	-11.29	8.00	19.29

11g

Frequency [MHz]	Measured Frequency [MHz]	Reading [dBm/3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm/3 kHz]	Limit [dBm/3 kHz]	Margin [dB]
2412	2410.430	-33.49	1.29	20.27	-11.93	8.00	19.93
2437	2435.373	-34.82	1.29	20.27	-13.26	8.00	21.26
2462	2460.089	-33.16	1.30	20.27	-11.59	8.00	19.59

11n-20 (SISO)

Frequency [MHz]	Measured Frequency [MHz]	Reading [dBm/3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm/3 kHz]	Limit [dBm/3 kHz]	Margin [dB]
2412	2411.054	-34.61	1.29	20.27	-13.05	8.00	21.05
2437	2441.086	-35.80	1.29	20.27	-14.24	8.00	22.24
2462	2460.846	-35.03	1.30	20.27	-13.46	8.00	21.46

BT LE 1M-PHY

Frequency [MHz]	Measured Frequency [MHz]	Reading [dBm/3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm/3 kHz]	Limit [dBm/3 kHz]	Margin [dB]
2402	2401.988	-18.54	1.29	10.18	-7.07	8.00	15.07
2440	2439.993	-18.41	1.30	10.18	-6.93	8.00	14.93
2480	2479.997	-18.30	1.30	10.18	-6.82	8.00	14.82

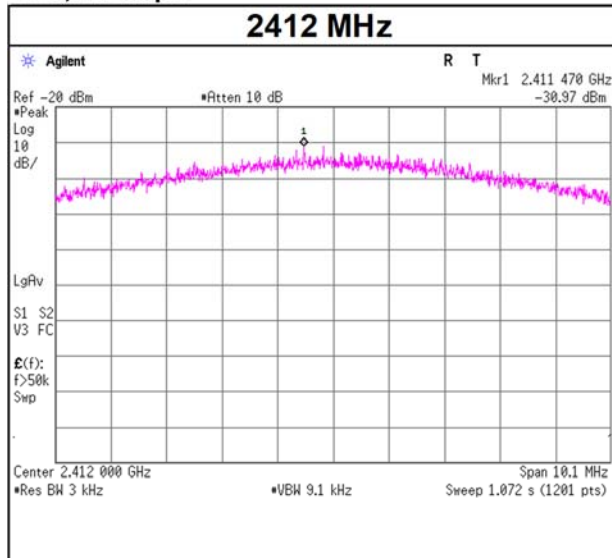
Sample Calculation:

