

RADIO TEST REPORT

Test Report No. 15148509H-B-R1

Customer	Sony Interactive Entertainment Inc.
Description of EUT	Wireless communication module
Model Number of EUT	J20H106
FCC ID	AK8M23TFU1
Test Regulation	FCC Part 15 Subpart C
Test Result	Complied
Issue Date	March 27, 2024
Remarks	Bluetooth (BR / EDR) parts

Representative Test EngineerTakeshi Hiyaji
Engineer**Approved By**Takayuki Shimada
Leader

CERTIFICATE 5107.02

- ☐ 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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- For test report(s) referred in this report, the latest version (including any revisions) is always referred.

REVISION HISTORY

Original Test Report No.: 15148509H-B

This report is a revised version of 15148509H-B. 15148509H-B is replaced with this report.

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	15148509H-B	February 29, 2024	-
1	15148509H-B-R1	March 27, 2024	<u>APPENDIX 3 Worst case Position</u> - Corrected Worst case Position (BT1): Antenna 4 → Antenna 3 <u>APPENDIX 4</u> - Corrected information for Item E and Cable No.5 in the tables of Conducted Emission and Radiated Spurious Emission

Reference: Abbreviations (Including words undescribed in this report)

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

CONTENTS	PAGE
SECTION 1: Customer Information	5
SECTION 2: Equipment Under Test (EUT).....	5
SECTION 3: Test Specification, Procedures & Results	8
SECTION 4: Operation of EUT during testing	11
SECTION 5: Conducted Emission.....	13
SECTION 6: Radiated Spurious Emission.....	14
SECTION 7: Antenna Terminal Conducted Tests	16
APPENDIX 1: Test data	17
Conducted Emission	17
20dB Bandwidth, 99%Occupied Bandwidth and Carrier Frequency Separation	19
Number of Hopping Frequency	25
Dwell time	28
Maximum Peak Output Power	33
Average Output Power.....	34
Radiated Spurious Emission.....	37
Conducted Spurious Emission.....	60
Conducted Emission Band Edge compliance	72
APPENDIX 2: Test Instruments	76
APPENDIX 3: Photographs of test setup.....	78
Conducted Emission	78
Radiated Spurious Emission.....	79
Worst Case Position	81
Antenna Terminal Conducted Tests	82
APPENDIX 4: Configuration and Peripherals.....	83

SECTION 1: Customer Information

Company Name	Sony Interactive Entertainment Inc.
Brand Name	SONY
Address	1-7-1 Konan, Minato-ku, Tokyo, 108-0075 Japan
Telephone Number	+81-50-3807-5639
Contact Person	Miho Nakamura

The information provided by 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

SECTION 2: Equipment Under Test (EUT)

2.1 Identification of EUT

Description	Wireless communication module
Model Number	J20H106
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	January 22, 2024
Test Date	January 23 to February 25, 2024

2.2 Product Description

General Specification

Rating	DC 3.3 V
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Radio Specification

This report contains data provided by the customer which can impact the validity of results. UL Japan, Inc. is only responsible for the validity of results after the integration of the data provided by the customer. The data provided by the customer is marked "a)" in the table below.

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

Equipment Type	Transceiver	
Frequency of Operation	2412 MHz to 2462 MHz	
Type of Modulation	DSSS, OFDM	
	OFDMA	20 MHz: 26/52/106/242-tone RU
Antenna Type	PIFA	
Antenna Gain	Antenna 1: 4.0 dBi	
	Antenna 2: 4.0 dBi	
Directional Gain *1)	7.01 dBi	

WLAN (IEEE802.11a/11n-20/11ac-20/11ax-20/11be-20/11n-40/11ac-40/11ax-40/11be-40/11ac-80/11ax-80/11be-80/11ac-160/11ax-160/11be-160)

Equipment Type	Transceiver	
Frequency of Operation	20 MHz Band:	5180 MHz to 5240 MHz 5260 MHz to 5320 MHz 5500 MHz to 5720 MHz 5745 MHz to 5825 MHz
	40 MHz Band:	5190 MHz to 5230 MHz 5270 MHz to 5310 MHz 5510 MHz to 5710 MHz 5755 MHz to 5795 MHz
	80 MHz Band:	5210 MHz 5290 MHz 5530 MHz to 5690 MHz 5775 MHz
	160 MHz Band:	5250 MHz 5570 MHz
Type of Modulation	OFDM	
	OFDMA	20 MHz: 26/52/106/242-tone RU
		40 MHz: 26/52/106/242/484-tone RU
		80 MHz: 26/52/106/242/484/996-tone RU
Antenna Type	PIFA	IFA
	Antenna 1: 5.5 dBi	Antenna 3: 5.0 dBi
Directional Gain *1)	8.26 dBi	

WLAN (IEEE802.11ax-20/11be-20/11ax-40/11be-40/11ax-80/11be-80/11ax-160/11be-160)

Equipment Type	Transceiver	
Frequency of Operation	20 MHz Band:	5955 MHz to 7095 MHz
	40 MHz Band:	5965 MHz to 7085 MHz
	80 MHz Band:	5985 MHz to 7025 MHz
	160 MHz Band:	6025 MHz to 6985 MHz
Type of Modulation	OFDM	
	OFDMA	20 MHz: 26/52/106/242-tone RU
		40 MHz: 26/52/106/242/484-tone RU
		80 MHz: 26/52/106/242/484/996-tone RU
Antenna Type	PIFA	IFA
	Antenna 1: 6.5 dBi	Antenna 3: 6.8 dBi
Directional Gain *1)	9.66 dBi	

* Preamble puncturing options are not supported.

BT1: Bluetooth (BR / EDR / Low Energy)

Equipment Type	Transceiver
Frequency of Operation	2402 MHz to 2480 MHz
Type of Modulation	BT: FHSS (GFSK, $\pi/4$ DQPSK, 8DPSK) BT LE: GFSK
Antenna Type	IFA
Antenna Gain ^{a)}	Antenna 3: 4.0 dBi

BT2: Bluetooth (BR / EDR / Low Energy)

Equipment Type	Transceiver
Frequency of Operation	2402 MHz to 2480 MHz
Type of Modulation	BT: FHSS (GFSK, $\pi/4$ DQPSK, 8DPSK) BT LE: GFSK
Antenna Type	IFA
Antenna Gain ^{a)}	Antenna 4: 3.5 dBi

*1) Directional antenna gain = $10 \log \left(\left(10^{\frac{Gain(Ant1)}{20}} + 10^{\frac{Gain(Ant2 \text{ or } Ant3)}{20}} \right)^2 / 2 \right)$

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	35.24 dB 0.15000 MHz, QP, N	Complied	-
Carrier Frequency Separation	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section15.247(a)(1) ISED: RSS-247 5.1 (b)	See data.	Complied	Conducted
20dB Bandwidth	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section15.247(a)(1) ISED: RSS-247 5.1 (a)		Complied	Conducted
Number of Hopping Frequency	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section15.247(a)(1)(iii) ISED: RSS-247 5.1 (d)		Complied	Conducted
Dwell time	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section15.247(a)(1)(iii) ISED: RSS-247 5.1 (d)		Complied	Conducted
Maximum Peak Output Power	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: RSS-Gen 6.12	FCC: Section15.247(b)(1) ISED: RSS-247 5.4 (b)		Complied	Conducted
Spurious Emission & Band Edge Compliance	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: RSS-Gen 6.13	FCC: Section15.247(d) ISED: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	12.5 dB 4882.0 MHz, AV, Vertical	Complied	Conducted/ 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).					

FCC Part 15.31 (e)

The stable voltage will be supplied by the end product, which will be required to have a power supply regulator. Therefore, the EUT complies with the requirement.

FCC Part 15.203/212 Antenna requirement

[Antenna 1 and 2] The EUT has unique coupling/antenna connector (U.FL).

[Antenna 3 and 4] The antenna is not removable from the EUT.

Therefore, the equipment complies with the antenna requirement of Section 15.203/212.

3.3 Addition to Standard

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

Conducted emission

Item	Frequency range	Unit	Calculated Uncertainty (+/-)
AMN (LISN)	0.009 MHz to 0.15 MHz	dB	3.7
	0.15 MHz to 30 MHz	dB	3.3

Radiated emission

Measurement distance	Frequency range		Unit	Calculated Uncertainty (+/-)
3 m	9 kHz to 30 MHz		dB	3.3
10 m			dB	3.1
3 m	30 MHz to 200 MHz	Horizontal	dB	4.8
		Vertical	dB	5.0
	200 MHz to 1000 MHz	Horizontal	dB	5.1
		Vertical	dB	6.2
10 m	30 MHz to 200 MHz	Horizontal	dB	4.8
		Vertical	dB	4.8
	200 MHz to 1000 MHz	Horizontal	dB	4.9
		Vertical	dB	5.0
3 m	1 GHz to 6 GHz	Test Receiver	dB	5.1
		Spectrum Analyzer	dB	4.9
	6 GHz to 18 GHz	Test Receiver	dB	5.4
		Spectrum Analyzer	dB	5.2
1 m	10 GHz to 18 GHz	Spectrum analyzer	dB	5.0
	18 GHz to 26.5 GHz	Spectrum analyzer	dB	5.6
	26.5 GHz to 40 GHz	Spectrum analyzer	dB	4.9
0.5 m	26.5 GHz to 40 GHz	Spectrum analyzer	dB	4.9
10 m	1 GHz to 18 GHz	Test Receiver	dB	5.4

Antenna Terminal Conducted

Item	Unit	Calculated Uncertainty (+/-)
Antenna terminated conducted emission / Power density / Burst power	dB	3.47
Adjacent channel power (ACP)	dB	2.28
Bandwidth (OBW)	%	0.96
Time readout (time span upto 100 msec)	%	0.11
Time readout (time span upto 1000 msec)	%	0.11
Time readout (time span upto 60 sec)	%	0.02
Power measurement (Power meter < 8 GHz)	dB	1.46
Power measurement (Call box < 6 GHz)	dB	1.69
Frequency readout (Frequency counter)	ppm	0.67
Frequency readout (Spectrum analyzer frequency readout function)	ppm	2.13
Temperature (constant temperature bath)	deg. C	0.69
Humidity (constant temperature bath)	%RH	2.98
Modulation characteristics	%	6.93
Frequency for mobile	ppm	0.08
Contention-based protocol	dB	2.26

3.5 Test Location

UL Japan, Inc. Ise EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 Japan

Telephone: +81-596-24-8999

A2LA Certificate Number: 5107.02 / FCC Test Firm Registration Number: 884919

ISED Lab Company Number: 2973C / CAB identifier: JP0002

Test site	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms	Maximum measurement distance
No.1 semi-anechoic chamber	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room	10 m
No.2 semi-anechoic chamber	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room	3 m
No.3 shielded room	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room	3 m
No.4 shielded room	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.5 measurement room	6.4 x 6.4 x 3.0	6.4 x 6.4	-	-
No.6 shielded room	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room	3.1 x 5.0 x 2.7	3.1 x 5.0	-	-
No.9 measurement room	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.10 shielded room	3.8 x 2.8 x 2.8	3.8 x 2.8	-	-
No.11 measurement room	4.0 x 3.4 x 2.5	N/A	-	-
No.12 measurement room	2.6 x 3.4 x 2.5	N/A	-	-
Large Chamber	16.9 x 22.1 x 10.17	16.9 x 22.1	-	10 m
Small Chamber	5.3 x 6.69 x 3.59	5.3 x 6.69	-	-

* Size of vertical conducting plane (for Conducted Emission test): 2.0 x 2.0 m for No.1, No.2, No.3, No.4, and No.5 semi-anechoic chambers and No.3 and No.4 shielded rooms.

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*
Bluetooth (BT)	BR / EDR, Payload: PRBS9
*EUT has the power settings by the software as follows; Power Setting: 2 dBm Software: MT_TEST_Tool Version: R1.01 (Date: January 22, 2024 / 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.	

Details of Operating Mode(s)

Test Item	Mode	Hopping	Tested Antenna	Tested Frequency
Conducted Emission, Radiated Spurious Emission (Below 1 GHz)	Tx 3DH5 *1)	Off	Antenna 3 (BT1)	2480 MHz
			Antenna 4 (BT2)	2402 MHz
Radiated Spurious Emission (Above 1 GHz), Conducted Spurious Emission	Tx DH5 Tx 3DH5	Off	Antenna 3 (BT1)	2402 MHz
			Antenna 4 (BT2)	2441 MHz 2480 MHz
Carrier Frequency Separation	Tx DH5 Tx 3DH5	On	Antenna 3 (BT1)	2402 MHz
			Antenna 4 (BT2)	2441 MHz 2480 MHz
20dB Bandwidth	Tx DH5 Tx 3DH5	Off	Antenna 3 (BT1)	2402 MHz
			Antenna 4 (BT2)	2441 MHz 2480 MHz
Number of Hopping Frequency	Tx DH5 Tx 3DH5	On	Antenna 3 (BT1)	-
			Antenna 4 (BT2)	-
Dwell time	Tx DH1, DH3, DH5 Tx 3DH1, 3DH3, 3DH5	On	Antenna 3 (BT1)	-
			Antenna 4 (BT2)	-
Maximum Peak Output Power	Tx DH5 Tx 2DH5 Tx 3DH5	Off	Antenna 3 (BT1)	2402 MHz
			Antenna 4 (BT2)	2441 MHz 2480 MHz
Band Edge Compliance (Conducted)	Tx DH5 Tx 3DH5	On	Antenna 3 (BT1)	2402 MHz
		Off	Antenna 4 (BT2)	2480 MHz
99% Occupied Bandwidth	Tx DH5 Tx 3DH5	On	Antenna 3 (BT1)	2402 MHz
		Off	Antenna 4 (BT2)	2441 MHz 2480 MHz

*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload length (except Dwell time test)

*2DH mode (2Mb/s EDR: pi/4DQPSK) was excluded for other tests than power measurement by using 3DH mode (3 Mb/s EDR: 8DPSK) as a representative.

*It is considered that the non-tested packet type (e.g. inquiry) can be omitted as it is complied with above all the test items based on Bluetooth Core specification.

*1) 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.

Simultaneous transmission

(Only Antenna 3 simultaneously transmits BT1 and WLAN 5 GHz on a signal antenna.)

Test Item	Mode *1)	Antenna type
Radiated Spurious Emission	Tx DH5 2402 MHz + 11be-80 [OFDM] 5775 MHz	Antenna 3 (BT1)
*1) The test was conducted on representative mode, the worst mode of GHz band at Spurious emission test for BT1 and the mode had the highest power at Antenna terminal conducted test for WLAN 5 GHz band and 6 GHz band.		

4.2 Configuration and Peripherals

This clause has been submitted for separate exhibit (refer to APPENDIX 4).

SECTION 5: Conducted Emission

Test Procedure and Conditions

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane.

The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT, including peripherals was aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80 cm 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.

For the tests on EUT with other peripherals (as a whole system)

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

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber.

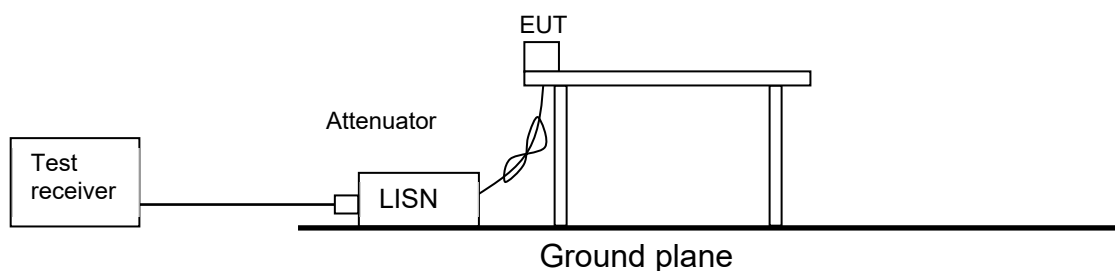
The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

Test results are rounded off and limit are rounded down, 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

[For below 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 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. 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,

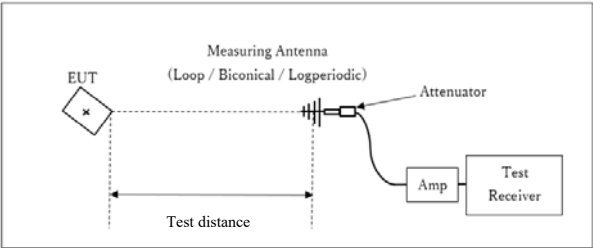
the radio frequency power that is produced by the intentional radiator confirmed 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

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	RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: 100 traces Duty factor was added to the results.	RBW: 100 kHz VBW: 300 kHz

Figure 2: Test Setup

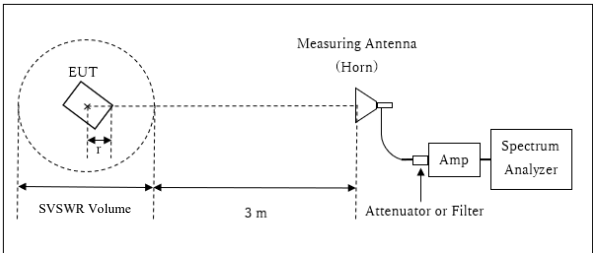
Below 1 GHz



x : Center of turn table

Test Distance: 3 m

1 GHz to 10 GHz

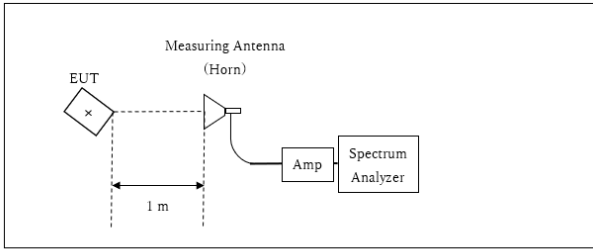


r : Radius of an outer periphery of EUT
x : Center of turn table

Distance Factor: $20 \times \log (3.75 \text{ m} / 3.0 \text{ m}) = 1.94 \text{ dB}$
Test Distance: $(3 + \text{SVSWR Volume} / 2) - r = 3.75 \text{ m}$
SVSWR Volume : 1.5 m

$r = 0.0 \text{ m}$
* 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



x : Center of turn table

Distance Factor: $20 \times \log (1.0 \text{ m} / 3.0 \text{ m}) = -9.5 \text{ dB}$
*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.

Test results are rounded off and limit are rounded down, 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
20dB Bandwidth	3 MHz	30 kHz	100 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: 50MHz BW)
Carrier Frequency Separation	3 MHz	30 kHz	100 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Number of Hopping Frequency	30 MHz	200 kHz	620 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Dwell Time	Zero Span	100 kHz, 1 MHz	300 kHz, 3 MHz	As necessary capture the entire dwell time per hopping channel	Peak	Clear Write	Spectrum Analyzer
Conducted Spurious Emission *3) *4)	9 kHz to 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz to 30 MHz	10 kHz	30 kHz				
	30 MHz to 25 GHz	100 kHz	300 kHz				
Conducted Spurious Emission Band Edge compliance	10 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer

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

*2) Reference data

*3) 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).

*4) 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.

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

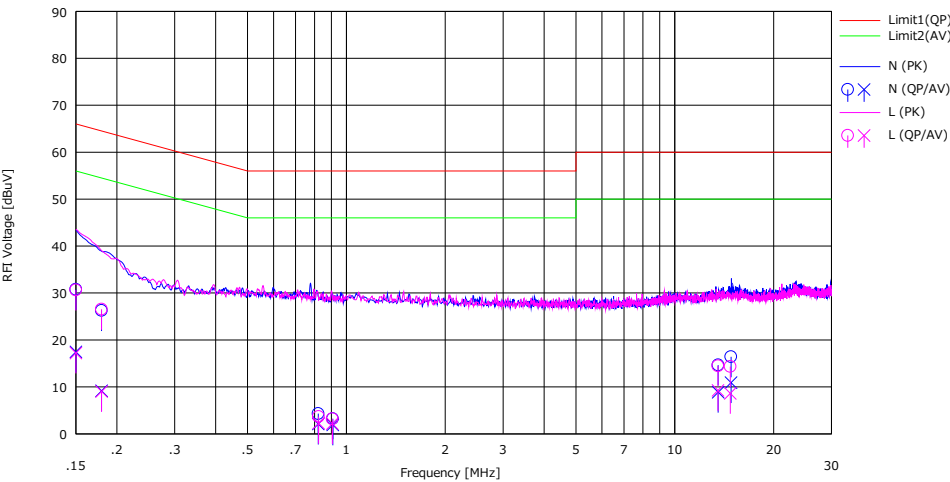
Test Data : APPENDIX
Test Result : Pass

APPENDIX 1: Test data

Conducted Emission
(BT1)

Test place Ise EMC Lab. No.2 Semi Anechoic Chamber
Date February 8, 2024
Temperature / Humidity 20 deg. C / 40 % RH
Engineer Ken Fujita
Mode Tx Hopping Off, 3DH5 2480 MHz

Limit : FCC_Part 15 Subpart C(15.207)



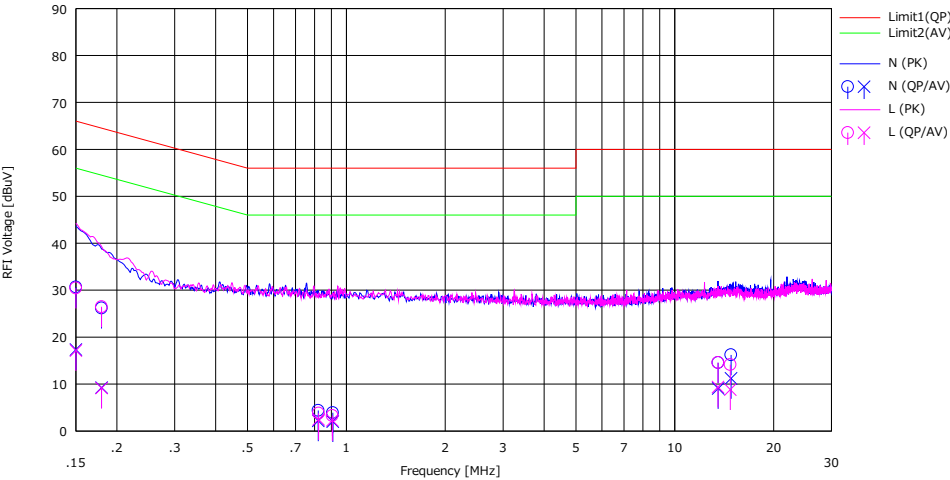
No.	Freq. [MHz]	Reading		USN [dB]	LOSS [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]			<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
		[dBuV]	[dBuV]			[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	17.60	4.30	0.06	13.10	30.76	17.46	66.00	56.00	35.24	38.54	N	
2	0.17975	13.10	-4.00	0.06	13.11	26.27	9.17	64.50	54.50	38.23	45.33	N	
3	0.82065	-9.00	-11.20	0.07	13.22	4.29	2.09	56.00	46.00	51.71	43.91	N	
4	0.90905	-10.10	-11.40	0.08	13.23	3.21	1.91	56.00	46.00	52.79	44.09	N	
5	13.56000	0.30	-5.50	0.33	14.03	14.66	8.86	60.00	50.00	45.34	41.14	N	
6	14.84000	2.00	-3.50	0.34	14.08	16.42	10.92	60.00	50.00	43.58	39.08	N	
7	0.15000	17.50	4.10	0.03	13.10	30.63	17.23	66.00	56.00	35.37	38.77	L	
8	0.17975	13.40	-4.10	0.04	13.11	26.55	9.05	64.50	54.50	37.95	45.45	L	
9	0.82320	-9.60	-11.00	0.05	13.22	3.67	2.27	56.00	46.00	52.33	43.73	L	
10	0.90650	-10.10	-11.10	0.05	13.23	3.18	2.18	56.00	46.00	52.82	43.82	L	
11	13.54000	0.10	-5.10	0.34	14.03	14.47	9.27	60.00	50.00	45.53	40.73	L	
12	14.76000	-0.10	-5.80	0.35	14.08	14.33	8.63	60.00	50.00	45.67	41.37	L	

CHART: WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + LISN + LOSS (CABLE + ATT)
Except for the above table: adequate margin data below the limits.

Conducted Emission
(BT2)

Test place Ise EMC Lab. No.2 Semi Anechoic Chamber
Date February 8, 2024
Temperature / Humidity 20 deg. C / 40 % RH
Engineer Ken Fujita
Mode Tx Hopping Off, 3DH5 2402 MHz

Limit : FCC_Part 15 Subpart C(15.207)



No.	Freq. [MHz]	Reading		LISN	LOSS	Results		Limit		Margin		Phase	Comment
		<QP>	<AV>			<QP>	<AV>	<QP>	<AV>	<QP>	<AV>		
		[dBuV]	[dBuV]		[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	17.50	4.20	0.06	13.10	30.66	17.36	66.00	56.00	35.34	38.64	N	
2	0.17975	13.00	-3.90	0.06	13.11	26.17	9.27	64.50	54.50	38.33	45.23	N	
3	0.82065	-8.90	-11.10	0.07	13.22	4.39	2.19	56.00	46.00	51.61	43.81	N	
4	0.90905	-9.40	-11.30	0.08	13.23	3.91	2.01	56.00	46.00	52.09	43.99	N	
5	13.56000	0.20	-5.30	0.33	14.03	14.56	9.06	60.00	50.00	45.44	40.94	N	
6	14.84000	1.80	-3.20	0.34	14.08	16.22	11.22	60.00	50.00	43.78	38.78	N	
7	0.15000	17.30	4.00	0.03	13.10	30.43	17.13	66.00	56.00	35.57	38.87	L	
8	0.17975	13.30	-4.00	0.04	13.11	26.45	9.15	64.50	54.50	38.05	45.35	L	
9	0.82320	-9.50	-10.80	0.05	13.22	3.77	2.47	56.00	46.00	52.23	43.53	L	
10	0.90650	-10.00	-11.00	0.05	13.23	3.28	2.28	56.00	46.00	52.72	43.72	L	
11	13.54000	0.20	-5.00	0.34	14.03	14.57	9.37	60.00	50.00	45.43	40.63	L	
12	14.76000	-0.30	-5.60	0.35	14.08	14.13	8.83	60.00	50.00	45.87	41.17	L	

CHART: WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + LISN + LOSS (CABLE + ATT)
Except for the above table: adequate margin data below the limits.

