

RADIO TEST REPORT

Test Report No. 15799350H-D-R1

Customer	Sony Interactive Entertainment Inc.
Description of EUT	Wireless Speaker
Model Number of EUT	CFI-ZWS1 R
FCC ID	AK8CFIZWS1R
Test Regulation	FCC Part 15 Subpart C
Test Result	Complied
Issue Date	September 26, 2025
Remarks	Bluetooth (BR / EDR) parts

Representative Test EngineerTakafumi Noguchi
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 any test report referred in this report, the latest version (including any revisions) is always referred to.
- If the latest version is a revision, it replaces the previous version. See the table below for revisions and versions.

REVISION HISTORY

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	15799350H-D	August 22, 2025	-
1	15799350H-D-R1	September 26, 2025	Clause 2.2 • Corrected Rating: DC 3.9 V (Battery) →DC 3.6 V (Battery) • Corrected Antenna Type of Bluetooth (BR/EDR): PIFA (Diversity) → PIFA Clause 3.2 Deleted reference standard: RSS-Gen Issue 5/Amendment 1/Amendment 2 for ISED APPENDIX 1 Corrected Plot data for Radiated Spurious Emission (page 37)

Reference: Abbreviations (Including words undescribed in this report)

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

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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 Speaker
Model Number	CFI-ZWS1 R
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	April 20, 2025
Test Date	May 7 to June 12, 2025

2.2 Product Description

General Specification

Rating	DC 3.6 V (Battery) DC 5.0 V (USB, Charging Dock)
Operating temperature	5 deg. C to 35 deg. C

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.

2.4 GHz proprietary

Equipment Type	Transceiver
Frequency of Operation	2404.35 MHz to 2474.35 MHz
Type of Modulation	$\pi/4$ DQPSK
Antenna Type	PIFA (Diversity)
Antenna Gain	Antenna 1: 1.25 dBi Antenna 2: 1.09 dBi

Bluetooth (BR/EDR)

Equipment Type	Transceiver
Frequency of Operation	2402 MHz to 2480 MHz
Type of Modulation	FHSS (GFSK, $\pi/4$ DQPSK, 8 DPSK)
Antenna Type	PIFA
Antenna Gain ^{a)}	1.38 dBi

SECTION 3: Test Summary

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

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

3.2 Reference Standards

ANSI/USEMCSC C63.2-2023
ANSI C63.4-2014/C63.4a-2017
ANSI C63.5-2017
ANSI C63.10-2020
ANSI/USEMCSC C63.10/Cor 1-2023
ANSI/USEMCSC C63.10a-2024(incl. Errata) for ISED
ANSI C63.25.1-2018
KDB 558074 D01 v05r02
KDB 662911 D01 v02r01 for FCC MIMO device

3.3 Procedures and Results

Item	Specification	Results	Remarks
Conducted Emission	FCC: Section 15.207 ISED: RSS-Gen 8.8	Complied	-
Carrier Frequency Separation	FCC: Section 15.247(a)(1) ISED: RSS-247 5.1 (b)	Complied	Conducted
20 dB Bandwidth	FCC: Section 15.247(a)(1) ISED: RSS-247 5.1 (a)	Complied	Conducted
Number of Hopping Frequency	FCC: Section 15.247(a)(1)(iii) ISED: RSS-247 5.1 (d)	Complied	Conducted
Dwell time	FCC: Section 15.247(a)(1)(iii) ISED: RSS-247 5.1 (d)	Complied	Conducted
Maximum Peak Output Power	FCC: Section 15.247(b)(1) ISED: RSS-247 5.4 (b)	Complied	Conducted
Spurious Emission & Band Edge Compliance	FCC: Section 15.247(d) ISED: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	Complied	Conducted/ Radiated (above 30 MHz) *1)
Note: UL Japan, Inc.'s EMI Work Procedures: Work Instructions-ULID-003591 and Work Instructions-ULID-003593.			
*1) Radiated test was selected over 30 MHz based on section 15.247(d).			

FCC Part 15.31 (e)

The EUT is USB and battery-operated device, and test was performed with the USB and full-charged battery. It was also confirmed that the RF characteristics were stable regardless of the input voltage of the RF part. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

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

3.4 Addition to Standard

Item	Specification	Results	Remarks
99 % Occupied Bandwidth	ISED: -	-	Conducted

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

3.5 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)	0.15 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	5.0
		Vertical	5.0
	200 MHz to 1000 MHz	Horizontal	5.2
		Vertical	6.2
10 m	30 MHz to 200 MHz	Horizontal	5.5
		Vertical	5.4
	200 MHz to 1000 MHz	Horizontal	5.5
		Vertical	5.5
3 m	1 GHz to 6 GHz	dB	5.1
	6 GHz to 18 GHz	dB	5.4
1 m	10 GHz to 18 GHz	dB	5.4
	18 GHz to 26.5 GHz	dB	5.3
	26.5 GHz to 40 GHz	dB	4.8
0.5 m	26.5 GHz to 40 GHz	dB	5.0

Antenna Terminal Conducted

Item	Unit	Calculated Uncertainty (+/-)
Antenna terminated conducted emission / Power density / Burst power	dB	3.50
Adjacent channel power (ACP)	dB	2.32
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	1.43
Power measurement (Call box < 6 GHz)	dB	1.89
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	2.97

3.6 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 (SAC1)	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 (SAC2)	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber (SAC3)	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room (PR3)	3 m
No.3 shielded room (SR3)	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber (SAC4)	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room (PR4)	3 m
No.4 shielded room (SR4)	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber (SAC5)	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.5 measurement room (MR5)	6.4 x 6.4 x 3.0	6.4 x 6.4	-	-
No.6 shielded room (SR6)	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room (MR6)	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room (SR7)	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room (MR8)	3.1 x 5.0 x 2.7	3.1 x 5.0	-	-
No.9 measurement room (MR9)	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.10 shielded room (SR10)	3.8 x 2.8 x 2.8	3.8 x 2.8	-	-
No.11 measurement room (MR11)	4.0 x 3.4 x 2.5	N/A	-	-
No.12 measurement room (MR12)	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.

3.7 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: 46 for BR, 47 for EDR (Maximum Peak Output Power) 61 (Other than Maximum Peak Output Power) Software: AB1565/68 Lab Test Tool Version: 5.3.0.3 (Date: May 7, 2025, 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 Frequency
Conducted Emission *1), Radiated Spurious Emission (Below 1 GHz) *1)	Tx DH5	Off	2441 MHz
Radiated Spurious Emission (Above 1 GHz), Conducted Spurious Emission	Tx DH5 Tx 3DH5	Off	2402 MHz 2441 MHz 2480 MHz
Carrier Frequency Separation	Tx DH5 Tx 3DH5	On	2402 MHz 2441 MHz 2480 MHz
20 dB Bandwidth	Tx DH5 Tx 3DH5	Off	2402 MHz 2441 MHz 2480 MHz
Number of Hopping Frequency	Tx DH5 Tx 3DH5	On	-
Dwell time	Tx DH1, DH3, DH5 Tx 3DH1, 3DH3, 3DH5	On	-
Maximum Peak Output Power	Tx DH5 Tx 2DH5 Tx 3DH5	Off	2402 MHz 2441 MHz 2480 MHz
Band Edge Compliance (Conducted)	Tx DH5 Tx 3DH5	On ----- Off	2402 MHz ----- 2480 MHz
99 % Occupied Bandwidth	Tx DH5 Tx 3DH5	On ----- Off	2402 MHz ----- 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.			

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 the platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane.

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

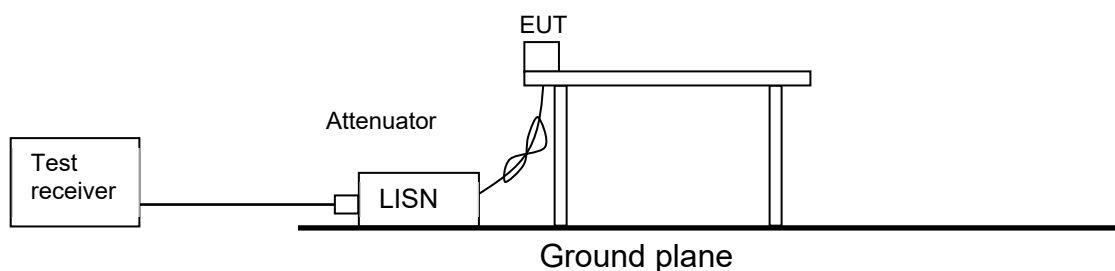
The EUT was connected to a LISN (Via AC adapter).

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 the platform of nominal size, 1.0 m by 1.5 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 the 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 *1)	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	
× : Center of turn table	Test Distance: 3 m
1 GHz to 18 GHz	
× : Center of turn table	Test Distance: 3 m
18 GHz to 26.5 GHz	
× : 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, Z axes of EUT, and EUT with Charging Dock 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
20 dB 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	300 kHz	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	2390 MHz to 2403 MHz 2479 MHz to 2493.5 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 not detected 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.

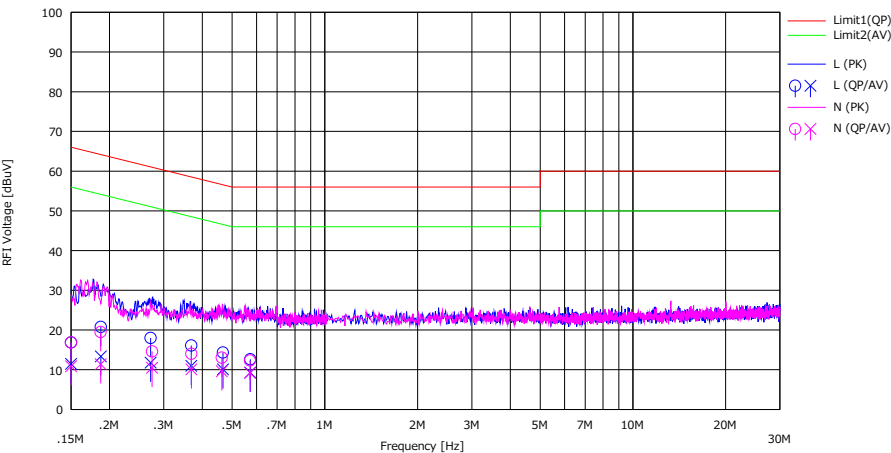
Test Data : APPENDIX
Test Result : Pass

APPENDIX 1: Test data

Conducted Emission

Mode	Tx, Hopping Off, DH5 2441 MHz			
Date	Test site	Temperature	Humidity	Engineer
May 19, 2025	SAC3	23 deg. C	52 % RH	Takafumi Noguchi

Limit : FCC_Part 15 Subpart C(15.207)



No.	Freq. [MHz]	Reading		LISN [dB]	LOSS [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]			<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15000	3.70	-1.70	0.04	13.12	16.86	11.46	66.00	56.00	49.14	44.54	L	
2	0.18744	7.60	0.20	0.04	13.13	20.77	13.37	64.15	54.15	43.38	40.78	L	
3	0.27195	4.80	-1.40	0.04	13.14	17.98	11.78	61.06	51.06	43.08	39.28	L	
4	0.36857	2.90	-2.20	0.04	13.15	16.09	10.99	58.53	48.53	42.44	37.54	L	
5	0.46681	1.10	-3.10	0.04	13.16	14.30	10.10	56.57	46.57	42.27	36.47	L	
6	0.57310	-0.60	-3.90	0.04	13.17	12.61	9.31	56.00	46.00	43.39	36.69	L	
7	0.15000	3.70	-2.30	0.06	13.12	16.88	10.88	66.00	56.00	49.12	45.12	N	
8	0.18717	6.30	-1.80	0.05	13.13	19.48	11.38	64.16	54.16	44.68	42.78	N	
9	0.27491	1.40	-2.70	0.05	13.14	14.59	10.49	60.97	50.97	46.38	40.48	N	
10	0.36882	0.80	-3.10	0.05	13.15	14.00	10.10	58.53	48.53	44.53	38.43	N	
11	0.46292	-0.20	-3.60	0.06	13.16	13.02	9.62	56.64	46.64	43.62	37.02	N	
12	0.57144	-0.90	-4.00	0.06	13.17	12.33	9.23	56.00	46.00	43.67	36.77	N	