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

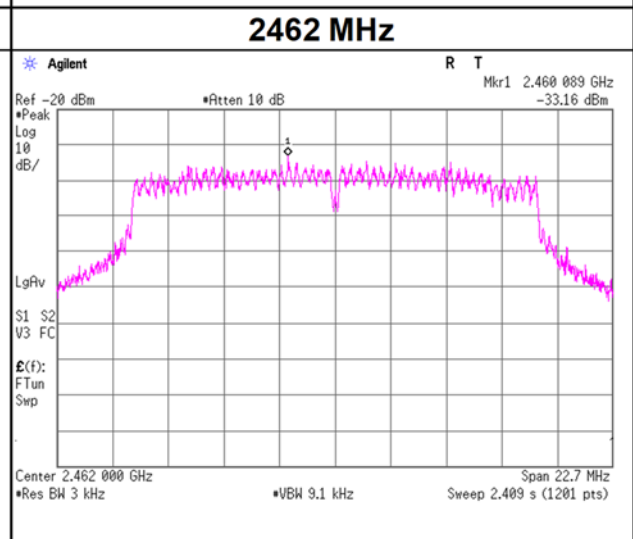
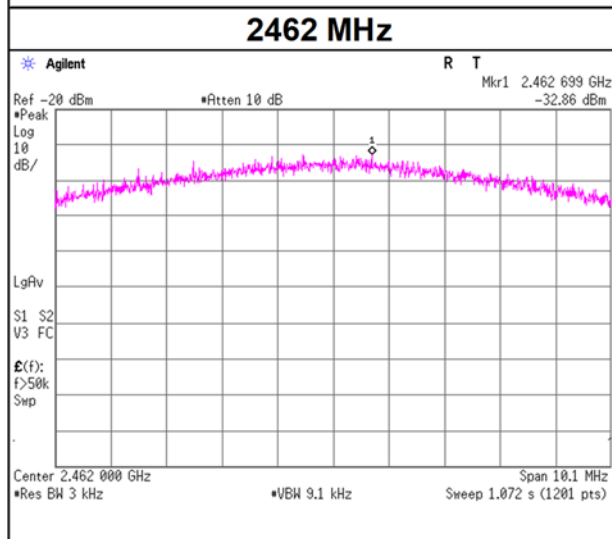
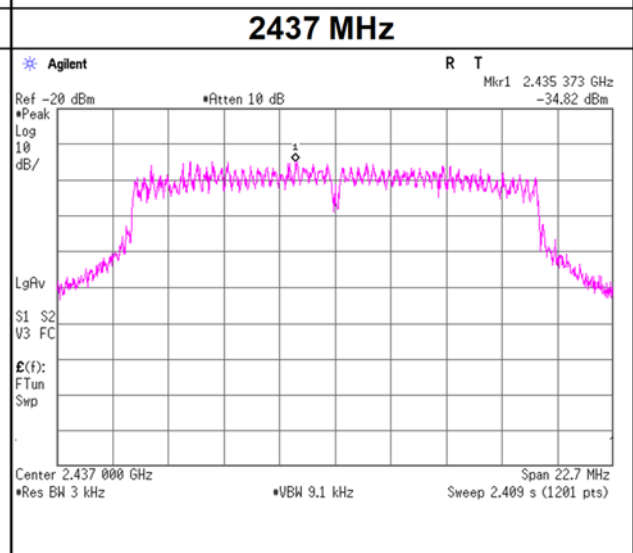
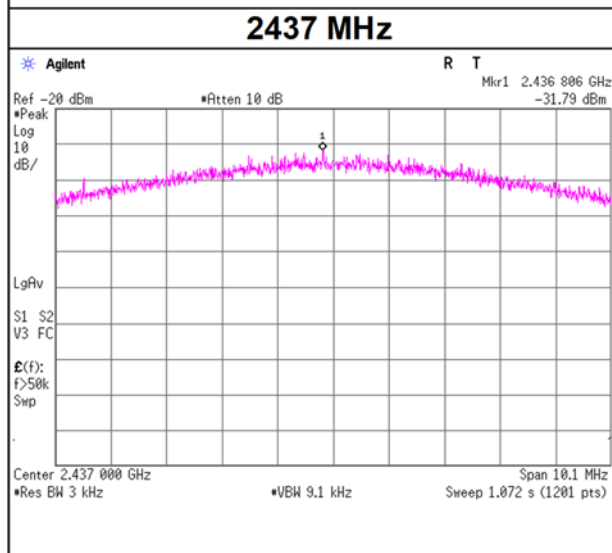
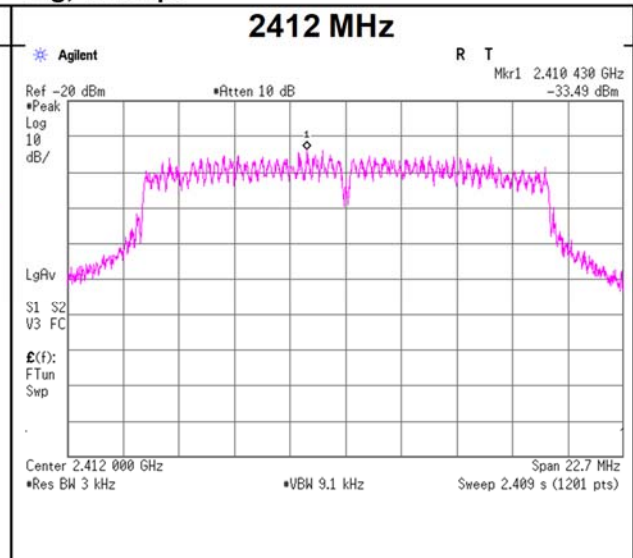
*The equipment and cables were not used for factor 0 dB of the data sheets.