20dB Bandwidth, 99%Occupied Bandwidth and Carrier Frequency Separation

Test place	Ise EMC Lab. No.6 Measurement Room	
Date	January 25, 2024	February 25, 2024
Temperature / Humidity	20 deg. C / 39 % RH	26 deg. C / 31 % RH
Engineer	Junya Okuno	Junya Okuno
Mode	Tx, Hopping Off, Tx, Hopping On	

BT1

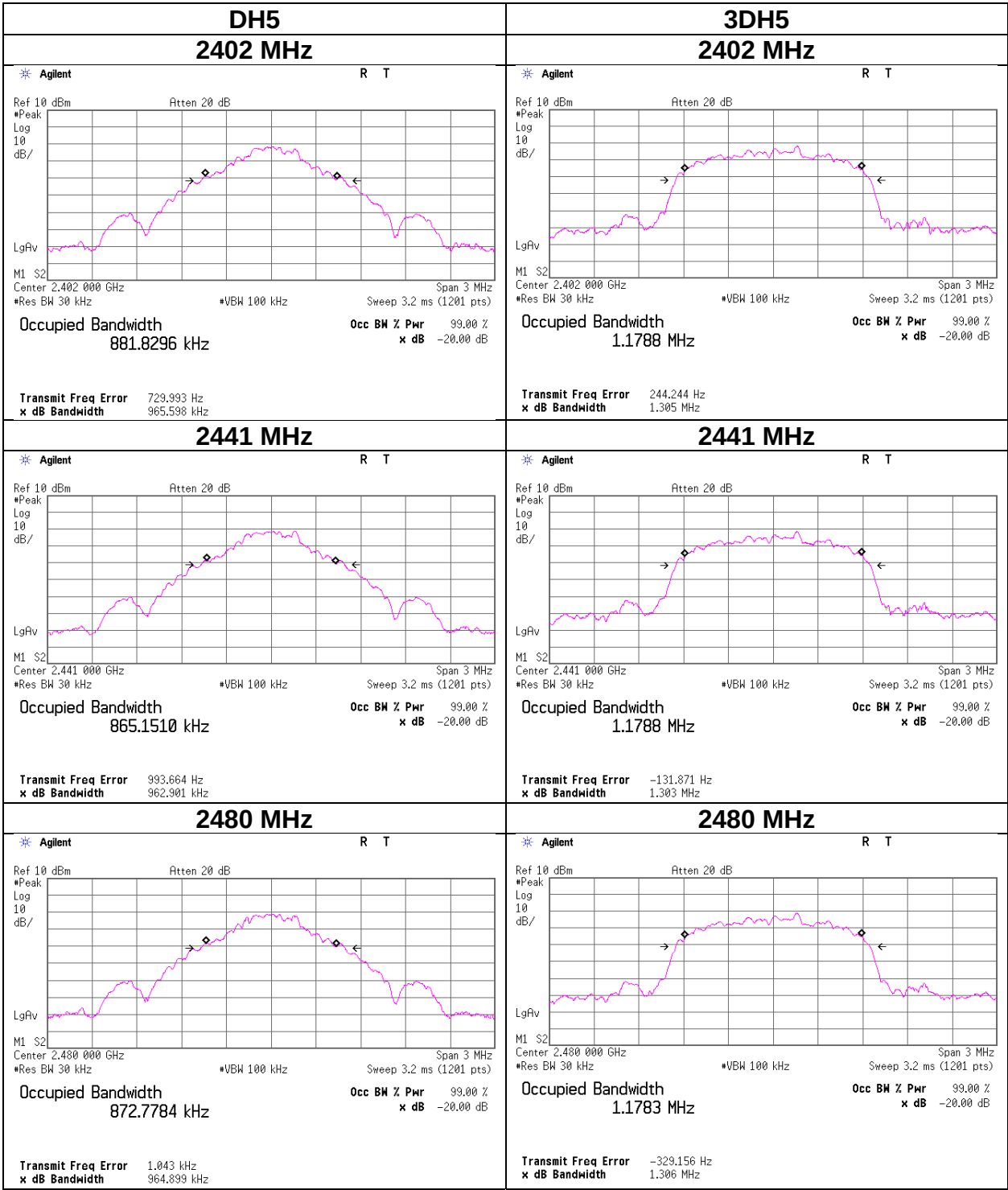
Mode	Freq. [MHz]	20 dB Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.966	881.830	1.000	>= 0.644
DH5	2441.0	0.963	865.151	1.000	>= 0.642
DH5	2480.0	0.965	872.778	1.000	>= 0.643
DH5	Hopping On	-	78657.400	-	-
3DH5	2402.0	1.305	1178.800	1.000	>= 0.870
3DH5	2441.0	1.303	1178.800	1.000	>= 0.869
3DH5	2480.0	1.306	1178.300	1.000	>= 0.871
3DH5	Hopping On	-	78764.700	-	-

BT2

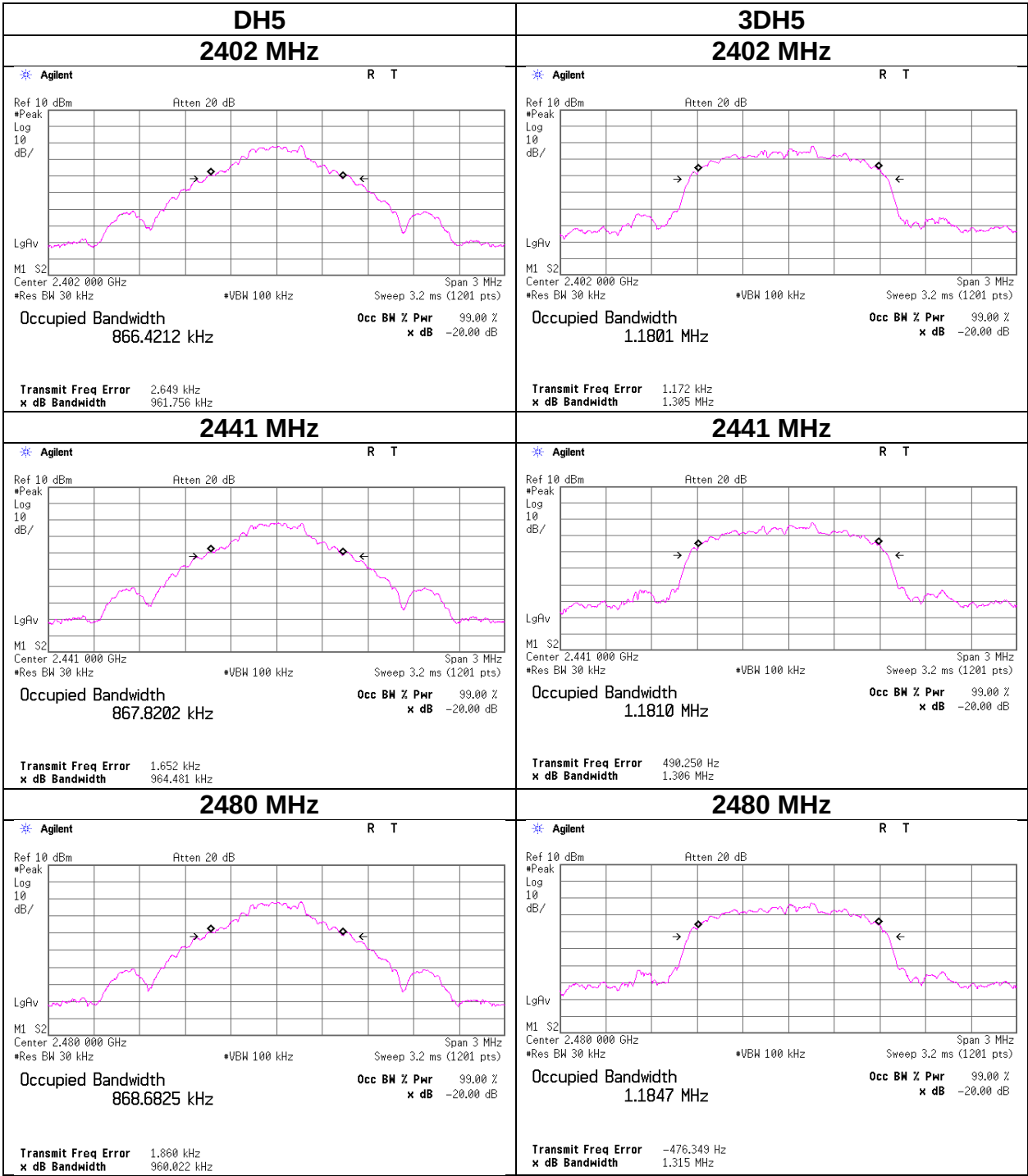
Mode	Freq. [MHz]	20 dB Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.962	866.421	1.000	>= 0.641
DH5	2441.0	0.964	867.820	1.000	>= 0.643
DH5	2480.0	0.960	868.683	1.000	>= 0.640
DH5	Hopping On	-	78642.000	-	-
3DH5	2402.0	1.305	1180.100	1.000	>= 0.870
3DH5	2441.0	1.306	1181.000	1.000	>= 0.871
3DH5	2480.0	1.315	1184.700	1.000	>= 0.877
3DH5	Hopping On	-	78733.000	-	-

Limit: Two-thirds of 20 dB Bandwidth or 25 kHz (whichever is greater).
No limit applies to 20 dB Bandwidth.

20dB Bandwidth and 99% Occupied Bandwidth
(BT1)

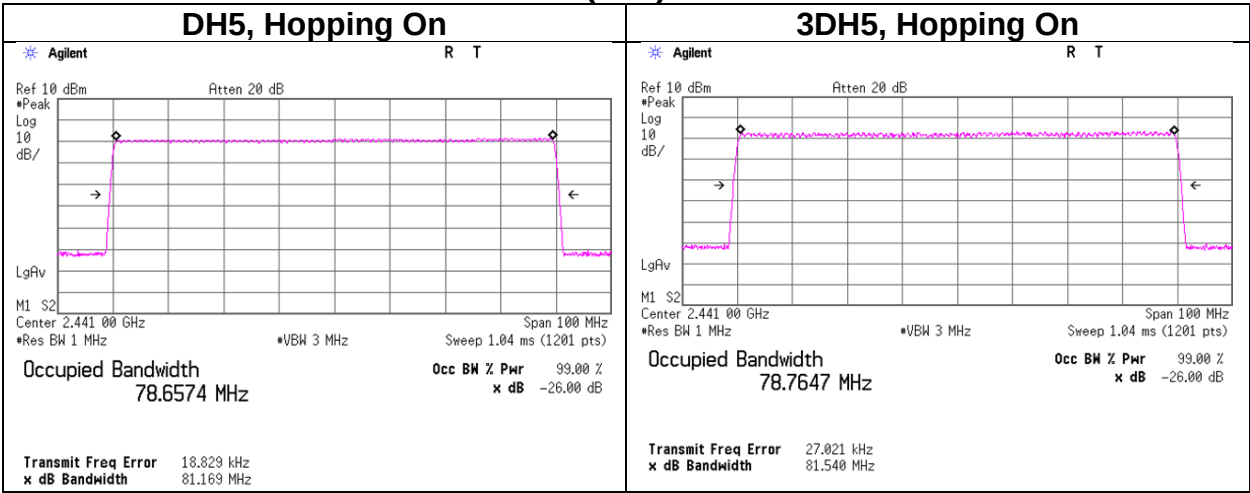


20dB Bandwidth and 99% Occupied Bandwidth
(BT2)

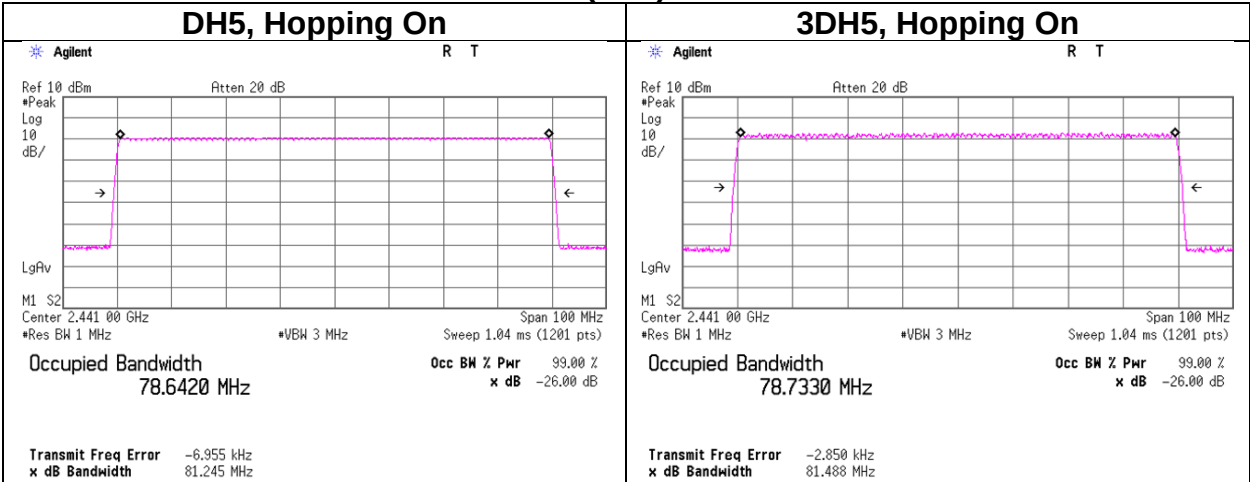


20dB Bandwidth and 99% Occupied Bandwidth

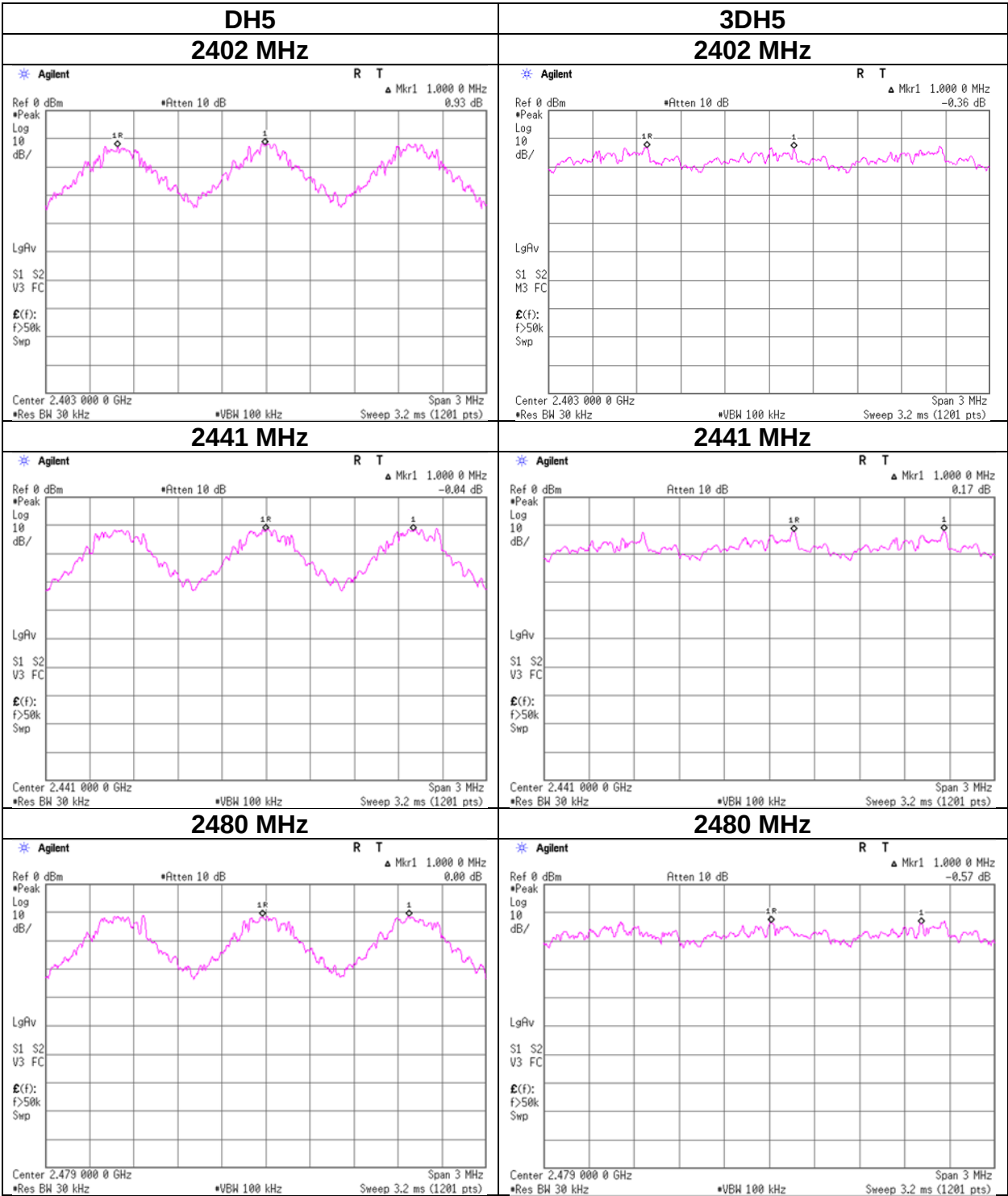
(BT1)



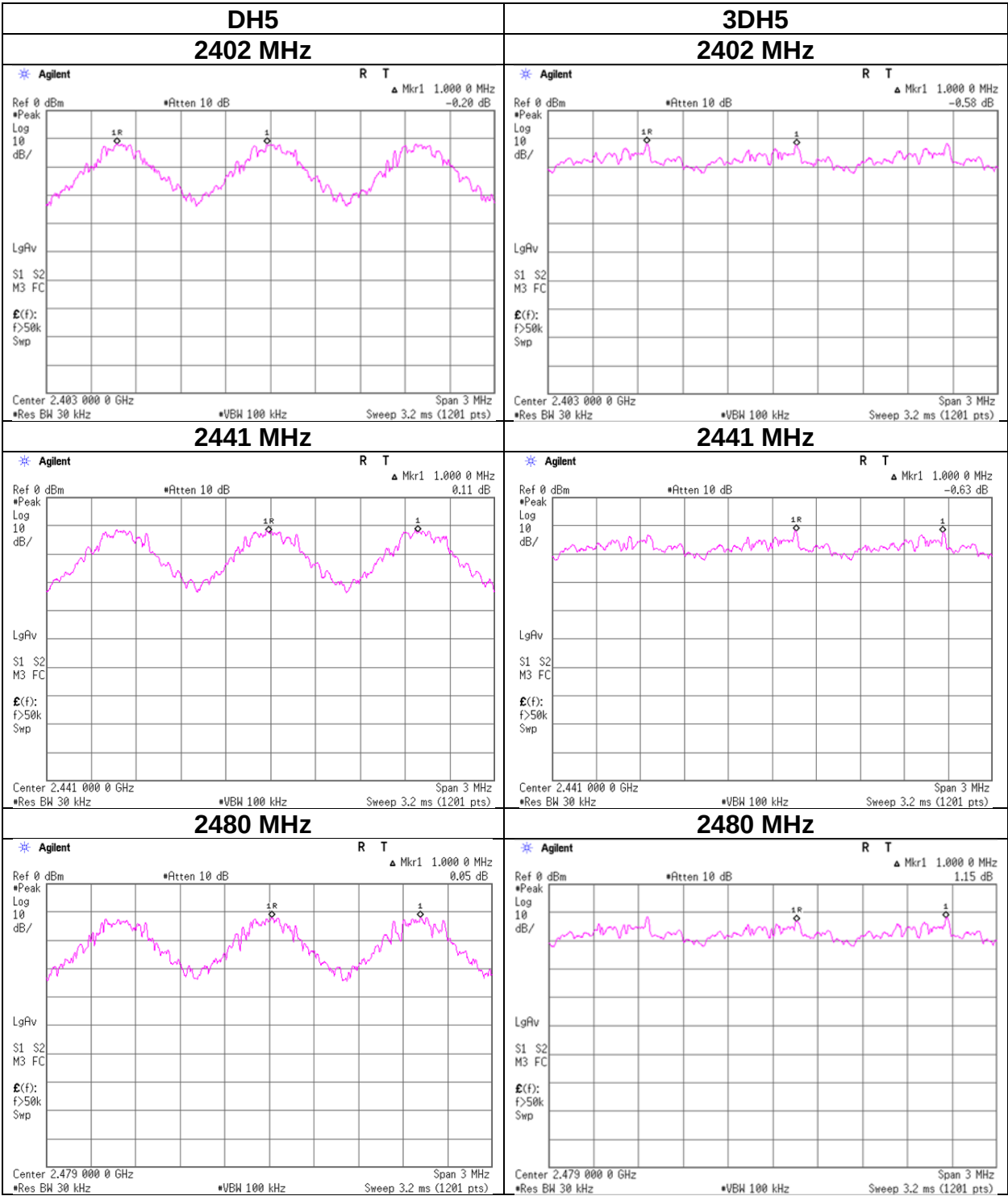
(BT2)



**Carrier Frequency Separation
(BT1)**



**Carrier Frequency Separation
(BT2)**



Number of Hopping Frequency

Test place Ise EMC Lab. No.6 Measurement Room
Date January 24, 2024
Temperature / Humidity 20 deg. C / 40 % RH
Engineer Junya Okuno
Mode Tx, Hopping On

BT1

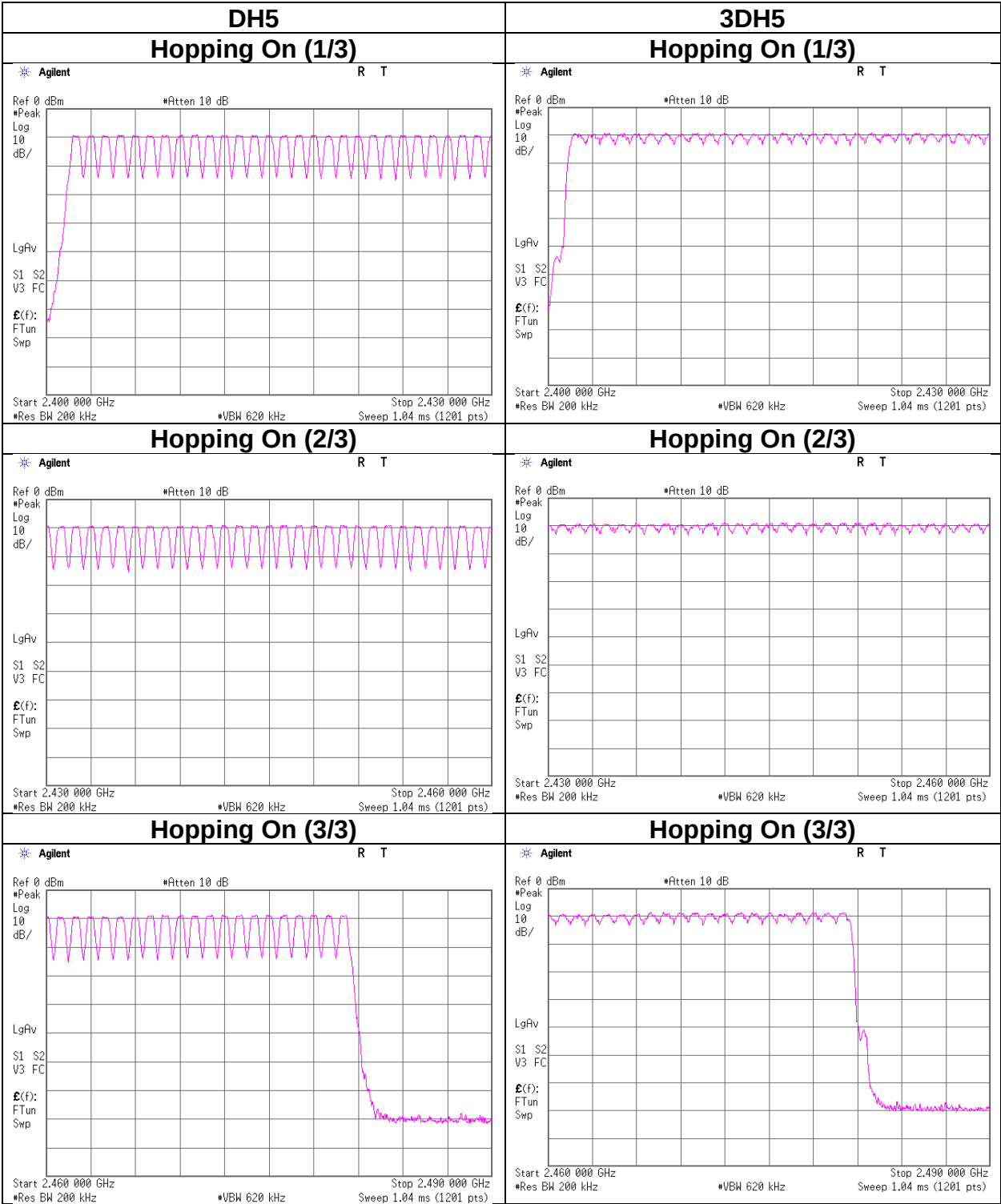
Mode	Number of channel [channels]	Limit [channels]
DH5	79	>= 15
3DH5	79	>= 15

BT2

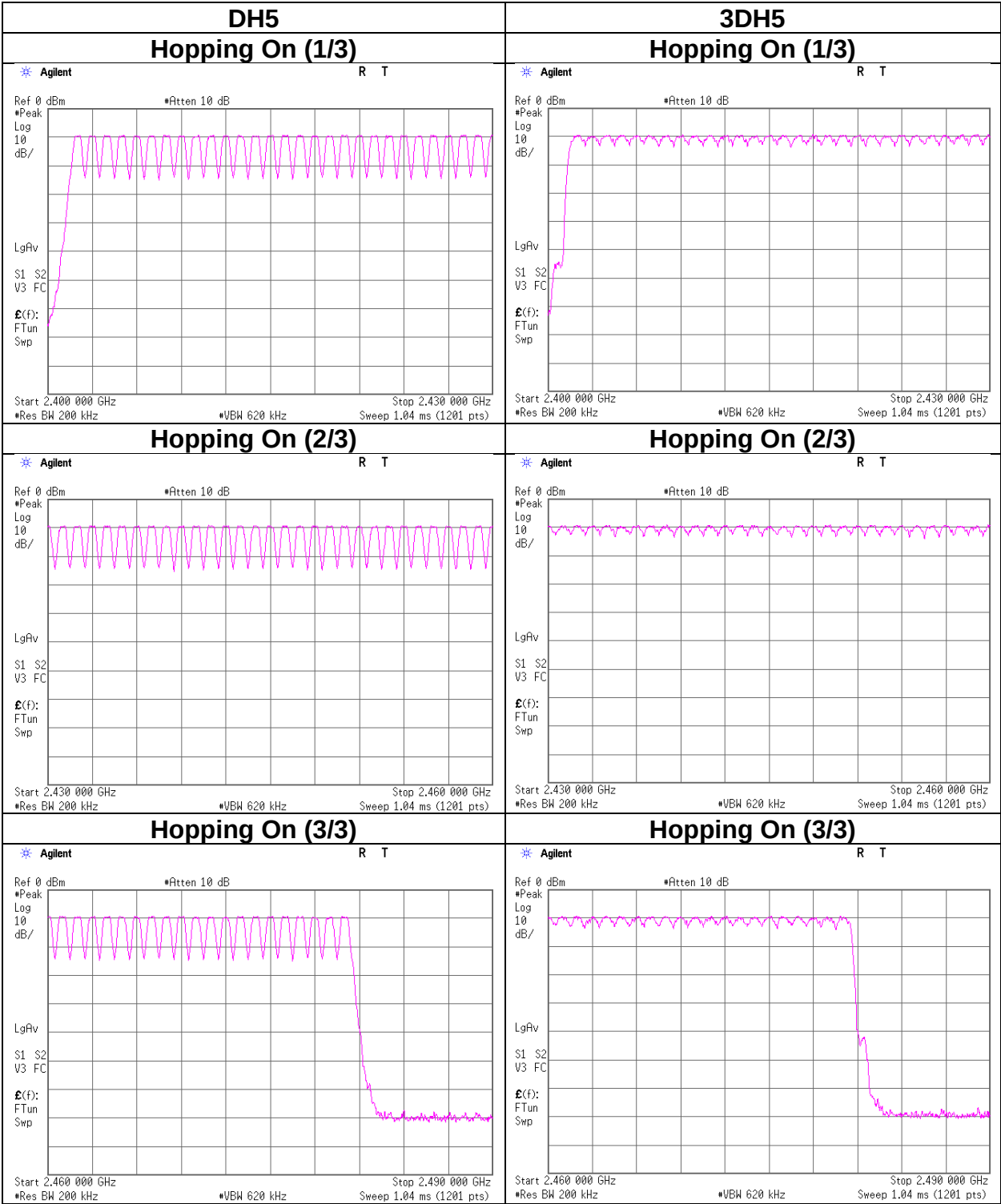
Mode	Number of channel [channels]	Limit [channels]
DH5	79	>= 15
3DH5	79	>= 15

Test was not performed at AFH mode whose number of hopping channel is 20 channels because this Bluetooth radio is in compliance of Bluetooth Specification.