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

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

Mode	Tx, Hopping Off / On
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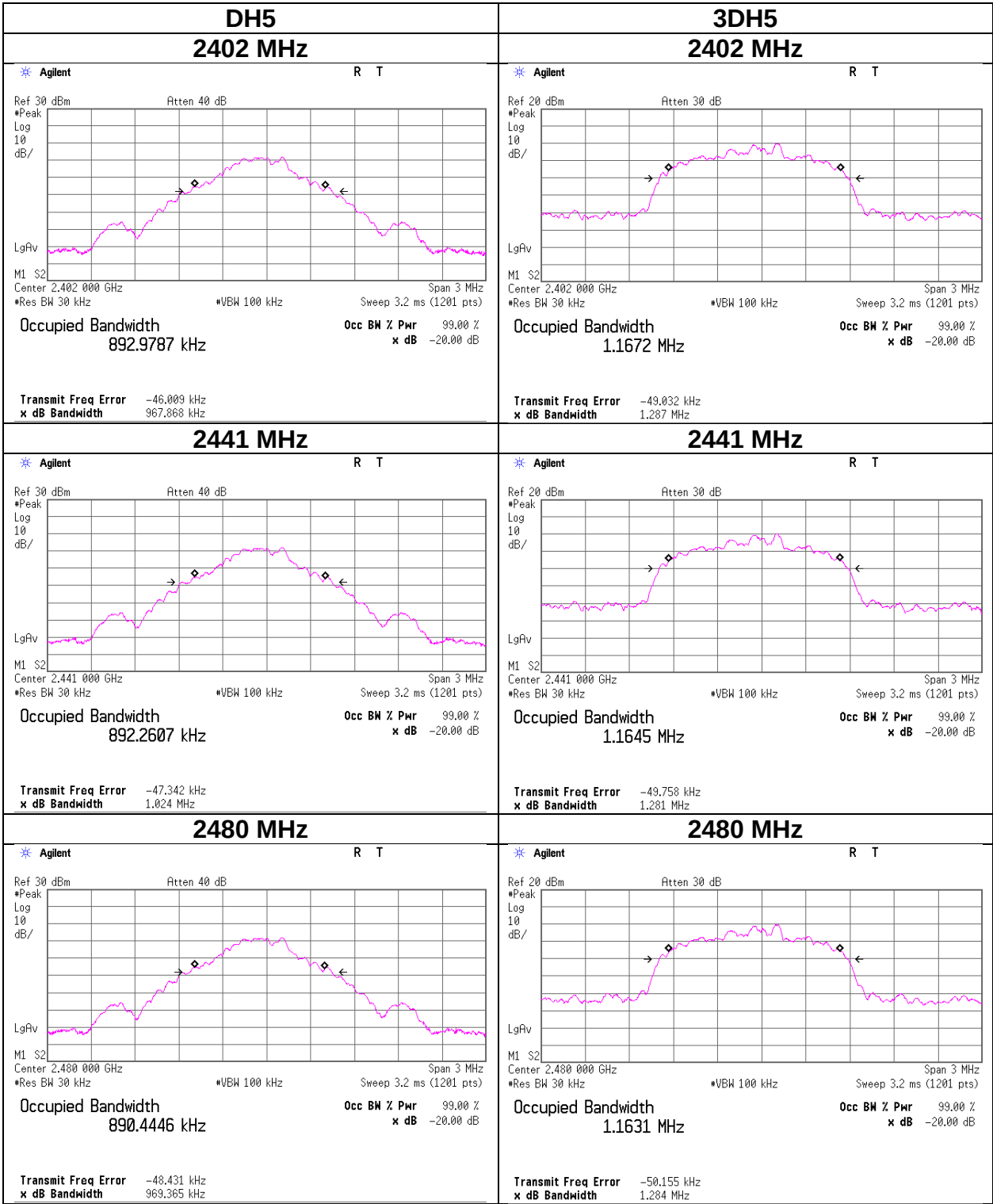
Date	Test site	Temperature	Humidity	Engineer
May 9, 2025	MR6	24 deg. C	50 % RH	Takafumi Noguchi

Mode	Freq. [MHz]	20 dB Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.968	892.979	1.000	>= 0.645
DH5	2441.0	1.024	892.261	1.000	>= 0.683
DH5	2480.0	0.969	890.445	1.000	>= 0.646
DH5	Hopping On	-	78627.900	-	-
3DH5	2402.0	1.287	1167.200	1.000	>= 0.858
3DH5	2441.0	1.281	1164.500	1.000	>= 0.854
3DH5	2480.0	1.284	1163.100	1.000	>= 0.856
3DH5	Hopping On	-	78639.000	-	-

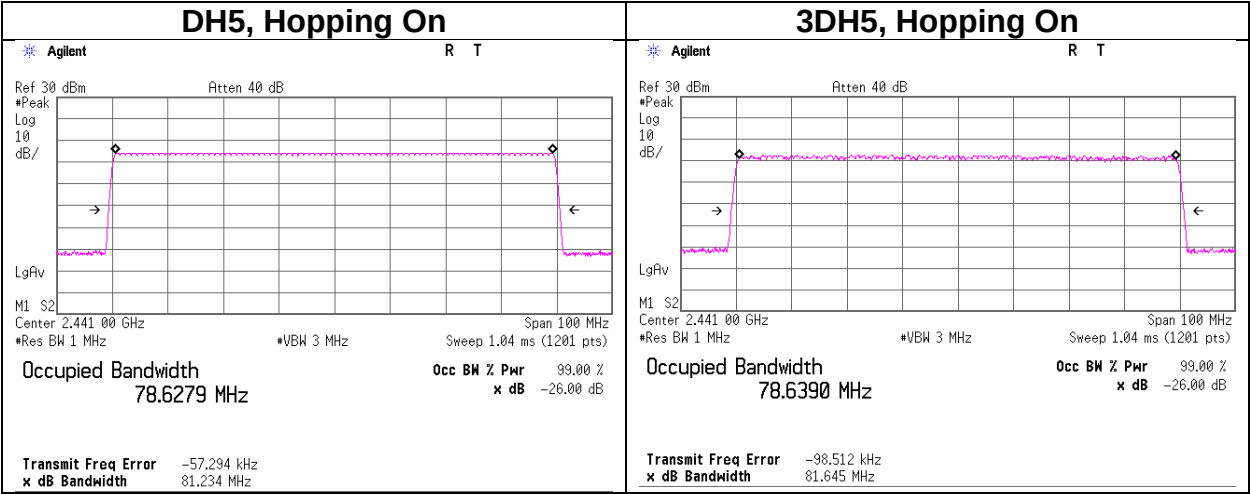
Limit: Two-thirds of 20 dB Bandwidth or 25 kHz (whichever is greater).

No limit applies to 20 dB Bandwidth.

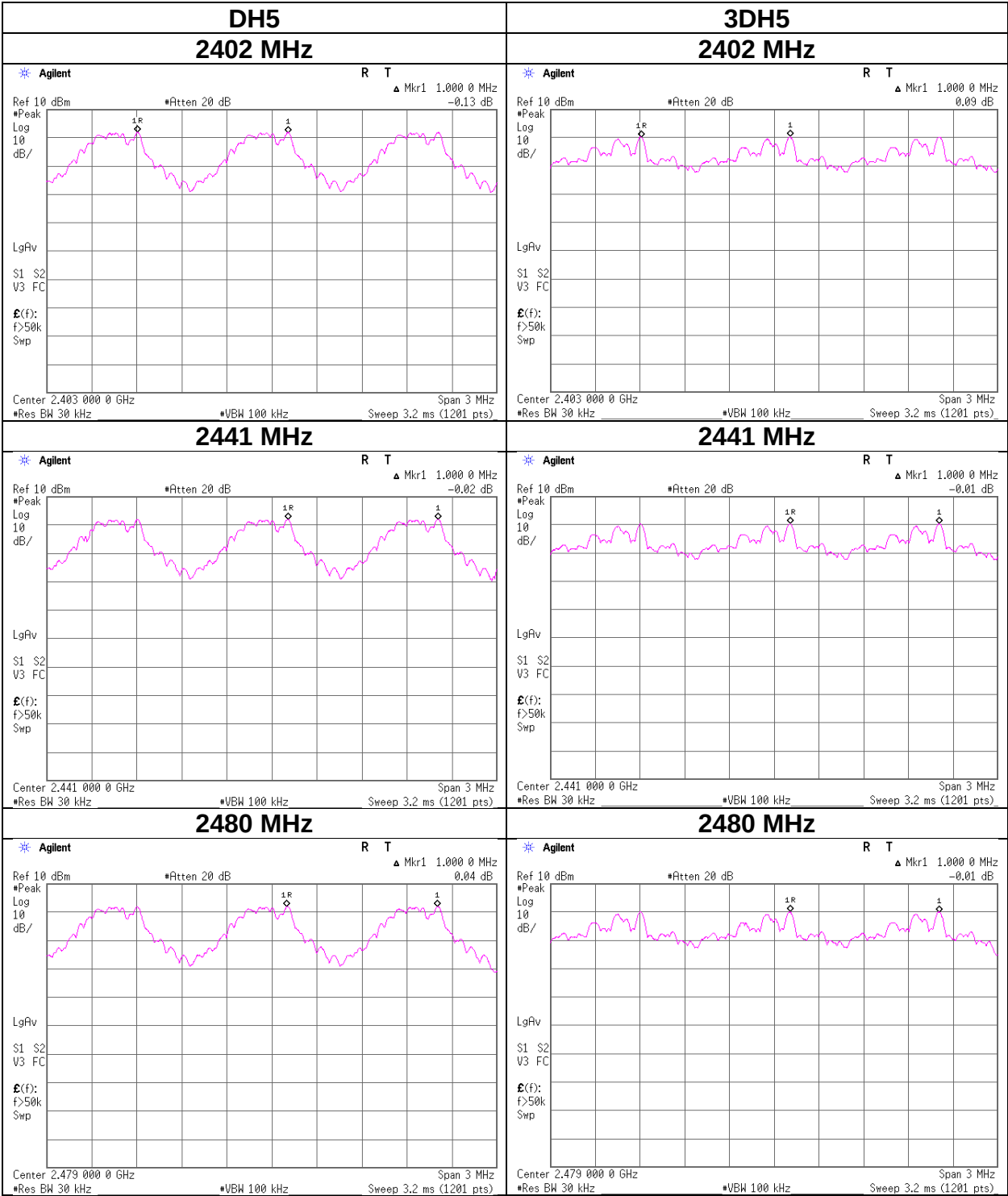
20 dB Bandwidth and 99 % Occupied Bandwidth



20 dB Bandwidth and 99 % Occupied Bandwidth



Carrier Frequency Separation



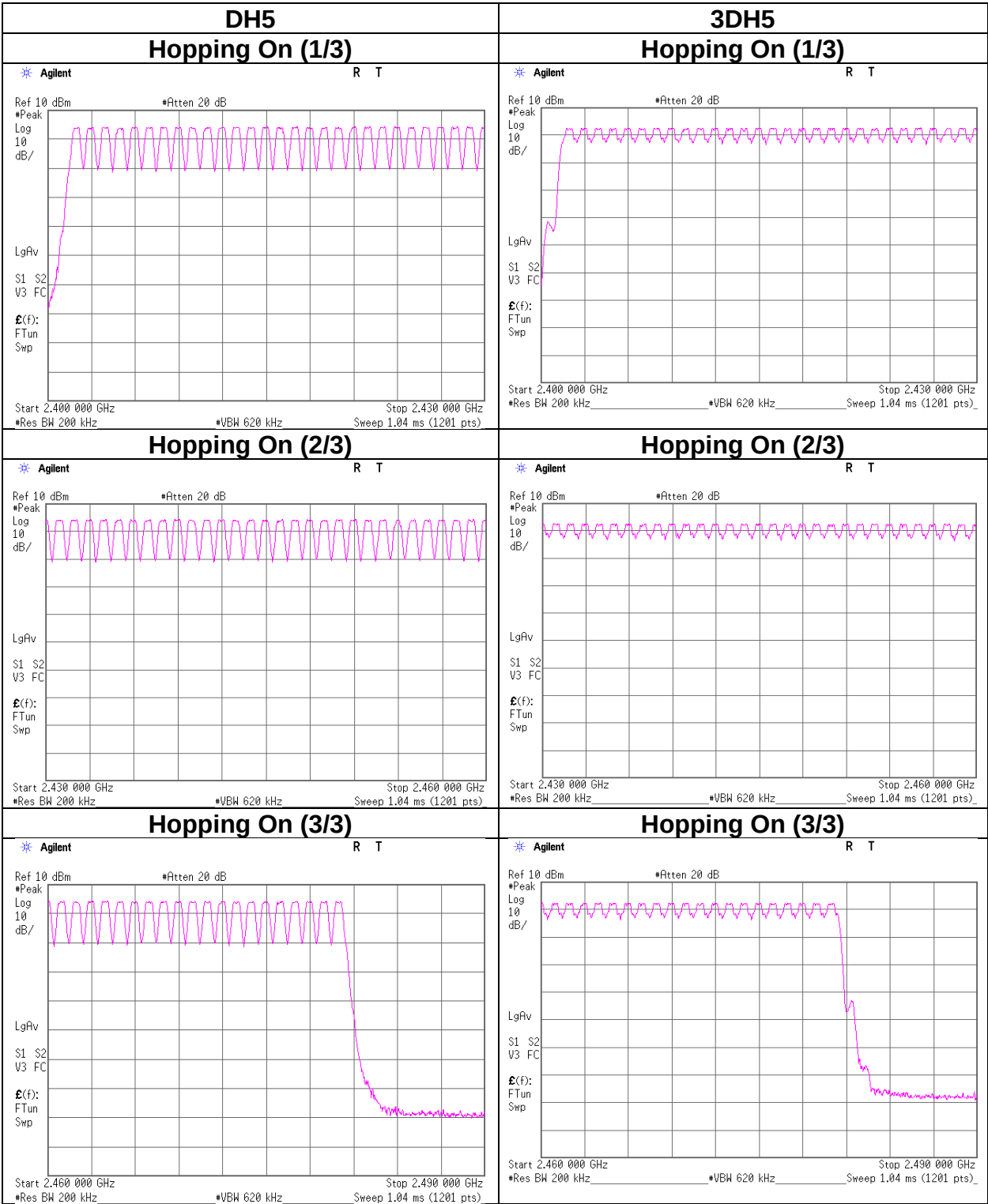
Number of Hopping Frequency

Mode	Tx, Hopping On			
Date	Test site	Temperature	Humidity	Engineer
May 9, 2025	MR6	24 deg. C	50 % RH	Takafumi Noguchi

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



Dwell time

Mode	Tx, Hopping On
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Date	Test site	Temperature	Humidity	Engineer
May 13, 2025	MR6	24 deg. C	47 % RH	Takafumi Noguchi