Power Density

11b, 11 Mbps



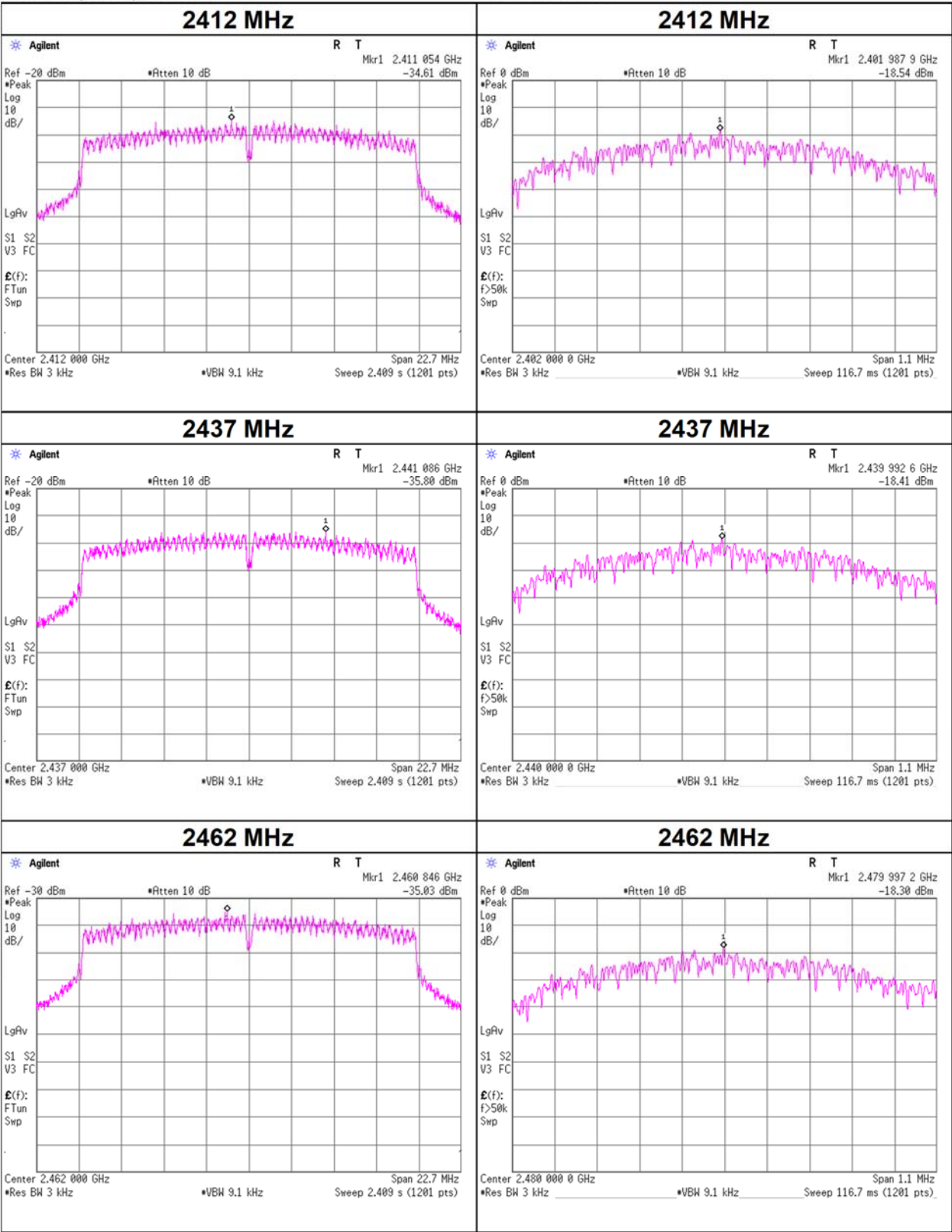
11g, 12 Mbps



Power Density

11n-20 (SISO), MCS 2

BT LE 1M-PHY



APPENDIX 2: Test Instruments

Test Equipment [1/2]