**Number of Hopping Frequency
(BT1)**



**Number of Hopping Frequency
(BT2)**



Dwell time

Test place	Ise EMC Lab. No.6 Measurement Room
Date	January 24, 2024
Temperature / Humidity	20 deg. C / 40 % RH
Engineer	Junya Okuno
Mode	Tx, Hopping On

BT1

Mode	Number of transmission in a 31.6 (79 Hopping x 0.4) / 12.8 (32 Hopping x 0.4) second period					Length of transmission [ms]	Result [ms]	Limit [ms]
DH1	50.2 times	/	5 s	x	31.6 s = 318 times	0.386	123	400
DH3	25.0 times	/	5 s	x	31.6 s = 158 times	1.657	262	400
DH5	19.8 times	/	5 s	x	31.6 s = 126 times	2.900	365	400
3DH1	50.4 times	/	5 s	x	31.6 s = 319 times	0.398	127	400
3DH3	26.8 times	/	5 s	x	31.6 s = 170 times	1.657	282	400
3DH5	20.2 times	/	5 s	x	31.6 s = 128 times	2.907	372	400

BT2

B12

Mode	Number of transmission in a 31.6 (79 Hopping x 0.4) / 12.8 (32 Hopping x 0.4) second period					Length of transmission [ms]	Result [ms]	Limit [ms]
DH1	50.6 times	/	5 s	x	31.6 s = 320 times	0.386	124	400
DH3	25.2 times	/	5 s	x	31.6 s = 160 times	1.647	263	400
DH5	19.8 times	/	5 s	x	31.6 s = 126 times	2.897	365	400
3DH1	50.6 times	/	5 s	x	31.6 s = 320 times	0.391	125	400
3DH3	27.2 times	/	5 s	x	31.6 s = 172 times	1.652	284	400
3DH5	19.8 times	/	5 s	x	31.6 s = 126 times	2.897	365	400

Sample Calculation

Result = Number of transmission x Length of transmission

BT1

*Average data of 5 tests.(except Inquiry)

Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	49	51	49	50	52	50.2
DH3	25	25	26	25	24	25
DH5	20	19	20	21	19	19.8
3DH1	50	51	51	50	50	50.4
3DH3	27	26	27	27	27	26.8
3DH5	18	21	19	22	21	20.2

BT2

*Average data of 5 tests.(except Inquiry)

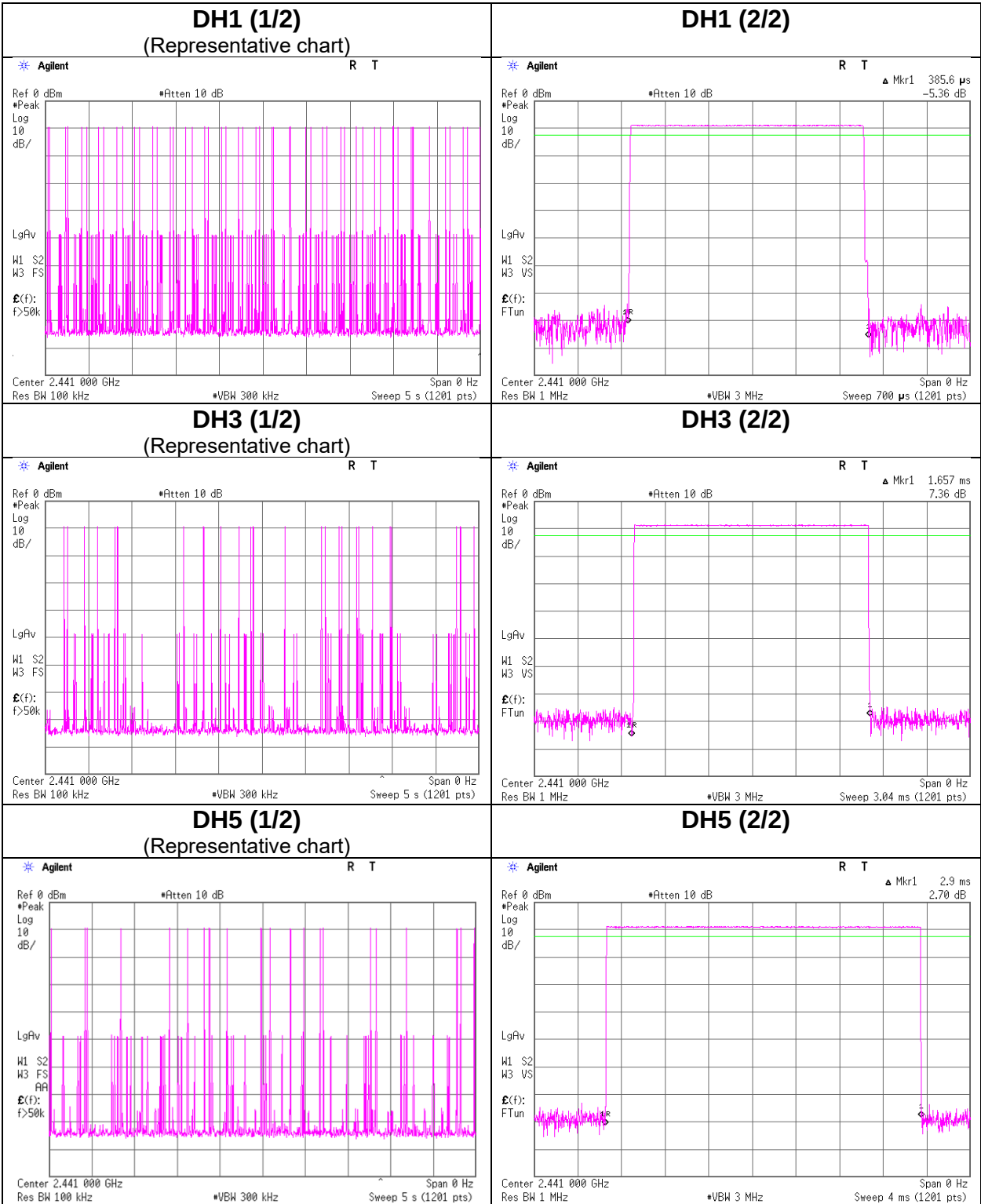
Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	51	51	51	50	50	50.6
DH3	26	26	25	24	25	25.2
DH5	18	21	21	20	19	19.8
3DH1	51	51	51	49	51	50.6
3DH3	27	27	27	29	26	27.2
3DH5	19	21	21	18	20	19.8

Sample Calculation

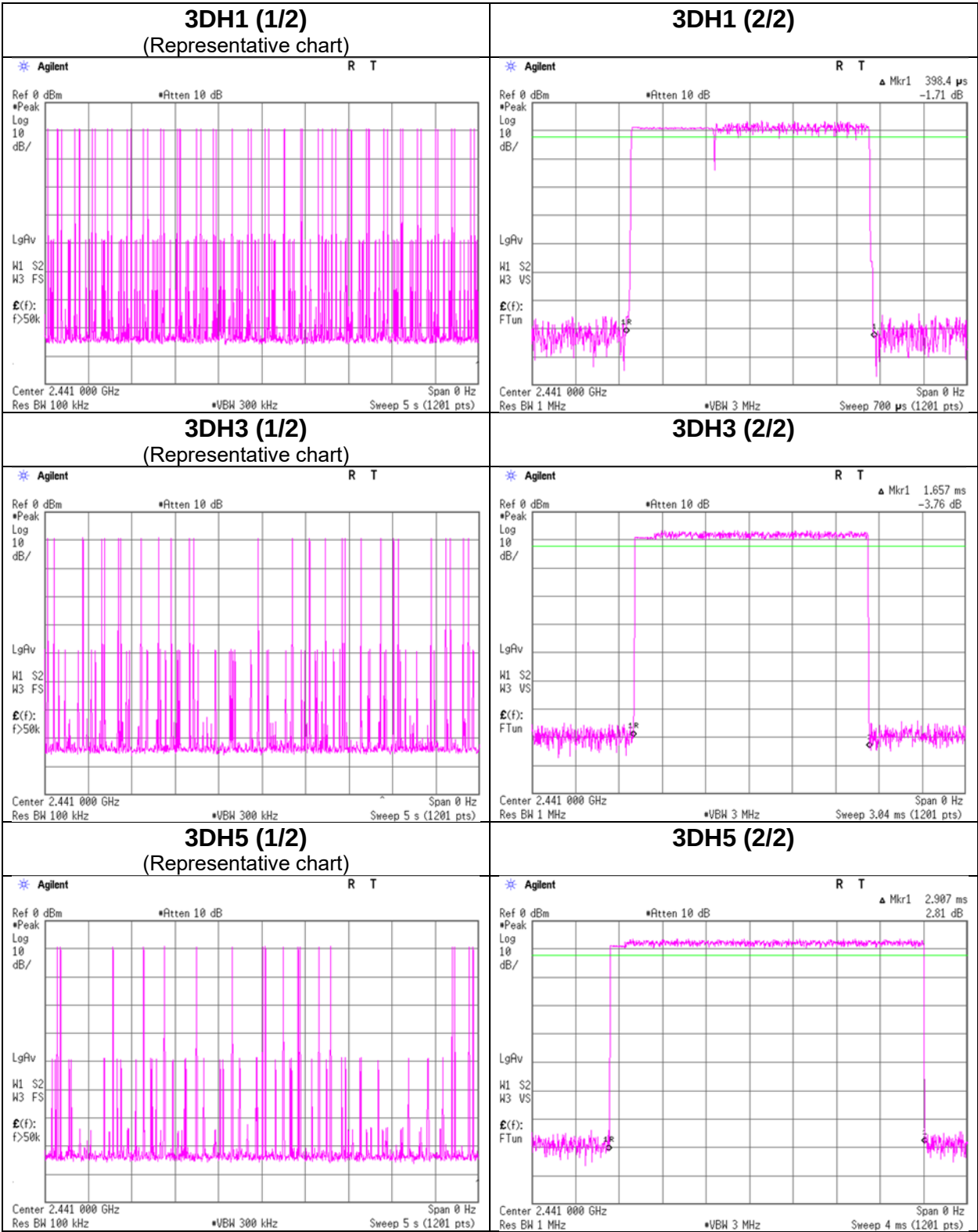
Average = Summation (Sampling 1 to 5) / 5

This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in $N \times 0.4$ s, where N is the number of channels being used in the hopping sequence ($20 \leq N \leq 79$), is always less than 0.4 s regardless of packet size. This is confirmed in the test report for $N = 79$.

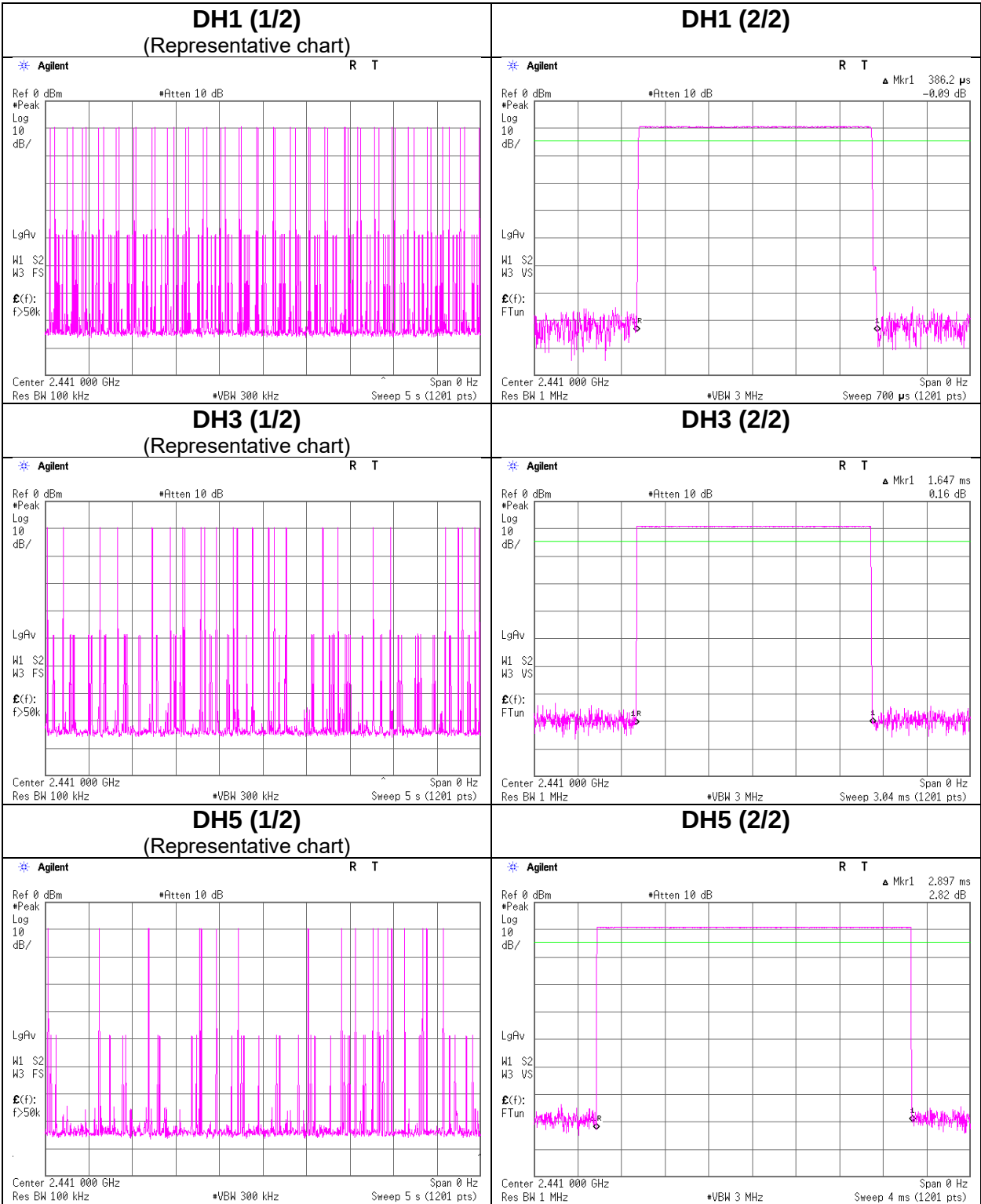
Dwell time
(BT1)



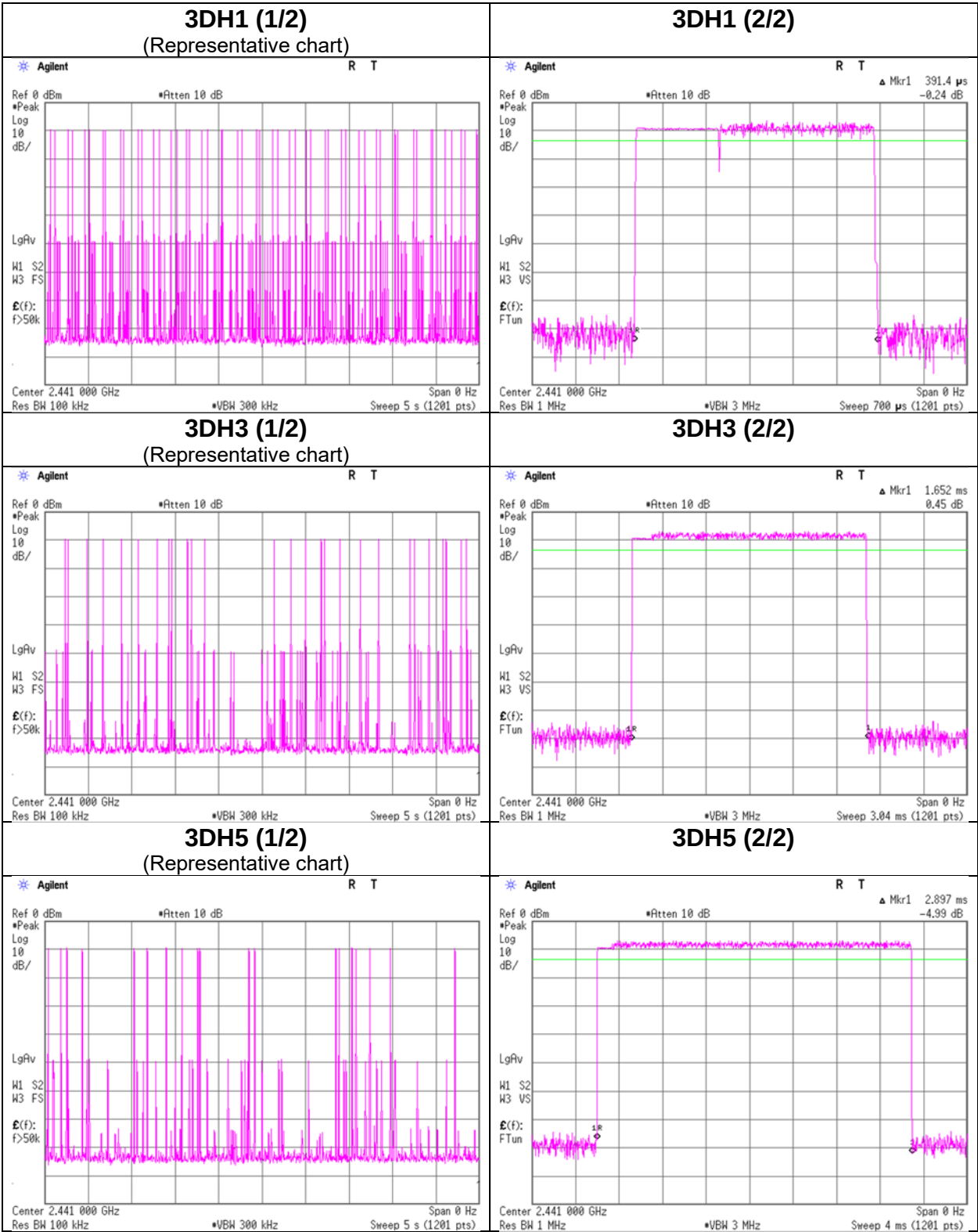
Dwell time
(BT1)



Dwell time
(BT2)



Dwell time
(BT2)



Maximum Peak Output Power

Test place Ise EMC Lab. No.6 Measurement Room
Date January 23, 2024
Temperature / Humidity 22 deg. C / 40 % RH
Engineer Junya Okuno
Mode Tx, Hopping Off

BT1					Conducted Power					e.i.r.p. for RSS-247					
Mode	Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	Antenna Gain	Result		Limit		Margin
					[dBm]	[mW]	[dBm]	[mW]			[dB]	[dBi]	[dBm]	[mW]	
DH5	2402.0	-9.43	1.38	9.74	1.69	1.48	20.96	125	19.27	4.00	5.69	3.71	36.02	4000	30.33
DH5	2441.0	-9.01	1.39	9.75	2.13	1.63	20.96	125	18.83	4.00	6.13	4.10	36.02	4000	29.89
DH5	2480.0	-8.98	1.40	9.75	2.17	1.65	20.96	125	18.79	4.00	6.17	4.14	36.02	4000	29.85
2DH5	2402.0	-6.28	1.38	9.74	4.84	3.05	20.96	125	16.12	4.00	8.84	7.66	36.02	4000	27.18
2DH5	2441.0	-6.24	1.39	9.75	4.90	3.09	20.96	125	16.06	4.00	8.90	7.76	36.02	4000	27.12
2DH5	2480.0	-5.80	1.40	9.75	5.35	3.43	20.96	125	15.61	4.00	9.35	8.61	36.02	4000	26.67
3DH5	2402.0	-6.02	1.38	9.74	5.10	3.24	20.96	125	15.86	4.00	9.10	8.13	36.02	4000	26.92
3DH5	2441.0	-6.06	1.39	9.75	5.08	3.22	20.96	125	15.88	4.00	9.08	8.09	36.02	4000	26.94
3DH5	2480.0	-5.60	1.40	9.75	5.55	3.59	20.96	125	15.41	4.00	9.55	9.02	36.02	4000	26.47

BT2					Conducted Power					e.i.r.p. for RSS-247					
Mode	Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	Antenna Gain	Result		Limit		Margin
					[dBm]	[mW]	[dBm]	[mW]			[dB]	[dBm]	[mW]	[dBm]	
DH5	2402.0	-9.03	1.38	9.74	2.09	1.62	20.96	125	18.87	3.50	5.59	3.62	36.02	4000	30.43
DH5	2441.0	-9.03	1.39	9.75	2.11	1.63	20.96	125	18.85	3.50	5.61	3.64	36.02	4000	30.41
DH5	2480.0	-9.13	1.40	9.75	2.02	1.59	20.96	125	18.94	3.50	5.52	3.56	36.02	4000	30.50
2DH5	2402.0	-6.27	1.38	9.74	4.85	3.05	20.96	125	16.11	3.50	8.35	6.84	36.02	4000	27.67
2DH5	2441.0	-6.48	1.39	9.75	4.66	2.92	20.96	125	16.30	3.50	8.16	6.55	36.02	4000	27.86
2DH5	2480.0	-6.43	1.40	9.75	4.72	2.96	20.96	125	16.24	3.50	8.22	6.64	36.02	4000	27.80
3DH5	2402.0	-5.93	1.38	9.74	5.19	3.30	20.96	125	15.77	3.50	8.69	7.40	36.02	4000	27.33
3DH5	2441.0	-6.12	1.39	9.75	5.02	3.18	20.96	125	15.94	3.50	8.52	7.11	36.02	4000	27.50
3DH5	2480.0	-6.05	1.40	9.75	5.10	3.24	20.96	125	15.86	3.50	8.60	7.24	36.02	4000	27.42

Sample Calculation:

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

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

Test was not performed at AFH mode, because the decrease of number of channel (min: 20 ch) at AFH mode does not influence on the output power and bandwidth of the EUT.

As this device had AFH mode and frequency separation could not meet the requirement of over 20 dB BW without 2/3 relaxation, 125 mW power limit was applied to it.