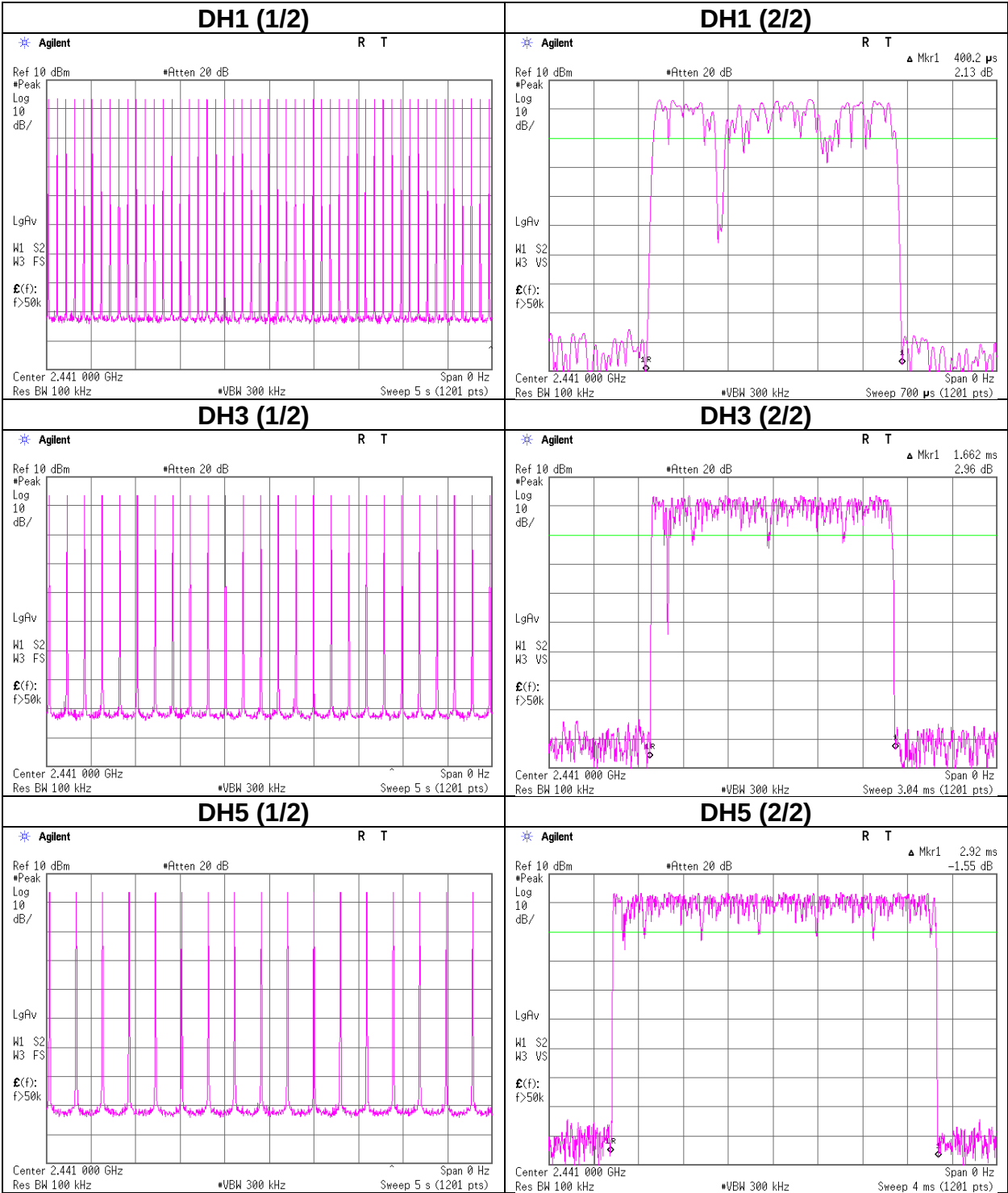
Mode	Dwell time per hop [ms]	Number of hops in a 5.0 second period	Average number of hops in a 31.6 (79 Hopping x 0.4) second period				Result [ms]
DH1	0.400	51	51.0 [times] / 5.0 [s]	x	31.6 [s]	=	323
DH3	1.662	26	26.0 [times] / 5.0 [s]	x	31.6 [s]	=	165
DH5	2.920	17	17.0 [times] / 5.0 [s]	x	31.6 [s]	=	108
3DH1	0.406	51	51.0 [times] / 5.0 [s]	x	31.6 [s]	=	323
3DH3	1.659	26	26.0 [times] / 5.0 [s]	x	31.6 [s]	=	165
3DH5	2.920	17	17.0 [times] / 5.0 [s]	x	31.6 [s]	=	108

Sample Calculation

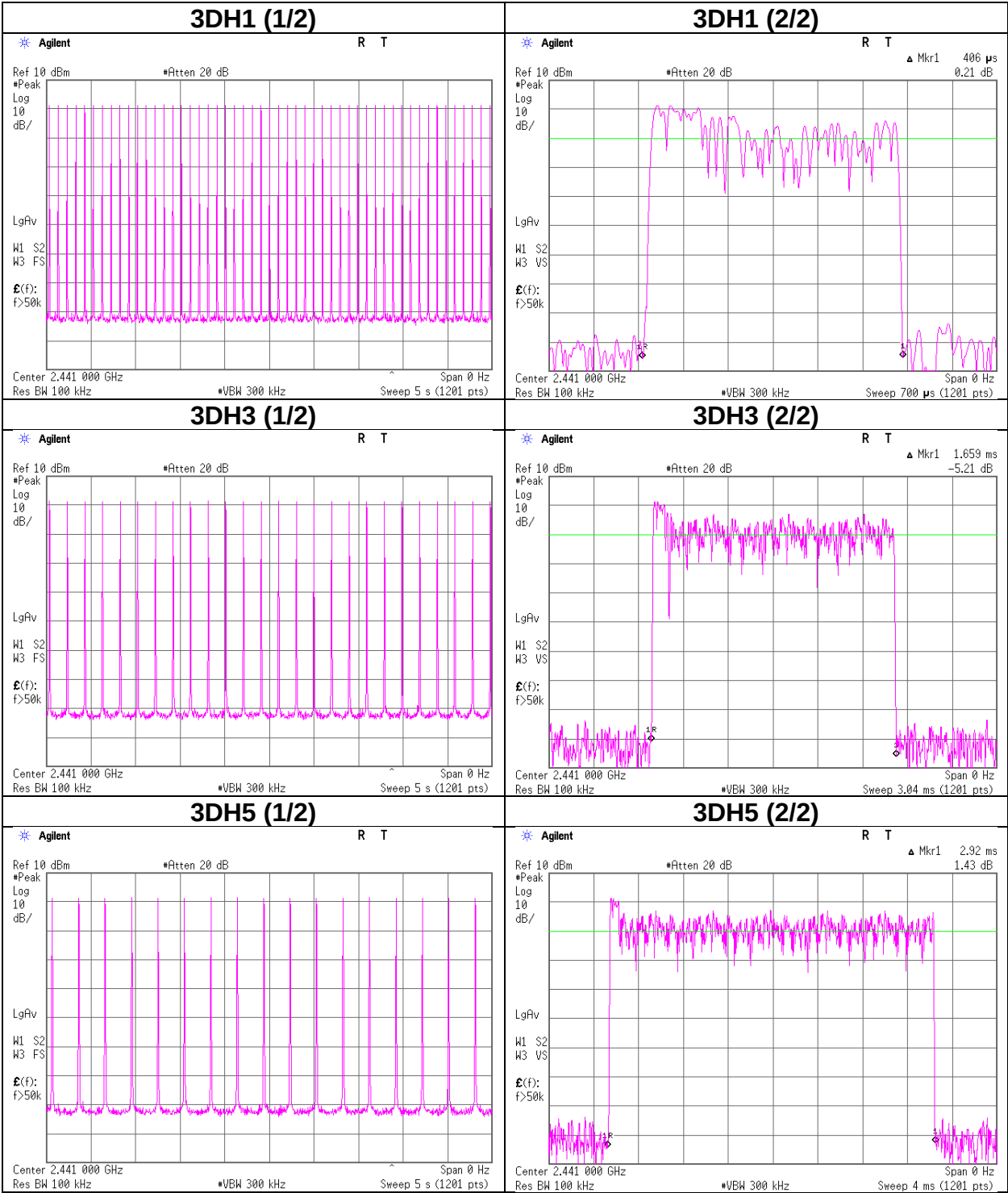
Result = Dwell time per hop x Average number of hops in a 31.6 (79 Hopping x 0.4) second period

*Also compliance with the requirements for minimum number of channels(20 hops) made by Bluetooth AFH Specification.

Dwell time



Dwell time



Maximum Peak Output Power

Mode	Tx, Hopping Off
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Date	Test site	Temperature	Humidity	Engineer
June 12, 2025	MR6	24 deg. C	60 % RH	Junki Nagatomi

Mode	Freq.	Reading	Cable Loss	Atten. Loss	Conducted Power					Antenna Gain	e.i.r.p. for RSS-247				
					Result		Limit		Margin		Result		Limit		Margin
					[dBm]	[mW]	[dBm]	[mW]			[dB]	[dBm]	[mW]	[dBm]	
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	[dB]
DH5	2402.0	-3.86	1.55	10.03	7.72	5.92	20.96	125	13.24	1.38	9.10	8.13	36.02	4000	26.92
DH5	2441.0	-4.15	1.56	10.03	7.44	5.55	20.96	125	13.52	1.38	8.82	7.62	36.02	4000	27.20
DH5	2480.0	-4.22	1.57	10.03	7.38	5.47	20.96	125	13.58	1.38	8.76	7.52	36.02	4000	27.26
2DH5	2402.0	-3.63	1.55	10.03	7.95	6.24	20.96	125	13.01	1.38	9.33	8.57	36.02	4000	26.69
2DH5	2441.0	-3.93	1.56	10.03	7.66	5.83	20.96	125	13.30	1.38	9.04	8.02	36.02	4000	26.98
2DH5	2480.0	-3.96	1.57	10.03	7.64	5.81	20.96	125	13.32	1.38	9.02	7.98	36.02	4000	27.00
3DH5	2402.0	-3.47	1.55	10.03	8.11	6.47	20.96	125	12.85	1.38	9.49	8.89	36.02	4000	26.53
3DH5	2441.0	-3.77	1.56	10.03	7.82	6.05	20.96	125	13.14	1.38	9.20	8.32	36.02	4000	26.82
3DH5	2480.0	-3.79	1.57	10.03	7.81	6.04	20.96	125	13.15	1.38	9.19	8.30	36.02	4000	26.83

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)

Mode	Tx, Hopping Off			
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Date	Test site	Temperature	Humidity	Engineer
June 12, 2025	MR6	24 deg. C	60 % RH	Junki Nagatomi

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	-5.17	1.55	10.03	6.41	4.38	1.15	7.56	5.70
DH5	2441.0	-5.48	1.56	10.03	6.11	4.08	1.15	7.26	5.32
DH5	2480.0	-5.51	1.57	10.03	6.09	4.06	1.15	7.24	5.30
2DH5	2402.0	-7.36	1.55	10.03	4.22	2.64	1.15	5.37	3.44
2DH5	2441.0	-7.66	1.56	10.03	3.93	2.47	1.15	5.08	3.22
2DH5	2480.0	-7.67	1.57	10.03	3.93	2.47	1.15	5.08	3.22
3DH5	2402.0	-7.35	1.55	10.03	4.23	2.65	1.15	5.38	3.45
3DH5	2441.0	-7.65	1.56	10.03	3.94	2.48	1.15	5.09	3.23
3DH5	2480.0	-7.66	1.57	10.03	3.94	2.48	1.15	5.09	3.23

Sample Calculation:

Sample Calculation:

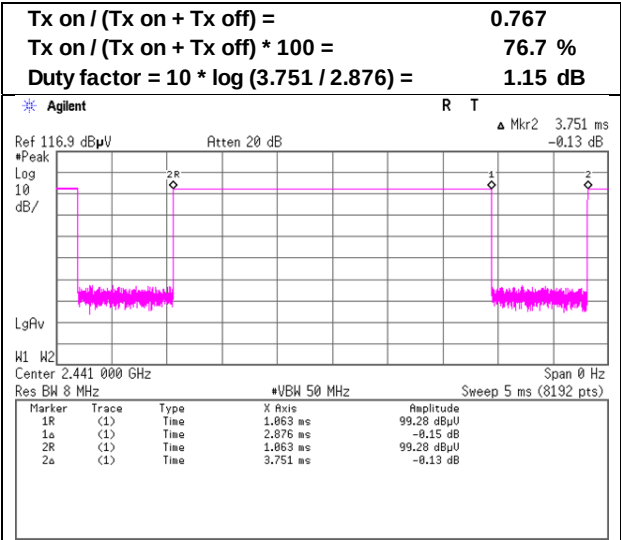
Result (Burst power average) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

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

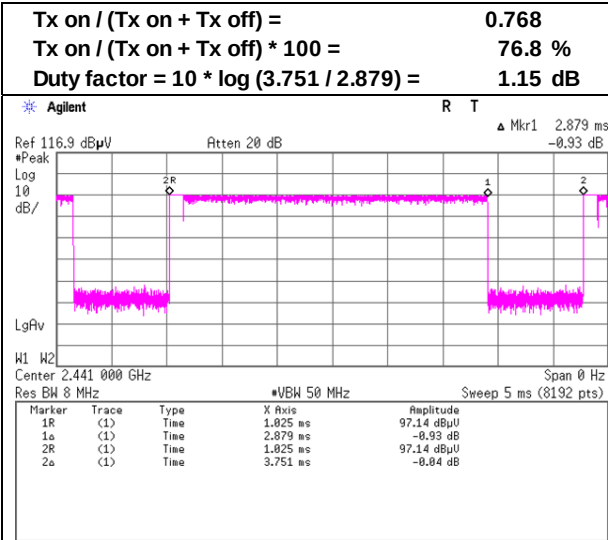
Burst Rate Confirmation

Mode	Tx, Hopping Off			
Date	Test site	Temperature	Humidity	Engineer
May 7, 2025	SAC4	22 deg. C	52 % RH	Daiki Matsui