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
AT	SAT10-15	160493	Attenuator	Weinschel Corp.	54A-10	83406	2022/12/01	12
AT	SAT20-07	145155	Attenuator	Weinschel Corp.	54A-20	31484	2023/04/05	12
AT	SCC-G12	145040	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	2023/03/02	12
AT	SOS-27	191845	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	-	2023/08/07	12
AT	SPM-13	169910	Power Meter	Keysight Technologies Inc	8990B	MY51000448	2023/09/28	12
AT	SPSS-06	169911	Power sensor	Keysight Technologies Inc	N1923A	MY57270004	2023/09/28	12
AT	STS-05	146212	Digital Hitester	HIOKI E.E. CORPORATION	3805-50	80997828	2023/09/25	12
AT, RE	SSA-02	145800	Spectrum Analyzer	Agilent	E4448A	MY48250106	2023/03/01	12
CE	KAT3-12	144896	Attenuator	JFW IND. INC.	50HF-003N	-	2023/07/11	12
CE	SAT3-10	144960	Attenuator	JFW	50HF-003N	-	2023/08/22	12
CE	SCC-B12/B13/SRSE-02	144969	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4906	-/0901-270(RF Selector)	2023/04/18	12
CE	SCC-C9/C10/SRSE-03	145036	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4906	-/0901-271(RF Selector)	2023/04/18	12
CE	SLS-04	145541	LISN	Rohde & Schwarz	ENV216	100514	2023/02/21	12
CE	SLS-05	145542	LISN	Rohde & Schwarz	ENV216	100516	2023/02/21	12
CE	SOS-06	146294	Humidity Indicator	A&D Company	AD-5681	4062118	-	-
CE	SOS-22	191839	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	-	2023/08/01	12
CE	STM-05	145762	Terminator	TME	CT-01 BP	-	2022/12/16	12
CE,RE	COTS-SEMI-5	170932	EMI Software	TSJ (Techno Science Japan)	TEPTO-DV3(RE,CE,ME, PE)	-	-	-
CE,RE	KJM-02	146432	Tape Measure	TAJIMA	GL19-55	-	-	-
CE,RE	SJM-20	207277	Measuring	ASKUL	-	-	-	-
CE,RE	STR-08	150463	Test Receiver	Rohde & Schwarz	ESW44	101581	2023/08/25	12
CE,RE	STR-09	213530	Test Receiver	Rohde & Schwarz	ESW44	103068	2023/01/12	12
CE,RE	STS-02	145793	Digital Hitester	HIOKI E.E. CORPORATION	3805-50	80997819	2023/05/26	12
CE,RE	STS-03	146210	Digital Hitester	HIOKI E.E. CORPORATION	3805-50	80997823	2023/09/25	12
RE	SAEC-02(NSA)	145563	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	2023/03/28	12
RE	SAEC-02(SVSWR)	145598	Semi-Anechoic Chamber	TDK	SAEC-02(SVSWR)	2	2023/05/17	12
RE	SAEC-03(NSA)	145565	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	2023/04/05	12
RE	SAEC-03(SVSWR)	145566	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	2023/05/14	12
RE	SAF-02	145004	Pre Amplifier	SONOMA	310N	290212	2023/02/09	12
RE	SAF-03	145126	Pre Amplifier	SONOMA	310N	290213	2023/02/09	12
RE	SAF-06	145005	Pre Amplifier	Toyo Corporation	TPA0118-36	1440491	2023/02/02	12
RE	SAF-08	145007	Pre Amplifier	Toyo Corporation	HAP18-26W	19	2023/03/03	12
RE	SAT10-06	145137	Attenuator	Keysight Technologies Inc	8493C-010	74865	2022/10/20	12
RE	SAT10-16	160494	Attenuator	Weinschel Corp.	54A-10	83420	2022/12/01	12
RE	SAT3-11	150921	Attenuator	JFW	50HF-003N	-	2023/02/09	12

Test Equipment [2/2]

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	SAT6-13	167094	Attenuator	JFW	50HF-006N	-	2023/02/09	12
RE	SAT6-14	167095	Attenuator	JFW	50HF-006N	-	2023/02/09	12
RE	SBA-02	145022	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	BBA9106	91032665	2023/04/12	12
RE	SBA-03	145023	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	BBA9106	91032666	2023/05/16	12
RE	SCC-B1/B3/B5/B7/B8/B13/SRSE-02	144975	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	2023/04/18	12
RE	SCC-B2/B4/B6/B7/B8/B13/SRSE-02	144976	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	2023/04/18	12
RE	SCC-C1/C2/C3/C4/C5/C10/SRSE-03	145171	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	2023/04/18	12
RE	SCC-G15	145176	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	2023/08/23	12
RE	SCC-G40	166491	Coaxial Cable	Junkosha	MWX221-01000NFSNMS/B	1612S005	2023/01/12	12
RE	SCC-G43	156380	Coaxial Cable	Huber+Suhner	SUCOFLEX_104_E	SN MY 13406/4E	2023/05/19	12
RE	SCC-G44	168300	Coaxial Cable	Huber+Suhner	SUCOFLEX 104	800375/4A	2022/11/10	12
RE	SCC-G57	179540	Coaxial Cable	Huber+Suhner	SUCOFLEX 102	802815/2	2023/03/03	12
RE	SCC-G70	200010	Coaxial Cable	Huber+Suhner	SUCOFLEX 104	575618/4	2023/06/06	12
RE	SFL-18	145305	Highpass Filter	Micro-Tronics	HPM50111	119	2023/03/02	12
RE	SHA-03	145501	Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	9120D-739	2023/03/27	12
RE	SHA-04	145512	Horn Antenna	ETS-Lindgren	3160-09	00094868	2023/06/12	12
RE	SHA-10	194685	Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA 9120 C	711	2023/03/27	12
RE	SLA-06	145528	Logperiodic Antenna	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	195	2023/04/12	12
RE	SLA-07	145529	Logperiodic Antenna	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	196	2023/05/16	12
RE	SOS-21	191838	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	-	2023/08/03	12
RE	SOS-23	191840	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	-	2023/08/03	12
RE	SRENT-15	160899	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46185516	2022/12/09	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:

AT: Antenna Terminal Conducted test

CE: Conducted Emission

RE: Radiated Emission