Average Output Power (Reference data for RF Exposure)

Test place	Ise EMC Lab. No.6 Measurement Room
Date	January 23, 2024
Temperature / Humidity	22 deg. C / 40 % RH
Engineer	Junya Okuno
Mode	Tx, Hopping Off

BT1

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
					[dBm]	[mW]		[dBm]	[mW]
DH5	2402.0	-11.00	1.38	9.74	0.12	1.03	1.13	1.25	1.33
DH5	2441.0	-10.71	1.39	9.75	0.43	1.10	1.13	1.56	1.43
DH5	2480.0	-10.40	1.40	9.75	0.75	1.19	1.13	1.88	1.54
2DH5	2402.0	-10.87	1.38	9.74	0.25	1.06	1.12	1.37	1.37
2DH5	2441.0	-10.60	1.39	9.75	0.54	1.13	1.12	1.66	1.47
2DH5	2480.0	-10.33	1.40	9.75	0.82	1.21	1.12	1.94	1.56
3DH5	2402.0	-10.86	1.38	9.74	0.26	1.06	1.12	1.38	1.37
3DH5	2441.0	-10.59	1.39	9.75	0.55	1.14	1.12	1.67	1.47
3DH5	2480.0	-10.31	1.40	9.75	0.84	1.21	1.12	1.96	1.57

BT2

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
					[dBm]	[mW]		[dBm]	[mW]
DH5	2402.0	-11.18	1.38	9.74	-0.06	0.99	1.13	1.07	1.28
DH5	2441.0	-10.97	1.39	9.75	0.17	1.04	1.13	1.30	1.35
DH5	2480.0	-11.06	1.40	9.75	0.09	1.02	1.13	1.22	1.32
2DH5	2402.0	-11.01	1.38	9.74	0.11	1.03	1.13	1.24	1.33
2DH5	2441.0	-10.80	1.39	9.75	0.34	1.08	1.13	1.47	1.40
2DH5	2480.0	-10.86	1.40	9.75	0.29	1.07	1.13	1.42	1.39
3DH5	2402.0	-11.00	1.38	9.74	0.12	1.03	1.13	1.25	1.33
3DH5	2441.0	-10.80	1.39	9.75	0.34	1.08	1.13	1.47	1.40
3DH5	2480.0	-10.84	1.40	9.75	0.31	1.07	1.13	1.44	1.39

Sample Calculation:

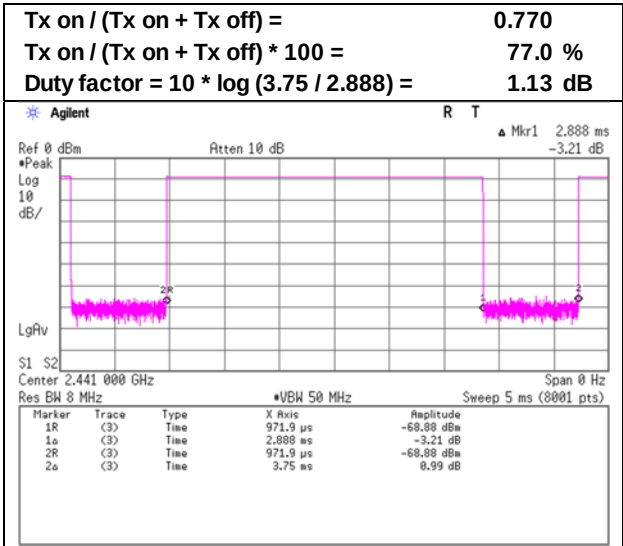
Result (Time average) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

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

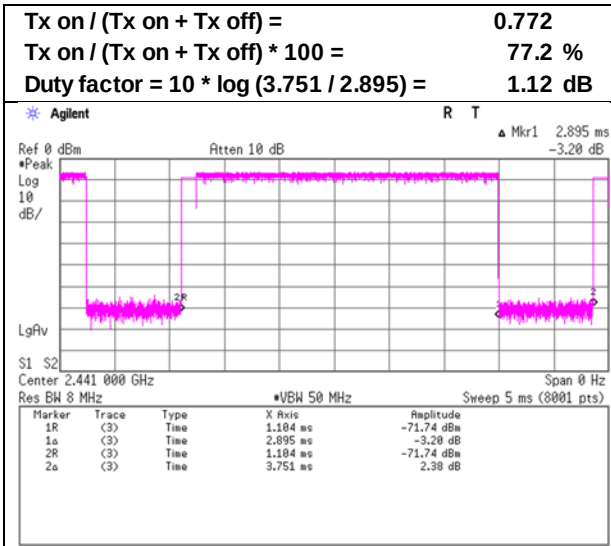
Burst Rate Confirmation
(BT1)

Test place	Ise EMC Lab. No.6 Measurement Room
Date	January 24, 2024
Temperature / Humidity	20 deg. C / 40 % RH
Engineer	Junya Okuno
Mode	Tx, Hopping Off

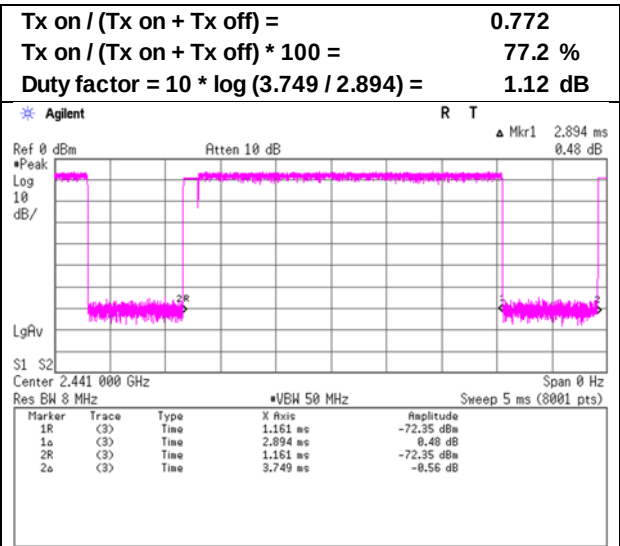
DH5



2DH5



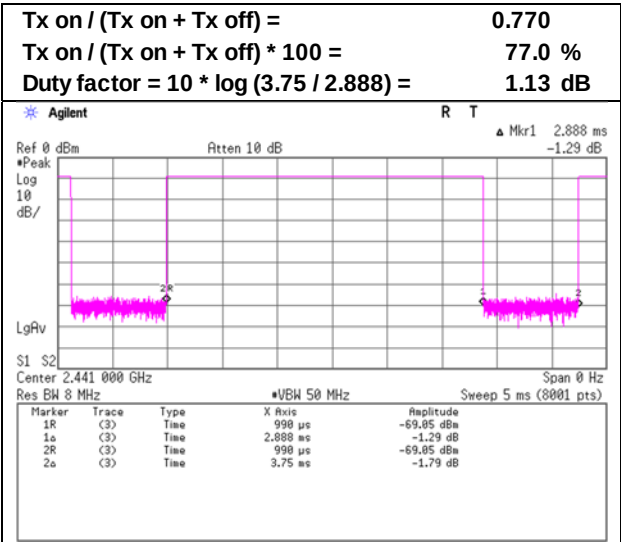
3DH5



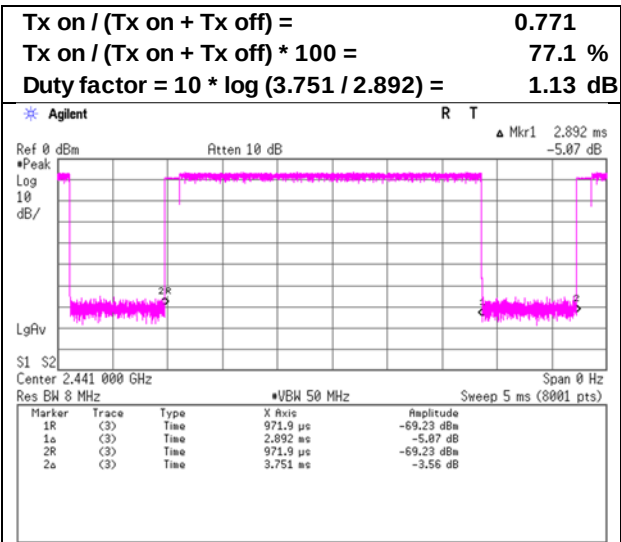
**Burst Rate Confirmation
(BT2)**

Test place Ise EMC Lab. No.6 Measurement Room
Date January 24, 2024
Temperature / Humidity 20 deg. C / 40 % RH
Engineer Junya Okuno
Mode Tx, Hopping Off

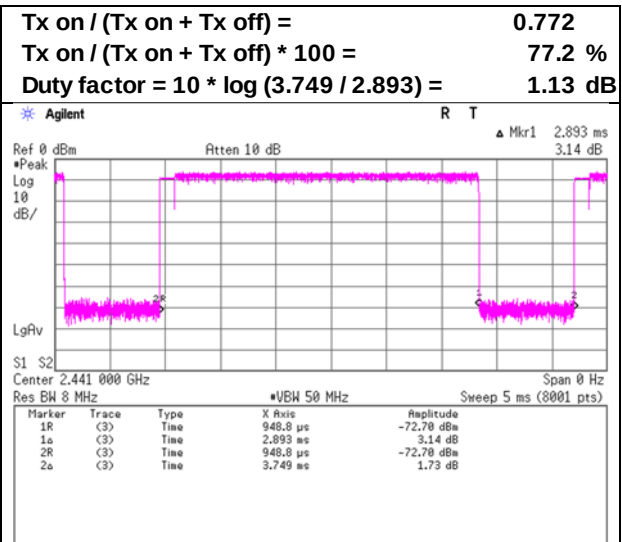
DH5



2DH5



3DH5



Radiated Spurious Emission
(BT1)

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.2	No.2	No.2
Date	January 29, 2024	February 8, 2024	February 8, 2024
Temperature / Humidity	23 deg. C / 41 % RH	24 deg. C / 40 % RH	22 deg. C / 45 % RH
Engineer	Yuta Moriya	Daiki Matsui	Tomohisa Nakagawa
	(1 GHz to 10 GHz)	(10 GHz to 18 GHz)	(18 GHz to 26.5 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz		

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	2390.0	49.1	36.8	27.7	4.9	34.9	1.1	46.7	35.5	73.9	53.9	27.2	18.4	*1)
Hori.	4804.0	41.9	33.9	31.6	7.0	34.1	-	46.4	38.3	73.9	53.9	27.6	15.6	Floor noise
Hori.	7206.0	43.1	34.9	35.6	8.1	34.0	-	52.8	44.6	73.9	53.9	21.1	9.3	Floor noise
Hori.	9608.0	42.0	34.7	35.7	8.7	34.7	-	51.7	44.5	73.9	53.9	22.2	9.4	Floor noise
Vert.	2390.0	50.3	36.8	27.7	4.9	34.9	1.1	47.9	35.5	73.9	53.9	26.0	18.4	*1)
Vert.	4804.0	41.9	33.9	31.6	7.0	34.1	-	46.4	38.3	73.9	53.9	27.6	15.6	Floor noise
Vert.	7206.0	43.1	34.9	35.6	8.1	34.0	-	52.8	44.6	73.9	53.9	21.1	9.3	Floor noise
Vert.	9608.0	42.0	34.7	35.7	8.7	34.7	-	51.7	44.5	73.9	53.9	22.2	9.4	Floor noise

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
*QP detector was used up to 1GHz.
*1) Not Out of Band emission(Leakage Power)

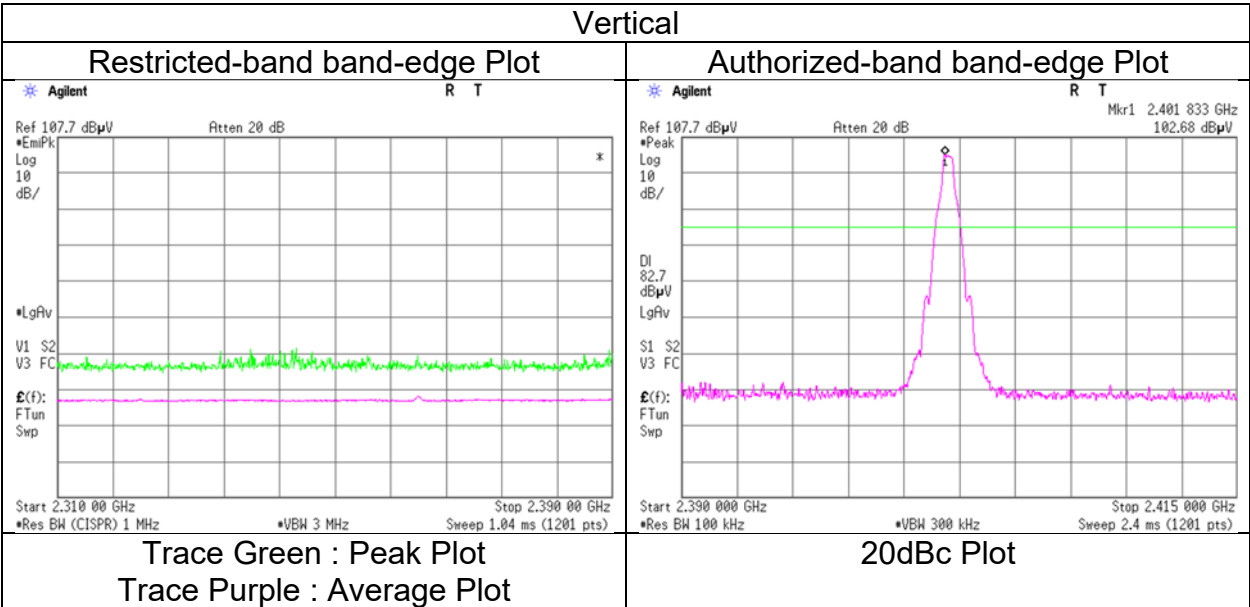
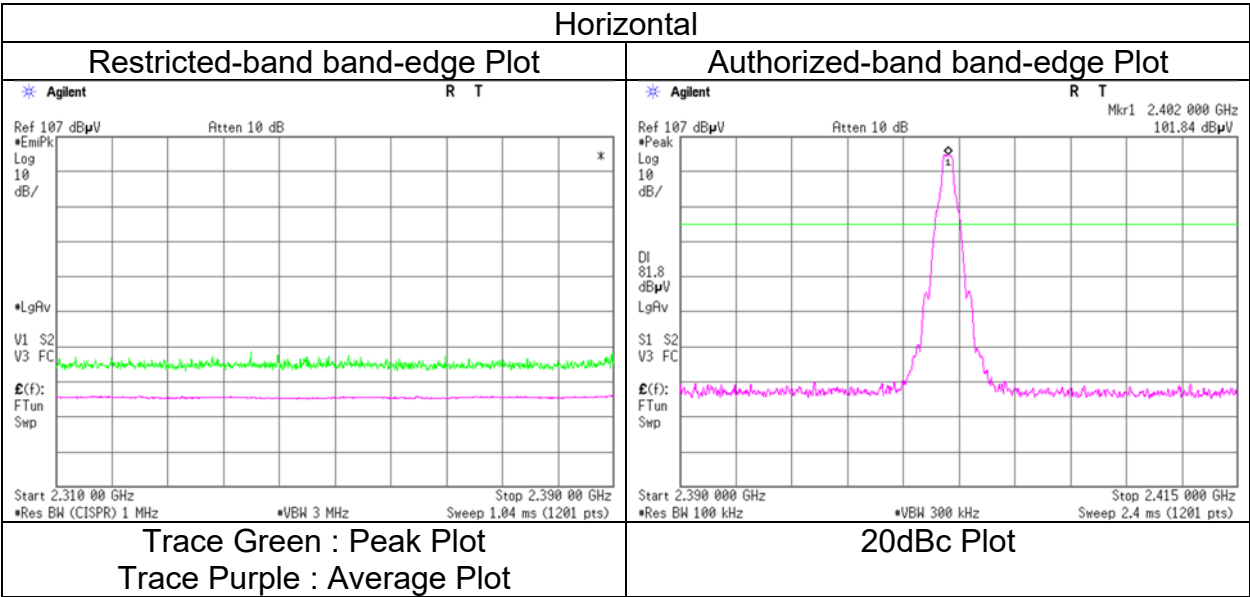
20dBc Data Sheet

Polarity	Frequency	Reading (PK)	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	2402.0	101.8	27.6	4.9	34.9	99.5	-	-	Carrier
Hori.	2400.0	39.0	27.6	4.9	34.9	36.6	79.5	42.9	
Vert.	2402.0	102.7	27.6	4.9	34.9	100.3	-	-	Carrier
Vert.	2400.0	39.6	27.6	4.9	34.9	37.2	80.3	43.1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
Distance factor:
1 GHz - 6 GHz 20log (3.75 m / 3.0 m) = 1.94 dB
6 GHz - 10 GHz 20log (3.75 m / 3.0 m) = 1.94 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission
(Reference Plot for band-edge
(BT1)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	January 29, 2024
Temperature / Humidity	23 deg. C / 41 % RH
Engineer	Yuta Moriya
	(1 GHz to 10 GHz)
Mode	Tx, Hopping Off, DH5 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
(BT1)

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.2	No.2	No.2
Date	January 29, 2024	February 8, 2024	February 8, 2024
Temperature / Humidity	20 deg. C / 35 % RH	24 deg. C / 40 % RH	22 deg. C / 45 % RH
Engineer	Takeshi Hiyaji	Daiki Matsui	Tomohisa Nakagawa
	(1 GHz to 10 GHz)	(10 GHz to 18 GHz)	(18 GHz to 26.5 GHz)
Mode	Tx, Hopping Off, DH5 2441 MHz		

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	4882.0	42.2	33.8	31.6	7.1	34.2	-	46.7	38.4	73.9	53.9	27.2	15.5	Floor noise
Hori.	7323.0	42.8	34.0	35.6	8.3	34.1	-	52.6	43.8	73.9	53.9	21.3	10.1	Floor noise
Hori.	9764.0	42.7	34.1	36.0	9.2	34.7	-	53.2	44.6	73.9	53.9	20.7	9.3	Floor noise
Vert.	4882.0	42.0	33.7	31.6	7.1	34.2	-	46.6	38.3	73.9	53.9	27.3	15.6	Floor noise
Vert.	7323.0	42.7	34.2	35.6	8.3	34.1	-	52.6	44.1	73.9	53.9	21.3	9.8	Floor noise
Vert.	9764.0	43.6	34.1	36.0	9.2	34.7	-	54.1	44.6	73.9	53.9	19.8	9.3	Floor noise

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
*QP detector was used up to 1GHz.

Distance factor:	1 GHz - 6 GHz	20log (3.75 m / 3.0 m) = 1.94 dB
	6 GHz - 10 GHz	20log (3.75 m / 3.0 m) = 1.94 dB
	10 GHz - 26.5 GHz	20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission
(BT1)

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.2	No.2	No.2
Date	January 29, 2024	February 8, 2024	February 8, 2024
Temperature / Humidity	20 deg. C / 35 % RH	24 deg. C / 40 % RH	22 deg. C / 45 % RH
Engineer	Takeshi Hiyaji	Daiki Matsui	Tomohisa Nakagawa
	(1 GHz to 10 GHz)	(10 GHz to 18 GHz)	(18 GHz to 26.5 GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz		

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	2483.5	44.4	36.2	27.5	5.0	34.9	1.1	42.1	34.9	73.9	53.9	31.8	19.0	*1)
Hori.	4960.0	43.3	31.9	31.7	7.1	34.2	-	48.0	36.5	73.9	53.9	25.9	17.4	Floor noise
Hori.	7440.0	41.7	34.4	35.5	8.4	34.1	-	51.4	44.1	73.9	53.9	22.5	9.8	Floor noise
Hori.	9920.0	42.3	34.7	36.2	9.2	34.7	-	53.0	45.4	73.9	53.9	20.9	8.5	Floor noise
Vert.	2483.5	44.5	35.6	27.5	5.0	34.9	1.1	42.2	34.4	73.9	53.9	31.8	19.5	*1)
Vert.	4960.0	42.0	31.7	31.7	7.1	34.2	-	46.6	36.3	73.9	53.9	27.3	17.6	Floor noise
Vert.	7440.0	41.9	34.4	35.5	8.4	34.1	-	51.7	44.1	73.9	53.9	22.3	9.8	Floor noise
Vert.	9920.0	41.9	34.1	36.2	9.2	34.7	-	52.6	44.8	73.9	53.9	21.3	9.1	Floor noise

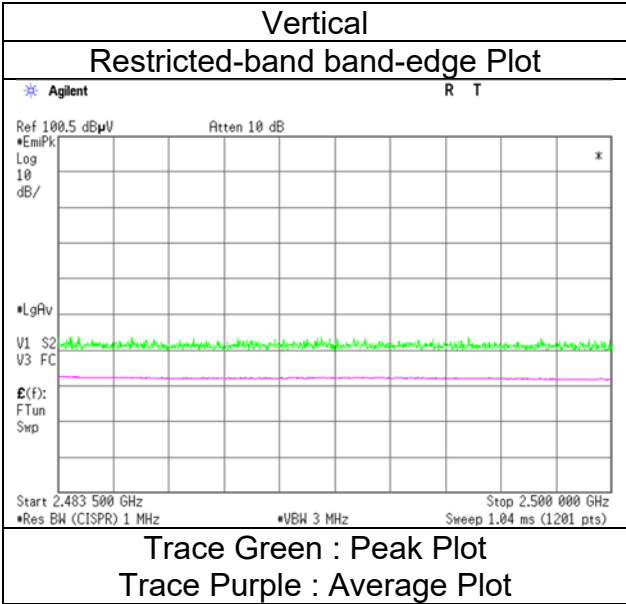
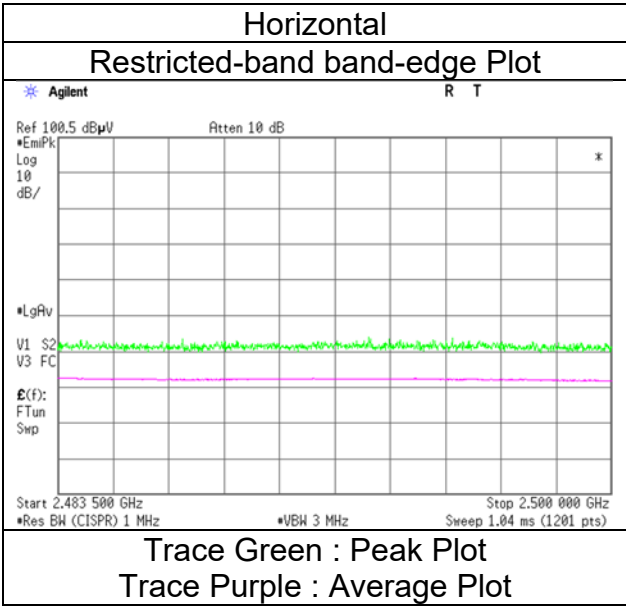
Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
*QP detector was used up to 1GHz.
*1) Not Out of Band emission(Leakage Power)

Distance factor: 1 GHz - 6 GHz $20\log(3.75\text{ m} / 3.0\text{ m}) = 1.94\text{ dB}$
 6 GHz - 10 GHz $20\log(3.75\text{ m} / 3.0\text{ m}) = 1.94\text{ dB}$
 10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Radiated Spurious Emission
(Reference Plot for bandto edge
(BT1)

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer
Mode

Ise EMC Lab.
No.2
January 29, 2024
20 deg. C / 35 % RH
Takeshi Hiyaji
Tx, Hopping Off, DH5 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
(BT1)

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.2	No.2	No.2
Date	January 29, 2024	February 8, 2024	February 8, 2024
Temperature / Humidity	20 deg. C / 35 % RH	24 deg. C / 40 % RH	22 deg. C / 45 % RH
Engineer	Takeshi Hiyaji	Daiki Matsui	Tomohisa Nakagawa
	(1 GHz to 10 GHz)	(10 GHz to 18 GHz)	(18 GHz to 26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz		

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	2390.0	51.7	33.9	27.7	5.0	34.9	1.1	49.4	32.7	73.9	53.9	24.6	21.2	*1)
Hori.	4804.0	41.0	31.6	31.6	7.1	34.1	-	45.5	36.1	73.9	53.9	28.4	17.8	Floor noise
Hori.	7206.0	42.2	34.4	35.6	8.2	34.0	-	52.0	44.2	73.9	53.9	21.9	9.7	Floor noise
Hori.	9608.0	42.5	34.5	35.7	9.1	34.7	-	52.6	44.6	73.9	53.9	21.3	9.3	Floor noise
Vert.	2390.0	47.8	35.6	27.7	5.0	34.9	1.1	45.4	34.4	73.9	53.9	28.5	19.6	*1)
Vert.	4804.0	41.1	33.6	31.6	7.1	34.1	-	45.7	38.1	73.9	53.9	28.3	15.8	Floor noise
Vert.	7206.0	42.6	34.4	35.6	8.2	34.0	-	52.5	44.3	73.9	53.9	21.5	9.7	Floor noise
Vert.	9608.0	41.7	34.4	35.7	9.1	34.7	-	51.8	44.6	73.9	53.9	22.1	9.4	Floor noise

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
*QP detector was used up to 1GHz.
*1) Not Out of Band emission(Leakage Power)

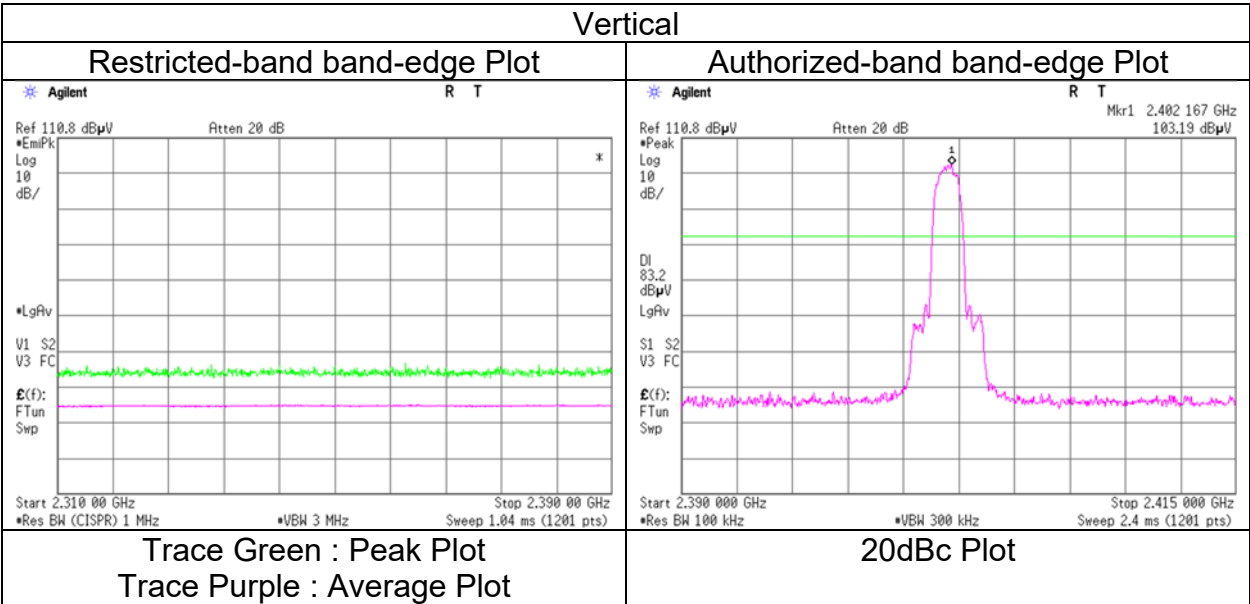
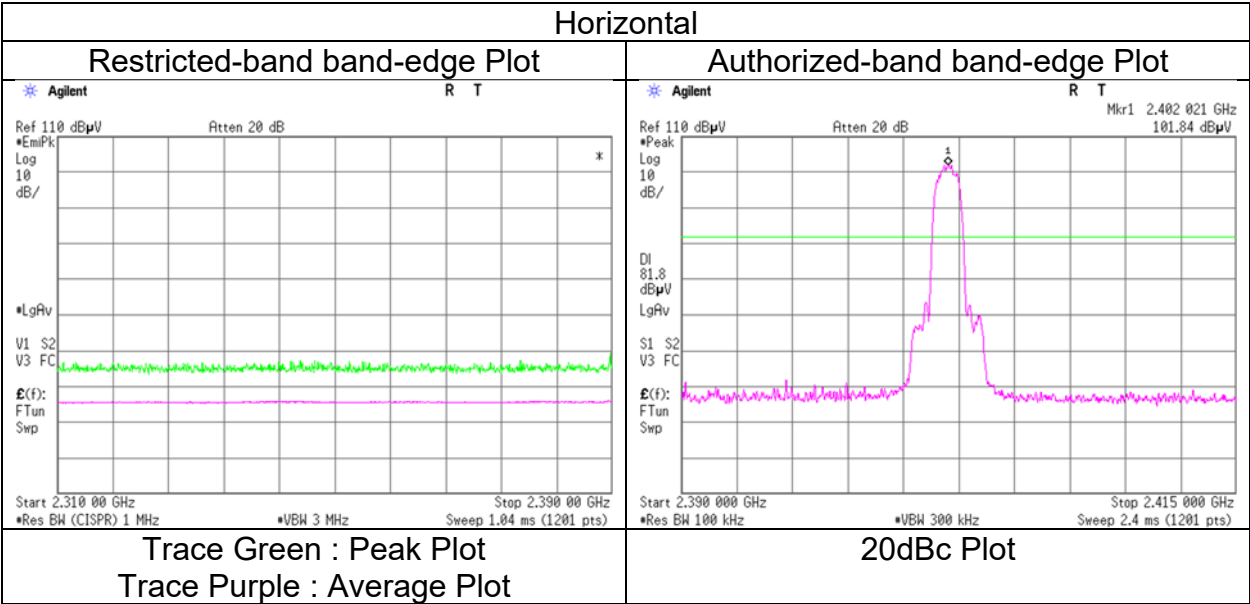
20dBc Data Sheet

Polarity	Frequency	Reading (PK)	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	2402.0	101.8	27.6	5.0	34.9	99.5	-	-	Carrier
Hori.	2400.0	40.7	27.6	5.0	34.9	38.3	79.5	41.2	
Vert.	2402.0	103.2	27.6	5.0	34.9	100.9	-	-	Carrier
Vert.	2400.0	41.7	27.6	5.0	34.9	39.4	80.9	41.5	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
Distance factor:
1 GHz - 6 GHz 20log (3.75 m / 3.0 m) = 1.94 dB
6 GHz - 10 GHz 20log (3.75 m / 3.0 m) = 1.94 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission
(Reference Plot for band-edge)
(BT1)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	January 29, 2024
Temperature / Humidity	20 deg. C / 35 % RH
Engineer	Takeshi Hiyaji
Mode	Tx, Hopping Off, 3DH5 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
(BT1)

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.2	No.2	No.2
Date	January 29, 2024	February 8, 2024	February 8, 2024
Temperature / Humidity	20 deg. C / 35 % RH	24 deg. C / 40 % RH	22 deg. C / 45 % RH
Engineer	Takeshi Hiyaji	Daiki Matsui	Tomohisa Nakagawa
	(1 GHz to 10 GHz)	(10 GHz to 18 GHz)	(18 GHz to 26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2441 MHz		

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	4882.0	42.4	33.6	31.6	7.1	34.2	-	47.0	38.2	73.9	53.9	27.0	15.7	Floor noise
Hori.	7323.0	41.8	34.4	35.6	8.3	34.1	-	51.6	44.2	73.9	53.9	22.3	9.7	Floor noise
Hori.	9764.0	42.1	34.3	36.0	9.2	34.7	-	52.6	44.8	73.9	53.9	21.3	9.1	Floor noise
Vert.	4882.0	42.8	33.7	31.6	7.1	34.2	-	47.4	38.3	73.9	53.9	26.6	15.6	Floor noise
Vert.	7323.0	42.5	33.6	35.6	8.3	34.1	-	52.4	43.4	73.9	53.9	21.5	10.5	Floor noise
Vert.	9764.0	42.1	33.4	36.0	9.2	34.7	-	52.6	43.9	73.9	53.9	21.3	10.0	Floor noise

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
*QP detector was used up to 1GHz.