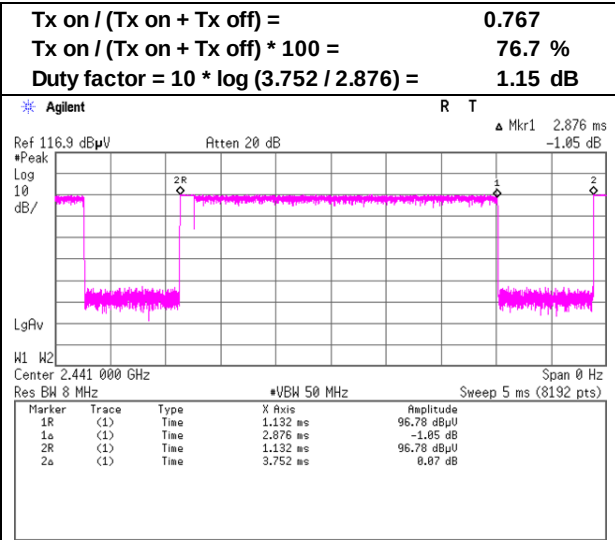
DH5



2DH5



3DH5



Radiated Spurious Emission

Mode	Tx, Hopping Off, DH5, 2402 MHz
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Date	Test site	Temperature	Humidity	Engineer	Measurement Range
May 7, 2025	SAC4	22 deg. C	52 % RH	Daiki Matsui	1 GHz to 10 GHz
May 7, 2025	SAC4	22 deg. C	64 % RH	Daiki Matsui	Above 10 GHz

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	46.2	35.2	27.8	3.0	32.0	1.2	44.9	35.1	73.9	53.9	29.0	18.9	*1)
Hori.	4804.0	44.1	34.8	31.5	4.3	31.0	1.2	48.9	40.7	73.9	53.9	25.1	13.2	*2)
Hori.	7206.0	45.2	35.7	36.4	6.4	32.1	1.2	55.8	47.5	73.9	53.9	18.1	6.4	*2)
Hori.	9608.0	43.0	33.5	38.1	7.0	32.5	-	55.6	46.1	73.9	53.9	18.3	7.8	Floor noise
Hori.	12010.0	46.6	37.4	38.2	6.0	36.6	1.2	54.2	46.2	73.9	53.9	19.7	7.7	*2)
Hori.	14412.0	46.9	37.3	38.9	6.6	37.3	-	55.1	45.5	73.9	53.9	18.8	8.4	Floor noise
Hori.	16814.0	47.2	37.4	39.2	7.2	38.4	-	55.2	45.4	73.9	53.9	18.7	8.5	Floor noise
Vert.	2390.0	45.8	34.7	27.8	3.0	32.0	1.2	44.5	34.6	73.9	53.9	29.4	19.3	*1)
Vert.	4804.0	43.4	33.4	31.5	5.2	31.0	1.2	49.1	40.2	73.9	53.9	24.8	13.7	*2)
Vert.	7206.0	45.1	35.2	36.4	6.4	32.1	1.2	55.7	47.0	73.9	53.9	18.2	6.9	*2)
Vert.	9608.0	43.3	33.4	38.1	7.0	32.5	-	55.9	46.0	73.9	53.9	18.0	7.9	Floor noise
Vert.	12010.0	45.8	36.3	38.2	6.0	36.6	1.2	53.4	45.1	73.9	53.9	20.5	8.8	*2)
Vert.	14412.0	48.0	37.3	38.9	6.6	37.3	-	56.1	45.5	73.9	53.9	17.8	8.4	Floor noise
Vert.	16814.0	47.0	37.4	39.2	7.2	38.4	-	55.0	45.4	73.9	53.9	18.9	8.5	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)

*2) Noise synchronized with duty of carrier frequency

20dBc Data Sheet

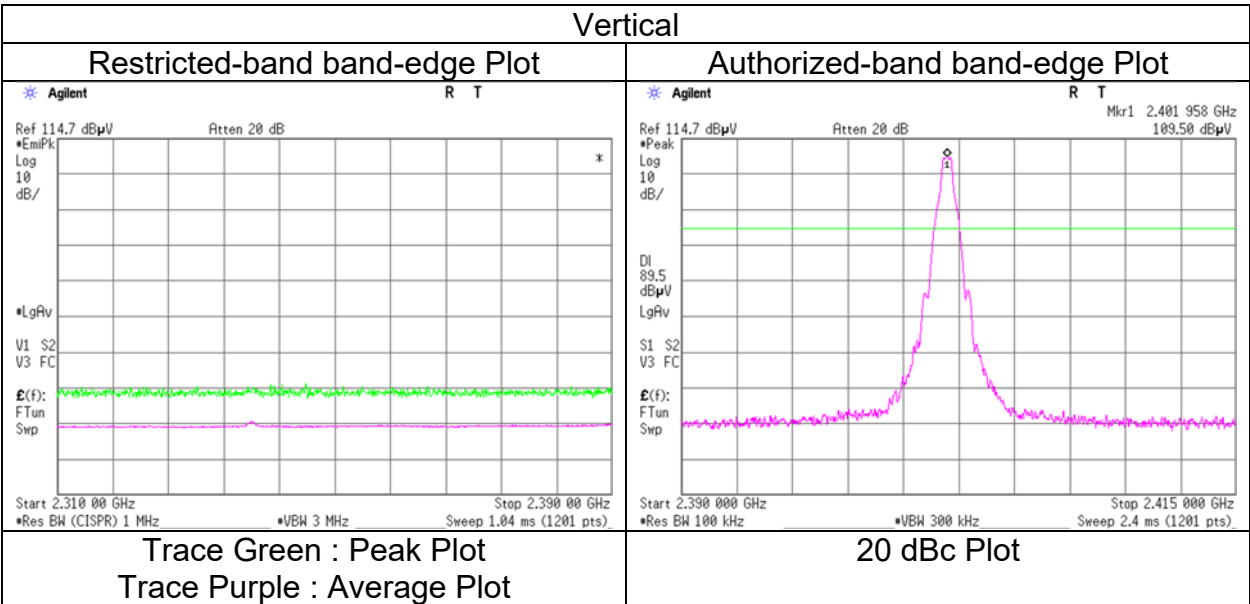
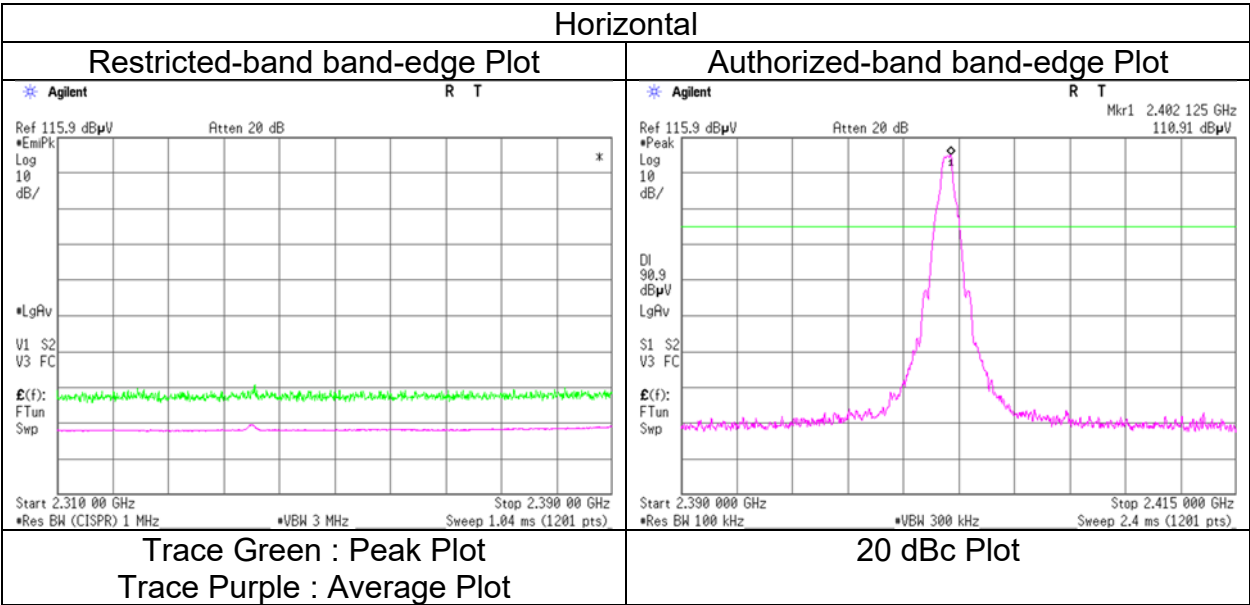
Polarity	Frequency	Reading (PK)	Ant. Factor	Loss	Gain	Result	Limit	Margin	Remark
[Hori/Vert]	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	2402.0	110.9	27.7	3.0	31.9	109.7	-	-	Carrier
Hori.	2400.0	49.5	27.8	3.0	31.9	48.3	89.7	41.4	
Vert.	2402.0	109.5	27.7	3.0	31.9	108.3	-	-	Carrier
Vert.	2400.0	48.4	27.8	3.0	31.9	47.2	88.3	41.1	

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

Distance factor: 18 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)

Mode	Tx, Hopping Off, DH5, 2402 MHz				
Date	Test site	Temperature	Humidity	Engineer	Measurement Range
May 7, 2025	SAC4	22 deg. C	52 % RH	Daiki Matsui	1 GHz to 10 GHz



* 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

Mode	Tx, Hopping Off, DH5, 2441 MHz
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Date	Test site	Temperature	Humidity	Engineer	Measurement Range
May 7, 2025	SAC4	22 deg. C	52 % RH	Daiki Matsui	1 GHz to 10 GHz
May 7, 2025	SAC4	22 deg. C	64 % RH	Daiki Matsui	Above 10 GHz
May 14, 2025	SAC2	23 deg. C	50 % RH	Yuta Moriya	Below 1 GHz

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.	55.8	29.3	-	9.1	7.1	28.5	-	17.0	-	40.0	-	23.0	-	
Hori.	82.8	22.7	-	7.4	7.4	28.5	-	9.0	-	40.0	-	31.0	-	
Hori.	432.0	33.3	-	16.2	9.7	28.7	-	30.5	-	46.0	-	15.5	-	
Hori.	480.0	29.2	-	17.3	9.9	29.0	-	27.4	-	46.0	-	18.6	-	
Hori.	864.0	31.8	-	21.8	11.3	29.0	-	35.9	-	46.0	-	10.1	-	
Hori.	960.0	31.0	-	22.1	11.6	28.7	-	36.0	-	46.0	-	10.0	-	
Hori.	4882.0	43.3	33.6	31.6	5.2	31.0	1.2	49.1	40.5	73.9	53.9	24.8	13.4	*1)
Hori.	7323.0	45.5	35.0	36.5	6.4	32.2	1.2	56.2	46.9	73.9	53.9	17.7	7.1	*1)
Hori.	9764.0	42.8	33.2	38.5	7.1	32.6	-	55.8	46.1	73.9	53.9	18.1	7.8	Floor noise
Hori.	12205.0	46.0	36.8	38.2	6.1	36.6	1.2	53.6	45.6	73.9	53.9	20.3	8.3	*1)
Hori.	14646.0	46.1	36.8	39.1	6.6	37.4	-	54.4	45.1	73.9	53.9	19.6	8.8	Floor noise
Hori.	17087.0	46.4	37.0	39.3	7.2	38.4	-	54.5	45.1	73.9	53.9	19.4	8.8	Floor noise
Vert.	55.8	43.7	-	9.1	7.1	28.5	-	31.4	-	40.0	-	8.6	-	
Vert.	82.8	33.2	-	7.4	7.4	28.5	-	19.5	-	40.0	-	20.5	-	
Vert.	432.0	34.0	-	16.2	9.7	28.7	-	31.2	-	46.0	-	14.8	-	
Vert.	480.0	34.3	-	17.3	9.9	29.0	-	32.5	-	46.0	-	13.5	-	
Vert.	864.0	30.0	-	21.8	11.3	29.0	-	34.1	-	46.0	-	11.9	-	
Vert.	960.0	30.8	-	22.1	11.6	28.7	-	35.8	-	46.0	-	10.2	-	
Vert.	4882.0	42.8	33.2	31.6	5.2	31.0	1.2	48.6	40.1	73.9	53.9	25.3	13.8	*1)
Vert.	7323.0	45.1	34.9	36.5	6.4	32.2	1.2	55.8	46.8	73.9	53.9	18.1	7.1	*1)
Vert.	9764.0	43.4	33.5	38.5	7.1	32.6	-	56.4	46.4	73.9	53.9	17.5	7.5	Floor noise
Vert.	12205.0	46.4	36.3	38.2	6.1	36.6	1.2	54.0	45.1	73.9	53.9	19.9	8.8	*1)
Vert.	14646.0	46.8	37.1	39.1	6.6	37.4	-	55.0	45.3	73.9	53.9	18.9	8.6	Floor noise
Vert.	17087.0	47.0	36.6	39.3	7.2	38.4	-	55.1	44.7	73.9	53.9	18.8	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) Noise synchronized with duty of carrier frequency

Distance factor: 18 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission

Mode	Tx, Hopping Off, DH5, 2480 MHz
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Date	Test site	Temperature	Humidity	Engineer	Measurement Range
May 7, 2025	SAC4	22 deg. C	52 % RH	Daiki Matsui	1 GHz to 10 GHz
May 7, 2025	SAC4	22 deg. C	64 % RH	Daiki Matsui	Above 10 GHz

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	49.6	39.0	27.7	3.0	31.9	1.2	48.4	38.9	73.9	53.9	25.5	15.0	*1)
Hori.	4960.0	44.3	34.5	31.7	5.2	30.9	1.2	50.3	41.7	73.9	53.9	23.6	12.2	*2)
Hori.	7440.0	43.7	34.4	36.7	6.4	32.2	1.2	54.5	46.4	73.9	53.9	19.5	7.5	*2)
Hori.	9920.0	43.5	33.5	38.6	7.1	32.7	-	56.5	46.5	73.9	53.9	17.4	7.4	Floor noise
Hori.	12400.0	46.6	37.0	37.9	6.1	36.7	1.2	53.9	45.5	73.9	53.9	20.0	8.4	*2)
Hori.	14880.0	46.8	36.8	39.1	6.7	37.5	-	55.1	45.1	73.9	53.9	18.8	8.8	Floor noise
Hori.	17360.0	46.4	36.4	39.9	7.4	38.4	-	55.2	45.2	73.9	53.9	18.7	8.7	Floor noise
Vert.	2483.5	51.9	40.2	27.7	3.0	31.9	1.2	50.7	40.2	73.9	53.9	23.2	13.7	*1)
Vert.	4960.0	43.0	33.1	31.7	5.2	30.9	1.2	49.0	40.2	73.9	53.9	24.9	13.7	*2)
Vert.	7440.0	44.6	34.6	36.7	6.4	32.2	1.2	55.4	46.6	73.9	53.9	18.5	7.3	*2)
Vert.	9920.0	43.2	33.2	38.6	7.1	32.7	-	56.2	46.2	73.9	53.9	17.8	7.7	Floor noise
Vert.	12400.0	46.6	37.3	37.9	6.1	36.7	1.2	54.0	45.8	73.9	53.9	19.9	8.1	*2)
Vert.	14880.0	46.8	37.1	39.1	6.7	37.5	-	55.1	45.4	73.9	53.9	18.8	8.5	Floor noise
Vert.	17360.0	47.2	36.6	39.9	7.4	38.4	-	56.0	45.4	73.9	53.9	17.9	8.5	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.