Distance factor: 1 GHz - 6 GHz 20log (3.75 m / 3.0 m) = 1.94 dB
 6 GHz - 10 GHz 20log (3.75 m / 3.0 m) = 1.94 dB
 10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission
(BT1)

Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date January 29, 2024 February 8, 2024 February 8, 2024 February 7, 2024
Temperature / Humidity 20 deg. C / 35 % RH 24 deg. C / 40 % RH 22 deg. C / 45 % RH 21 deg. C / 38 % RH
Engineer Takeshi Hiyaji Daiki Matsui Tomohisa Nakagawa Daiki Matsui
 (1 GHz to 10 GHz) (10 GHz to 18 GHz) (18 GHz to 26.5 GHz) (Below 1 GHz)
Mode Tx, Hopping Off, 3DH5 2480 MHz

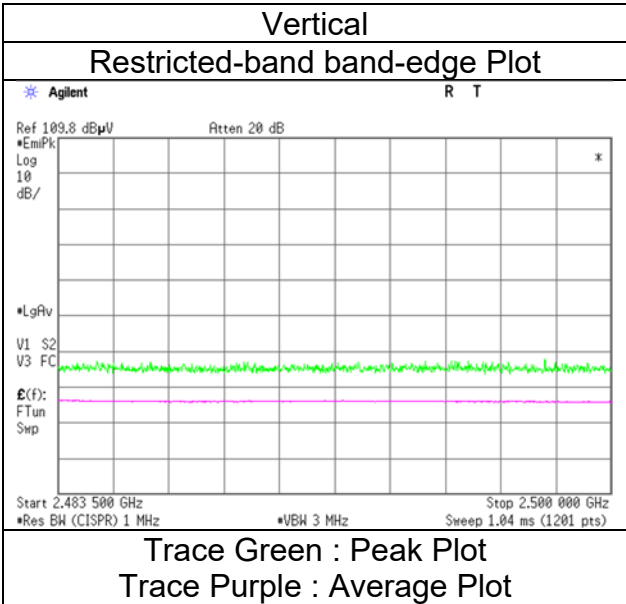
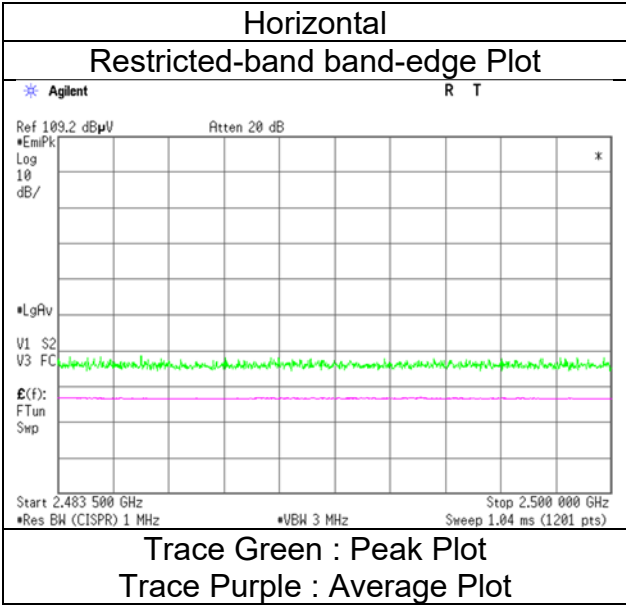
Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	45.7	21.2	-	12.7	6.8	28.6	-	12.2	-	40.0	-	27.9	-	
Hori.	83.7	21.4	-	7.4	7.2	28.5	-	7.5	-	40.0	-	32.5	-	
Hori.	108.9	21.5	-	11.5	7.4	28.4	-	12.0	-	43.5	-	31.5	-	
Hori.	164.0	20.2	-	15.6	7.9	28.2	-	15.5	-	43.5	-	28.0	-	
Hori.	345.3	24.3	-	15.1	9.0	28.0	-	20.4	-	46.0	-	25.6	-	
Hori.	522.6	21.0	-	17.7	9.9	29.2	-	19.4	-	46.0	-	26.6	-	
Hori.	2483.5	44.5	35.9	27.5	5.0	34.9	1.1	42.1	34.6	73.9	53.9	31.8	19.3	*1)
Hori.	4960.0	41.8	33.7	31.7	7.1	34.2	-	46.4	38.4	73.9	53.9	27.5	15.5	Floor noise
Hori.	7440.0	42.9	34.3	35.5	8.4	34.1	-	52.6	44.0	73.9	53.9	21.3	9.9	Floor noise
Hori.	9920.0	42.4	34.5	36.2	9.2	34.7	-	53.1	45.2	73.9	53.9	20.8	8.7	Floor noise
Vert.	45.3	21.2	-	12.8	6.8	28.6	-	12.3	-	40.0	-	27.7	-	
Vert.	83.1	29.7	-	7.3	7.2	28.5	-	15.7	-	40.0	-	24.3	-	
Vert.	105.6	26.1	-	11.0	7.4	28.4	-	16.1	-	43.5	-	27.4	-	
Vert.	164.1	20.2	-	15.6	7.9	28.2	-	15.5	-	43.5	-	28.0	-	
Vert.	348.8	21.6	-	15.2	9.0	28.0	-	17.7	-	46.0	-	28.3	-	
Vert.	522.6	25.4	-	17.7	9.9	29.2	-	23.8	-	46.0	-	22.2	-	
Vert.	2483.5	44.8	36.1	27.5	5.0	34.9	1.1	42.4	34.8	73.9	53.9	31.5	19.1	*1)
Vert.	4960.0	41.6	33.8	31.7	7.1	34.2	-	46.2	38.4	73.9	53.9	27.7	15.5	Floor noise
Vert.	7440.0	42.3	34.4	35.5	8.4	34.1	-	52.1	44.1	73.9	53.9	21.8	9.8	Floor noise
Vert.	9920.0	42.2	34.1	36.2	9.2	34.7	-	52.9	44.8	73.9	53.9	21.0	9.2	Floor noise

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
*QP detector was used up to 1GHz.
*1) Not Out of Band emission(Leakage Power)

Distance factor: 1 GHz - 6 GHz 20log (3.75 m / 3.0 m) = 1.94 dB
 6 GHz - 10 GHz 20log (3.75 m / 3.0 m) = 1.94 dB
 10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission
(Reference Plot for band-edge)
(BT1)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	January 29, 2024
Temperature / Humidity	20 deg. C / 35 % RH
Engineer	Takeshi Hiyaji
Mode	Tx, Hopping Off, 3DH5 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
(BT2)

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.2	No.2	No.2
Date	January 29, 2024	February 8, 2024	February 8, 2024
Temperature / Humidity	20 deg. C / 35 % RH	24 deg. C / 40 % RH	22 deg. C / 45 % RH
Engineer	Takeshi Hiyaji	Daiki Matsui	Tomohisa Nakagawa
	(1 GHz to 10 GHz)	(10 GHz to 18 GHz)	(18 GHz to 26.5 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz		

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	2390.0	44.7	35.6	27.7	5.0	34.9	1.1	42.4	34.4	73.9	53.9	31.5	19.6	*1)
Hori.	4804.0	41.9	35.5	31.6	7.1	34.1	1.1	46.4	41.2	73.9	53.9	27.5	12.7	
Hori.	7206.0	42.4	34.8	35.6	8.2	34.0	-	52.3	44.6	73.9	53.9	21.7	9.3	Floor noise
Hori.	9608.0	41.8	34.4	35.7	9.1	34.7	-	51.9	44.5	73.9	53.9	22.0	9.4	Floor noise
Vert.	2390.0	51.6	36.8	27.7	5.0	34.9	1.1	49.2	35.5	73.9	53.9	24.7	18.4	*1)
Vert.	4804.0	41.6	35.6	31.6	7.1	34.1	1.1	46.1	41.3	73.9	53.9	27.8	12.6	
Vert.	7206.0	42.3	34.6	35.6	8.2	34.0	-	52.1	44.4	73.9	53.9	21.8	9.5	Floor noise
Vert.	9608.0	42.6	34.7	35.7	9.1	34.7	-	52.7	44.8	73.9	53.9	21.2	9.1	Floor noise

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
*QP detector was used up to 1GHz.
*1) Not Out of Band emission(Leakage Power)

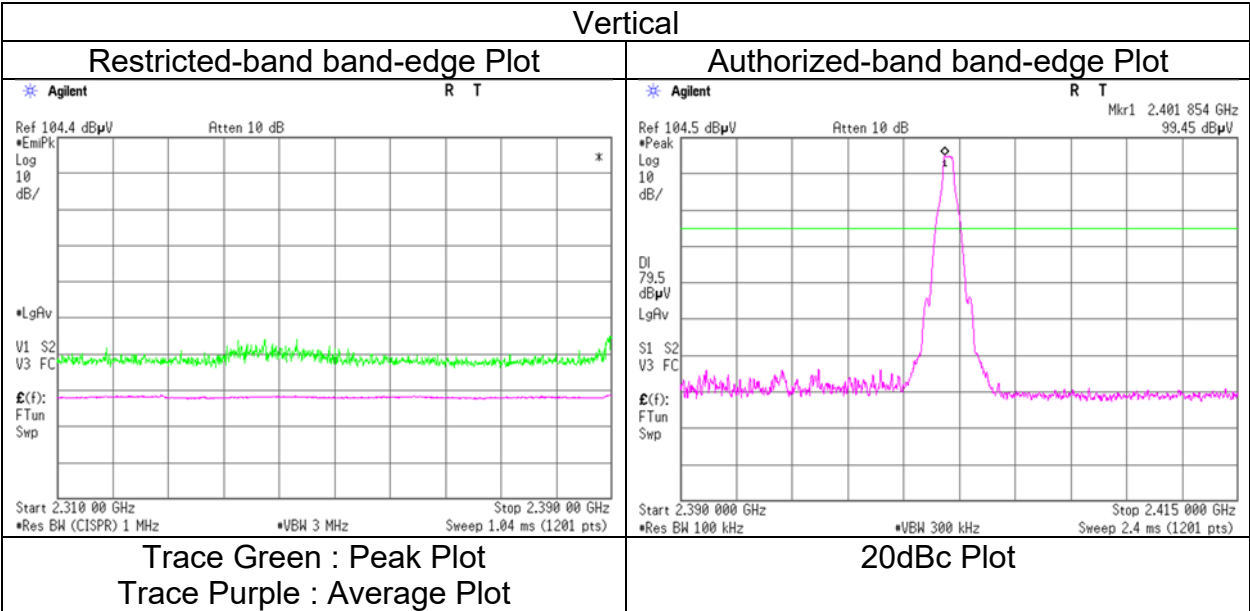
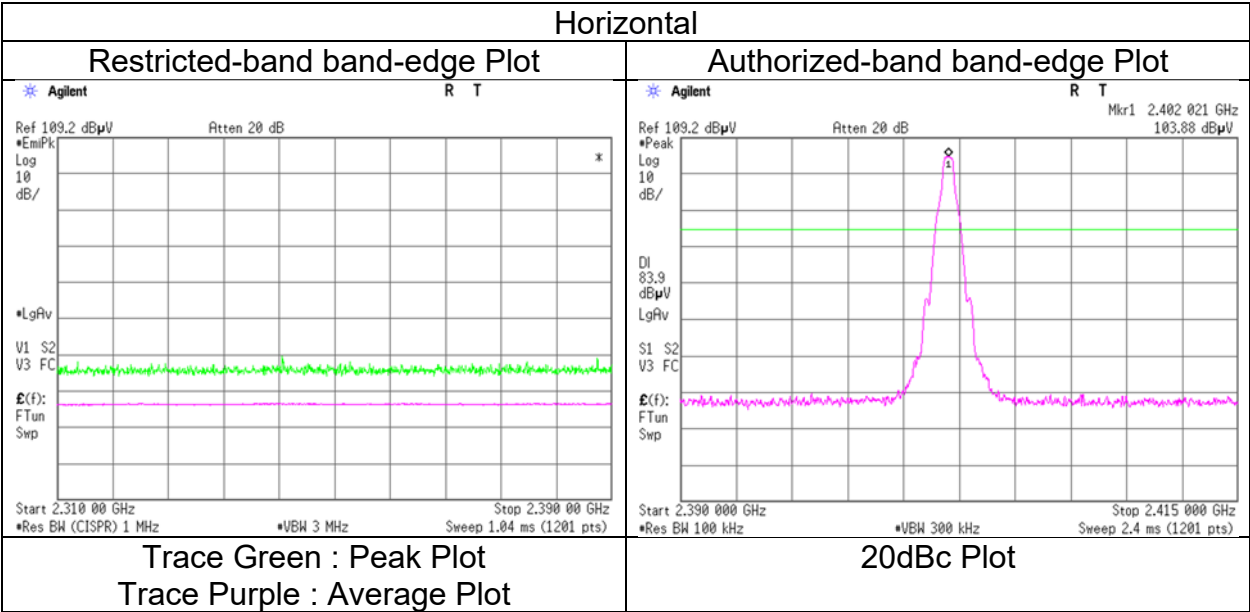
20dBc Data Sheet

Polarity	Frequency	Reading (PK)	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	2402.0	103.9	27.6	5.0	34.9	101.6	-	-	Carrier
Hori.	2400.0	39.8	27.6	5.0	34.9	37.5	81.6	44.1	
Vert.	2402.0	99.5	27.6	5.0	34.9	97.1	-	-	Carrier
Vert.	2400.0	37.8	27.6	5.0	34.9	35.5	77.1	41.6	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
Distance factor:
1 GHz - 6 GHz 20log (3.75 m / 3.0 m) = 1.94 dB
6 GHz - 10 GHz 20log (3.75 m / 3.0 m) = 1.94 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission
(Reference Plot for band-edge)
(BT2)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	January 29, 2024
Temperature / Humidity	20 deg. C / 35 % RH
Engineer	Takeshi Hiyaji
Mode	Tx, Hopping Off, DH5 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
(BT2)

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.2	No.2	No.2
Date	January 29, 2024	February 8, 2024	February 8, 2024
Temperature / Humidity	20 deg. C / 35 % RH	24 deg. C / 40 % RH	22 deg. C / 45 % RH
Engineer	Takeshi Hiyaji	Daiki Matsui	Tomohisa Nakagawa
	(1 GHz to 10 GHz)	(10 GHz to 18 GHz)	(18 GHz to 26.5 GHz)
Mode	Tx, Hopping Off, DH5 2441 MHz		

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	4882.0	40.8	35.3	31.6	7.1	34.2	1.1	45.3	41.1	73.9	53.9	28.6	12.9	
Hori.	7323.0	41.5	34.1	35.6	8.3	34.1	-	51.4	43.9	73.9	53.9	22.5	10.0	Floor noise
Hori.	9764.0	41.6	34.0	36.0	9.2	34.7	-	52.1	44.5	73.9	53.9	21.8	9.4	Floor noise
Vert.	4882.0	42.4	34.9	31.6	7.1	34.2	1.1	47.0	40.6	73.9	53.9	26.9	13.3	
Vert.	7323.0	42.2	33.9	35.6	8.3	34.1	-	52.0	43.7	73.9	53.9	21.9	10.2	Floor noise
Vert.	9764.0	41.9	34.1	36.0	9.2	34.7	-	52.4	44.6	73.9	53.9	21.5	9.3	Floor noise

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
*QP detector was used up to 1GHz.

Distance factor:	1 GHz - 6 GHz	20log (3.75 m / 3.0 m) = 1.94 dB
	6 GHz - 10 GHz	20log (3.75 m / 3.0 m) = 1.94 dB
	10 GHz - 26.5 GHz	20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission
(BT2)

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.2	No.2	No.2
Date	January 29, 2024	February 8, 2024	February 8, 2024
Temperature / Humidity	20 deg. C / 35 % RH	24 deg. C / 40 % RH	22 deg. C / 45 % RH
Engineer	Takeshi Hiyaji	Daiki Matsui	Tomohisa Nakagawa
	(1 GHz to 10 GHz)	(10 GHz to 18 GHz)	(18 GHz to 26.5 GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz		

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	2483.5	43.9	36.0	27.5	5.0	34.9	1.1	41.5	34.8	73.9	53.9	32.4	19.2	*1)
Hori.	2489.6	44.2	36.3	27.5	5.0	34.3	1.1	42.4	35.6	73.9	53.9	31.5	18.3	
Hori.	4960.0	42.3	33.8	31.7	7.1	34.2	-	47.0	38.4	73.9	53.9	26.9	15.5	Floor noise
Hori.	7440.0	43.0	34.6	35.5	8.4	34.1	-	52.7	44.3	73.9	53.9	21.2	9.6	Floor noise
Hori.	9920.0	42.5	34.1	36.2	9.2	34.7	-	53.2	44.8	73.9	53.9	20.8	9.1	Floor noise
Vert.	2483.5	42.6	35.3	27.5	5.0	34.9	1.1	40.2	34.1	73.9	53.9	33.7	19.9	*1)
Vert.	2489.6	45.8	37.4	27.5	5.0	34.3	1.1	44.0	36.7	73.9	53.9	29.9	17.2	
Vert.	4960.0	42.9	33.9	31.7	7.1	34.2	-	47.5	38.6	73.9	53.9	26.4	15.3	Floor noise
Vert.	7440.0	42.6	34.4	35.5	8.4	34.1	-	52.3	44.1	73.9	53.9	21.6	9.8	Floor noise
Vert.	9920.0	42.3	34.0	36.2	9.2	34.7	-	53.0	44.7	73.9	53.9	20.9	9.2	Floor noise

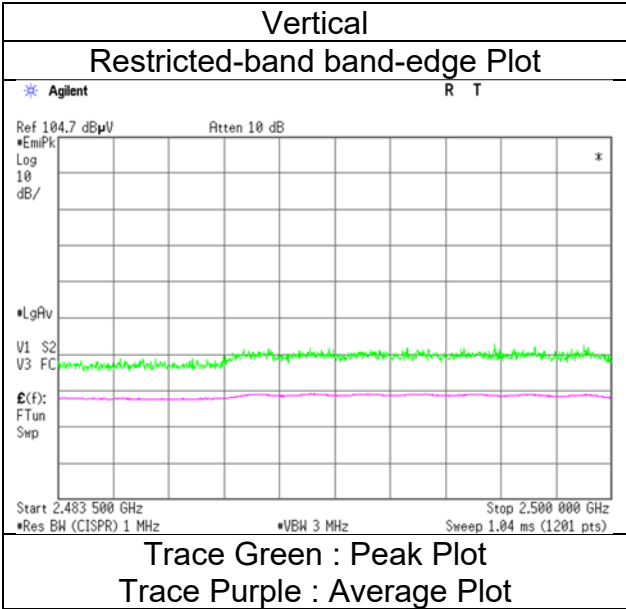
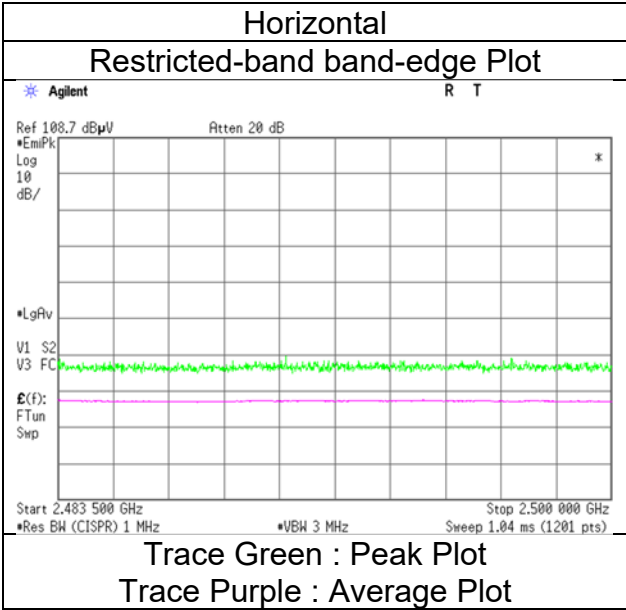
Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
*QP detector was used up to 1GHz.
*1) Not Out of Band emission(Leakage Power)

Distance factor: 1 GHz - 6 GHz 20log (3.75 m / 3.0 m) = 1.94 dB
 6 GHz - 10 GHz 20log (3.75 m / 3.0 m) = 1.94 dB
 10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission
(Reference Plot for bandto edge
(BT2)

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer
Mode

Ise EMC Lab.
No.2
January 29, 2024
20 deg. C / 35 % RH
Takeshi Hiyaji
Tx, Hopping Off, DH5 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 (BT2)

Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.2	No.2	No.2	No.2
Date	January 29, 2024	February 8, 2024	February 8, 2024	February 7, 2024
Temperature / Humidity	20 deg. C / 35 % RH	24 deg. C / 40 % RH	22 deg. C / 45 % RH	21 deg. C / 38 % RH
Engineer	Takeshi Hiyaji	Daiki Matsui	Tomohisa Nakagawa	Daiki Matsui
	(1 GHz to 10 GHz)	(10 GHz to 18 GHz)	(18 GHz to 26.5 GHz)	(Below 1 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz			

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	45.7	22.6	-	12.7	6.8	28.6	-	13.5	-	40.0	-	26.5	-	
Hori.	69.6	23.2	-	6.4	7.1	28.5	-	8.2	-	40.0	-	31.9	-	
Hori.	107.1	20.7	-	11.2	7.4	28.4	-	10.9	-	43.5	-	32.6	-	
Hori.	164.0	20.4	-	15.6	7.9	28.2	-	15.7	-	43.5	-	27.8	-	
Hori.	355.8	24.3	-	15.2	9.0	28.1	-	20.4	-	46.0	-	25.6	-	
Hori.	522.7	20.6	-	17.7	9.9	29.2	-	19.0	-	46.0	-	27.0	-	
Hori.	2390.0	46.1	36.4	27.7	5.0	34.9	1.1	43.7	35.2	73.9	53.9	30.2	18.7	*1)
Hori.	4804.0	41.6	34.7	31.6	7.1	34.1	1.1	46.1	40.3	73.9	53.9	27.8	13.6	
Hori.	7206.0	42.2	34.4	35.6	8.2	34.0	-	52.0	44.2	73.9	53.9	21.9	9.7	Floor noise
Hori.	9608.0	41.5	34.5	35.7	9.1	34.7	-	51.6	44.6	73.9	53.9	22.3	9.3	Floor noise
Vert.	36.0	22.1	-	16.3	6.7	28.6	-	16.5	-	40.0	-	23.5	-	
Vert.	82.2	30.3	-	7.1	7.2	28.5	-	16.1	-	40.0	-	23.9	-	
Vert.	105.4	26.7	-	11.0	7.4	28.4	-	16.7	-	43.5	-	26.8	-	
Vert.	164.1	20.3	-	15.6	7.9	28.2	-	15.6	-	43.5	-	27.9	-	
Vert.	348.7	21.3	-	15.2	9.0	28.0	-	17.4	-	46.0	-	28.6	-	
Vert.	522.7	25.2	-	17.7	9.9	29.2	-	23.6	-	46.0	-	22.4	-	
Vert.	2390.0	51.0	36.3	27.7	5.0	34.9	1.1	48.6	35.1	73.9	53.9	25.3	18.8	*1)
Vert.	4804.0	42.4	35.2	31.6	7.1	34.1	1.1	46.9	40.8	73.9	53.9	27.0	13.1	
Vert.	7206.0	42.0	34.5	35.6	8.2	34.0	-	51.8	44.3	73.9	53.9	22.1	9.6	Floor noise
Vert.	9608.0	41.4	34.6	35.7	9.1	34.7	-	51.6	44.7	73.9	53.9	22.4	9.2	Floor noise

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

*QP detector was used up to 1GHz.

*1) Not Out of Band emission(Leakage Power)

20dBc Data Sheet

Polarity	Frequency	Reading (PK)	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	2402.0	104.1	27.6	5.0	34.9	101.7	-	-	Carrier
Hori.	2400.0	41.9	27.6	5.0	34.9	39.6	81.7	42.2	
Vert.	2402.0	98.7	27.6	5.0	34.9	96.4	-	-	Carrier
Vert.	2400.0	39.5	27.6	5.0	34.9	37.2	76.4	39.2	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

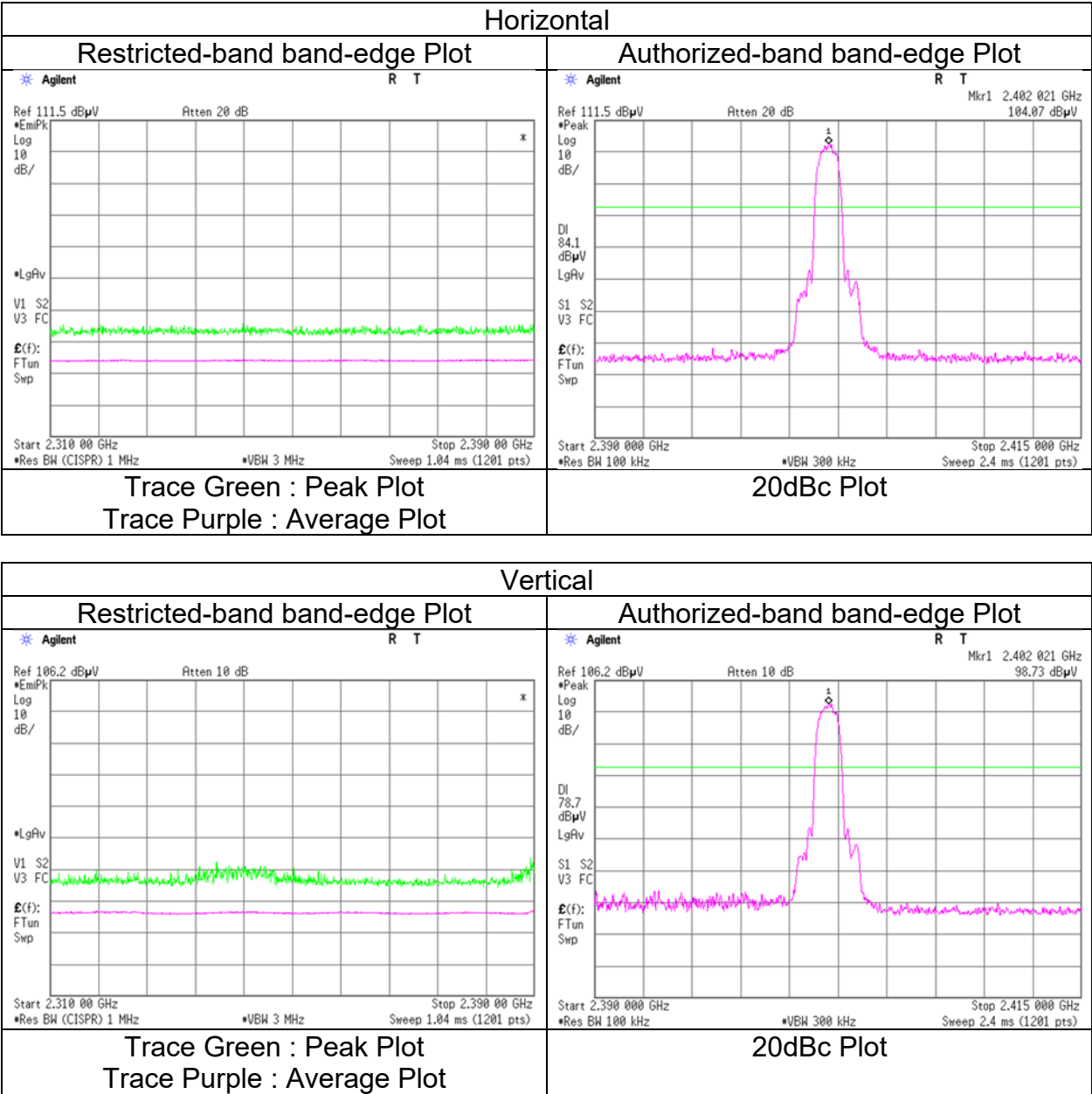
Distance factor: 1 GHz - 6 GHz 20log (3.75 m / 3.0 m) = 1.94 dB

6 GHz - 10 GHz 20log (3.75 m / 3.0 m) = 1.94 dB

10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission
(Reference Plot for band-edge)
(BT2)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	January 29, 2024
Temperature / Humidity	20 deg. C / 35 % RH
Engineer	Takeshi Hiyaji
Mode	Tx, Hopping Off, 3DH5 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
(BT2)

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.2	No.2	No.2
Date	January 29, 2024	February 8, 2024	February 8, 2024
Temperature / Humidity	20 deg. C / 35 % RH	24 deg. C / 40 % RH	22 deg. C / 45 % RH
Engineer	Takeshi Hiyaji	Daiki Matsui	Tomohisa Nakagawa
	(1 GHz to 10 GHz)	(10 GHz to 18 GHz)	(18 GHz to 26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2441 MHz		

Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	4882.0	41.5	35.0	31.6	7.1	34.2	1.1	46.1	40.7	73.9	53.9	27.8	13.2	
Hori.	7323.0	41.8	33.8	35.6	8.3	34.1	-	51.7	43.7	73.9	53.9	22.2	10.2	Floor noise
Hori.	9764.0	42.2	34.1	36.0	9.2	34.7	-	52.7	44.6	73.9	53.9	21.3	9.4	Floor noise
Vert.	4882.0	41.5	35.7	31.6	7.1	34.2	1.1	46.1	41.5	73.9	53.9	27.8	12.5	
Vert.	7323.0	41.1	34.0	35.6	8.3	34.1	-	50.9	43.8	73.9	53.9	23.0	10.1	Floor noise
Vert.	9764.0	41.3	34.0	36.0	9.2	34.7	-	51.8	44.5	73.9	53.9	22.1	9.4	Floor noise

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
*QP detector was used up to 1GHz.

Distance factor:	1 GHz - 6 GHz	20log (3.75 m / 3.0 m) = 1.94 dB
	6 GHz - 10 GHz	20log (3.75 m / 3.0 m) = 1.94 dB
	10 GHz - 26.5 GHz	20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission
(BT2)

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.2	No.2	No.2
Date	January 29, 2024	February 8, 2024	February 8, 2024
Temperature / Humidity	20 deg. C / 35 % RH	24 deg. C / 40 % RH	22 deg. C / 45 % RH
Engineer	Takeshi Hiyaji	Daiki Matsui	Tomohisa Nakagawa
	(1 GHz to 10 GHz)	(10 GHz to 18 GHz)	(18 GHz to 26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz		

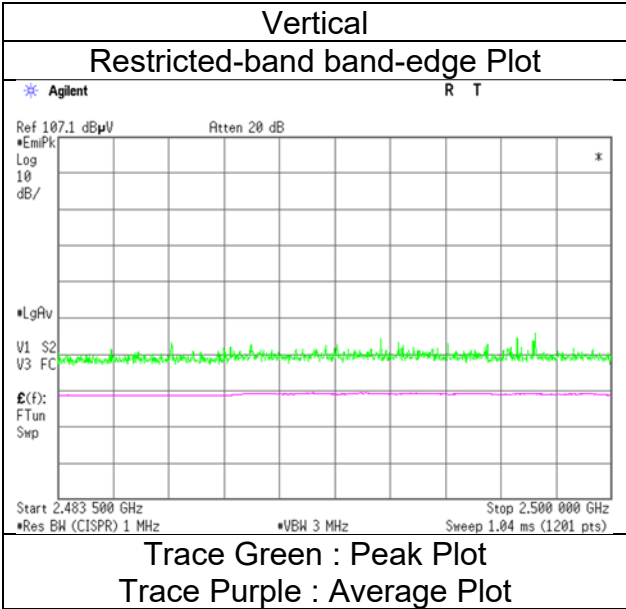
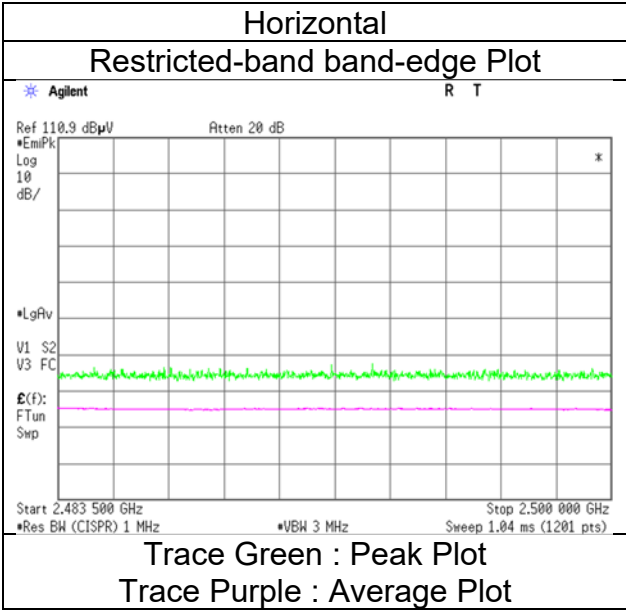
Polarity	Frequency	Reading (QP / PK)	Reading (AV)	Ant. Factor	Loss	Gain	Duty Factor	Result (QP / PK)	Result (AV)	Limit (QP / PK)	Limit (AV)	Margin (QP / PK)	Margin (AV)	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Hori.	2483.5	44.5	36.2	27.5	5.0	34.9	1.1	42.2	34.9	73.9	53.9	31.7	19.0	*1)
Hori.	4960.0	42.7	33.8	31.7	7.1	34.2	-	47.3	38.5	73.9	53.9	26.6	15.4	Floor noise
Hori.	7440.0	42.7	34.4	35.5	8.4	34.1	-	52.4	44.1	73.9	53.9	21.5	9.8	Floor noise
Hori.	9920.0	41.8	34.4	36.2	9.2	34.7	-	52.5	45.1	73.9	53.9	21.4	8.8	Floor noise
Vert.	2483.5	46.6	35.1	27.5	5.0	34.9	1.1	44.2	33.8	73.9	53.9	29.7	20.1	*1)
Vert.	4960.0	42.5	34.2	31.7	7.1	34.2	-	47.1	38.9	73.9	53.9	26.8	15.0	Floor noise
Vert.	7440.0	42.1	34.4	35.5	8.4	34.1	-	51.9	44.1	73.9	53.9	22.0	9.8	Floor noise
Vert.	9920.0	42.4	34.2	36.2	9.2	34.7	-	53.1	44.9	73.9	53.9	20.8	9.0	Floor noise

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
*QP detector was used up to 1GHz.
*1) Not Out of Band emission(Leakage Power)

Distance factor: 1 GHz - 6 GHz 20log (3.75 m / 3.0 m) = 1.94 dB
 6 GHz - 10 GHz 20log (3.75 m / 3.0 m) = 1.94 dB
 10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission
(Reference Plot for band-edge
(BT2)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	January 29, 2024
Temperature / Humidity	20 deg. C / 35 % RH
Engineer	Takeshi Hiyaji
Mode	Tx, Hopping Off, 3DH5 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 (BT1)

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	February 20, 2024	February 7, 2024
Temperature / Humidity	23 deg. C / 58 % RH	21 deg. C / 38 % RH
Engineer	Takafumi Noguchi (1 GHz to 26.5 GHz)	Daiki Matsui (Below 1 GHz)
Mode	Tx, Hopping Off, DH5 2402	MHz + 11be-80 [OFDM] 5775 MHz

Polarity	Frequency	Reading (QP / PK) [dBuV]	Reading (AV) [dBuV]	Ant. Factor [dB/m]	Loss	Gain	Duty Factor [dB]	Result (QP / PK) [dBuV/m]	Result (AV) [dBuV/m]	Limit (QP / PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (QP / PK) [dB]	Margin (AV) [dB]	Remark
[Hori/Vert]	[MHz]				[dB]	[dB]								
Hori.	126.0	35.3	-	13.4	7.6	28.3	-	27.9	-	43.5	-	15.6	-	
Hori.	168.4	40.7	-	15.8	7.9	28.1	-	36.2	-	43.5	-	7.3	-	
Hori.	379.1	31.3	-	15.3	9.2	28.3	-	27.5	-	46.0	-	18.5	-	
Hori.	459.4	33.3	-	16.9	9.6	28.9	-	30.8	-	46.0	-	15.2	-	
Hori.	641.5	32.5	-	19.3	10.3	29.3	-	32.8	-	46.0	-	13.2	-	
Hori.	965.1	32.2	-	22.1	11.5	28.7	-	37.1	-	53.9	-	16.8	-	
Hori.	2390.0	49.0	36.5	27.7	4.9	34.9	1.1	46.6	35.3	73.9	53.9	27.3	18.6	*1)
Hori.	4804.0	41.9	33.9	31.6	7.0	34.1	-	46.4	38.3	73.9	53.9	27.6	15.6	Floor noise
Hori.	7206.0	43.1	34.9	35.6	8.1	34.0	-	52.8	44.6	73.9	53.9	21.1	9.3	Floor noise
Hori.	9608.0	42.0	34.7	35.7	8.7	34.7	-	51.7	44.5	73.9	53.9	22.2	9.4	Floor noise
Vert.	31.8	34.9	-	17.9	6.7	28.6	-	30.9	-	40.0	-	9.1	-	
Vert.	48.9	40.3	-	11.4	6.9	28.6	-	30.0	-	40.0	-	10.0	-	
Vert.	110.9	42.7	-	11.7	7.5	28.4	-	33.5	-	43.5	-	10.0	-	
Vert.	613.5	33.2	-	19.4	10.2	29.3	-	33.5	-	46.0	-	12.5	-	
Vert.	818.2	33.1	-	20.9	10.9	29.1	-	35.9	-	46.0	-	10.2	-	
Vert.	956.2	31.9	-	22.1	11.4	28.7	-	36.7	-	46.0	-	9.3	-	
Vert.	2390.0	50.3	36.7	27.7	4.9	34.9	1.1	47.9	35.5	73.9	53.9	26.0	18.4	*1)
Vert.	4804.0	41.9	33.9	31.6	7.0	34.1	-	46.4	38.3	73.9	53.9	27.6	15.6	Floor noise
Vert.	7206.0	43.1	34.9	35.6	8.1	34.0	-	52.8	44.6	73.9	53.9	21.1	9.3	Floor noise
Vert.	9608.0	42.0	34.7	35.7	8.7	34.7	-	51.7	44.5	73.9	53.9	22.2	9.4	Floor noise

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

$$\text{Result (AV)} = \text{Reading} + \text{Ant Factor} + \text{Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz))} - \text{Gain(Amplifier)} + \text{Duty factor}$$

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

*QP detector was used up to 1GHz.

*1) Not Out of Band emission(Leakage Power)

20dBc Data Sheet

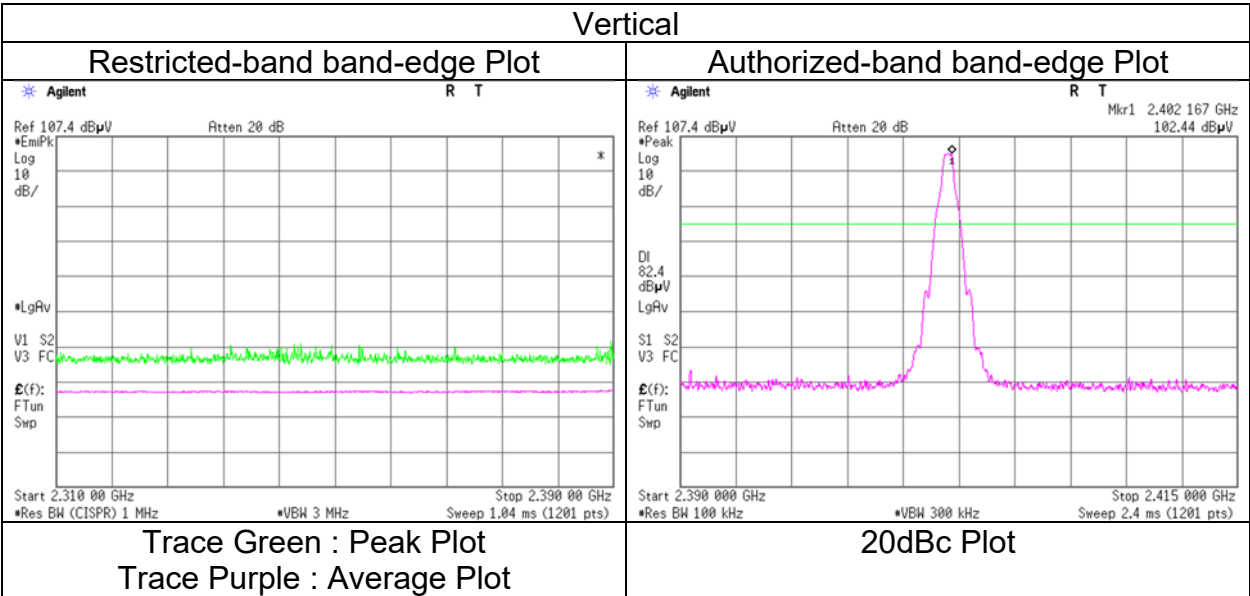
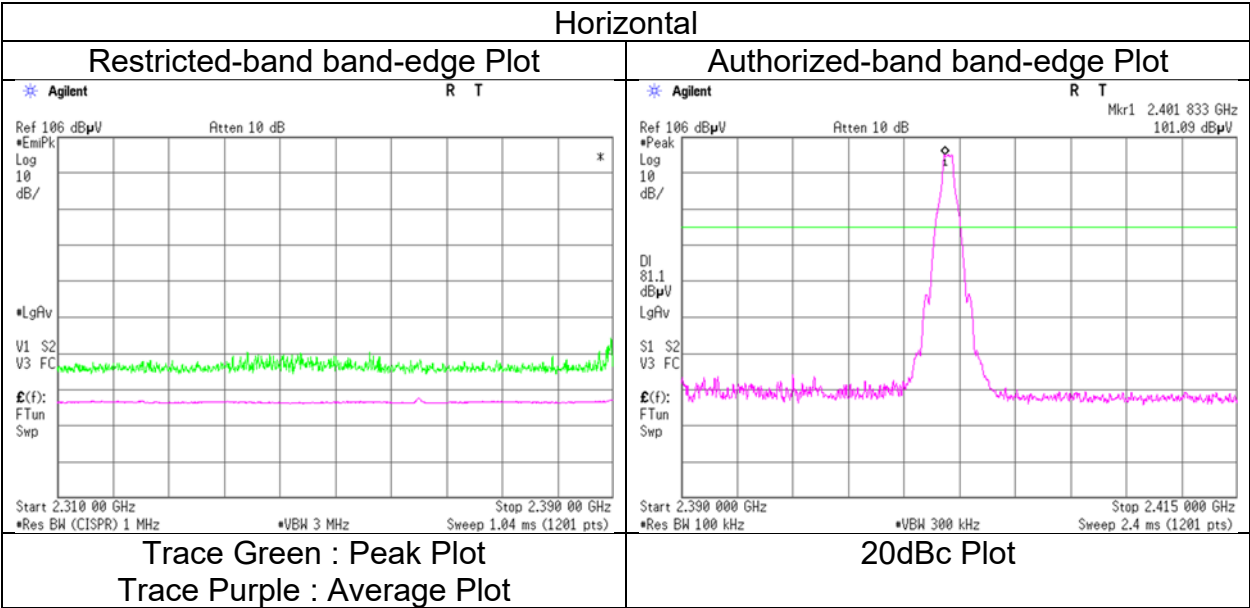
Polarity	Frequency	Reading (PK)	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	2402.0	101.1	27.6	4.9	34.9	98.7	-	-	Carrier
Hori.	2400.0	38.7	27.6	4.9	34.9	36.3	78.7	42.4	
Vert.	2402.0	102.4	27.6	4.9	34.9	100.1	-	-	Carrier
Vert.	2400.0	39.4	27.6	4.9	34.9	37.0	80.1	43.0	

$$\text{Result} = \text{Reading} + \text{Ant Factor} + \text{Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz))} - \text{Gain(Amprifier)}$$

Distance factor:	1 GHz - 6 GHz	$20\log(3.75\text{ m} / 3.0\text{ m}) = 1.94\text{ dB}$
	6 GHz - 10 GHz	$20\log(3.75\text{ m} / 3.0\text{ m}) = 1.94\text{ dB}$
	10 GHz - 26.5 GHz	$20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Radiated Spurious Emission
(Reference Plot for band-edge
(BT1)

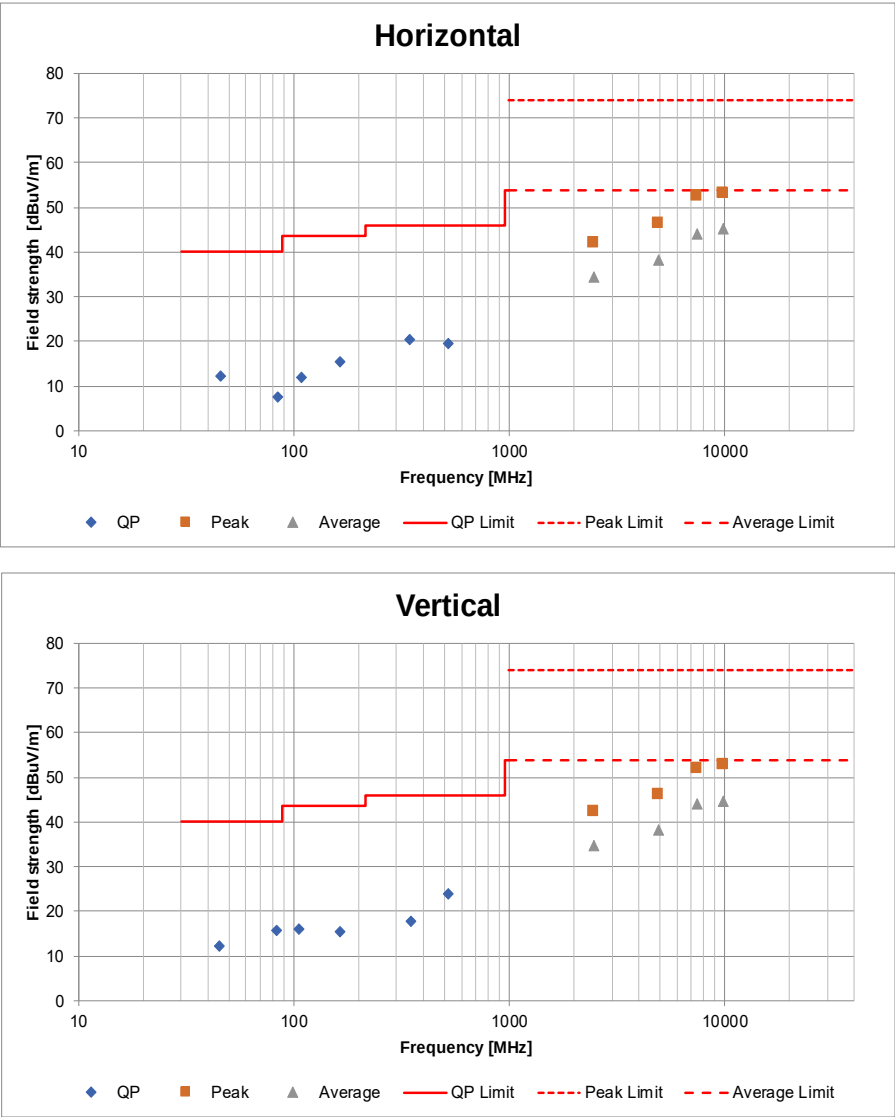
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	February 20, 2024
Temperature / Humidity	23 deg. C / 58 % RH
Engineer	Takafumi Noguchi
Mode	Tx, Hopping Off, DH5 2402 MHz + 11be-80 [OFDM] 5775 MHz



* 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
(Plot data, Worst case mode for Maximum Peak Output Power)
(BT1)

Test place	Ise EMC Lab.	No.2	No.2	No.2
Semi Anechoic Chamber	No.2	No.2	No.2	No.2
Date	January 29, 2024	February 8, 2024	February 8, 2024	February 7, 2024
Temperature / Humidity	20 deg. C / 35 % RH	24 deg. C / 40 % RH	22 deg. C / 45 % RH	21 deg. C / 38 % RH
Engineer	Takeshi Hiyaji	Daiki Matsui	Tomohisa Nakagawa	Daiki Matsui
	(1 GHz to 10 GHz)	(10 GHz to 18 GHz)	(18 GHz to 26.5 GHz)	(Below 1 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz			



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

Test place	Ise EMC Lab. No.6 Measurement Room
Date	January 25, 2024
Temperature / Humidity	20 deg. C / 39 % RH
Engineer	Junya Okuno
Mode	Tx, Hopping Off, DH5

9 kHz to 150 kHz

Agilent R T

Ref -20 dBm #Atten 10 dB Mkr1 76.21 kHz -96.59 dBm

Peak Log 10 dB/ DC Coupled

LgAv

S1 S2

Start 9.00 kHz Stop 150.00 kHz

#Res BW 200 Hz #VBW 620 Hz Sweep 2.279 s (1201 pts)