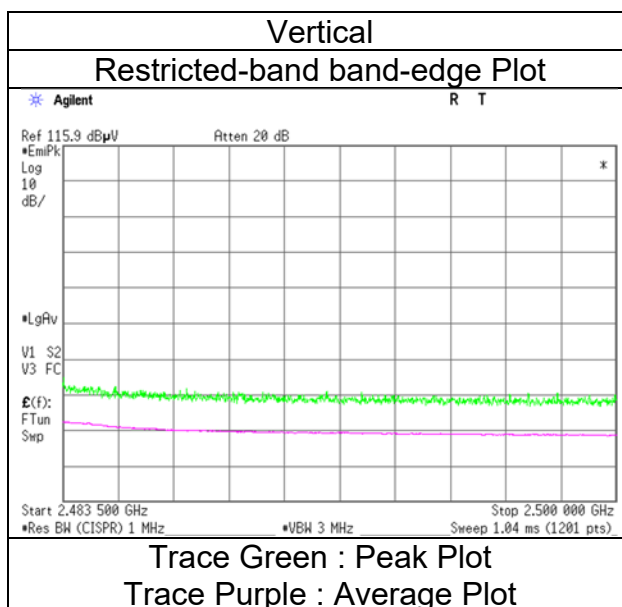
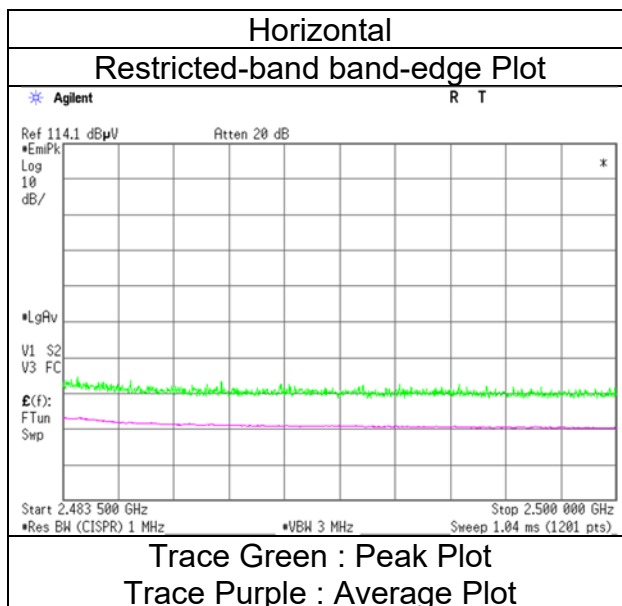
*1) Not Out of Band emission(Leakage Power)

*2) Noise synchronized with duty of carrier frequency

Distance factor: 18 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission (Reference Plot for band-edge)

Mode	Tx, Hopping Off, DH5, 2480 MHz				
Date	Test site	Temperature	Humidity	Engineer	Measurement Range
May 7, 2025	SAC4	22 deg. C	52 % RH	Daiki Matsui	1 GHz to 10 GHz



* 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

Mode	Tx, Hopping Off, 3DH5, 2402 MHz				
Date	Test site	Temperature	Humidity	Engineer	Measurement Range
May 7, 2025	SAC4	22 deg. C	52 % RH	Daiki Matsui	1 GHz to 10 GHz
May 7, 2025	SAC4	22 deg. C	64 % RH	Daiki Matsui	Above 10 GHz

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	44.5	32.1	27.8	3.0	32.0	1.2	43.3	32.0	73.9	53.9	30.7	21.9	*1)
Hori.	4804.0	42.8	32.9	31.5	5.2	31.0	-	48.5	38.6	73.9	53.9	25.4	15.3	Floor noise
Hori.	7206.0	44.3	33.6	36.4	6.4	32.1	-	54.9	44.3	73.9	53.9	19.0	9.6	Floor noise
Hori.	9608.0	43.6	33.4	38.1	7.0	32.5	-	56.2	46.0	73.9	53.9	17.7	7.9	Floor noise
Hori.	12010.0	45.1	35.9	38.2	6.0	36.6	-	52.8	43.5	73.9	53.9	21.1	10.4	Floor noise
Hori.	14412.0	47.2	37.1	38.9	6.6	37.3	-	55.4	45.3	73.9	53.9	18.5	8.6	Floor noise
Hori.	16814.0	46.4	37.2	39.2	7.2	38.4	-	54.4	45.2	73.9	53.9	19.5	8.7	Floor noise
Vert.	2390.0	46.7	36.1	27.8	3.0	32.0	1.2	45.5	36.0	73.9	53.9	28.4	17.9	*1)
Vert.	4804.0	43.2	32.6	31.5	5.2	31.0	-	48.8	38.2	73.9	53.9	25.1	15.7	Floor noise
Vert.	7206.0	43.6	33.9	36.4	6.4	32.1	-	54.3	44.6	73.9	53.9	19.6	9.3	Floor noise
Vert.	9608.0	43.6	33.3	38.1	7.0	32.5	-	56.3	45.9	73.9	53.9	17.7	8.0	Floor noise
Vert.	12010.0	46.2	35.8	38.2	6.0	36.6	-	53.8	43.5	73.9	53.9	20.1	10.4	Floor noise
Vert.	14412.0	46.2	37.1	38.9	6.6	37.3	-	54.4	45.3	73.9	53.9	19.5	8.6	Floor noise
Vert.	16814.0	47.2	37.6	39.2	7.2	38.4	-	55.2	45.6	73.9	53.9	18.7	8.3	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.
*1) Not Out of Band emission(Leakage Power)

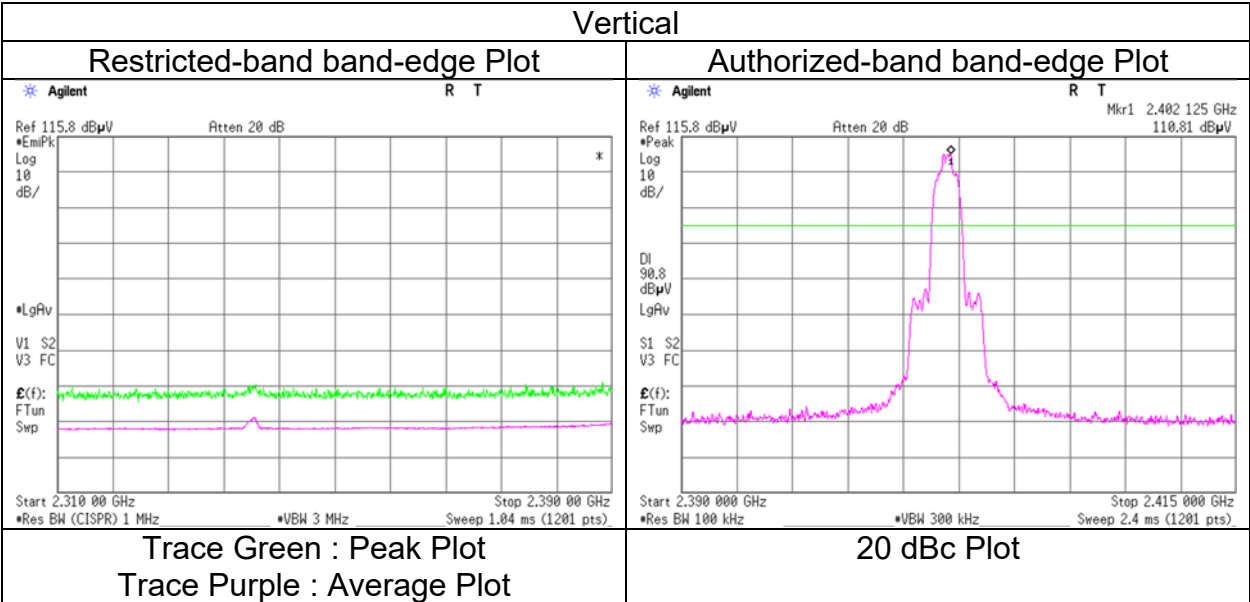
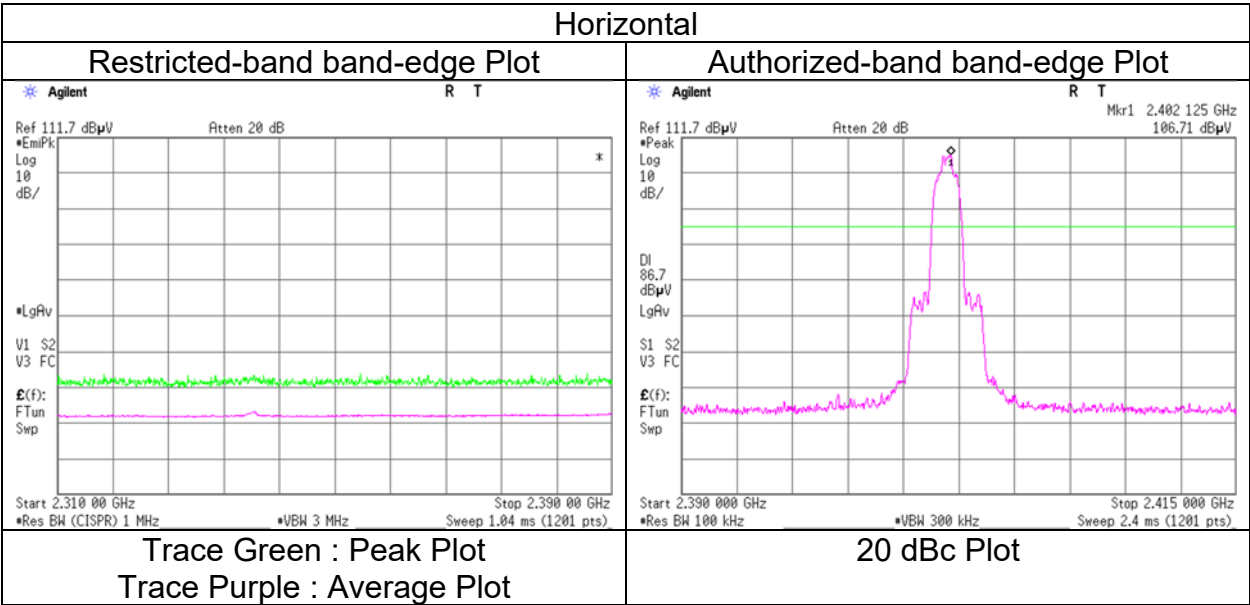
20dBc Data Sheet

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	106.7	27.7	3.0	31.9	105.5	-	-	Carrier
Hori.	2400.0	45.5	27.8	3.0	31.9	44.2	85.5	41.2	
Vert.	2402.0	110.8	27.7	3.0	31.9	109.6	-	-	Carrier
Vert.	2400.0	49.4	27.8	3.0	31.9	48.2	89.6	41.4	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
Distance factor: 18 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Mode	Tx, Hopping Off, 3DH5, 2402 MHz				
Date	Test site	Temperature	Humidity	Engineer	Measurement Range
May 7, 2025	SAC4	22 deg. C	52 % RH	Daiki Matsui	1 GHz to 10 GHz



* 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

Mode	Tx, Hopping Off, 3DH5, 2441 MHz
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Date	Test site	Temperature	Humidity	Engineer	Measurement Range
May 7, 2025	SAC4	22 deg. C	52 % RH	Daiki Matsui	1 GHz to 10 GHz
May 7, 2025	SAC4	22 deg. C	64 % RH	Daiki Matsui	Above 10 GHz