Marker	Trace	Type	Freq	Amplitude
1	(3)		76.21 kHz	-96.59 dBm

150 kHz to 30 MHz

Agilent R T

Ref -10 dBm #Atten 10 dB Mkr1 1.444 MHz -90.68 dBm

Peak Log 10 dB/ DC Coupled

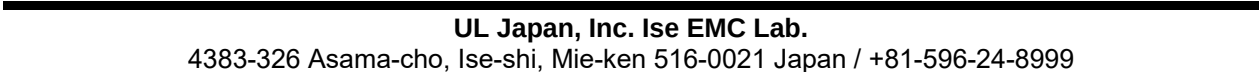
LgAv

S1 S2

Start 150 kHz Stop 30.000 MHz

#Res BW 10 kHz #VBW 30 kHz Sweep 285.3 ms (1201 pts)

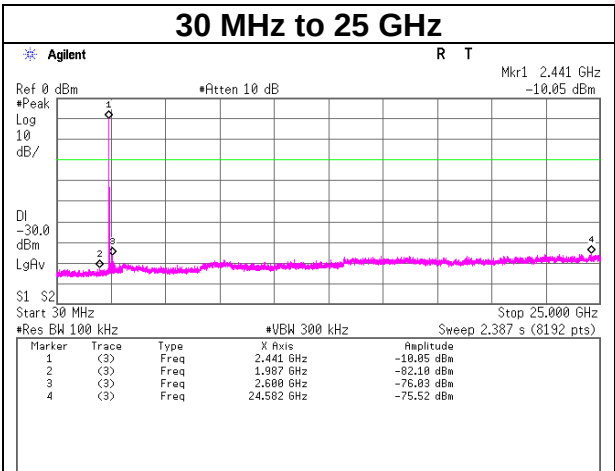
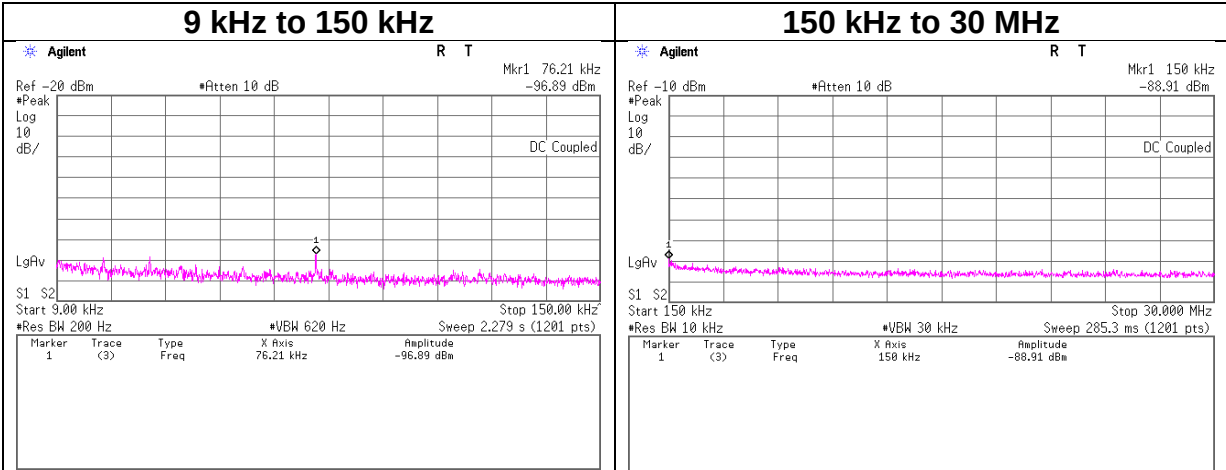
Marker	Trace	Type	Freq	Amplitude
1	(3)		1.444 MHz	-90.68 dBm



Conducted Spurious Emission
(BT1)

Test place Ise EMC Lab. No.6 Measurement Room
Date January 25, 2024
Temperature / Humidity 20 deg. C / 39 % RH
Engineer Junya Okuno
Mode Tx, Hopping Off, DH5

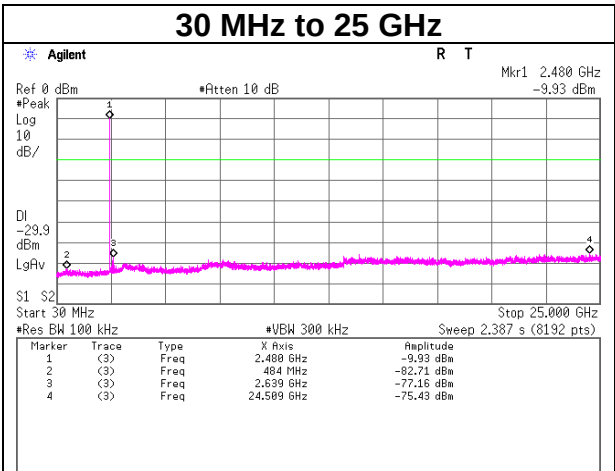
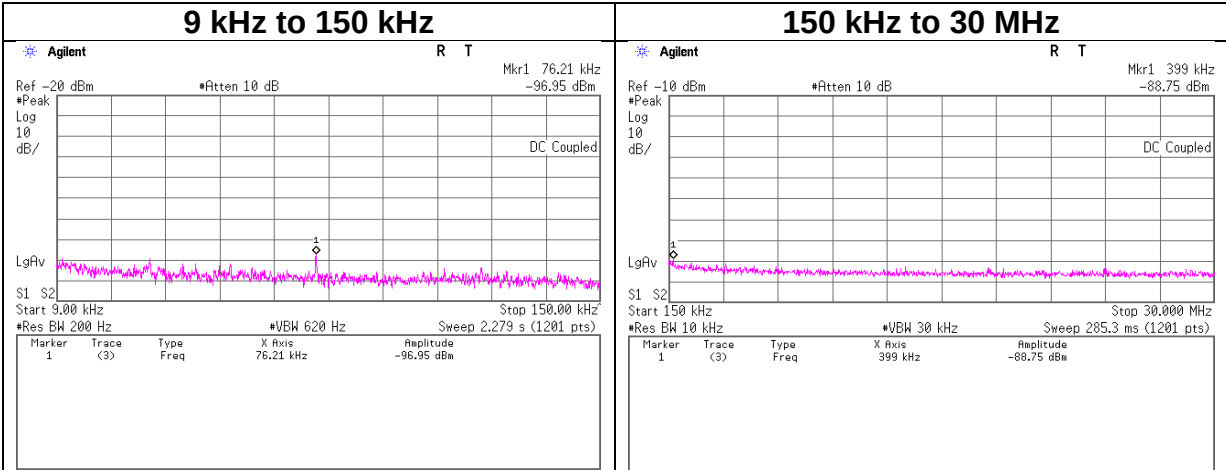
2441 MHz



Conducted Spurious Emission
(BT1)

Test place Ise EMC Lab. No.6 Measurement Room
Date January 25, 2024
Temperature / Humidity 20 deg. C / 39 % RH
Engineer Junya Okuno
Mode Tx, Hopping Off, DH5

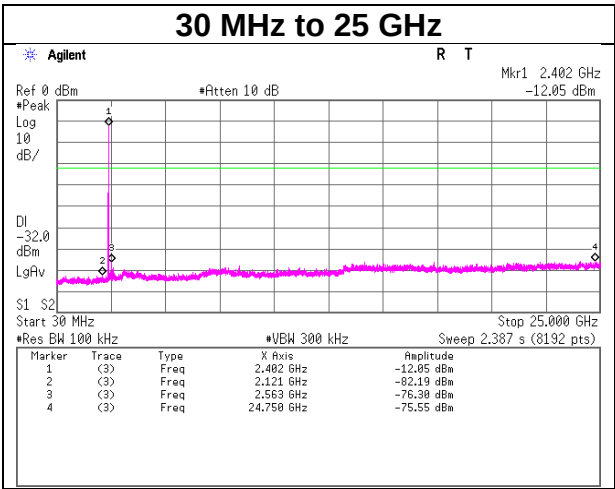
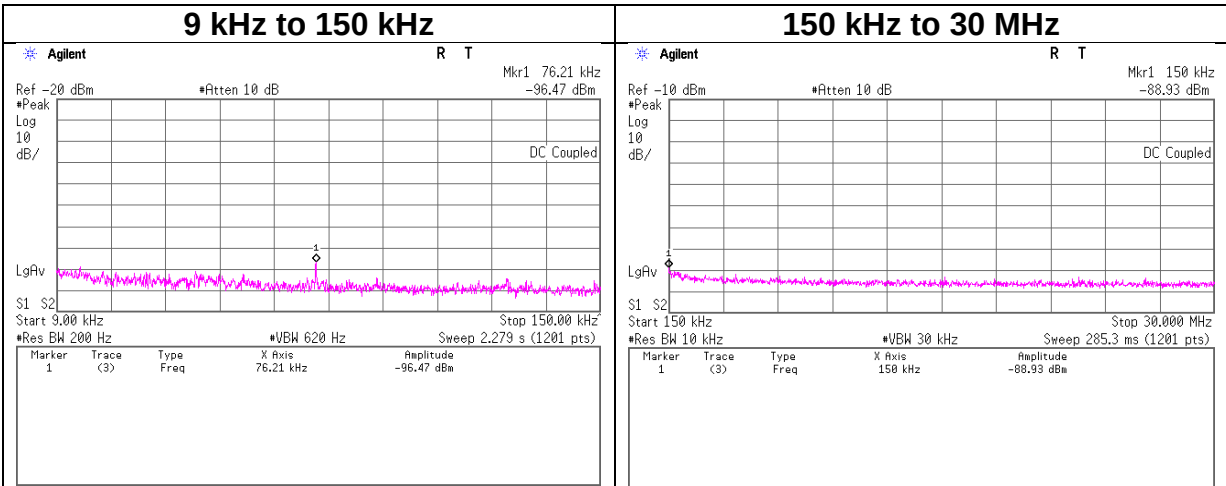
2480 MHz



Conducted Spurious Emission
(BT1)

Test place	Ise EMC Lab. No.6 Measurement Room
Date	January 25, 2024
Temperature / Humidity	20 deg. C / 39 % RH
Engineer	Junya Okuno
Mode	Tx, Hopping Off, 3DH5

2402 MHz



Conducted Spurious Emission
(BT1)

Test place

Date

Temperature / Humidity

Engineer

Mode

Ise EMC Lab. No.6 Measurement Room

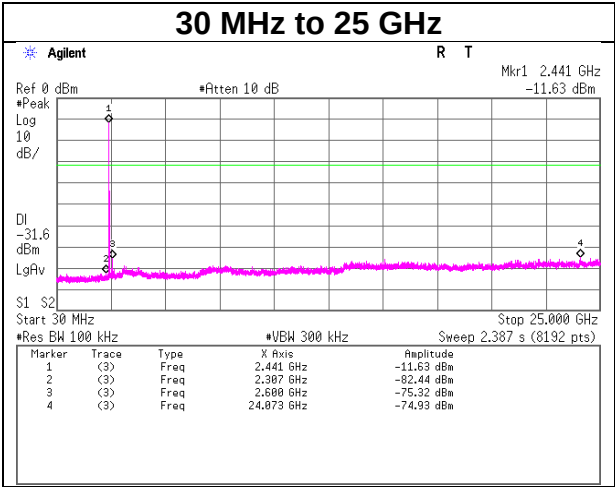
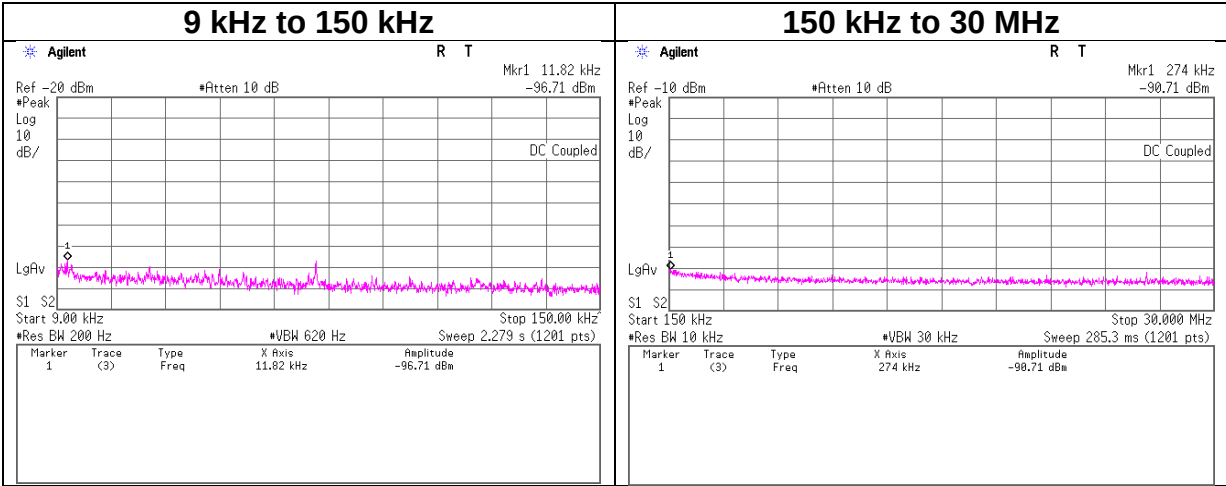
January 25, 2024

20 deg. C / 39 % RH

Junya Okuno

Tx, Hopping Off, 3DH5

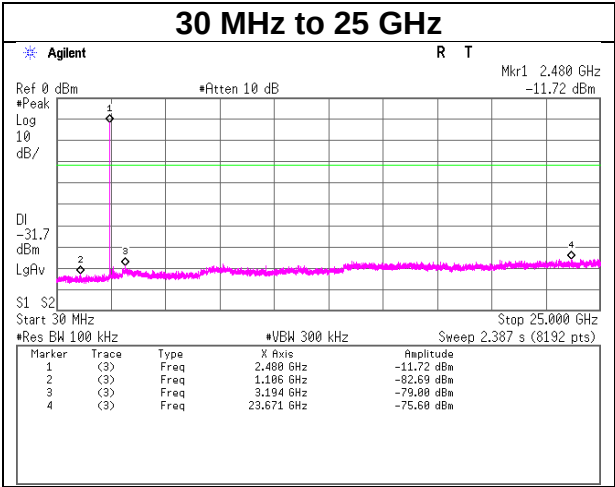
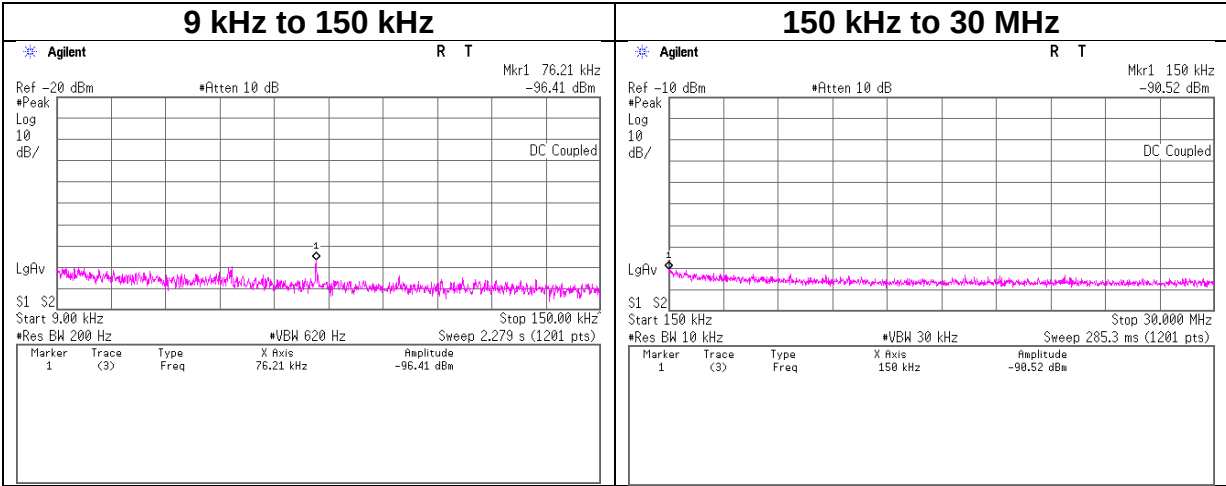
2441 MHz



Conducted Spurious Emission
(BT1)

Test place Ise EMC Lab. No.6 Measurement Room
Date January 25, 2024
Temperature / Humidity 20 deg. C / 39 % RH
Engineer Junya Okuno
Mode Tx, Hopping Off, 3DH5

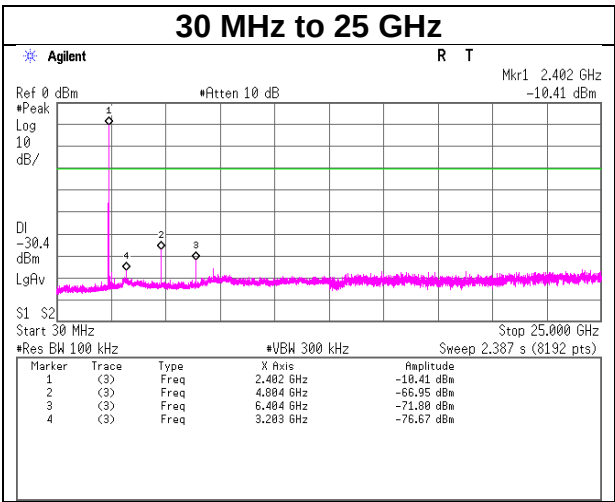
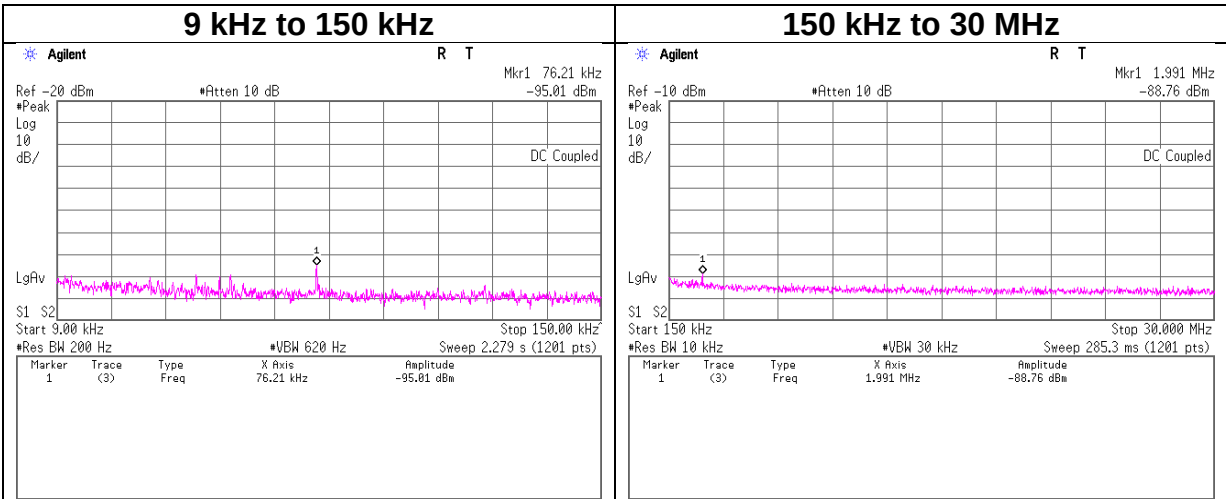
2480 MHz



Conducted Spurious Emission
(BT2)

Test place	Ise EMC Lab. No.6 Measurement Room
Date	January 25, 2024
Temperature / Humidity	20 deg. C / 39 % RH
Engineer	Junya Okuno
Mode	Tx, Hopping Off, DH5

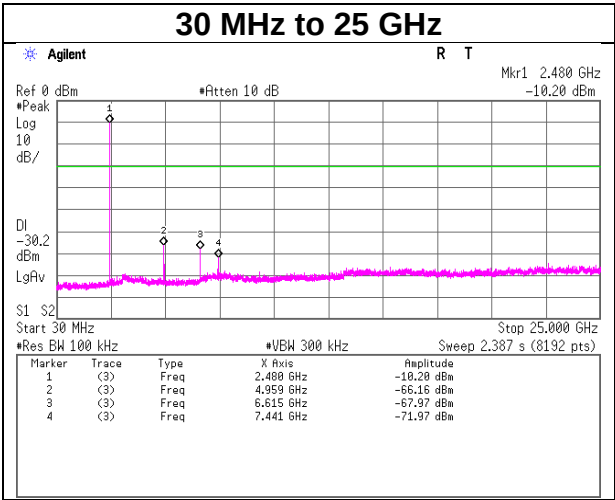
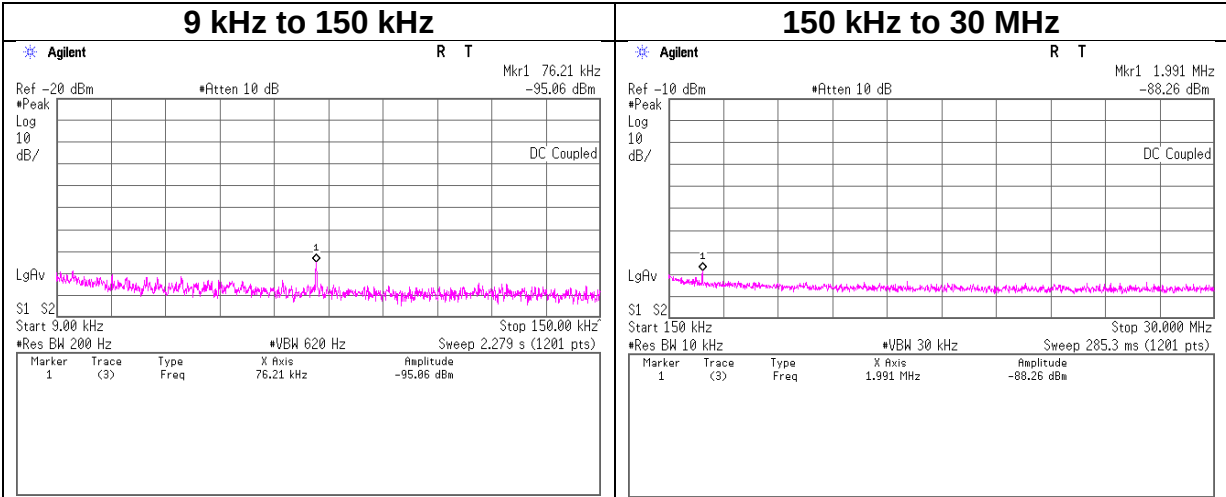
2402 MHz



Conducted Spurious Emission
(BT2)

Test place	Ise EMC Lab. No.6 Measurement Room
Date	January 25, 2024
Temperature / Humidity	20 deg. C / 39 % RH
Engineer	Junya Okuno
Mode	Tx, Hopping Off, DH5

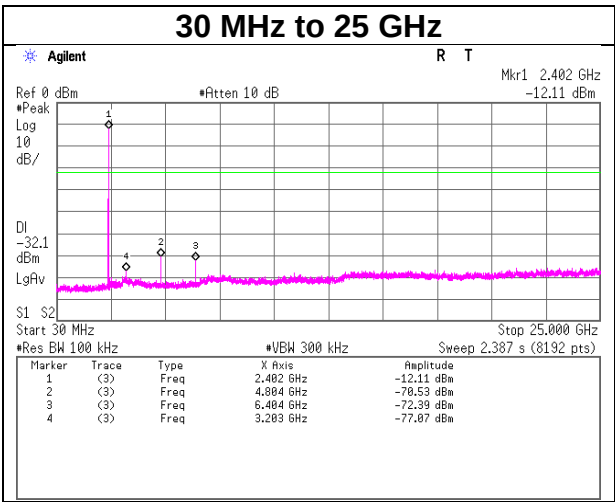
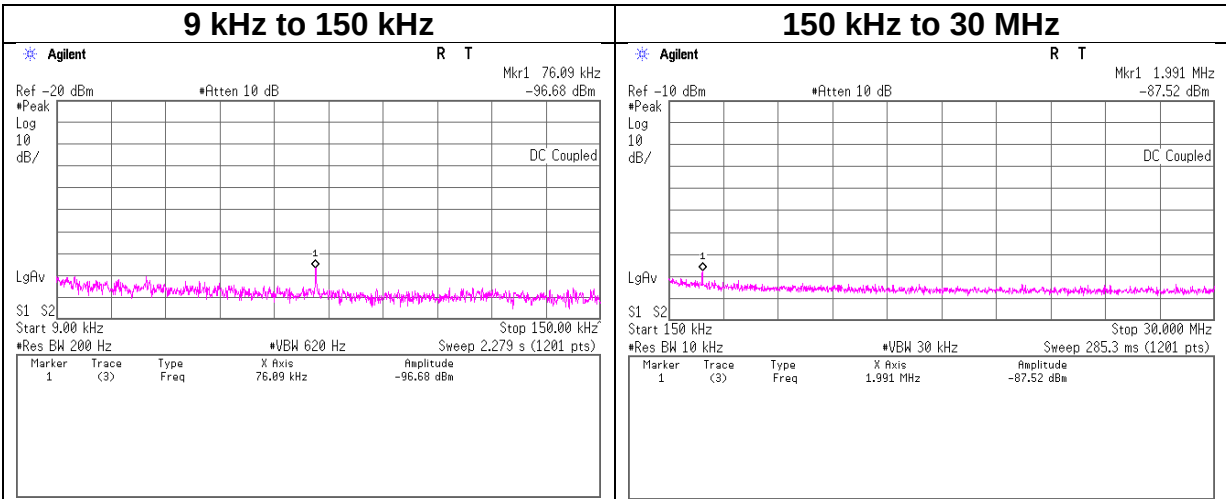
2480 MHz



Conducted Spurious Emission
(BT2)

Test place	Ise EMC Lab. No.6 Measurement Room
Date	January 25, 2024
Temperature / Humidity	20 deg. C / 39 % RH
Engineer	Junya Okuno
Mode	Tx, Hopping Off, 3DH5