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	32.3	31.6	5.2	31.0	-	48.0	38.1	73.9	53.9	25.9	15.8	Floor noise
Hori.	7323.0	43.8	33.6	36.5	6.4	32.2	-	54.6	44.3	73.9	53.9	19.3	9.6	Floor noise
Hori.	9764.0	43.0	33.7	38.5	7.1	32.6	-	56.0	46.6	73.9	53.9	17.9	7.3	Floor noise
Hori.	12205.0	45.9	35.9	38.2	6.1	36.6	-	53.5	43.6	73.9	53.9	20.4	10.3	Floor noise
Hori.	14646.0	46.0	36.8	39.1	6.6	37.4	-	54.3	45.1	73.9	53.9	19.6	8.8	Floor noise
Hori.	17087.0	46.1	36.9	39.3	7.2	38.4	-	54.2	45.0	73.9	53.9	19.7	8.9	Floor noise
Vert.	4882.0	42.1	32.4	31.6	5.2	31.0	-	47.8	38.2	73.9	53.9	26.1	15.7	Floor noise
Vert.	7323.0	44.1	33.6	36.5	6.4	32.2	-	54.8	44.3	73.9	53.9	19.1	9.6	Floor noise
Vert.	9764.0	42.7	33.3	38.5	7.1	32.6	-	55.7	46.2	73.9	53.9	18.2	7.7	Floor noise
Vert.	12205.0	45.3	36.2	38.2	6.1	36.6	-	52.9	43.8	73.9	53.9	21.0	10.1	Floor noise
Vert.	14646.0	46.1	36.7	39.1	6.6	37.4	-	54.4	45.0	73.9	53.9	19.5	8.9	Floor noise
Vert.	17087.0	46.1	37.0	39.3	7.2	38.4	-	54.2	45.1	73.9	53.9	19.7	8.8	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: 18 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission

Mode	Tx, Hopping Off, 3DH5, 2480 MHz
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Date	Test site	Temperature	Humidity	Engineer	Measurement Range
May 7, 2025	SAC4	22 deg. C	52 % RH	Daiki Matsui	1 GHz to 10 GHz
May 7, 2025	SAC4	22 deg. C	64 % RH	Daiki Matsui	Above 10 GHz

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	48.9	37.7	27.7	3.0	31.9	1.2	47.7	37.7	73.9	53.9	26.2	16.2	*1)
Hori.	4960.0	43.2	32.7	31.7	5.2	30.9	-	49.2	38.7	73.9	53.9	24.7	15.2	Floor noise
Hori.	7440.0	43.0	33.7	36.7	6.4	32.2	-	53.8	44.5	73.9	53.9	20.1	9.4	Floor noise
Hori.	9920.0	43.9	33.5	38.6	7.1	32.7	-	56.9	46.5	73.9	53.9	17.0	7.4	Floor noise
Hori.	12400.0	46.4	36.7	37.9	6.1	36.7	-	53.7	44.1	73.9	53.9	20.2	9.8	Floor noise
Hori.	14880.0	46.5	36.9	39.1	6.7	37.5	-	54.8	45.2	73.9	53.9	19.2	8.7	Floor noise
Hori.	17360.0	46.2	36.7	39.9	7.4	38.4	-	55.0	45.5	73.9	53.9	18.9	8.4	Floor noise
Vert.	2483.5	49.8	38.7	27.7	3.0	31.9	1.2	48.6	38.6	73.9	53.9	25.3	15.3	*1)
Vert.	4960.0	42.3	32.5	31.7	5.2	30.9	-	48.3	38.5	73.9	53.9	25.6	15.4	Floor noise
Vert.	7440.0	43.8	33.7	36.7	6.4	32.2	-	54.6	44.5	73.9	53.9	19.3	9.5	Floor noise
Vert.	9920.0	43.5	33.5	38.6	7.1	32.7	-	56.5	46.5	73.9	53.9	17.4	7.4	Floor noise
Vert.	12400.0	45.7	36.1	37.9	6.1	36.7	-	53.1	43.5	73.9	53.9	20.8	10.4	Floor noise
Vert.	14880.0	46.0	37.1	39.1	6.7	37.5	-	54.3	45.4	73.9	53.9	19.6	8.5	Floor noise
Vert.	17360.0	46.4	36.9	39.9	7.4	38.4	-	55.2	45.7	73.9	53.9	18.7	8.2	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).

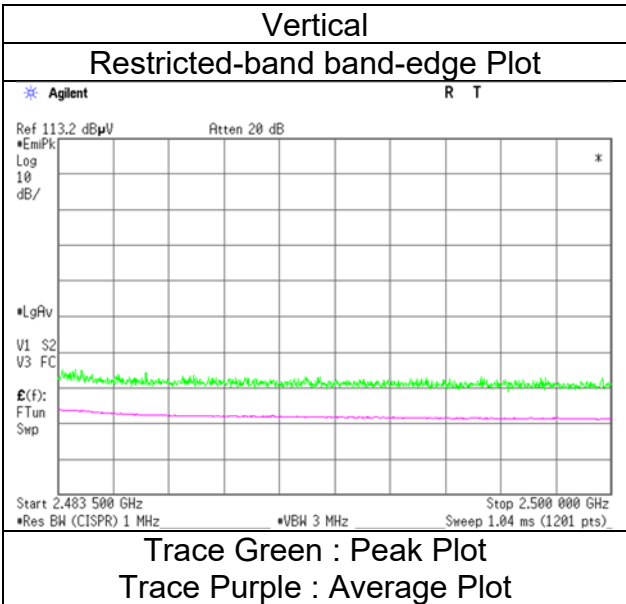
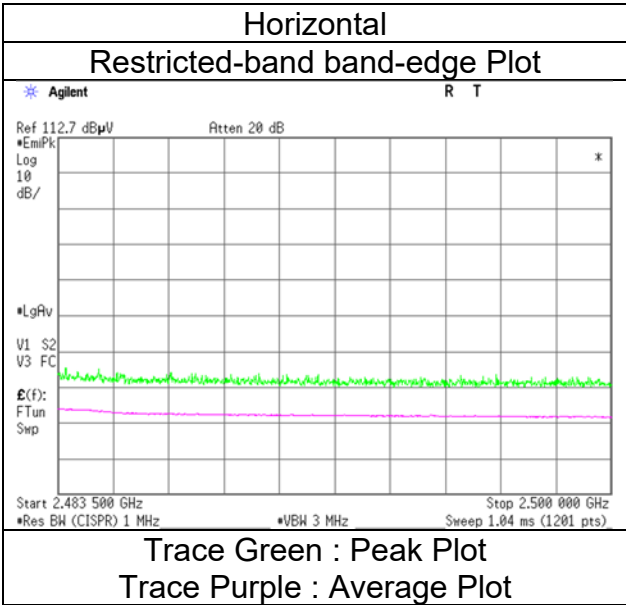
*QP detector was used up to 1GHz.

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

Distance factor: 18 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)

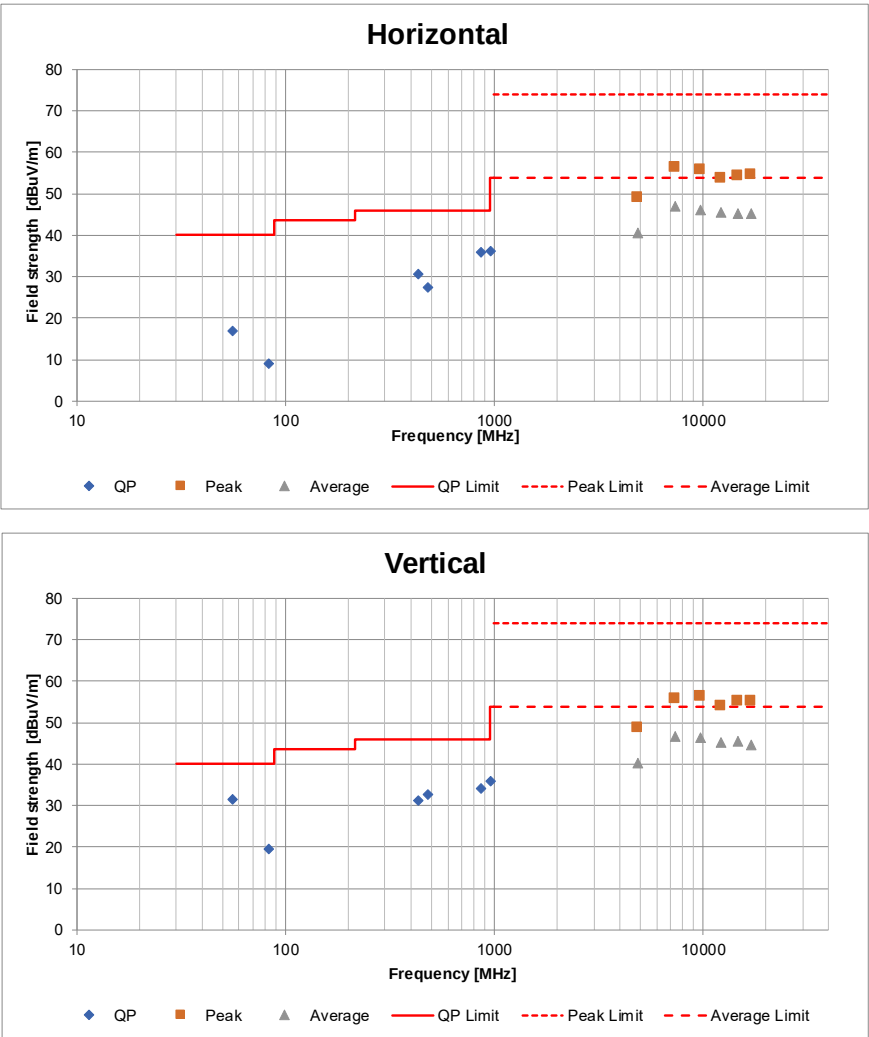
Mode	Tx, Hopping Off, 3DH5, 2480 MHz				
Date	Test site	Temperature	Humidity	Engineer	Measurement Range
May 7, 2025	SAC4	22 deg. C	52 % RH	Daiki Matsui	1 GHz to 10 GHz



* 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)

Mode	Tx, Hopping Off, DH5, 2441 MHz				
Date	Test site	Temperature	Humidity	Engineer	Measurement Range
May 7, 2025	SAC4	22 deg. C	52 % RH	Daiki Matsui	1 GHz to 10 GHz
May 7, 2025	SAC4	22 deg. C	64 % RH	Daiki Matsui	Above 10 GHz
May 14, 2025	SAC2	23 deg. C	50 % RH	Yuta Moriya	Below 1 GHz

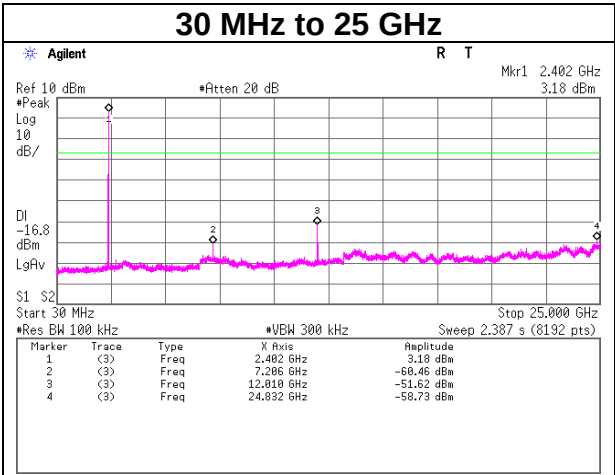
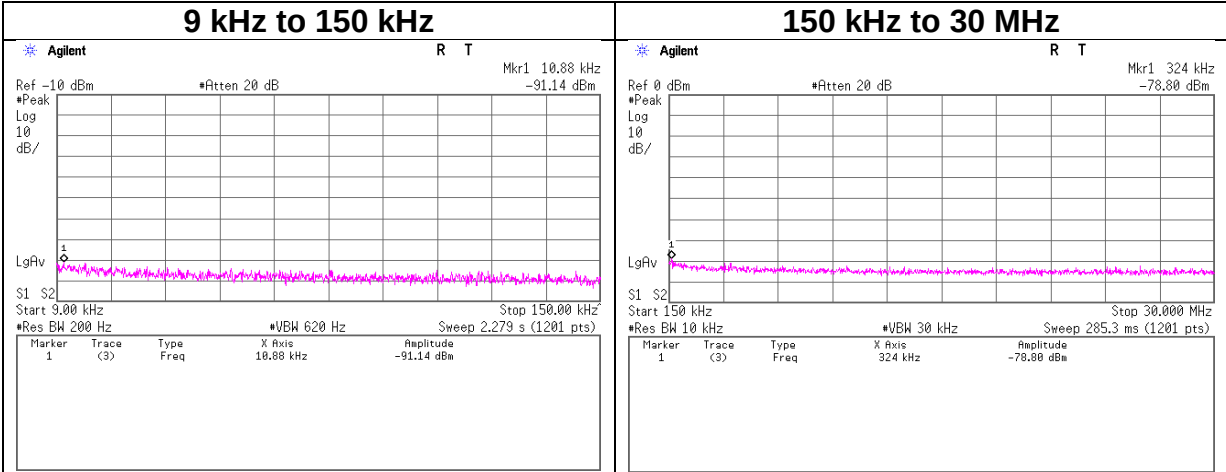


*These plots data contain sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission

Mode	Tx, Hopping Off, DH5			
Date	Test site	Temperature	Humidity	Engineer
May 9, 2025	MR6	24 deg. C	50 % RH	Takafumi Noguchi