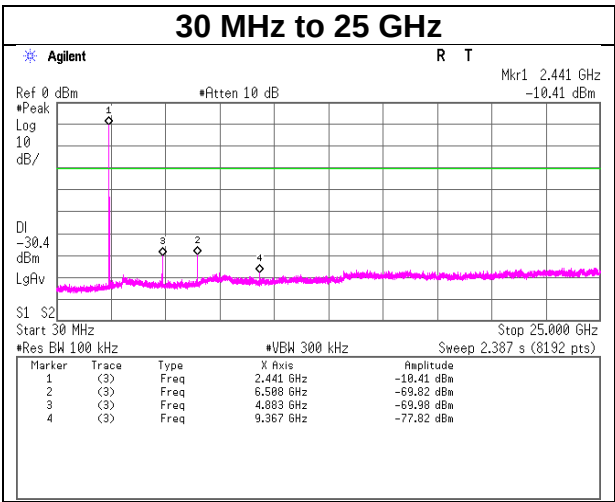
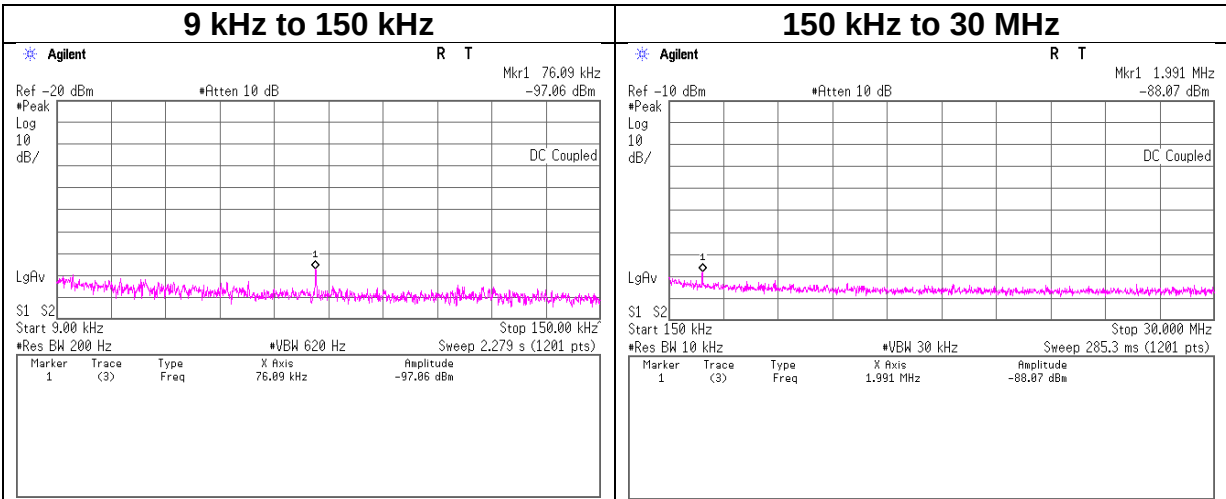
2402 MHz



Conducted Spurious Emission
(BT2)

Test place	Ise EMC Lab. No.6 Measurement Room
Date	January 25, 2024
Temperature / Humidity	20 deg. C / 39 % RH
Engineer	Junya Okuno
Mode	Tx, Hopping Off, 3DH5

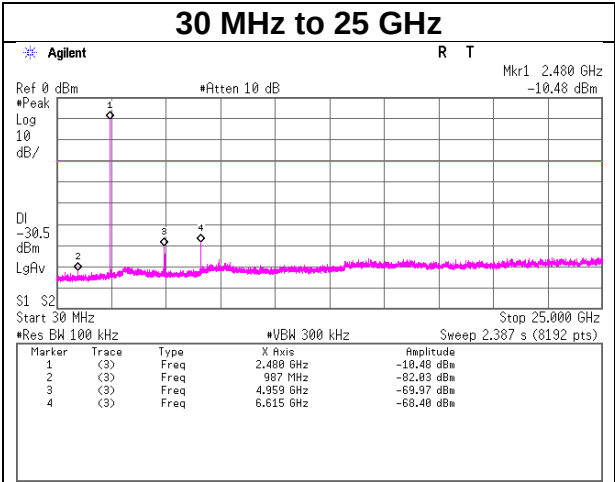
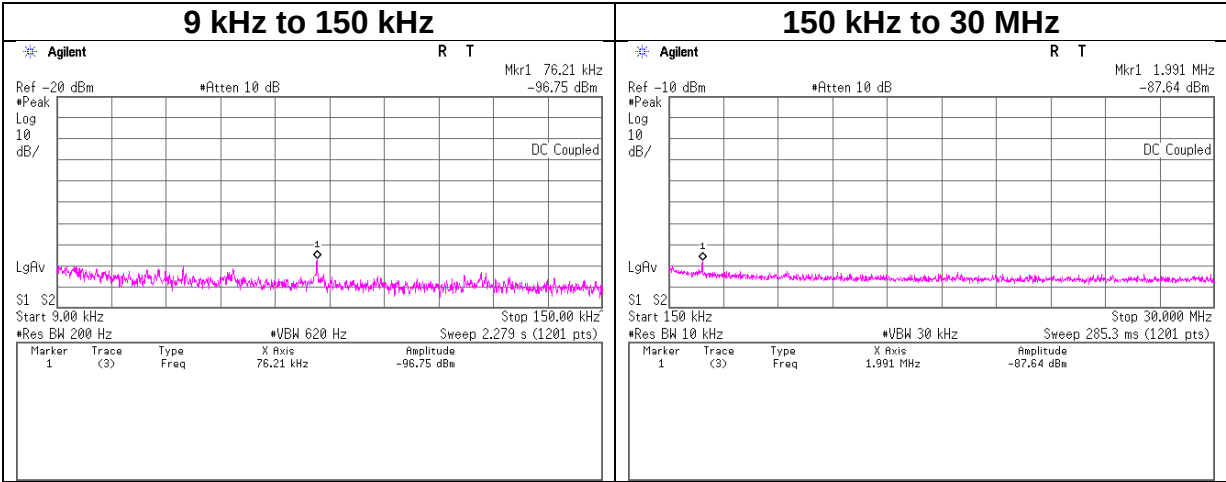
2441 MHz



Conducted Spurious Emission
(BT2)

Test place	Ise EMC Lab. No.6 Measurement Room
Date	January 25, 2024
Temperature / Humidity	20 deg. C / 39 % RH
Engineer	Junya Okuno
Mode	Tx, Hopping Off, 3DH5

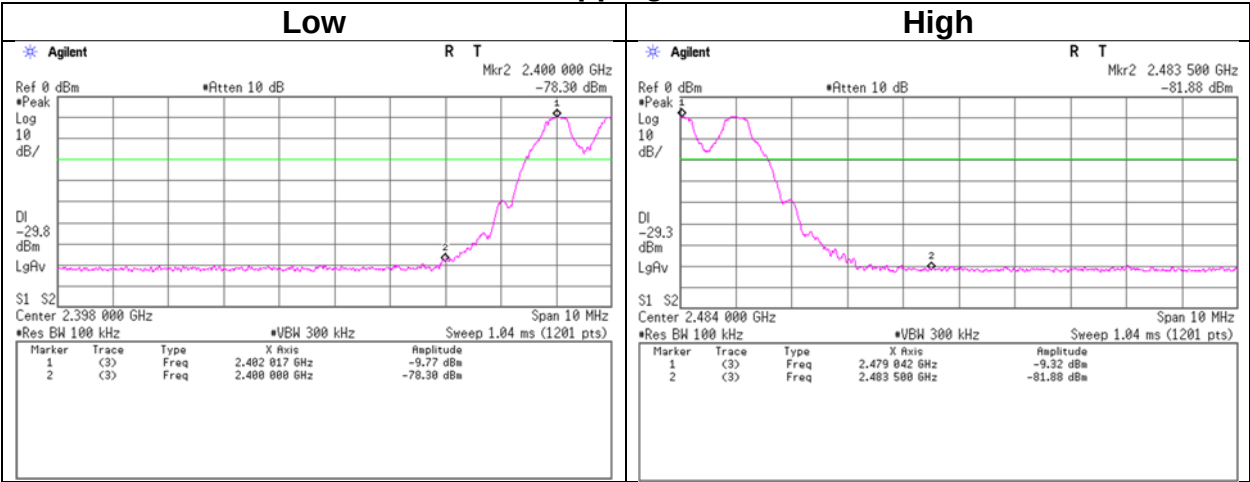
2480 MHz



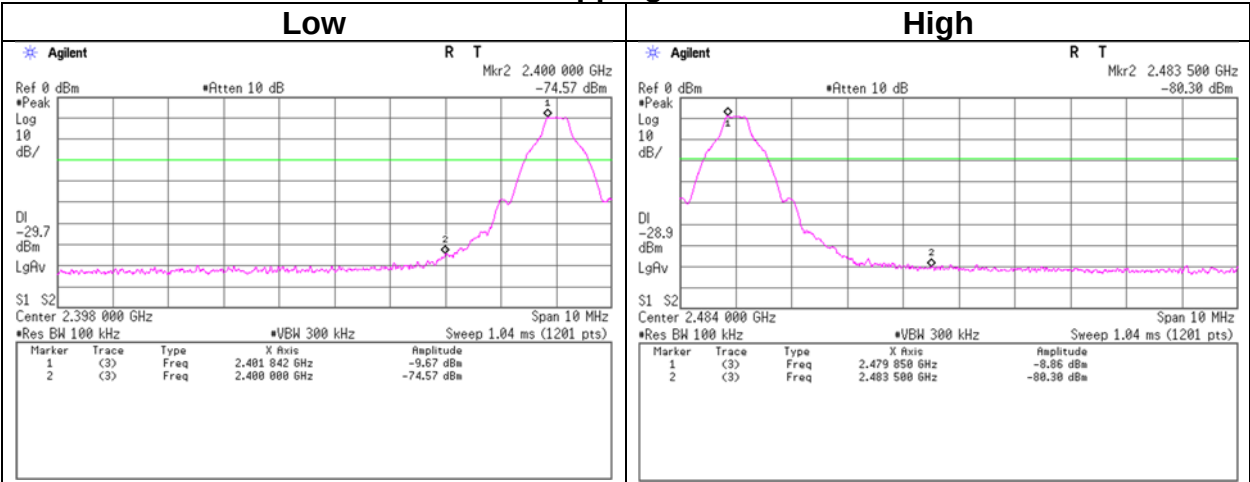
**Conducted Emission Band Edge compliance
(BT1)**

Test place Ise EMC Lab. No.6 Measurement Room
Date January 25, 2024
Temperature / Humidity 20 deg. C / 39 % RH
Engineer Junya Okuno
Mode Tx DH5

Hopping On



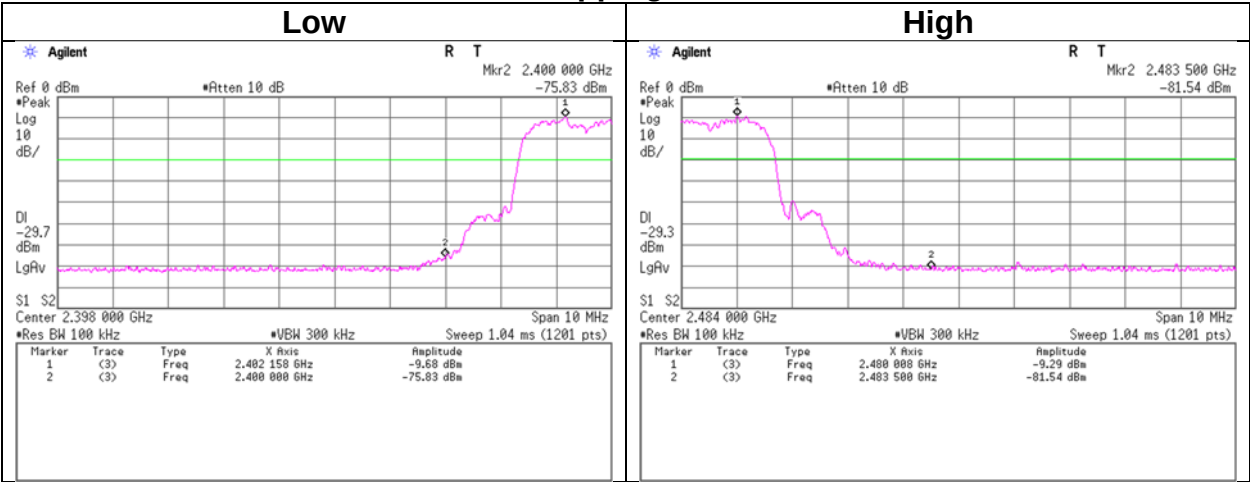
Hopping Off



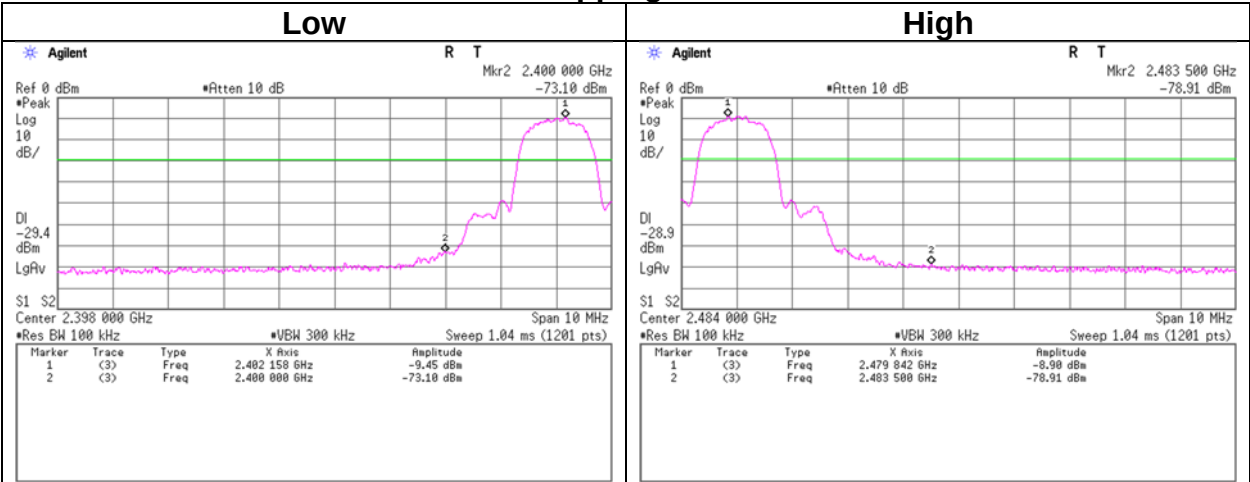
**Conducted Emission Band Edge compliance
(BT1)**

Test place	Ise EMC Lab. No.6 Measurement Room
Date	January 25, 2024
Temperature / Humidity	20 deg. C / 39 % RH
Engineer	Junya Okuno
Mode	Tx 3DH5

Hopping On



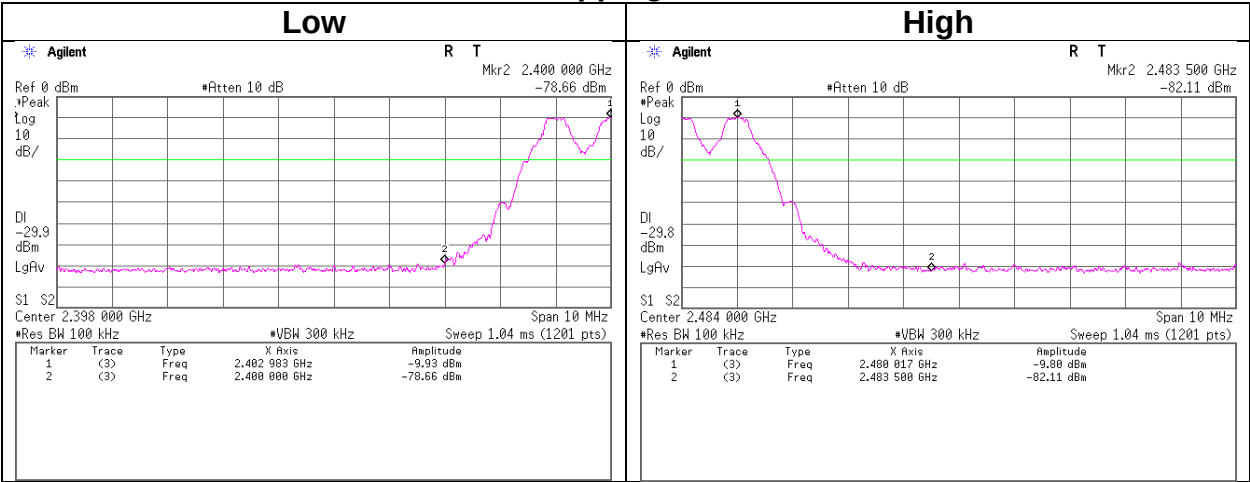
Hopping Off



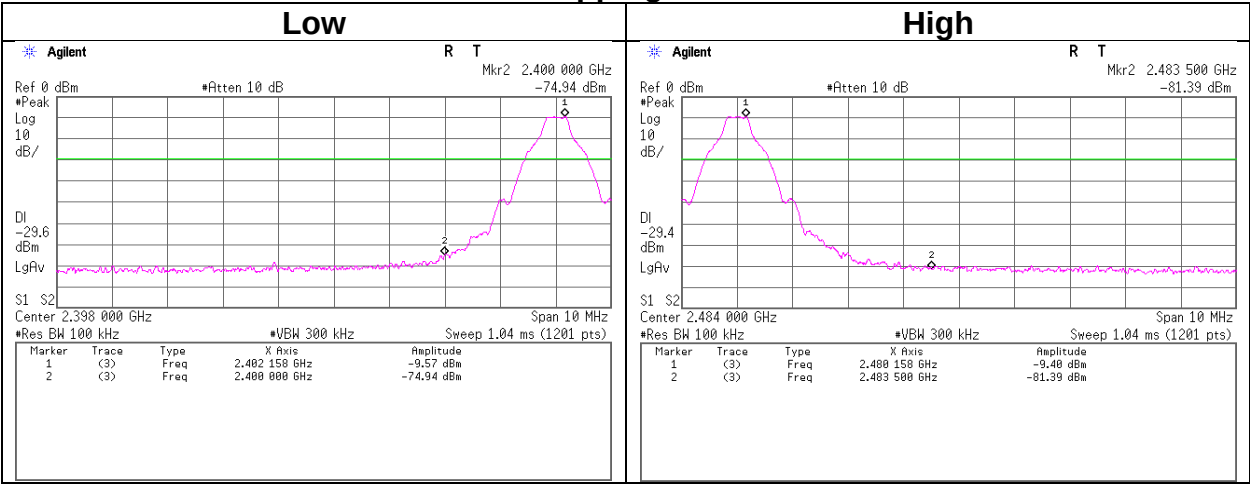
**Conducted Emission Band Edge compliance
(BT2)**

Test place	Ise EMC Lab. No.6 Measurement Room
Date	January 25, 2024
Temperature / Humidity	20 deg. C / 39 % RH
Engineer	Junya Okuno
Mode	Tx DH5

Hopping On



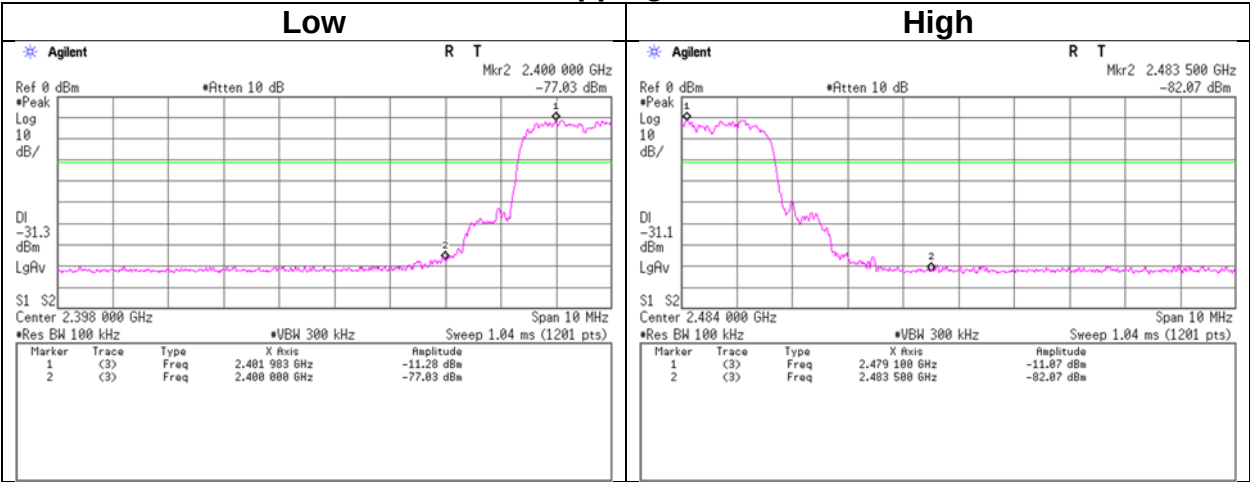
Hopping Off



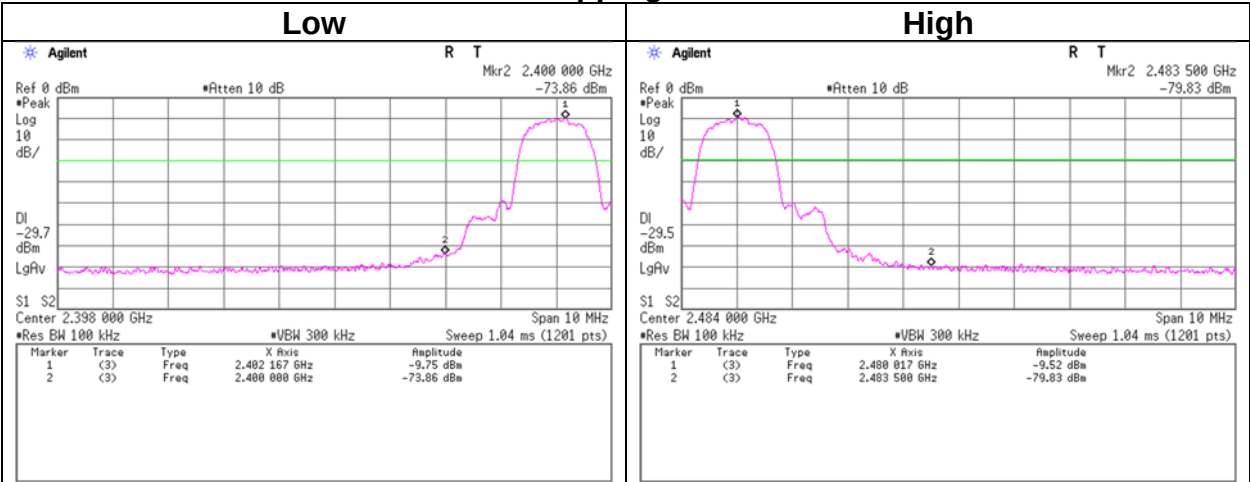
**Conducted Emission Band Edge compliance
(BT2)**

Test place	Ise EMC Lab. No.6 Measurement Room
Date	January 25, 2024
Temperature / Humidity	20 deg. C / 39 % RH
Engineer	Junya Okuno
Mode	Tx 3DH5

Hopping On



Hopping Off



APPENDIX 2: Test Instruments

Test Equipment (1/2)

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
AT	141244	Attenuator(10dB)	Weinschel - API Technologies Corp	WA8-10-34	A198	02/01/2023	12
AT	141419	Attenuator	Weinschel Associates	WA56-10	56100305	05/18/2023	12
AT	141420	Attenuator	Weinschel Associates	WA56-10	56100307	05/18/2023	12
AT	141558	Digital Tester(TRUE RMS MULTIMETER)	Fluke Corporation	115	17930030	05/29/2023	12
AT	141561	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	1401	-	-
AT	141809	Power Meter	Anritsu Corporation	ML2495A	825002	05/26/2023	12
AT	141830	Power sensor	Anritsu Corporation	MA2411B	738285	05/26/2023	12
AT	141903	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46186390	01/26/2024	12
AT	141978	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY46180899	03/06/2023	12
AT	142225	Tape Measure	ASKUL	-	-	-	-
AT	196430	Microwave Cable	Huber+Suhner	SF102D/11PC24/11PC24/1000mm	537059/126EA	02/02/2023	12
AT	197220	Microwave cable	Huber+Suhner	SF126E/11PC35/11PC35/2000MM	537003/126E	03/08/2023	12
AT	244712	Thermo-Hygrometer	HIOKI E.E. CORPORATION	LR5001	231202106	01/25/2024	12
CE	141222	Coaxial Cable	Fujikura,HP,Mini-Circuits,Fujikura	3D-2W(12m)/5D-2W(5m)/5D-2W(0.8m)/5D-2W(1m)	-	02/01/2023	12
CE	141290	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	12/07/2023	12
CE	141357	LISN(AMN)	Schwarzbeck Mess-Elektronik OHG	NSLK8127	8127-729	07/05/2023	12
CE	141542	Digital Tester	Fluke Corporation	FLUKE 26-3	78030611	08/01/2023	12
CE	141938	Terminator	TME	CT-01BP	-	12/04/2023	12
CE	141951	EMI Test Receiver	Rohde & Schwarz	ESR26	101408	04/10/2023	12
CE	142004	AC2_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	12/12/2023	24
CE	142228	Measure, Tape, Steel	KOMELON	KMC-36	-	-	-
CE	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
CE	192300	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	0013	-	-
RE	141232	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	09/04/2023	12
RE	141265	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	9111B-190	07/11/2023	12
RE	141296	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	002	09/01/2023	12
RE	141317	Coaxial Cable	UL Japan	-	-	09/12/2023	12
RE	141427	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHA9103B+BBA9106	08031	07/11/2023	12
RE	141503	Horn Antenna 18-26.5GHz	EMCO	3160-09	1265	06/23/2023	12
RE	141512	Horn Antenna 1-18GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	254	10/17/2023	12
RE	141542	Digital Tester	Fluke Corporation	FLUKE 26-3	78030611	08/01/2023	12
RE	141579	Pre Amplifier	Keysight Technologies Inc	8449B	3008A02142	02/14/2023	12
RE	141594	Pre Amplifier	Keysight Technologies Inc	8447D	2944A10150	02/02/2023	12
RE	141900	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46185823	06/16/2023	12
RE	141904	Spectrum Analyzer	Keysight Technologies Inc	N9030A	US51350215	11/08/2023	12
RE	141949	Test Receiver	Rohde & Schwarz	ESCI	100767	05/17/2023	12
RE	141978	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY46180899	03/06/2023	12
RE	142004	AC2_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	12/12/2023	24
RE	142006	AC2_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-06902	10/20/2023	12
RE	142228	Measure, Tape, Steel	KOMELON	KMC-36	-	-	-
RE	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-

Test Equipment (2/2)

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	192300	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	0013	-	-
RE	220646	Attenuator	Huber+Suhner	6806 N-50-1	-	03/17/2023	12
RE	238712	Double Ridge Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA 9120 C	687	08/10/2023	12
RE	240023	Microwave Cable	Huber+Suhner	SF126E/11PC35/11 PC35/1000MM,5000 MM	537060/126E / 537075/126E	09/08/2023	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