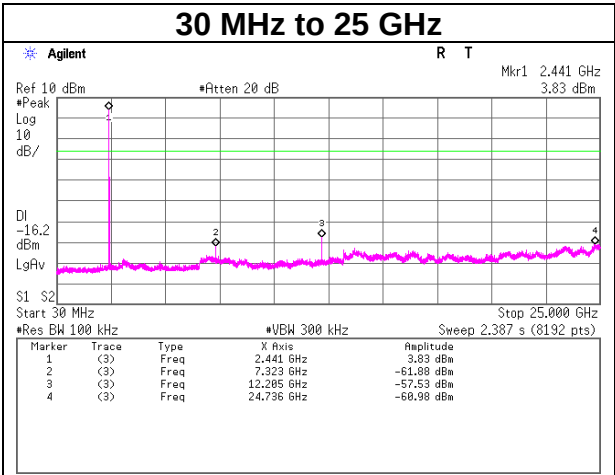
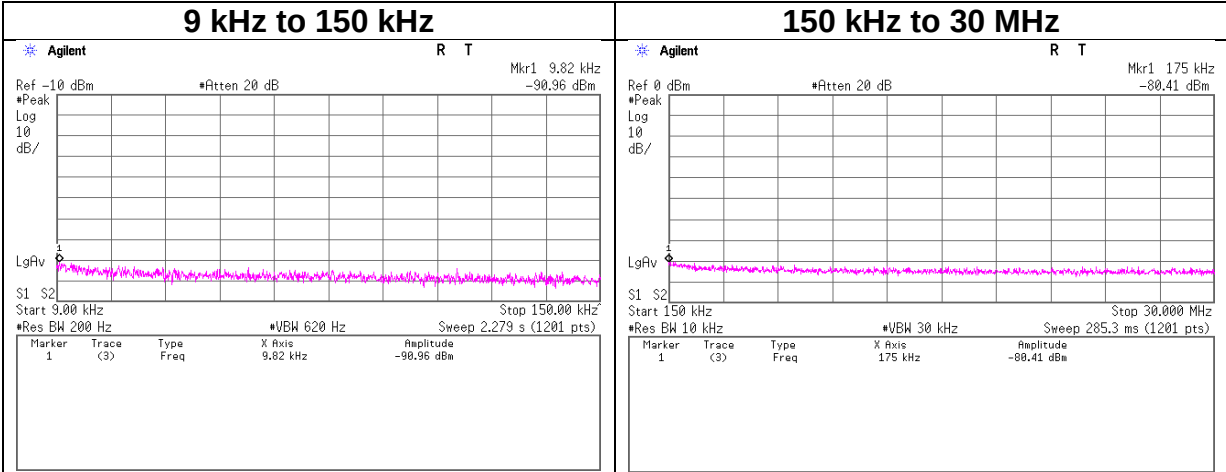
2402 MHz



Conducted Spurious Emission

Mode	Tx, Hopping Off, DH5			
Date	Test site	Temperature	Humidity	Engineer
May 9, 2025	MR6	24 deg. C	50 % RH	Takafumi Noguchi

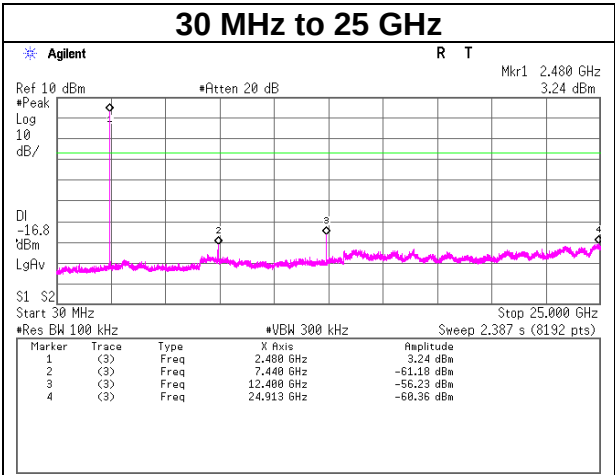
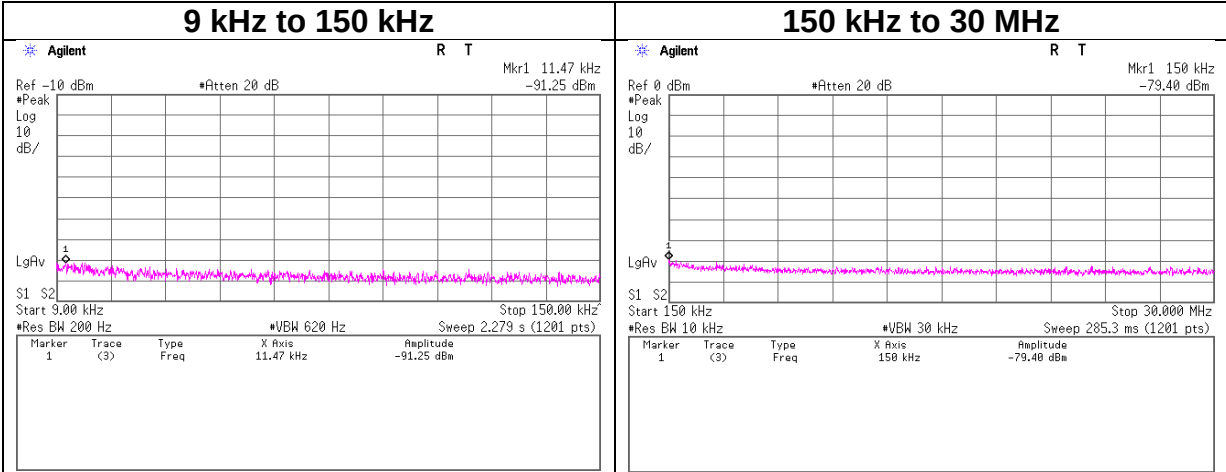
2441 MHz



Conducted Spurious Emission

Mode	Tx, Hopping Off, DH5			
Date	Test site	Temperature	Humidity	Engineer
May 9, 2025	MR6	24 deg. C	50 % RH	Takafumi Noguchi

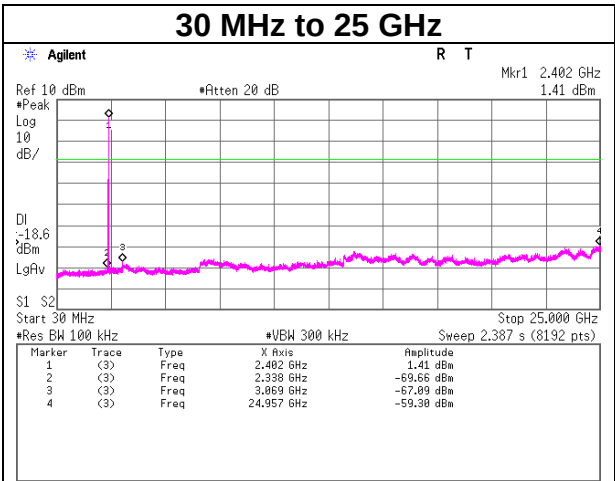
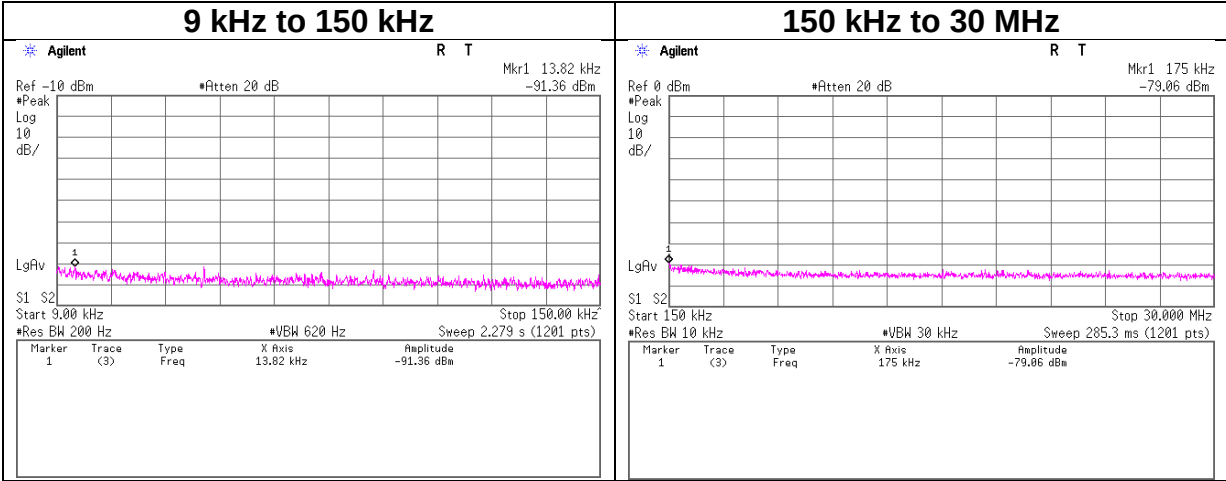
2480 MHz



Conducted Spurious Emission

Mode	Tx, Hopping Off, 3DH5			
Date	Test site	Temperature	Humidity	Engineer
May 9, 2025	MR6	24 deg. C	50 % RH	Takafumi Noguchi

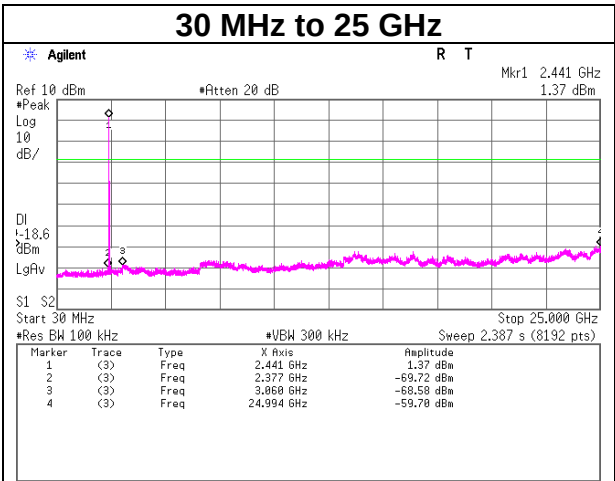
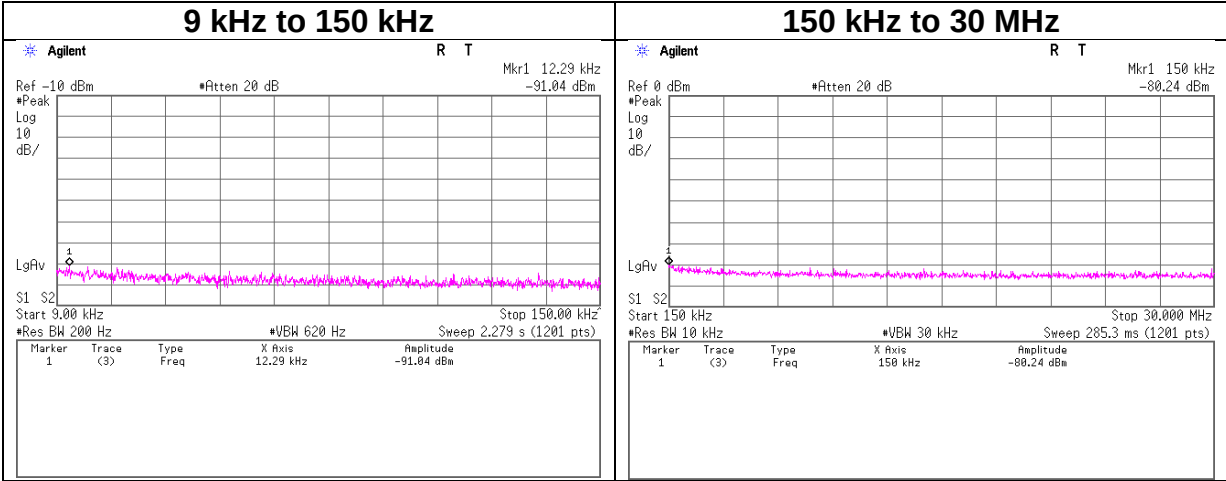
2402 MHz



Conducted Spurious Emission

Mode	Tx, Hopping Off, 3DH5			
Date	Test site	Temperature	Humidity	Engineer
May 9, 2025	MR6	24 deg. C	50 % RH	Takafumi Noguchi

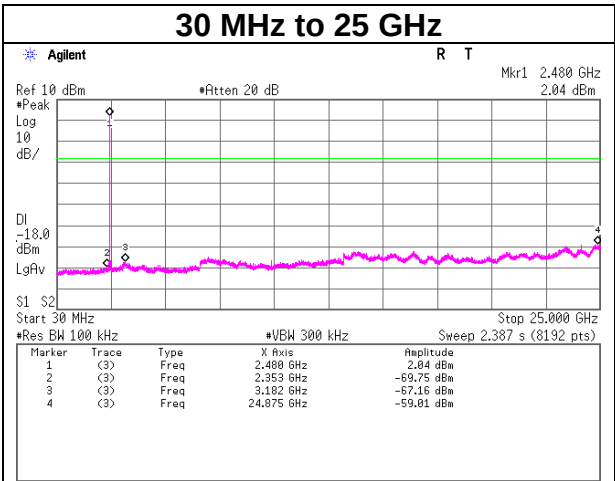
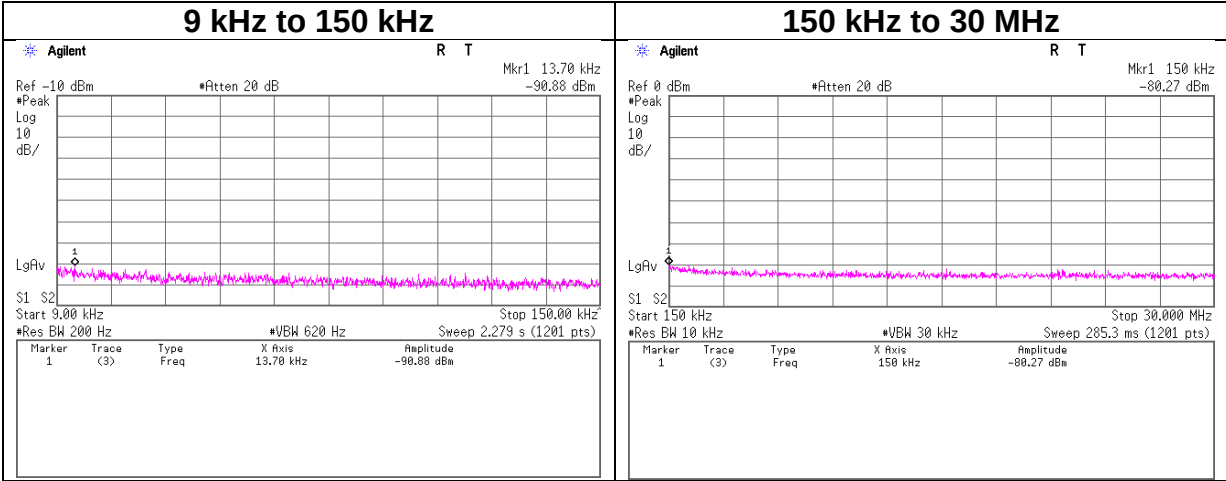
2441 MHz



Conducted Spurious Emission

Mode	Tx, Hopping Off, 3DH5			
Date	Test site	Temperature	Humidity	Engineer
May 9, 2025	MR6	24 deg. C	50 % RH	Takafumi Noguchi

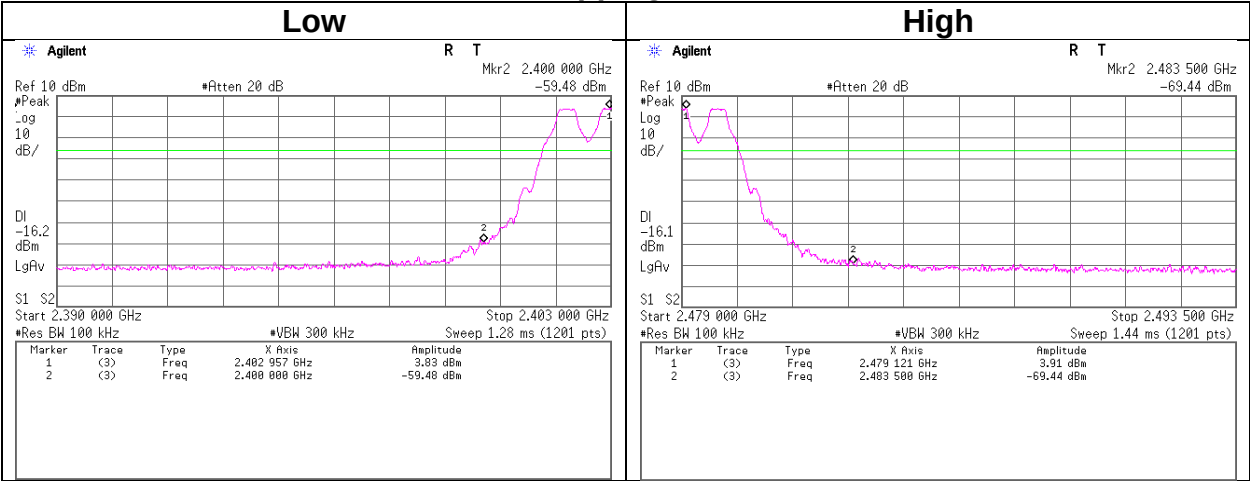
2480 MHz



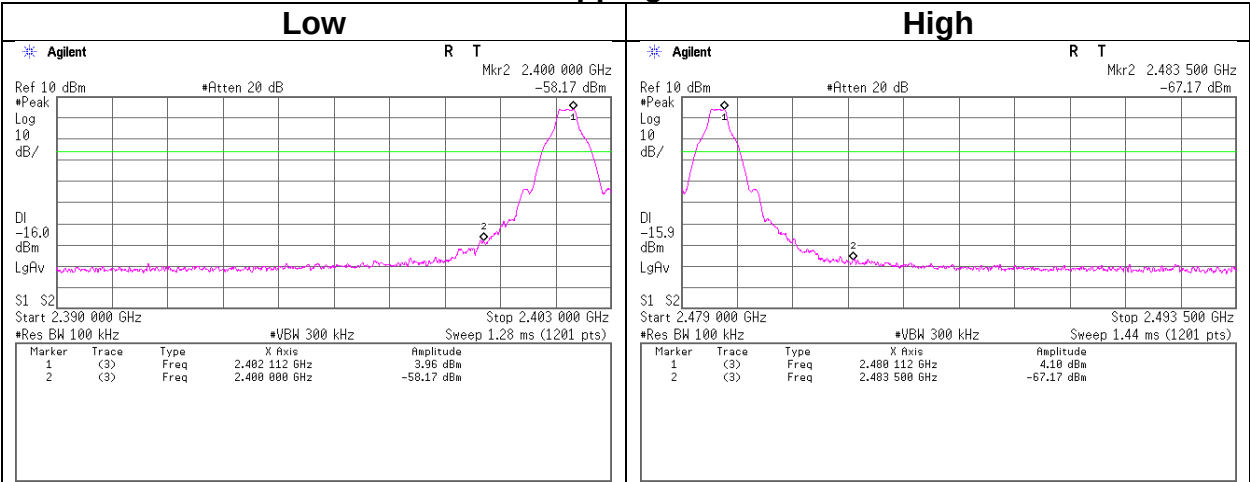
Conducted Emission Band Edge compliance

Mode	Tx DH5			
Date	Test site	Temperature	Humidity	Engineer
May 9, 2025	MR6	24 deg. C	50 % RH	Takafumi Noguchi

Hopping On



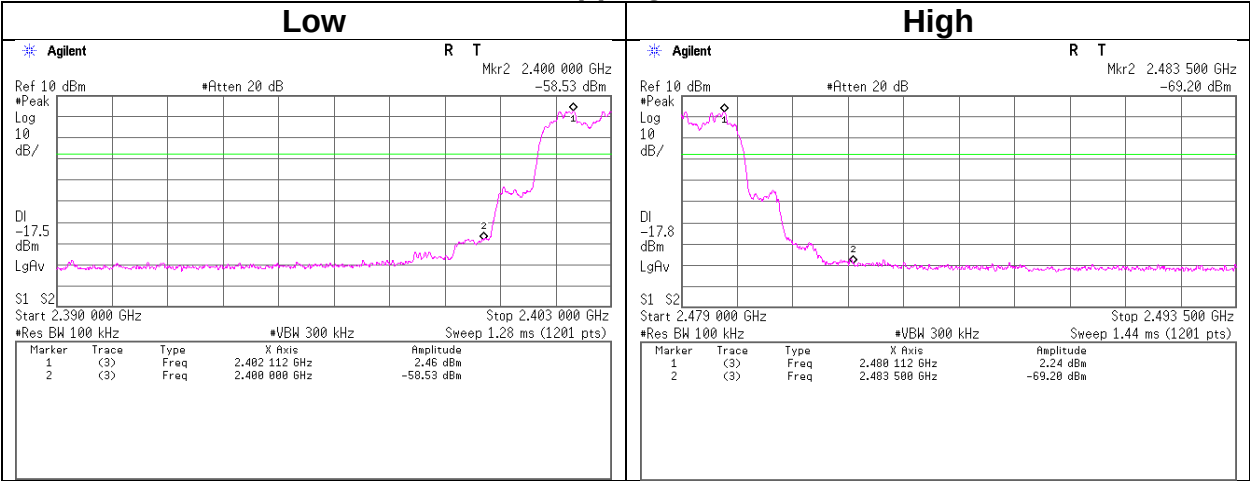
Hopping Off



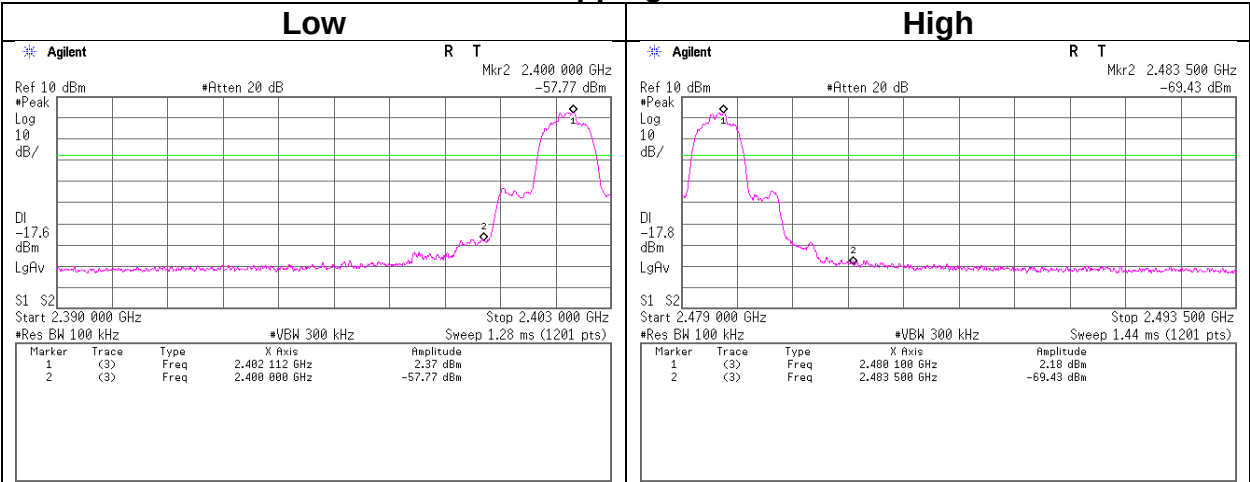
Conducted Emission Band Edge compliance

Mode	Tx 3DH5			
Date	Test site	Temperature	Humidity	Engineer
May 9, 2025	MR6	24 deg. C	50 % RH	Takafumi Noguchi

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	141156	Attenuator(10dB)	Weinschel Corp	2	BL1173	11/11/2024	12
AT	141269	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	03/03/2025	12
AT	141414	Microwave Cable	Junkosha	MWX221	1207S407	07/04/2025	12
AT	141558	Digital Tester(TRUE RMS MULTIMETER)	Fluke Corporation	115	17930030	05/13/2025	12
AT	141805	Power Meter	Anritsu Corporation	ML2495A	6K00003338	08/22/2024	12
AT	141840	Power sensor	Anritsu Corporation	MA2411B	011737	08/22/2024	12
AT	141884	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY44020357	05/15/2025	12
AT	142820	Terminator	Baumer	50 Ω SMA	-	-	-
AT	142822	Terminator	Mini-Circuits	ANNE-50X+	MUU3460140	-	-
AT	195231	Microwave Cable	Huber+Suhner	SF102D/11PC24/11 PC24/1000mm	537062/126E	02/19/2025	12
AT	244712	Thermo-Hygrometer	HIOKI E. E. CORPORATION	LR5001	231202106	01/19/2025	12
AT	248893	Attenuator	Weinschel Associates	WA56-10-1112	2	05/21/2025	12
CE	141216	Coaxial cable	Fujikura/Suhner/TSJ	5D- 2W/SFM14/sucofor m141-PE/421- 010/RFM-E321(SW)	-/00640	07/04/2025	12
CE	141248	Attenuator	JFW Industries, Inc.	50FP-013H2 N	-	12/03/2024	12
CE	141358	LISN(AMN)	Schwarzbeck Mess- Elektronik OHG	NSLK8127	8127-730	07/03/2025	12
CE	141532	DIGITAL HiTESTER	HIOKI E. E. CORPORATION	3805	051201197	01/16/2025	12
CE	141949	Test Receiver	Rohde & Schwarz	ESCI	100767	06/30/2025	12
CE	142008	AC3_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	07/09/2025	24
CE	142183	Measure	KOMELON	KMC-36	-	10/21/2024	12
CE	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
CE	244709	Thermo-Hygrometer	HIOKI E. E. CORPORATION	LR5001	231202103	01/19/2025	12
RE	141265	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess- Elektronik OHG	VUSLP9111B	9111B-190	07/22/2025	12
RE	141296	High Pass Filter 3.5-18.0GHz	UL-ISE	HPF SELECTOR	002	09/11/2024	12
RE	141317	Coaxial Cable	UL-ISE	-	-	09/11/2024	12
RE	141331	Attenuator(6dB)	TME	UFA-01	-	02/19/2025	12
RE	141427	Biconical Antenna	Schwarzbeck Mess- Elektronik OHG	VHA9103B+BBA910 6	08031	07/22/2025	12
RE	141506	Horn Antenna 15-40GHz	Schwarzbeck Mess- Elektronik OHG	BBHA9170	BBHA9170307	08/07/2024	12
RE	141508	Horn Antenna 1-18GHz	Schwarzbeck Mess- Elektronik OHG	BBHA9120D	557	05/20/2025	12
RE	141542	Digital Tester	Fluke Corporation	FLUKE 26-3	78030611	08/01/2025	12
RE	141545	DIGITAL HiTESTER	HIOKI E. E. CORPORATION	3805	51201148	02/25/2025	12
RE	141581	MicroWave System Amplifier	Keysight Technologies Inc	83017A	00650	10/30/2024	12
RE	141594	Pre Amplifier	Keysight Technologies Inc	8447D	2944A10150	02/19/2025	12
RE	141855	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46187750	11/14/2024	12
RE	141900	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46185823	11/13/2024	12
RE	141951	EMI Test Receiver	Rohde & Schwarz	ESR26	101408	05/07/2025	12
RE	142004	AC2_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	07/08/2025	24
RE	142017	AC4_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-10005	04/17/2025	24
RE	142228	Measure, Tape, Steel	KOMELON	KMC-36	-	-	-
RE	142230	Measure, Tape, Steel	KOMELON	KMC-36	-	-	-
RE	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	237927	Broadband Amplifier	ERAVANT	SBB-0115033218- 2F2F-E3	27554-01	07/02/2025	12

Test Equipment (2/2)

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	244707	Thermo-Hygrometer	HIOKI E. E. CORPORATION	LR5001	231202102	01/19/2025	12
RE	244710	Thermo-Hygrometer	HIOKI E. E. CORPORATION	LR5001	231202104	01/19/2025	12
RE	245788	Double Ridge Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA 9120 C	690	03/11/2025	12
RE	246002	Microwave Cable	Huber+Suhner	SF103/11PC35/11P C35/1000mm / SF126E/5000mm	800674(1m) / 610205(5m)	03/18/2025	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